Introduction to Payments for Ecosystem Services

A Reference Book for Uganda

FOREST TRENDS

the katoomba group

2011

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Introduction to Payments for Ecosystem Services:

A Reference Book for Uganda

Prepared by Forest Trends & The Katoomba Group for
The Government of Uganda's National Environment Management Authority (NEMA)

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PREFACE

Ecosystems provide services that sustain life. Forests and wetlands, for example, contribute to climate regulation, purify and deliver reliable flows of water, as well as support plants and animals upon which humans rely for sources of food and fuel.

If nature did not provide these services, then we would need to spend billions of dollars developing the infrastructure to accomplish what ecosystems do for free—if we were able to replace them at all. Yet, today, over 60% of ecosystem functions around the world are being degraded faster than they can recover. It is clear that for ecosystem services to be maintained, stewardship needs to become as, or more, profitable than alternative land uses.

Concern has led to innovation. Environmental markets—such as regulatory and voluntary carbon markets—and payments for ecosystem services (PES) are giving value to carbon storage, flood protection, as well as clean, reliable flows of water and other ecosystem services. The result is that formal environmental markets now exist and self-organized "payments for ecosystem services" are increasingly emerging.

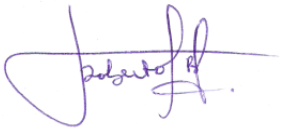
Within all of these environmental markets and PES transactions, contractual agreements are made between individuals (or groups of people) who engage in natural resource management practices that restore or maintain the flows of ecosystem services. The key characteristic of these transactions is a focus on maintaining a specified ecological service, such as clean water or carbon sequestration. In order to ensure that the ecological services are indeed maintained – as buyers expect for their money – the transactions may require regular, independent verification of sellers' actions and effects on the resources. Overall, the key attributes of these transactions are that sellers maintain specific ecological structures and functions, and remain accountable that the "service" being paid for is indeed being delivered.

As environmental markets and PES gain international attention, there is increasing demand for training - both as an introduction to the concepts as well as a 'primer' for technical applications. In order to address this demand for capacity building materials, Forest Trends and the Katoomba Group—in collaboration with The National Environment Management Authority of Uganda and the Chimpanzee Sanctuary & Wildlife Conservation Trust - has developed a series of training modules for specific audiences that are scalable as short or longer sessions. We are also grateful to other fiscal sponsors including USAID's TransLinks projects, the Gordon and Betty Moore Foundation, the Norwegian Agency for Development Cooperation (Norad), and the United Nations Development Program through the Global Environmental Facility.

The purpose of this manual is to introduce the basic concepts related to payments for ecosystem services in a clear and accessible manner. The Annex also presents concepts related to climate change and forest carbon markets.

Our hope is that this information will enable community leaders, government actors, NGO technical staff, and other interested persons to make informed decisions about, and, if desired, to participate in PES agreements, as well as in forums and policies that build and define the new ecosystem services markets.

Michael B. Jenkins
President
Forest Trends



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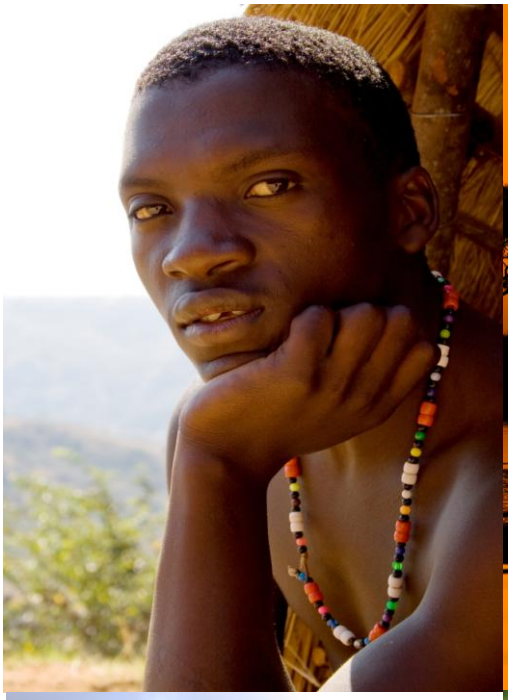
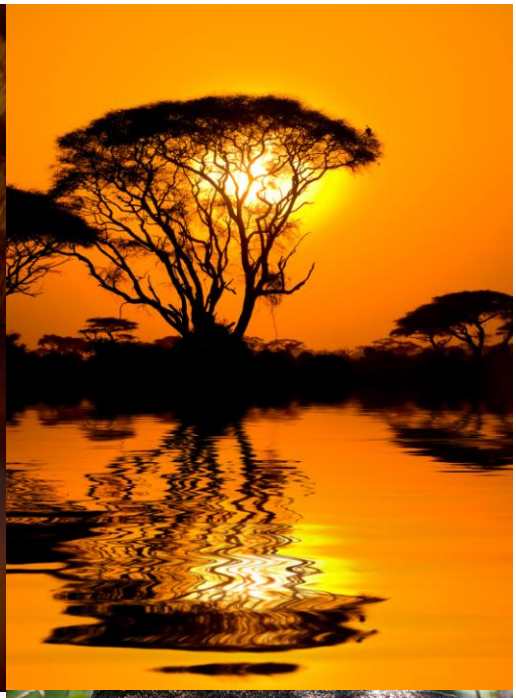




I. BACKGROUND: ECOSYSTEMS AND ECOSYSTEM SERVICES

Well-functioning ecosystems provide a wide range of services which are essential for society and people, delivering benefits such as soil fertility essential for food production, flows of reliable clean water, relatively predictable local climate, among other items. These benefits are known as **ecosystem** or **environmental services**.

Unfortunately human activity is straining ecosystems to the point where some of these support services are beginning to falter. Watersheds scoured of vegetation by deforestation are losing their ability to filter water, wetlands destroyed for housing are no longer able to control floodwaters when heavy rains hit, and the loss of natural habitat is causing the decline of wild pollinators essential for agriculture. Perhaps most perilous of all, the global temperature is fluctuating (fueling extreme weather events) as forests and oceans lose their ability to absorb heat-trapping gases.

An **ecosystem** is a biological environment and all of the organisms that live there, including both living and non-living components. A key characteristic of an ecosystem is the exchange of energy between the medium and its habitants. An ecosystem can vary between a small area, a municipality, and large areas of plants. Coral reefs, forests, deserts and tundra are all examples of ecosystems.

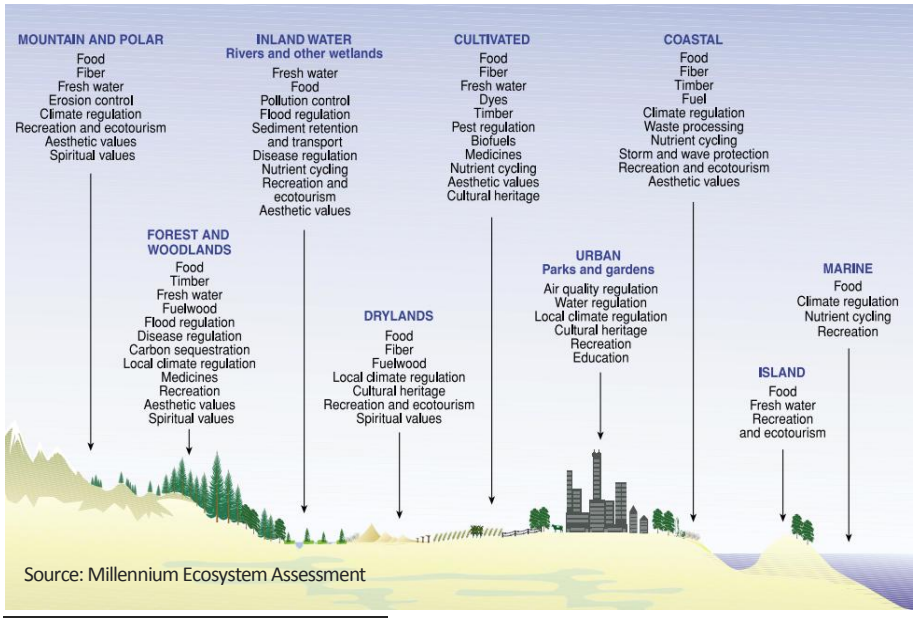
In Uganda, there are several distinct ecosystem types:

- shrub lands, savannah and grasslands (covering 44% of the country)
- cropland/natural vegetation mixture (35%)
- wetlands and water bodies (16%)
- forests (4%)
- barren or with sparse vegetation (1%)

Source: Wong, C, Roy M and Duraiappah AK. 2005. Connecting poverty and ecosystem services: A series of seven country scoping studies. Focus on Uganda. Nairobi, Kenya: UNEP and IISD.

There is a growing global awareness of the services that natural ecosystems provide. The value of these ecosystem services and the long term costs of their loss, however, are rarely taken into account in decisions about how natural resources are used. Because day-to-day management decisions often focus on short-term financial returns, the ecosystems that provide these services are often degraded, sometimes in ways that irreparably reduce ecosystem service provision.[1]

The degradation of these ecosystems and the services that they provide creates greater hardship for the rural poor – at times being the principal factor causing rural poverty and social conflict. For sub-Saharan Africa especially, improving the condition and management of ecosystem services is an essential component to reducing poverty.[2]



Source: Millennium Ecosystem Assessment

Some of the ecosystem services upon which we all rely include:

- climate regulation,
- nutrient cycling,
- maintenance of water quality and supply,
- food, fiber and fuel provision,
- pollination, and
- cultural services.

[1] Herbert, T, R Vonada, M Jenkins and R Bayon. 2010. Environmental *Funds and Payments for Ecosystem Services*. Rio de Janeiro: RedLAC. http://www.forest-trends.org/documents/files/doc_2627.pdf

[2] Millennium Ecosystem Assessment. 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington DC.

Each ecosystem service is laid out below, with a brief explanation.

Climate Regulation

We all need oxygen to breathe. And we need to live in an atmosphere that does not have too much carbon dioxide. Plants are an important element in this dynamic. Specifically, plants and trees are able to absorb carbon that is present in the atmosphere - an extremely important process because carbon is a greenhouse gas partially responsible for climate change and global warming.

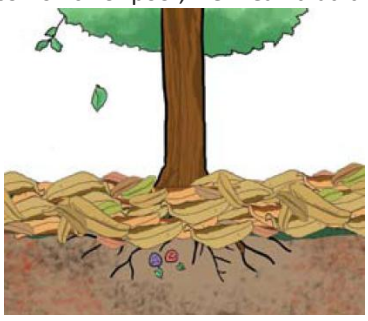
Climate change is the alteration of the climate of the Earth including the warming of the entire planet or specific regions, the increase or reductions in rains in certain geographic areas, and the shift of some seasons (for example, the dry season begins later in the year). These changes are not the same across the whole planet – some regions will receive more rain than historically fell, while other areas will experience droughts. **Global warming** refers to an increase in the average temperature of the entire planet.

Forests in particular have a key role in "carbon storage." It is important to mention here that the term "carbon" is used as shorthand when discussing carbon dioxide – the actual greenhouse gas with which we are concerned. In total, the planet's tropical forests absorb approximately 1.8 billion metric tons of carbon per year, storing ¼ of the world's greenhouse gas emissions in their woods and soil.[3] When tropical forests are cleared, however, the carbon that was stored in the trees is released into the atmosphere, adding to global emissions of greenhouse gases and contributing to climate change. Depending on how they are managed, therefore, forests can become either **carbon sinks** (a term used to describe systems that absorb carbon from the atmosphere) or carbon sources when they are cleared.

It is noteworthy that forests are not the only carbon sinks. Carbon is also absorbed into the soil and oceans. Certain agricultural practices, such as using no-till agriculture and grazing land management lead to increased carbon dioxide storage in the soils.

Nutrient Cycling

Ecosystems also have an important function in the protection of soils and nutrient cycling. Nutrients are chemical substances that are like vitamins and help plants grow. When we say that a particular soil is rich or poor, we mean that it has many or very few nutrients, respectively. As farmers know, soil nutrients relate directly to agricultural productivity. More soil nutrients, with the appropriate water, sun and other conditions, usually leads to greater crop production.[4]



As plants grow, they absorb the nutrients from the soil and store them in their leaves, stems and flowers. When these parts fall to the ground, they start to decompose and the nutrients that were stored there are released and reincorporated into the soil by

[4] Campos, MT. (2009) Aprendendo sobre Serviços Ambientais. Washington DC: Forest Trends.

rainfall and earthworms. The same process also occurs with dead animals and insects, and all of these nutrients are then available for other plants.

Therefore, nutrient cycling increases the quality of the soil and is regarded as a service provide to the environment. Without nutrient cycling, the soil begins to lose nutrients and the land loses its production capacity. When we let land rest or lie fallow for a time, the land is able to reestablish the cycling process, increasing nutrients in the soil and allowing us to plant in the same area again.

Nearly 88% of Ugandans practice subsistence agriculture and are highly dependent on the quality of the soil. The degradation of soils can therefore have a huge impact on the availability of food across the country.[5]

Maintenance of Water Quality and Supply

Well-functioning ecosystems are commonly able to filter out pollutants such as metals, oils, excess nutrients, and sediment as water moves through wetland areas, forests, and riparian zones. This purification process provides clean drinking water and water suitable for industrial uses, recreation, and wildlife habitat.

Water filtration provides humans and animals with health benefits such as clean drinking water. The provision of water filtration by well-functioning ecosystems also provides economic benefits as it is often easier and cheaper to maintain a natural ecosystem rather than build a filtration plant. Human activities that compact the soil or contaminate water – such as paving roads or removing forest cover beside rivers – can have a significant impact on the delivery of this service.[6]

Wetland ecosystems play an indispensable role in maintaining the water supply, filtering water, providing flood control, groundwater recharge and microclimate regulation. Today, however, wetlands in Uganda are under threat mainly due to conversion and drainage for agriculture (for rice or pasture), sand-mining and clay extraction for brick-making, as well as for infrastructure development, especially near Kampala.[7] While these resource needs are understandable, the challenge remains that these land conversion processes are undercutting the natural water filtration process.

Food, Fiber and Fuel Provision

Ecosystems provide humans with the means for growing (crops) and gathering (fish, game) the foods which provide the basis for our diets. Ecosystems also provide us with firewood and charcoal as well as other sources of fuel. In Uganda, firewood, charcoal (woodfuel) and agricultural wastes are the primary source of energy.[8] The challenge is that use of firewood and charcoal are also sources of deforestation and forest degradation and other ecosystem pressures, hence the importance of continuing to explore alternative sources of fuel.[9]

Pollination

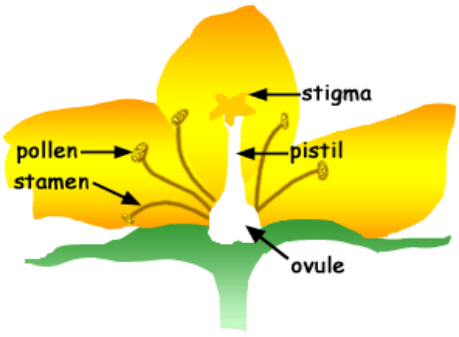
Pollination is a very important process for agriculture as well as maintaining a diverse array of plants across the landscape.

[5] Wong C, Roy M and Duraiappah AK. (2005)
[6] http://www.esa.org/ecoservices/comm/body.comm.fact.wate.html
[7] Wong C, Roy M and Duraiappah AK. (2005) Connecting poverty & ecosystem services: A series of seven country scoping studies: Focus on Uganda. Nairobi: UNEP and IISD.
[8] Wong C, Roy M and Duraiappah AK. (2005)
[9] http://news.mongabay.com/2010/0927-hance_tcs_kasagala.html

The process of pollination involves the pollen from a plant being moved from a stamen (the male part of a plant) to the stigma (the female part of the plant) in order to produce seeds. This process can be carried out by humans or natural causes such as the wind. Most often, however, bird and bee species play this role when they are searching for food like the pollen or sweet nectar in the flower. While they are eating, they unintentionally touch the stamens and some of the pollen sticks to their bodies. When they move to the next flower, the pollen can rub off onto this flower's stigma. This process allows for seeds to be formed and the plants are able to reproduce.

Pollination is extremely important for agricultural production in Uganda. More than 60% of the crop species grown in Uganda, including coffee, legumes such as beans and peas, tomatoes, mangoes, passion fruits and avocados, are likely to yield poorly without pollinators (like bees and birds) present in the farm landscapes.[10] Bees play such an important role in the pollination of coffee plants that without bees, a farmer will likely produce less than 1% of his or her potential coffee yield![11] The Food and Agricultural Organization of the United Nations estimates that the value of pollinators for East Africa is 2.5 million US dollars per year.[12]

A diversity of birds is also important for agricultural production. Birds eat many different pest species which can negatively affect crops, while also being one of the most effective mosquito repellents. [13]



Source: http://www.mbgnet.net/bioplants/pollination.html

Cultural Services

The importance of ecosystems goes far beyond its beauty and the products that it offers. Many people have a very strong cultural link with the ecosystem where they live. Many times they have developed myths, beliefs, and rituals that are associated with the environment, in addition to the traditional knowledge related to natural resources, such as the use of medicinal plants over thousands of years. The rhythm of life itself often reflects the natural environment, rainy and dry seasons and phases of the moon. The destruction of these ecosystems can affect the cultural richness of these local populations.[14]

Natural areas are often a draw for tourism or other recreation uses. When trees are cut down, watersheds are degraded or the landscape is modified, the opportunity for appreciating the scenic beauty of the environment is lost. This damage is not only detrimental to the biological organisms affected, but also to tourism and other economic benefits for the local populations and government in these regions.

Why are these ecosystem services important?

Without clean water or a source of fuel, we would not be able to survive. Unfortunately, many of these services that the environment has provided for us are under threat. In Uganda, a study prepared by the International Institute for Sustainable Development for the United Nations Environment Program[15] identified four ecosystem services as critically stressed:

- the maintenance of biodiversity
- food and fiber provision
- water supply, purification and regulation
- fuel provision

[10] Conserving Biodiversity on Farmed Landscapes of Uganda Briefing Paper. http://www.uganda-agrobiodiversity.org/documents/Agro-biodiversity%20handbook.pdf
[11] Conserving Biodiversity on Farmed Landscapes of Uganda Briefing Paper.
[12] Conserving Biodiversity on Farmed Landscapes of Uganda Briefing Paper.
[13] Conserving Biodiversity on Farmed Landscapes of Uganda Briefing Paper.
[14] Campos, MT. (2009) Aprendendo sobre Serviços Ambientais. Washington DC: Forest Trends.
[15] Wong C, Roy M and Duraiappah AK. (2005)

Throughout the country, the loss or degradation of these ecosystem services is already affecting human well-being. For instance, the service of food provision is being affected by soil degradation, drought and pest control which is leading to undernourishment, a lack of food security and low weights in children. Ecosystem service degradation is also leading to a decline in the ability of Ugandans to earn a living since the ability to produce agricultural cash crops is deteriorating. Due to wetland degradation, droughts and floods and water pollution, ecosystems are no longer able to regulate water supply and quality, leading to an increased prevalence in diarrhea as well as river blindness and a potential water shortage in the country by 2025. Deforestation is leading to biodiversity loss and wood deficits meaning that rural community residents have greater challenges in heating homes and cooking food.[16]

Below we present a table which shows the effects that ecosystem service degradation is already having on different aspects of human life across Uganda.

Ecosystem Services and Human Well-Being in Uganda

Region	Ecosystem Services Stressed	Constituents of Human Well-Being Threatened
Central	**Biodiversity loss:** mainly deforestation **Food provision:** soil degradation, drought and control of pests **Water supply, purification and regulation:** wetland degradation, low groundwater supply **Fuel (energy):** deforestation and wood deficit districts	**Adequately nourished:** almost 50 percent of children stunted and severely stunted **Adequate and clean water:** prevalence of diarrhea **Energy:** wood deficit in many regions **Ability to earn a livelihood:** incidence of poverty mainly 20-25 percent range
Eastern	**Biodiversity loss:** habitat fragmentation and land degradation **Food provision:** soil degradation, tsetse fly and control of pests **Water supply, purification and regulation:** wetland degradation, droughts and floods **Fuel (energy):** deforestation and some wood deficit districts	**Adequately nourished:** generally good insecure **Adequate and clean water:** prevalence of diarrhea **Energy:** wood deficit in a few regions **Ability to earn a livelihood:** Low – high areas poverty across districts
Northern	**Biodiversity loss:** Land degradation, overgrazing and poaching **Food provision:** Soil degradation, drought **Water supply, purification and regulation:** recurring droughts and floods **Fuel (energy):** Large number of displaced persons	**Adequately nourished:** generally food insecure, most underweight children **Adequate and clean water:** drought, least access to water; diarrhea **Energy:** woodfuel shortage in two districts **Ability to earn a livelihood:** highest incidence of poverty
Western	**Biodiversity loss:** habitat fragmentation, deforestation, hunting and poaching **Food provision:** land and soil degradation and control of pests **Water supply, purification and regulation:** wetland degradation, water pollution **Fuel (energy):** wood deficit in many districts	**Adequately nourished:** high incidence of child stunting **Adequate and clean water:** incidence of river blindness, drought, prevalence of diarrhea **Energy:** wood deficit in many districts **Ability to earn a livelihood:** lower incidence of poverty with higher pockets

Source: Wong C, Roy M and Duraiappah AK. (2005) Connecting poverty and ecosystem services: A series of seven country scoping studies Focus on Uganda. Nairobi, Kenya: IISD.

[16] Wong C, Roy M and Duraiappah AK. (2005)

II. PAYMENTS AND MARKETS FOR ECOSYSTEM SERVICES

Now that we understand the services delivered by ecosystems such as forests, grasslands, wetlands, mountains, and agricultural lands, as well as our intricate relationships with and dependencies to these services, we explore the concept of payments for ecosystem services.

For a mechanism of payment for ecosystem services to occur, at least four conditions need to be met[17]:

1. **Defined ecosystem service ("product"):** there needs to be a very well defined ecosystem service where the maintenance and/or supply can be of interest for someone. This will be the "product" which will be marketed.

2. **Buyer:** someone (one or more people, communities, companies, governments, etc.) able and willing to pay for this product. In this case, it is the conservation of the specific ecosystem service.

3. **Seller/Provider:** someone (one or more people, communities, companies, governments, etc.) receiving a financial resource, who, in exchange, must promise to maintain that ecosystem service.

4. **Voluntary**: the transaction of paying and receiving for an ecosystem service should be primarily voluntary. That is, that those involved in the transaction should participate because they want to and not because they are obligated to do so.

For more clarity, we will give an example of how this scheme can occur in practice, through an example.[18]

Imagine a city that is located near a mountain. The inhabitants of the city depend on the water from the rivers that flows down the mountain for their basic necessities like drinking, bathing, washing clothes, and other activities. On the high part of the mountain live some producers who own forests and productive systems with trees (agroforestry systems such as shade-grown carbon).

Keeping in mind that the maintenance and regulation of water quality is one of the ecosystem services, if the producers in the high regions cut the trees present upstream, this would affect the provision of high quality water for the inhabitants of the city. In this context, the people in the city may be willing to pay so that the producers who live in the high regions in the mountains can maintain, or even reforest, the region in order to maintain high water quality.

It is important to note that "payment" does not necessarily mean a cash incentive. Many people use the term "**compensation**" instead of "payment" to reflect the idea that a payment does not need to be cash, but could be a non-cash reward such as secure tenure rights, employment opportunities, economic development investments, the construction of health centers in the village, or any number of options which the community deems suitable. Throughout this manual, we use "payment for ecosystem services" to refer to both payment and compensation initiatives.

In this case, the **buyers** are those who live in the city who are paying for the **ecosystem service** of the maintenance of water quantity and quality which is provided by the forests and agroforestry systems. The **providers** are those rural producers in the mountainous region who conserve and manage the forests to allow for delivery of the ecosystem service.

Payment for ecosystem service transactions can occur in various manners including:

- **Private transactions** where the government does not participate.
    - *Using the same example, a mineral water company could pay the producers to conserve and recuperate the forests along the river. In this way, the source of water for the company to sell is guaranteed.*

- **Public schemes** where the government (local, state or national) participates in the process as a buyer or intermediary in receiving and distributing the resources,
    - *Using the example above, the city water company may pay the farmers upstream which will reduce their costs to put in a new filtration plant.*

[17] Wunder, 2005. Payments for environmental services: some nuts and bolts. CIFOR. Occasional Paper, n. 42, 24 p

[18] Example in: Campos, MT. (2009) Aprendendo sobre Serviços Ambientais. Washington DC: Forest Trends.

- **Mixed schemes** in which businesses, community members, and governments are all involved.
    - *In the same way, there could be multiple buyers – businesses and governments could both contribute to the payments and the community members would receive the payments to implement land use change in the area.*

In terms of public policies, payment for ecosystem service transactions have received growing attention recently, since they function as an incentive for the sustainable management of the natural resources and improvement in the livelihoods of the populations. This positive incentive is becoming a new way to promote the conservation and recuperation of ecosystems, complementing and reinforcing existing command and control policies.

In addition to payments for ecosystem services, there are also **markets for ecosystem services** also known as **environmental markets**. Environmental markets work like a food market – there are multiple sellers which means that buyers have a choice from whom to purchase a particular service and can lead to greater competition between sellers.

The most common types of environmental markets are related to:

1. **Climate regulation and carbon sequestration services**, which may be sold in carbon markets.
2. **Watershed services and markets**, which are more often implemented regionally or locally since water benefits from a land use practice typically extend only the range of a given watershed and not farther
3. **Biodiversity-related payments and markets**, which commonly have agreements that originate on the national and international levels

Each environmental market is discussed in detail below.

1. Climate Regulation and Carbon Sequestration Services

In order to understand carbon markets, we must first clarify a few key concepts.

Carbon dioxide plays an important role in climate change. This is because carbon dioxide is a **greenhouse gas**. Greenhouse gases are capable of retaining heat in a "blanket" that surrounds the earth called the atmosphere. (Other greenhouse gases include methane, nitrous oxide, perflourocarbons, hydrofluorocarbons and sulfur hexafluoride.) The greenhouse gases reflect some of the sun's energy back to outer space. Part of this energy is absorbed by earth's surface and heats the planet. The rest of the energy is reflected by the earth's surface and is not able to escape from the earth's surface. This process is known as the **"greenhouse effect"**, a completely natural phenomenon which is beneficial for all living beings because the earth would be too cold for living beings without it.

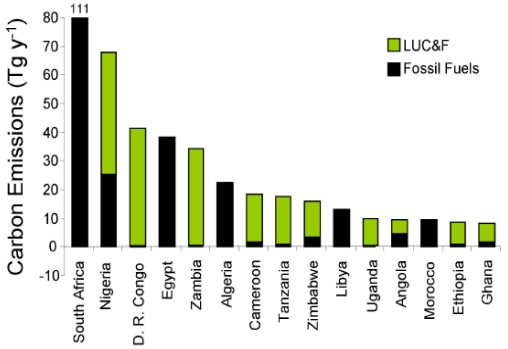
> The **greenhouse effect** maintains the Earth at an **average temperature of 15°C.**
> **Without the greenhouse effect,** the Earth would be frozen with an **average temperature of -18°C.**

Human beings are changing this process, however, by emitting extra greenhouse gases through burning fossil fuels like natural gas, charcoal and petroleum in industrial processes and transportation. Deforestation and forest fires also release greenhouse gases, but in a much smaller proportion than the burning of fossil fuels.

To better understand, we can compare the increase in greenhouse gases effect with what happens in our bodies when we cover ourselves with a blanket on a cold day. The blanket that we use is not what warms us. In reality, the blanket merely contains our body heat under the blanket to keep us warm. The thicker the blanket, the more heat it retains, and the

warmer we feel. Increasing the amount of greenhouse gases in the atmosphere can be thought of as putting a thicker blanket around the earth.[19]

Africa as a whole contributes very little to global climate change, since emissions across the continent are low. One study shows that from 1980 through 2005, Africa was responsible for only 2.5% of the global cumulative carbon dioxide emissions from burning fossil fuels.[20] The majority of these emissions came from a few countries: South Africa, Egypt, Nigeria and Algeria (see graph to the right).



Annual emissions of carbon (Tg C y^{-1}) from the combustion of fossil fuels and land use change and forestry (LUC&F). Top fifteen African countries averaged for the period 2000 -2005. Source: J.G. Canadell et al. Anthropogenic CO_2 emissions in Africa. 2009.

In Africa, land-use change and deforestation are almost as significant in terms of greenhouse gas emissions as the burning of fossil fuels. Most of the deforestation is due to increased land clearing for agriculture, but also, at least in part, to an increased demand for fuel wood, charcoal, and other wood-derived fuels. Deforestation plays a large role in greenhouse gas emissions in Nigeria, the Democratic Republic of the Congo and Zambia.

Climate change has the potential to affect every person who lives on the planet. In fact, some areas in Africa are already experiencing effects of global warming. The people of Bundibugyo, at the foothills of the Rwenzori Mountains, have begun to move up the mountains in order to find a temperature suitable for growing crops. Though they have realized that the glaciers on the mountains are shrinking (from 536 acres in 1906 to only 45.7 acres in 2006), they are not yet concerned about water availability. If the glacier disappears, however, they will no longer have water to use to irrigate their crops.[21]

In northeast Uganda, shifting rainfall patterns have adversely affected crops, causing food shortages. This is a big problem for people like the Karimojong who are historically semi-nomadic and concentrated on raising livestock such as cattle. The droughts that lasted from 2006 – 2009 destroyed their agricultural production.[22] They also were forced to travel further distances with their animals to find food and many animals died en route. This combination – directly influenced by climate change – meant that most Karimojong had to rely on the government and aid organizations for food.[23]

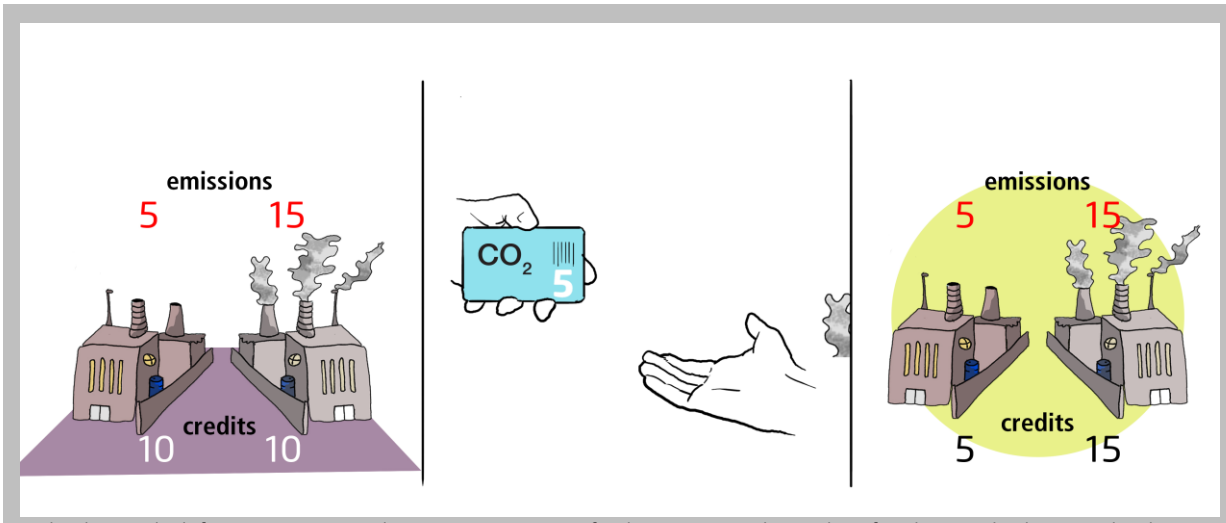
The effects may only worsen in the coming years. The United Nations has been working to reduce, or mitigate, climate change through the creation of an international agreement controlling greenhouse gas emissions. The first agreement is called the **Kyoto Protocol**. The Kyoto Protocol states that industrialized counties who ratify the agreement must reduce their greenhouse gas emissions before 2012. (It is important to note that the United States has not signed the Kyoto Protocol, though the country is one of the largest emitters of greenhouse gases.)

The ratification of the Kyoto Protocol brought about the creation of carbon credits and, consequently, the carbon market. In this way, the countries or industries that are not able to reach their emission reduction goals, or that want to reduce their emissions even lower than the established goal, are the buyers of carbon credits. Conversely, those industries or countries that are able to lower their emissions below their determined quotas can sell the remaining "emissions reductions," or carbon credits, in a national or international market.

[19] Example included in: Campos, MT. (2009) Aprendendo sobre Serviços Ambientais. Washington DC: Forest Trends.
[20] Canadell, J.G., M.R. Raupach and R.A. Houghton. (2009) "Anthropogenic CO2 emissions in Africa. Biogeosciences, 6, 463 – 468.
[21] Climate Change Threatens Ugandan Livelihood. (2009, June 15) redOrbit. http://www.redorbit.com/news/science/1705538/climate_change_threatens_ugandan_livelihood/
[22] Climate Change Threatens Ugandan Livelihood. (2009, June 15) redOrbit.
[23] The struggle against drought in northern Uganda. (2009, Aug 3). Reuters. http://blogs.reuters.com/africanews/2009/08/03/the-struggle-against-drought-in-northern-uganda/

What are carbon credits?

Carbon credits are certificates that are issued when a reduction of greenhouse emissions from the implementation of a forest conservation and/or reforestation activity occurs. It was established that one ton of carbon dioxide (CO_2) corresponds to one carbon credit. These carbon credits are negotiated in national and international markets between countries or businesses, establishing a monetary value associated with the reduction of pollution and combating climate change.[24]



In this diagram, both factories are permitted to emit up to 10 tons of carbon per year – the number of credits given by the regional authority. However, the factory on the right emits 15 tons of carbon and it would be very expensive for them to replace their machinery with new technologies that reduce emissions. The factory on the left side, however, has extra credits because they only emit 5 tons of carbon, so they can sell their extra credits to their neighbor. The same idea can also apply to countries.

Types of Carbon Markets

There are two types of carbon markets:

1. **Regulatory Markets** commercialize carbon associated with compliance with the Kyoto Protocol.
2. **Voluntary markets** include carbon credit transactions that are not required by any national or international legislation, so the compensation occurs spontaneously.

Depending on the market and the type of credits, the prices for carbon can vary greatly. For a general idea of the variation, one ton of carbon can cost between US$3 and US$20.[25]

If it's not obligatory, who buys these carbon credits in the voluntary market and why?

The majority of the carbon credit buyers in the voluntary market are private companies or investors. They buy the carbon credits for various reasons:

- as a way of investing (since they believe that the carbon credits will be worth more in the future);
- in anticipation of a future regulation; or
- simply for marketing reasons. This propaganda can be used as a way to say that their company is contributing to the reduction of greenhouse gas emissions.

In some cases, countries are adopting voluntary greenhouse gas reductions as well. Some of these initiatives are being carried out in Australia, Japan, Canada, the United States, and Brazil.

[24] Campos, MT. (2009) Aprendendo sobre Serviços Ambientais. Washington DC: Forest Trends.
[25] www.ecosystemmarketplace.com/

Reduced Emissions from Deforestation and Forest Degradation

The Kyoto Protocol expires in 2012 and the United Nations representatives are currently discussing how to design a follow-up agreement. One important issue included in recent discussions is called "Reduced Emissions from Deforestation and Forest Degradation" or REDD. Between 15 and 20 percent of greenhouse gas emissions are caused by deforestation and forest degradation. These emission sources were not included in the Kyoto Protocol, however, because of technical issues which have since been overcome to a large extent.

It is important to note that, while currently approximately 90% of the funding is for REDD projects, only 10% of the earth's land area is eligible for this type of project. On the other hand, 90% of the land area could be eligible under a REDD++ scheme, but only 10% of funding is currently available for this type of project. (Based on graphic by Lucio Pedroni.)

REDD would allow countries with large forest reserves to receive financial compensation for reducing deforestation rates.

Two additional forms of REDD have been discussed as well: REDD+ and REDD++. REDD+ includes the role of conservation, sustainable management of forests and increasing of carbon stocks. This would mean a country could generate carbon credits in managed forests or from reforesting a degraded area as well. REDD++ (also known as Reducing Emissions from All Land Uses or REALU) includes all land uses which reduce deforestation, creating a landscape-based approach for reducing greenhouse gas emissions. Some REDD projects are already underway, but as of this writing, the credits can only be sold in the voluntary, not regulatory markets. If REDD(+/++) is included in a post-Kyoto agreement (which is very likely), carbon credits generated will be permitted in the regulatory markets.

RECAP: Climate Regulation and Carbon Sequestration Services

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

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

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

2. Watershed Services and Markets

A watershed is an area that drains to a common point. Watershed management efforts and payments for watershed services aim to influence this upstream-downstream relationship through encouraging land-use practices upstream that will maintain water quality and quantity downstream.[26]

While currently there is little pressure on Uganda's water system in meeting demands, estimates by the National Wetlands Program show that Uganda is expected to experience water stress by 2025, meaning that the country will likely experience periodic or limited water shortages. Many freshwater sources are being degraded as chemicals used in domestic, industrial and agricultural processes run off into streams and rivers. [27]

Wetlands also provide important ecosystem services including water filtration, flood control and groundwater recharge. Uganda is the only African country with a National Wetland Policy and a National Wetland Programme, but most of its wetlands are being degraded or converted for agriculture. In urban areas, wetlands are being used for infrastructure development including housing and often receive solid waste and industrial pollution.[28]

The degradation of freshwater resources and wetlands may have a major impact on human health as many diseases can be spread through water contamination and some regions are already being affected by recurring droughts and floods which suggest that the ecosystem's ability to regulate water resources is declining.[29]

Water quality and quantity can be maintained or improved through:

- Maintaining forest cover
- Reforesting, possibly with a focus on specific (often native) tree species
- Adopting sustainable or best land use management practices such as sustainable farming or sustainable forestry, including restricting activities alongside riparian zones to reduce erosion, eliminating tilling to minimize soil loss, and similar activities.

The restoration, creation or enhancement of wetlands is also an example of a method for improving watershed services. These actions help to increase water flow, control for floods and provide a high-quality water supply to users downstream.

There are two leading instruments for watershed protection:

- **Payments for Watershed Services** which are driven primarily by voluntary action to provide financial or in-kind incentives to land managers and land stewards to adopt practices that can be linked to the improvements of valuable watershed services.
- **Water Quality Trading** which refers to initiatives driven by regulated standards that allow for the trading of pollutant reduction credits (similar to the carbon markets).

A recent study identified 10 active payments for watershed services programs in Africa (in Kenya, South Africa and Uganda), as well 9 others which are in development. The structure of these programs varies significantly across Africa, but almost always includes a strong social component, focusing on issues such as poverty alleviation, community development, and capacity building.

[26] USAID PES Sourcebook: Lessons and Best Practices for Pro-Poor Payment for Ecosystem Services (2007) www.oired.vt.edu/sanremcrsp/pes.
[27] Wong C, Roy M and Duraiappah AK. (2005)
[28] Wong C, Roy M and Duraiappah AK. (2005)
[29] Wong C, Roy M and Duraiappah AK. (2005)

"Programs are comprised of investments in:

- enhancing and rehabilitating watershed services;
- improving the capacity of local communities and institutions to identify, formulate, and implement integrated ecosystem management activities at micro-catchment level;
- establishing community leadership structures (at micro-catchment level) to coordinate the implementation of ecosystem management interventions, and in-depth training of Community Own Resources Persons (CORPs) to better ensure long-term sustainability of the established micro-catchment management system.

All of these investments result in watershed services such as increased water supply and improved water quality; therefore, they are included as PWS. In most cases, these activities are part of national ecosystem conservation programs, as is the case in Tanzania and Kenya."[30]

PES schemes supporting watershed management in Africa tend not to monitor the actual change in water quality or quantity, but instead verify and reward the adoption of the land management options that are considered (scientifically) likely to deliver the expected environmental benefits.[31]

The challenges is that high start-up costs for designing and implementing PWS programs in Africa is a key factor as to why so few programs are up and running and why the programs that are functioning are either dependent on donor funding or government support. Existing projects and increased interest in ecosystem services are laying the groundwork, however, for what may be a robust system in Africa in the future.[32]

RECAP: Watershed Services

What?

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

How?

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

Why?

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

- Creating or maintaining natural filters in the watershed to reduce pollution—such as nitrates or pesticides— in local water supplies
- Maintaining vegetation in order to aid with filtration and regulation of water flow through the year
- Controlling for floods
- Minimizing soil loss and sedimentation

[30] Stanton, Tracy; Echavarria, Marta; Hamilton, Katherine; and Ott, Caroline. 2010. State of Watershed Payments: An Emerging Marketplace. Ecosystem Marketplace. Available online: http://www.forest-trends.org/documents/files/doc_2438.pdf

[31] Stanton, Tracy; Echavarria, Marta; Hamilton, Katherine; and Ott, Caroline. 2010

[32] Stanton, Tracy; Echavarria, Marta; Hamilton, Katherine; and Ott, Caroline. 2010

3. Biodiversity-Related Payments and Markets

Biodiversity can be defined literally as the "diversity of life." In other words, it is the variety of plants, animals, and microorganisms in a determined area. As such, the more life that is present, the more biodiverse the region.

Even though Uganda is relatively small, the country is home to 11 percent of the world's bird species, more than half of the world's population of mountain gorillas,[33] 4.6% of the world's dragonfly species, 6.8% of the butterflies, and 7.5% of the world's mammals. High biodiversity is a function of Uganda's unique location between different ecosystems. In the eastern regions, the country is influenced by the drier East African savannas, while the western region contains moist West African rain forests. In addition, the large differences in elevation – from the high Rwenzori Mountains to the western rift valley – provide a high variety of habitats for different animal species. Distinctive aquatic habitats such as in Lake Victoria and the Nile River provide a home for various species as well.[34]

These plants, animals, and microorganisms provide food, medicines, and a large part of the primary material that we all use. In addition to this material value, biodiversity is natural diversity itself and constitutes a grand "treasure" for the world.

High biodiversity is an important reason why many tourists visit protected areas within Uganda. At least one study has shown that an increase in the number of bird species a tourist is likely to see is correlated with his or her willingness to pay to enter a park.[35] In addition charismatic species such as chimpanzees and mountain gorillas also attract tourists to the country. Tourism is already a main exchange earner and employment provider in the country. In 2004, for example, nature-based tourism represented approximately 25% of the total value of exports of goods and services in Uganda.[36] As mentioned previously, species such as bees and birds play an important role in pollination and agricultural production.

From the 1960s through the 1990s biodiversity richness declined steeply in Uganda and many species face the threat of extinction[37] due to habitat loss because of the expanding agricultural frontier, unsustainable harvesting, the invasion of introduced species and pollution.[38] Current and future losses of biodiversity could have profound negative impacts on both agricultural production and ecotourism in the country.

Because of the important roles that biodiversity plays in agriculture, tourism and other important sectors, several payment schemes for biodiversity protection have already emerged in Africa and worldwide. These initiatives fall into the following broad categories:

1. **Purchase of high biodiversity value habitat** by a range of buyers including national governments to expand national parks and protected areas, non-profit conservation organizations and individual conservationists with the sole intent of protecting biodiversity in that area.
2. **Payments for biodiversity use or management** by paying landowners to manage their assets to achieve biodiversity conservation. This could include management contracts on private farms which have rules for biodiversity management activities and payments linked to the achievement of specified biodiversity objectives.
3. **Payments for private access to species or habitat**, often related to particular species or habitats, but which, in practice, cover some or all of the costs of providing broader ecosystem services. Ecotourism companies which pay forest owners to bring tourists onto their lands to observe wildlife provide one example. Bioprospecting rights which allow companies or individuals to collect, test and use genetic material from designated areas, as often occurs with medicinal plants to formulate new medicines are another.

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[33] Wong C, Roy M and Duraiappah AK. (2005)
[34] International Resources Group. (2006) Uganda Biodiversity and Tropical Forest Assessment. http://www.pdf.usaid.gov/pdf_docs/PNADK264.pdf
[35] Naidoo R and Adamowicz WL (2005) Biodiversity and nature-based tourism at forest reserves in Uganda. *Environment and Development.* 10: 159 -178.
[36] Moyini, Y. (2006) Uganda: Ecotourism Assessment.
[37] Wong C, Roy M and Duraiappah AK. (2005)
[38] International Resources Group. (2006)

4. **Tradable rights and credits within a regulatory framework** in which the government limits infrastructure development contractors regarding effects to specific species or ecosystems, and tradable biodiversity credits can be purchased to ensure they meet a minimum standard of biodiversity protection.
5. **Biodiversity offsets** which aim to achieve no net loss of biodiversity which may arise from project development after appropriate prevention and mitigation measures have been implemented.[39]
6. **Biodiversity-conserving business** such as eco-labeling schemes which advertise or certify products that were produced in ways consistent with biodiversity conservation. One example is the Bird Friendly label developed by the Smithsonian Institution. Used by coffee growers in Ethiopia and other parts of the world, this label certifies that the coffee was grown organically and shade-grown which provides benefits for the bird species which inhabit that area.

Uganda is in the early stages of developing biodiversity offsets. The country's Environmental Impact Assessment law provides a supporting framework for compensation schemes and a few pilot projects are in the works. The Uganda Wildlife Authority (UWA) is in the early stage of developing a biodiversity offset policy and is also investigating voluntary offsets with oil companies to catalyze national law for offsets in the future.[40]

RECAP: Biodiversity-Related Payments and Markets

What?
To protect biodiversity, sellers might offer to restore or conserve habitat to compensate for the unavoidable impact on biodiversity caused by infrastructure projects, ensuring "no net loss," and, preferably, a net gain of biodiversity.

How?
After following accepted planning processes and attempting to avoid or mitigate biodiversity losses, protection of biodiversity can occur by investing in activities such as:

- Establishing biological corridors between protected areas
- Creating new protected areas or strengthening ineffective protected areas
- Replanting degraded areas with native species and/or removing invasive alien species
- Maintaining healthy soils and minimizing need to fertilizers and pesticides
- Managing biodiversity to maintain quality agricultural products, ensure pest control, pollination, genetic resources or of key habitats
- Avoiding damage to areas of cultural, spiritual or aesthetic value
- Launching conservation projects outside of project areas

Why?
To maintain biodiversity at a landscape scale.

[39] See http://bbop.forest-trends.org/index.php for more information.
[40] Madsen, Becca; Carroll, Nathaniel; Moore Brands, Kelly; 2010. State of Biodiversity Markets Report: Offset and Compensation Programs Worldwide. Available at: http://www.ecosystemmarketplace.com/documents/acrobat/sbdmr.pdf

III. COMMUNITY ENGAGEMENT WITH MARKETS AND PAYMENTS FOR ECOSYSTEM SERVICES

The involvement of communities in a payment for ecosystem services scheme is essential for success and sustainability. This participation should go far beyond solely receiving the benefits from the transaction. For a payment for ecosystem services transaction to be successful, it is necessary that rural community members actively participate from the beginning of project identification and design, with suggestions and input. Community members should also remain involved in the implementation, as well as the monitoring, of activities related to the program.

Historically, community populations have not always had satisfactory experiences with mechanisms that were created and developed at national and international levels without the consultation of their positions and consideration of their beliefs, conditions and lifestyles. Additionally, in many cases the rights related to the land tenure are still not legally resolved. As such, it is fundamental that whatever mechanism is developed internationally and implemented across the globe should not only recognize the rights of indigenous populations over their territories, but also guarantee compliance with the rights recognized in the **United Nations Declaration on the Rights of Indigenous People**[41] adopted in 2007. Among the rights recognized in this Declaration, are:

- Recognition of their rights over their traditionally owned or occupied lands, especially natural resources, and their customary forms of management.
- Respect the right of autonomy and self-determination, which means that the indigenous populations and local communities have the autonomy to manage their lands as well as the legal capacity to negotiate and make decisions regarding their participation in projects and initiatives that affect them directly and indirectly.
- Apply the right of free, prior, and informed consent in which the involved communities must have access to all of the information related to the project and principally be consulted BEFORE beginning any activity. (See more information on FPIC below.)
- Ensure the full and effective participation of the indigenous people in all of the stages of the project.

Not meeting these principles in payment for ecosystem service programs constitutes a violation of the rights of indigenous people and other traditional communities. In addition, the inadequate involvement of the forest communities can put the project in jeopardy, not only from an ethical stance, but also project viability, as a transparent, just and egalitarian association is fundamental for the success of PES programs.

Another key element of community participation in payment for ecosystem service projects is **free, prior and informed consent.** Free, prior and informed consent (FPIC) refers to the right of local communities to give or withhold their consent to proposed measures that will affect them or the land and resources they own or use. The process of free, prior and informed consent is essential for ensuring that commitments made by communities are made only when the community fully and realistically understands a PES project. For indigenous communities, free, prior and informed consent is included in international law, but it is also recognized as a very important tool for other local communities and smallholder farmers.

Free, prior and informed consent does not mean that every single member of a community has to agree with a project, but that a consensus is reached within the community (through a council or tribal government, for example) to move forward. Communities must give their consent before a project begins to implement activities so that they still have the option to refuse project implementation. In addition, they must be presented with complete information on the intent and scope of the project in a language and process which they can easily understand. Coercion or intimidation which forces community

[41] To learn more, see: http://www.un.org/esa/socdev/unpfii/es/drip.html

members to make a certain decision is not allowed. The process of free, prior and informed consent should also reflect traditional consultation processes and respect customary leadership.[42]

Why should project developers be concerned with stakeholder participation?

For project developers, engagement with communities is necessary, not just to comply with project standards, but also to ensure project sustainability. Ensuring the full participation, acceptance and consent of communities does require additional effort, time and money from project developers, but experience has shown that doing so helps to avoid delays, setbacks and conflicts during project implementation. In addition, community engagement helps to reduce risks, especially because non-engagement could lead to increased leakage and reduced permanence (see the Annex on Climate Change and Carbon) when forest-dependent communities are impacted negatively, marginalized or even excluded from project opportunities. Working with community members and other stakeholders also increases the reputation of projects in the marketplace by ensuring that elite capture and other potentially poverty exacerbating effects do not occur. Standards for carbon projects, such as the Community, Climate, and Biodiversity Standard, require community engagement, which increases market access for projects. Finally, projects showing good social practice are often able to access 'softer' finance which is aimed at helping protect communities and the poor from adverse climate change impacts more easily.

(See Blomley, T., M. Richards, and B. Borges. Forthcoming. "Good Practice Guidance for Community Engagement in Forest Carbon Projects." In J. Ebeling and J. Olander (eds.). *Building Forest Carbon Projects: A Step by Step Guide.* Washington, D.C.: Forest Trends.)

It is fundamental that a community agrees to participate in the program and to work with the other institutions involved before any action is undertaken. The first step is to certify that the program objective(s) and the responsibilities of community members are perfectly clear for everyone. That is, community members, ideally all, should understand not only the benefits of the project, but also the commitments that they must undertake. This reflection should be done with objectivity and in a participatory manner, identifying the possible risks for implementing the program. Only after this process are community members able to offer their free, prior, and informed consent. The consent to participate in the program should preferably be written, mentioning the agreements, responsibilities of each partner, and formally authorizing project implementation. It is recommended to obtain legal advice and certify that the terms of the agreements, as well as the PES program objectives, are in agreement with the current laws in the country.

Community members should be able to answer the following questions:

- To whom does the right to the carbon credit belong (the landowner, a person who has use rights, the federal, municipal or local government)?
- Who is paying?
- What ecosystem service are the buyers paying for?
- How much is the buyer willing to paying?
- Whom is the buyer paying?
- For how long?
- Who receives the money and how?
- How can we guarantee that the benefits are distributed in a transparent manner?
- What are my responsibilities if I decide to participate in the program?
- What happens if I don't meet my responsibilities?
- How can we guarantee that the rights of all community members will be considered and respected?
- What laws should be modified or created for the project to be implemented?
- Is there a need for a government agency or other independent institution to administer the resource?

[42] Fergus MacKay. 2004. Indigenous Peoples' Right to Free, Prior and Informed Consent and the World Bank's Extractive Industries Review.

Throughout the free, prior and informed consent process, potential benefits and risks for the communities or stakeholders involved should be discussed in great detail in order to minimize these risks and ensure maximum community benefits.

Key Issues and Challenges in the FPIC Process

Time: Sound, consensus-based decisions will only emerge from processes that are iterative, inclusive and allow enough time for systematic consultation, information gathering and feedback. Projects are necessarily iterative since communities have the right to consent (or not) at all key stages of project development.

Who has the right to give consent? Consent should be granted by the representative organizations of indigenous groups or other local communities. For some groups, this may be clearer than for others, but it is necessary to ascertain which group has the ability to give consent in order for the project to proceed.

How inclusive are 'collective' and 'traditional' decision-making processes? Though FPIC states the consent derives from traditional and (ideally) collective decision-making processes, there is no guarantee that these systems are genuinely representative and inclusive. In situations where these assumptions do not hold, projects need to find alternative ways of consulting with marginalized stakeholder sub-groups like women and ethnic minorities.

Cost of providing independent and comprehensive information: Providing balanced information to community members is a costly process including impact studies to fully understand the costs and benefits of project implementation, making information accessible, providing access to legal advice and participatory mapping to clarify customary rights, areas and rights holders.

FPIC is more difficult when outcomes are uncertain: For forest carbon projects especially, there is uncertainty regarding financial outcomes. This makes it difficult to be definitive about financial returns when holding consultations with communities.

(See Blomley, T., M. Richards, and B. Borges. Forthcoming. "Good Practice Guidance for Community Engagement in Forest Carbon Projects." In J. Ebeling and J. Olander (eds.). *Building Forest Carbon Projects: A Step by Step Guide.* Washington, D.C.: Forest Trends.)

What are the potential risks and how can they be managed?

If PES and REDD mechanisms are not designed correctly, there are many potential risks that could be faced by community members who are signatories to a PES agreement.

- Indigenous people and community members not involved in decision-making process at national or international level may lead to the implementation of activities with which communities do not agree or from which they are excluded
- Possible eviction from traditional lands due to exclusionary models of forest conservation and possible carbon revenues
- Benefits may not be distributed equally or fairly within a community
- Corruption and embezzlement of international funds by national elites
- Violation of free prior and informed consent and the United Nations Declaration on the Rights of Indigenous Peoples
- Reliance on markets to provide funding
- Current focus on carbon and not other services the forest also provides such as biodiversity protection, homes, and source of livelihoods for many people does not adequately value these ecosystems[43]
- Opportunity costs related to non-PES land use revenues

[43] Raymond de Chavez & Victoria Tauli-Corpuz, eds. (2008) Guide on Climate Change and Indigenous Peoples.

Other risks may also exist. It is of utmost importance for a community to consider and weigh both the benefits and risks to determine whether or not implementing a carbon project in their territory will allow them to reach their goals and will be beneficial for them or not.

Some organizations have found ways to reduce risks related to their participation in PES markets. Consider the case of Brazil, for example, where various community groups, non-governmental organizations and community-based organizations worked together for nearly a year to develop a set of principles and criteria related to REDD+ which ensure that the rights of communities are respected during project development. These principles and criteria are used as a reference for the development and application of forest carbon projects, government REDD+ programs, for the use and application of international resources destined for this use, and for the independent evaluation and validation of REDD+ projects in Brazil.[44]

Socio-Environmental Principles and Criteria for REDD+: The Brazilian Case

1. **Legal compliance:** meeting the requirements of Brazilian law and applicable international agreements
2. **Recognition and guarantee of rights:** recognition and respect of ownership and use rights for lands, territories, and natural resources
3. **Benefit-sharing:** Fair, transparent and equitable distribution of the benefits that result from REDD+ actions
4. **Economic sustainability, livelihood improvement and poverty reduction:** contribute to the economic diversification and sustainable use of natural resources
5. **Environmental conservation and recuperation**: contribution to the conservation and recuperation of natural ecosystems, biodiversity, and ecosystem services
6. **Participation:** participation in the elaboration and implementation of REDD+ actions and in decision-making process
7. **Monitoring and Transparency**: full availability of the information related to REDD+ actions
8. **Governance**: promotion of improved governance, articulation, and alignment with the national, regional, and local policies and directives.

It is important to highlight that the principles and criteria aim to contribute to improving forest governance, valuing the transparency of information, increasing public participation in decision-making, enhancing the coordination of activities between different actors as well as the respect and recognition of traditional and indigenous populations.

What are the benefits and how are they allocated?

The great advantage of participating in payment for ecosystem service schemes is the possibility of receiving financial benefits, either directly or indirectly. It is essential that these benefits reach the hands of all of the people committed to the program in an organized and transparent manner.

Important questions include:

- How, how much and when will financial benefits be paid to community members?
- How will the resources be allocated?
- Will payments be made to the group or to individuals?
- To whom are the payments made - men or to women?
- Will benefits be paid in case or in-kind? Community

Elite Capture

Several country studies indicate that without well-designed measures to increase or safeguard equity, transparency and accountability, there is a clear risk for community forestry benefits to be concentrated among members of the forest management committee. This is particularly common when the facilitators of community forestry work closely with the management committee, but with little communication to the wider community.

(See Blomley, T., M. Richards, and B. Borges. Forthcoming. "Good Practice Guidance for Community Engagement in Forest Carbon Projects." In J. Ebeling and J. Olander (eds.). *Building Forest Carbon Projects: A Step by Step Guide.* Washington, D.C.: Forest Trends.)

[44] In December 2009, the same group of civil society actors released a publication which describes a process for developing similar socio-environmental safeguards in other regions. It can be downloaded here: http://www.forest-trends.org/publication_details.php?publicationID=2573

members may decide that in-kind payments such as the building of a new school or technical training to develop new projects within the community will be more beneficial for them in the long run.

> Currently, there are people offering to represent communities in the negotiation of potential carbon credit contracts. These people visit communities promising large sums of money with little work, but often the community never receives the benefits. Frequently, these people demand that the community representatives sign the contracts on the first visit. This situation could prevent the community from speaking with representatives or partners, and could potentially make a future PES scheme unviable.

Financial planning is fundamental to ensure that the resources are used in a way that is beneficial for all community members for an extended period, while also guaranteeing the provision of the ecosystem service. The creation of a financial management fund with use criteria and resource distribution as well as a transparent governance structure is recommended.

In addition to financial benefits, community members engaging in payment for ecosystem services transactions also gain expanded experience with external businesses and government agencies through transactions and interactions with other stakeholders and intermediaries. Improved ecosystem resilience and land productivity are also potential community level benefits of PES project activities.

From both the consent and benefit allocation perspectives, it is important to consider both **gender and** equity impacts in the development and implementation phases as this approach is not only the most ethical way to develop projects, but also helps to ensure project sustainability. Equitable outcomes depend primarily on high levels of transparency and accountability. It is important that project developers recognize that communities are not homogenous, but rather that there are differences and inequities which exist in communities and that a project may not benefit all members in the same way.

It is also important to consider gender issues for many reasons including the application of international human rights legislation and standards, different roles and interests of men and women with regard to natural resource management, and increased overall levels of participation. In addition, studies show that when women are the recipients of income from carbon projects, the money is more likely to have positive welfare outcomes, thus having a greater effect on poverty and equity impacts.[45]

[45] Blomley T, Richards M and Borges B (2011)

IV. EXAMPLES OF PAYMENTS FOR ECOSYSTEM SERVICES TRANSACTIONS IN AFRICA

Though markets and payments for ecosystem services are still relatively new, there are already some examples on the ground across Africa which provide us with valuable insights and allow for reflection upon the possibility of developing similar projects in our communities. Here we will present four such cases:

- Cocoa Carbon in Ghana
- The Equitable Payments for Watershed Services Program in Tanzania
- Wildlife Protection in the North-West Serengeti, Tanzania
- A Personal Forestry Carbon Sale Uganda

The first three studies relate directly to the three services we discussed earlier: carbon, watershed protection and biodiversity. The final study is also a carbon study which shows how an individual landholder can become involved in these markets. We also present some of the barriers to payment for ecosystem service project development in East and Southern Africa.

Cocoa Carbon in Ghana[46]

Ghana is the second largest producer of cocoa after the Ivory Coast, with an annual yield (2007) of 680,000 tons. It is estimated that there are more than 1.5 million hectares enrolled in cocoa production in Ghana. The crop supports 30% of the population, and cocoa exports account for about 40% of total exports. Cocoa is both key to local livelihoods but also an important driver of deforestation as farmers search for more productive ground.

Farmers drying cocoa beans in Ghana
Photo: Michael Richards

Common cocoa farming techniques wreak havoc on both soil and surrounding forests – contributing to both global warming and biodiversity loss. For example, instead of growing cocoa under the shade of numerous tree species, some farmers have adopted monocultures which decrease the amount of standing trees sequestering carbon and available habitats for animals and plants per hectare. Evidenced by the decline in cocoa yield per hectare farmed, the cocoa industry in Ghana is threatened by depleted soil fertility, reduced water supplies, and disease.

The good news: over 66% of Ghana's stored carbon lies in its high-forest region, where much cocoa farming takes place. Industry insiders estimate that the value of carbon stored in Ghana's cocoa landscapes is over $2.2 billion dollars. Traditional shade- cocoa stores as much as twice the carbon as shade-free farms – farmers could potentially get paid to decrease cocoa yield and increase canopy.

The Katoomba Incubator and Nature Conservation Research Centre (NCRC) are collaborating to test whether carbon finance can play a pivotal role in shifting cocoa farming onto a more sustainable path, through a number of potential activities under Reduced Emissions from Deforestation and Degradation (REDD) and REDD+.

The Incubator and Nature Conservation Research Centre are working with farmer organizations, cocoa buyer organizations in the Bonsambepo Landscape, a corridor including six Forest Reserves of high biodiversity value (key species include

[46] 'How Carbon Markets Can Help Avert a Chocolate Shortage', 'Sweetening the Deal for Shade-Grown Cocoa: A Preliminary Review of Constraints and Feasibility of 'Cocoa Carbon' in Ghana' and 'Cocoa Carbon: Carbon Finance to Improve Sustainability of Cocoa Production.' Available at: http://ecosystemmarketplace.com.

Chimpanzee, Bongo, Forest Buffalo, and the White-Necked Rock Fowl, which was previously thought to be extinct in Ghana) surrounded by a mosaic of settlements, cocoa farms, food crop farms, and fallow lands.

Overall, the initiative aims to pilot the development of REDD+ / agricultural carbon credits that will focus on climate change mitigation and adaptation by:

1. Reducing emissions from forest degradation and enhancing above ground and below ground carbon stocks;
2. Improving the overall productivity and ecological resilience of the cocoa farming system through access to associated agronomic and economic resources; and
3. Improving livelihoods from increased farming income and access to other project benefits.

More specifically, the strategy is to avoid forest degradation by preventing community members from encroaching into forested areas to establish new farms, and encouraging them not to cut down mature forest trees in replanting old cocoa farms. In addition, it will focus on carbon stock enhancement through the planting of shade trees or enabled natural regeneration in new/young farms. The initiative could also target enhancement of soil carbon stocks through improved farming practices. Furthermore, it plans to use the associated carbon-based financing to leverage other potential streams of revenue and benefits, including certification (which brings a premium of at least $150/ton of cocoa), and access to extension services and credit facilities that will enable significant increases in on-farm productivity.

It is expected that at full implementation, the activities within the Bonsambepo landscape will cover 60,000 ha of the cocoa farming landscape (off-reserve) and possibly another 20,000-50,000 ha within the forest reserves. Studies show that, including soil carbon and the cocoa trees, shaded cocoa (crown canopy in excess of 30%) was found to store about 159 tonnes of carbon per hectare – 70% of the carbon found in intact high forest and over double that stored in unshaded (under 10% canopy cover) cocoa. There may be some tradeoffs, however, given that shade-grown cocoa may lead to lower productivity and thus more land will be needed to maintain current cocoa production levels.

The Equitable Payments for Watershed Services Program (EPWS) in Tanzania[47]

CARE International in Tanzania, in partnership with the World Wildlife Fund (WWF), the International Institute for Environment and Development (IIED), and the Poverty Reduction & Environmental Management Program (PREM) initiated a new project in 2006, Equitable Payment for Water Services (EPWS). The program is based in the Uluguru and East Usambara mountains, focusing on Ruvu and Sigi River basins, which are the major sources of water to the cities of Dar es Salaam and Tanga, respectively. The City of Dar es Salaam provides water to some four million inhabitants and roughly 80 percent of industries. The public water utility, Dar es Salaam Water Supply and Sewerage Corporation (DAWASCO), currently spends nearly US$2 million per year in water treatment costs due to increased sediment load in the Ruvu river, which feeds the city.

The Equitable Payments for Watershed Services (EPWS) program aims to improve the quality and flow of water for downstream users by compensating upstream farmers to engage in various land-use practices to control soil erosion brought on by unsustainable farmland expansion and irrigation practices, deforestation, and illegal mining activities in river systems and within forest reserves. The project aims to establish long-term financial investment in modifying land use to conserve and improve watersheds for reliable flow and quality of water to establish a compensation mechanism that recognizes the needs and priorities of marginalized and poor people, and to improve quality of life of communities through substantial benefits to the rural poor hence contributing to poverty reduction. As of 2008, DAWASCO and the Coca-Cola Company had enrolled more than 450 farmers.

[47] Stanton, Tracy; Echavarria, Marta; Hamilton, Katherine; and Ott, Caroline. 2010. *State of Watershed Payments: An Emerging Marketplace*. Ecosystem Marketplace. http://www.forest-trends.org/documents/files/doc_2438.pdf

Wildlife Protection in the North-West Serengeti, Tanzania[48]

The Serengeti ecosystem forms one of the most important wildlife areas in Eastern Africa. The Serengeti provides habitat to 30 species of ungulates (species with hoofs like rhinoceroses, elephants and hippopotami), 13 species of large carnivores and more than 500 species of birds. Directly bordering the Serengeti National Park are range and farmlands occupied by over 10,000 community households. Faced with poverty and employment challenges, local communities have historically not valued diverse wildlife due to its role in crop destruction. This area has seen a sharp decline in wildlife diversity and frequency due to habitat loss from agriculture impacts, deforestation and poaching.

In the North-West Serengeti the development of a range of markets for wildlife products and services has provided communities the incentive to conserve wildlife habitat and end poaching. Villagers outside of The Serengeti National Park deliver ecosystem services in schemes driven by private-sector demand. Buyers are local corporations and the commercial tourism industry due to their reliance on community wildlife conservation activities.

- **Revenue-sharing by tourist hunters**: A voluntary 10% tax above tourist trophy fees implemented by hunting outfitters can generate profits of up to US$ 12,500 a year for villages occupying the hunting concession.
- **Local sourcing of products**: Hotels, lodges and hunting camps obtain food products from local sources. This demand provides additional community income and encourages diversified farm production.
- **Community wildlife-cropping**: Communities are allocated wildlife cropping quotas. By legalizing/ restricting the sale and consumption of game meat and products, poaching is controlled and a market for wildlife products stimulates revenues flowing to communities.
- **Land-leases and joint tourism enterprises:** Private sector tourist operators form partnerships with communities to develop land lease agreements, wildlife camps, joint ventures, etc. which supply labor, food products, and profit-sharing to local stakeholders.

By increasing the economic value of wildlife to communities, wildlife is integrated into local land use planning and is a critical aspect of community livelihoods. Incentivizing conservation has generated significant revenues for community participants. This project is an example of community and private sector coordination coupled with collaboration among numerous villages for the delivery of ecosystem services through market incentives.

A Personal Forestry Carbon Sale Uganda[49]

Beatrice Ahimbisibwe from the Mitooma- Bushenyi Village in South Western Uganda has an impressive and unexpected resume. She is Chairperson of the Bitreko Women's Group, Director of a private primary school, Board member of a village Bank, mother of two, and…co-coordinator of tree -farmers for carbon in 3 sub-counties of Uganda. How did this school teacher and active community member also become involved in the carbon market?

It all started in 2002 and 2003 when ECOTRUST and technical partners ICRAF, CARE, LTS International, and ECCM began to coordinate a project to pay local farmers to sequester carbon. ECOTRUST began talking with Ugandan farmers about carbon, climate change, and the possibilities available to them for the sale of carbon credits.

[48] THE ECONOMICS OF ECOSYSTEMS AND BIODIVERSITY (TEEB); D2 Report For Local/Regional Policy And Public Management: Case Studies; http://www.cbd.int/programmes/socio-eco/incentives/case-study.aspx?id=5471; http://data.iucn.org/dbtw-wpd/edocs/PDF-2000-001.pdf

[49] Excerpted from: 'From Ugandan Schoolteacher to International Carbon Consultant', Ricardo Bayon, Ecosystem Marketplace 2004 http://www.ecosystemmarketplace.com/pages/dynamic/article.page.php?page_id=4000&section=home with current updates from Ms. Ahimbisibwe, personal correspondence March 2011.

One of the groups which ECOTRUST consulted was the Bitreko Women's Group, of which Beatrice Ahimbisibwe is Chairperson. Beatrice and other landowners were informed by ECOTRUST that in exchange for planting native species, they would receive payments for the carbon these trees would sequester. Payments would come from individuals and organizations in developed countries contributing to global warming. In June 2003 Ahimbisibwe entered into contract with ECOTRUST to sell forestry carbon sequestration credits from a single hectare parcel of land on her property. Beatrice provided ECOTRUST with proof of ownership, and signatures of her family members to agree to protect the planted trees.

According to the contract, one hectare of native tree species (African Cherry, Musizi, Funtumia, Khaya) generates 57 tons of sequestered carbon over 10 years, at an original price of USD 8/ton. 10% of credits are set aside to protect against unforeseen events. Beatrice began by selling 52 tons of carbon for a total of $416 delivered in installments over 10 years. She can use the land for multiple benefits, provided the trees stay intact. After 15 years she can harvest the timber from the hectare. The credits are delivered to ECOTRUST who coordinates with the buyers, Tetra Pak UK, YOU and WE. Beatrice has also planted an additional 2.5 hectare plot of carbon trees which generates approximately 145 tons of sequestered carbon. Her son, Benedict, has a plot of 2.5 hectares, also delivering 145 tons of credited carbon. Buyers for Beatrice and Benedict's carbon are YOU and WE. Beatrice's daughter Annah has also joined the family business with a 1 ha plot. Her buyer is CAMCO. The price per ton of carbon has increased to 12 USD since the beginning of the project (from 8 USD) and the number of tree farmers has increased to 300 in 3 sub-counties.

Beatrice is generating additional income to supplement her teacher's salary while also protecting her community's natural resources. "I am so proud," Beatrice says, "not only do I use my work as an example when I teach my school children, and not only do I get to talk to and meet people from all over the world, but now my neighbors come and ask me questions about my carbon and my trees. Can you believe, I have become a consultant!" So far Beatrice has travelled to Canada, South Africa, Tanzania, Washington DC and Sweden to present about her experiences in the carbon market.

Challenges for Project Development

The case studies presented above are examples of some of the projects that could be developed across Africa. There are already many additional projects being implemented and there is high potential for many more.

A study assessing[50], in part, existing payment for ecosystem system service deals in Kenya, Madagascar, Malawi, South Africa, Tanzania and Uganda that could be expanded or replicated identified four major barriers to the effective development of payments for ecosystem services in the region including:

- **Information:** there is too little information on payments for ecosystem services and that which does exist is often too generic to be of much use to policy makers.
- **Technical barriers:** there are too few people with the appropriate skills and knowledge to design and implement effective payments for ecosystem services projects and programs.
- **Policy and regulation:** generally legal and policy frameworks for environmental and resource management and fragmented, outdated and often lack cohesion. The current legal and policy frameworks has not prevented the pilot projects, but it is quite likely that they will limit any attempts to scale up or replicate PES initiatives
- **Institutional barriers:** in addition to the limited human skills and fragmented legal and policy frameworks, there are insufficient organizations, such as financial intermediaries, certification bodies, national registries, etc. to support the development of payments for ecosystem services in the region.

[50] Ruhweza and Waage (2007) The State of Play: Payments for Ecosystem Services in East and Southern Africa. In: Opinion, Ecosystem Marketplace.

V. FOUNDATIONS FOR PAYMENTS FOR ECOSYSTEM SERVICES

In this section we review the foundations for Payments for Ecosystem Services projects. The information presented here is designed to help readers make educated decisions about engaging in PES projects and transactions. With an awareness of opportunities, risks, ideal conditions, historical challenges, and proper steps of due diligence, ecosystem service providers become discerning negotiators who with their knowledge are able to protect their communities against unintended outcomes.

We discuss ideal conditions for PES project success and the importance of a feasibility study to assess a potential PES project's political, ecological, social, and economic context prior to implementation. Key components of feasibility studies are presented. Finally, we include a list of organizations in Uganda who are involved in PES project development and sources for further information if you are interested in developing a PES project.

Ensuring PES Project Success

Payments for Ecosystem Services are an attractive mechanism both for conservation and community benefits. PES cannot be implemented in all situations; in areas where legal frameworks and their enforcement are weak, communities lack sufficient information, start-up financing or bargaining power, PES implementation is limited. PES transactions are most likely to flourish when and where:[51]

- **Demand for ecosystem services is clear and financially valuable to one or more players.**
  Payments for ecosystem services are most likely to occur when there is at least one beneficiary of ecosystem services with both an incentive to invest in the maintenance of this service and available funds for doing so.

- **Supply is threatened.**
  If resources are clearly diminishing to the point of scarcity because of a declining ecosystem service, then a PES deal holds potential.

- **Specific resource management actions have the potential to address supply constraints.**
  For PES to be a viable option, it is essential to identify what resource management practices could be changed and what ecosystem services results will ensure improvement of 'supply' issues.

- **Effective brokers or intermediaries exist.**
  These intermediaries can assist with documenting ecosystem service conditions, identifying specific resource management alternatives, aggregating multiple landowners/ resource users (if needed), engaging and negotiating with prospective buyers, and any other activities related to implementation (including monitoring, certification, verification, etc.).

- **Contract laws not only exist but are enforced, and resource tenure is clear.**
  The supplier must have control over the area where the PES agreement is to be implemented, and the buyer must have assurance, and recourse to ensure, that contract provisions of the deal are secure.

- **Clear criteria for evaluating equitable outcomes across partners are established.**
  In the case where partnerships are formed to supply the ecosystem service, clear criteria of fairness need to be designed and agreed by all parties to the transaction.

[51] Herbert, T, R Vonada, M Jenkins and R Bayon. 2010. *Environmental Funds and Payments for Ecosystem* Services. Rio de Janeiro: RedLAC. http://www.forest-trends.org/documents/files/doc_2627.pdf

Feasibility Studies[52]

Before launching into an ecosystem services project, it is important to research the viability of a project in light of its political, ecological, social, and economic context. Feasibility studies help stakeholders to make educated decisions about engaging in ecosystem services transactions or projects. These assessments can vary in level of depth, methodologies employed, ecosystem services considered and regions inventoried; however, there are some elements which remain consistent.

Feasibility Assessment Question # 1: What ecosystem service is for sale?

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

Feasibility Assessment Question # 2: Is the project politically and legally viable?

- Is there clear ownership of, or rights to, the land that will be the focus of a PES agreement?
- Is there clear ownership of, or rights to, the ecosystem service that will be the focus of a PES agreement?
- Is there government support for transacting carbon and/or engaging in payment for watershed services schemes?

An investigation of the land tenure regime and national policy context relevant to the project will reveal potential challenges in discerning who owns rights to ecosystem services/ carbon benefits.

Feasibility Assessment Question #3: Is the project institutionally feasible?

- Who are the project partners?
- What are their roles?
- Do these institutions have the capacity to engage in PES transactions?
- Who will be affected by project activities?
- What is the plan for stakeholder engagement and securing ongoing support?

Feasibility Assessment Question # 4: Is the potential project technically feasible and viable?

- What applicable methodologies exist? Do buyers accept these methodologies?
- What does a baseline analysis predict regarding future ecosystem service delivery?

Feasibility Assessment Question # 5: What are the costs to develop a project and do the partners have funding available?

- What are the short-term funding needs?
- Do the institutions have this funding? If not, where can we look to find additional funding sources?
- Who are the potential buyers or investors?
- What are the likely opportunity, transaction, implementation and monitoring costs?
- What is the predicted value of the ecosystem service that will be transacted?
- Will the project be able to raise sufficient funds to cover the opportunity, transaction, implementation and monitoring costs?
- When will project revenues be realized (particularly in relation to project costs)?

[52] A successful feasibility assessment provides a foundation for a viable project development plan. It will have to be backed by sound science and research. Please view the following link for an example Feasibility Study conducted by The Katoomba Incubator for a carbon REDD+ project in Ghana: http://www.katoombagroup.org/~foresttr/publication_details.php?publicationID=2549.

If a feasibility assessment looks favorable for the development of a PES project, it is time to move forward. For those that are ready to develop a project, there are more detailed steps presented in the Annex.

Finding Support for the Development of PES Projects

After considering the information presented in this chapter, if there is an opportunity to engage in a payment for ecosystem services scheme, the authors suggest reaching out to one of the organizations listed operating in Uganda and East and Southern Africa. These supporting institutions can serve as benevolent, effective, and technically savvy intermediaries to communities and ecosystem services providers. We encourage that potential providers consult with one or more of these groups prior to moving forward with a PES transaction. We also encourage providers to review our list of supporting resources and documents for additional guidance.

The organizations listed below have developed or are developing projects in Uganda at the current time. Internal limitations, however, may affect whether or not they are able to assist in additional projects at any given time.

Organization	Contact
The Environmental Conservation Trust of Uganda http://www.ecotrust.or.ug/	Plot 49 Nakiwogo Road Entebbe, P.O. Box 8986, Kampala, Uganda Phone: 0312266419/0414322573 support@ecotrust.or.ug
ICRAF Pro-poor Rewards for Environmental Services in Africa (PRESA) http://presa.worldagroforestry.org/	sara.namirembe@gmail.com Phone: +254 20 722 4298
National Environment Management Authority – Uganda http://www.nemaug.org/	Plot 17/19/21 Jinja Road NEMA House Kampala, Uganda Phone: 256-414-251064 info@nemaug.org
National Forestry Authority – Uganda http://www.nfa.org.ug/	National Forestry Authority 10/20 Spring Road, Nakawa Phone: +256 031 264 035/6 E-mail: info @nfa.org.ug
Nature Harness Initiatives http://www.natureharness.or.ug/	Plot 960/961 Millennium Chambers Entebbe Road P.O.Box 29867 Kampala Phone: +256-414-669425 bbyamukama@natureharness.or.ug
Uganda Carbon Bureau http://www.ugandacarbon.org/	Plot 47 Lubowa Estate, P.O. Box 70480, Clocktower, Kampala, Uganda Phone: +256 752 644611 / +256 414 200988 mail@ugandacarbon.org
Uganda Wildlife Authority http://www.uwa.or.ug	Plot 7 Kira Road P.O Box 3530, Kamwokya Kampala, Uganda Phone: (+256) 414 35500, 312 35500

Where to Find Additional Information

http://www.forest-trends.org
Lists publications related to Payments for Ecosystem Services for a wide variety of audiences. Also information on upcoming events worldwide.

http://community.ecosystemmarketplace.com
Information on PES for community members and NGOs that work with them. Includes a "Talking Circle" for communities to ask and answer questions regarding PES project development.

http://www.katoombagroup.org
An international network of individuals working to promote PES. Includes tools and legal guidelines for project implementation.

http://www.ecosystemmarketplace.com
Leading source of news, data and analytics on markets and PES. Updated daily with new information and yearly reports on carbon, watershed and biodiversity markets.

Printed and Electronic Material

Forest Trends & The Katoomba Group. 2008. *An Introductory Primer to Assessing and Developing Payments for Ecosystem Service Deals.*
http://www.katoombagroup.org/documents/publications/GettingStarted.pdf

Forest Trends & The Katoomba Group. 2008. *Negotiating for Nature's Services: A Primer for Sellers of Ecosystem Services on Identifying & Approaching Prospective Private Sector Buyers.*
http://www.katoombagroup.org/documents/publications/NegotiatingforNature.pdf

Forest Trends & The Katoomba Group. 2007. *Conservation Economy Backgrounder.*
http://www.katoombagroup.org/documents/publications/ConservationEconomyBackgrounder.pdf

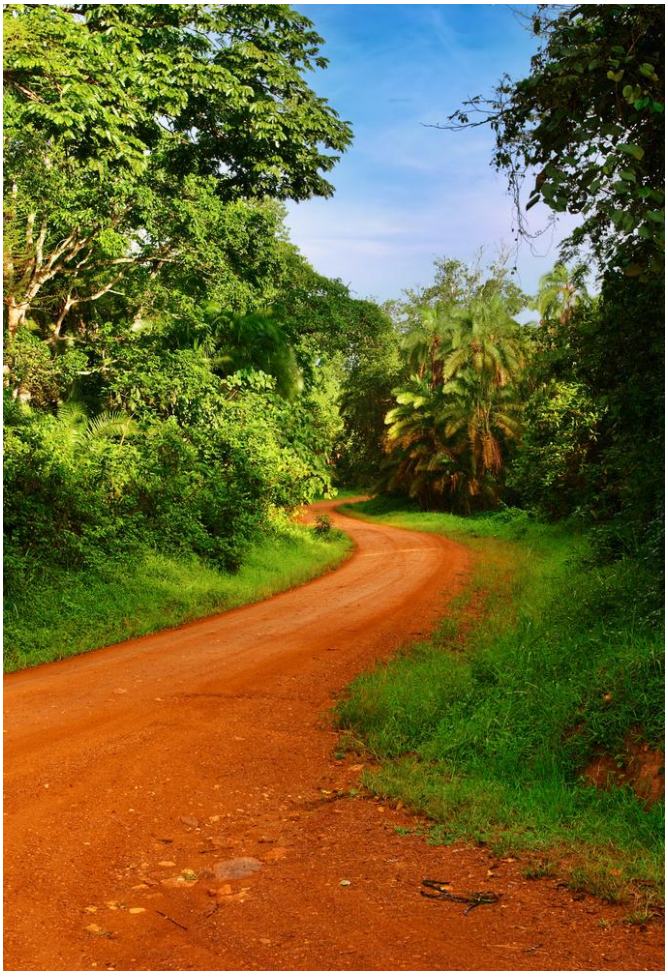
VI. PATHWAYS FORWARD

In this manual, we have covered various concepts regarding ecosystem services, opportunities for ecosystem services payments and markets, the feasibility and key components of PES project development, and the state of PES projects in the East and Southern Africa region.

Even though some themes for the elaboration of ecosystem services projects are very technical, the success of the project depends on the stakeholders to pay close attention to some points:

- Obtain the correct and most precise information possible.
- Examine the potential for your project to be implemented.
- Find good partners.
- Know the laws and policies related to the theme.
- Actively participate in the elaboration and implementation of the project.
- Ensure that members of the involved community understand what is expected of them.

Now, off to work and good luck!



ANNEX: DEVELOPING PAYMENTS FOR ECOSYSTEM SERVICES PROJECTS

In this annex, we present some important concepts that are used in defining and structuring payment for ecosystem service schemes such as externality, property rights, and opportunity and transaction costs. We also present the steps for PES project development.

Concepts Related to Payments for Ecosystem Services[53]

Externality: the effect of an activity on people who are not involved in the activity. An externality can be negative or positive. In our day to day lives, we constantly encounter different types of externalities.

For example, smoke from cigarettes, the noise from bars close to our homes, traffic jams are all negative externalities. A well-conserved neighboring property which makes the market value of our property increase or the manner in which vaccination against hepatitis diminishes the probability that the disease affects our family, among others are examples of positive externalities.

In economics an externality is a cost or benefit, not transmitted through prices, incurred by a party who did not agree to the action causing the cost or benefit. A benefit in this case is called a positive externality, while a cost is called a negative externality.[54]

The idea behind payment for ecosystem services transactions is that there is an externality – the benefit provided by the ecosystem service – which should be compensated. A payment for an ecosystem service can only be established when there is a willingness to pay a value that is greater than the cost of providing the externality.

Property Rights: the agreement between members of a society that regulate the access, use and control over the transfer of goods and services.

One of the crucial points related to the viability of a payment for an ecosystem service scheme refers to the guarantee that the provider will give the buyer regarding the provision of the ecosystem service. This guarantee involves conditions directly related to the type of land tenure and the property rights of the local inhabitants over the area that provide these services[55].

It is difficult for inhabitants who live in an area without legal standing (such as a property title or use rights) to participate in payment for ecosystem service transactions, because it may be difficult for them to convince buyers that the flow of the promised ecosystem service will be maintained by them over time with uncertain claims on the land. Therefore, land ownership is a fundamental requirement of most PES agreements.

[53] Rugnitz Tito, M. (2010) Aprendiendo sobre Servicios Ambientales: Fundamentos para la elaboración de proyectos de carbono forestal. Washington DC: Forest Trends.
[54] http://econ.duke.edu/~hf14/teaching/econ681b_spring03/ExternalityVersusPublicGood.pdf
[55] Wunder S. Börner J.; Rügnitz M. T.; Pereira L. 2008. *Payments for ecosystem services perspectives for the Legal Amazon*. Brazilian Ministry of the Environment.

There are five different property rights that are relevant for payments for ecosystem services[56]:

1. Access	Right to enter into a determined property and use – not extract – benefits (for example, areas designed for recreation, National Parks, etc.)	Accumulation of rights ↓	**Authorized Use**
2. Extraction	Right to extract natural resources (wood, medicinal plants, etc.)		
3. Management	Right to use and transform resources.		**Renter**
4. Exclusion	Right to determine who can access and extract resources and the ways in which they can be transferred to others.		
5. Sale	Right to transfer one or several property rights.		**Owner**

These different levels of property rights are cumulative. Land owners, for example, have all of the rights presented in the table. A renter, however, does not have the right to sell the land and, depending on the type of contract he or she has, should ask or negotiate with the landowner to obtain authorization before beginning to negotiate the sale of ecosystem services.

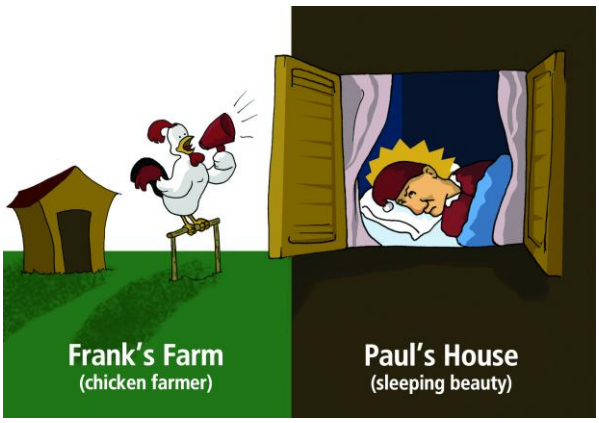
With regard to PES transactions, the right of exclusion (#4 in the table) is the one that determines the real potential of a site for PES transactions (Wunder, 2005). In cases where it is not possible to exclude others– whether they are loggers, illegal occupants, smallholder farmers, or traditional populations – then it will be difficult to guarantee the maintenance of carbon stocks (Wunder *et al.* 2008) or the provision of other ecosystem services. When the property rights over natural resources are not properly defined, conflicts between users can erupt and many of the individual rights cannot be demanded.

However, even when there is clarity on land ownership, the land owner may not hold the right to the ecosystem service benefits generated within the property. In some countries, the national constitutions grant the right to ecosystem services to the government.

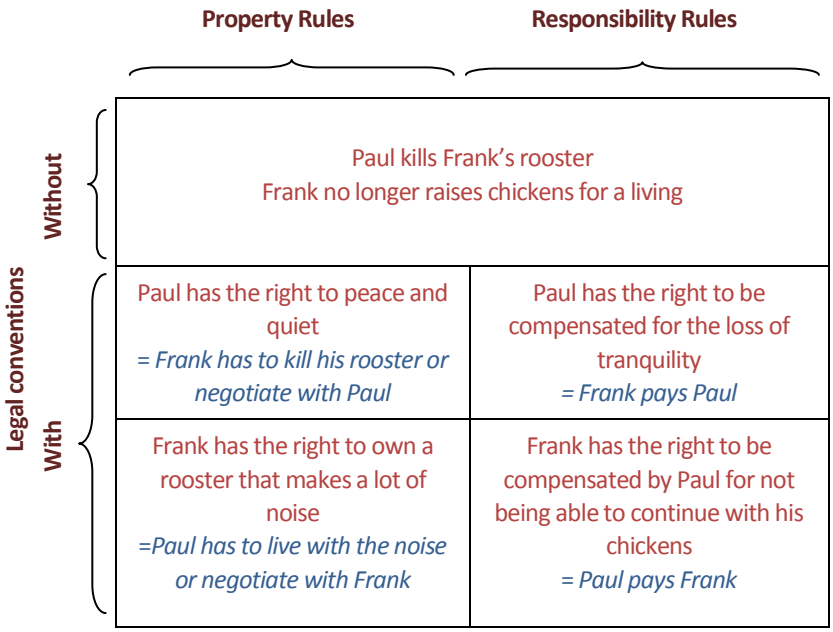
Let's show how all of the previously presented concepts work in an example.[57]

Imagine that there are two small, rural, neighboring properties. Frank lives in the first property, and he recently purchased a rooster thinking that he would become a chicken farmer. Paul lives on the neighboring property and he loves to sleep in. Since Frank bought the rooster, Paul isn't able to sleep in because the rooster crows really early in the morning every day.

There are several possible solutions for resolving the conflict that began when the rooster was bought. To understand these solutions better, we have diagramed them in the figure below, keeping in mind the property conventions (rights) as well as rules regarding responsibilities and property.



[56] Schlager, E.; Ostrom, E. 1992. Property-rights regimes and natural resources: A conceptual analysis. Land Economics, v. 68, p. 249-262,
[57] Example created by Jan Borner in his presentations regarding Payments for Ecosystem Services.



As you can see, there really are distinct solutions for what seems to be a very simple situation to resolve. The difference is that the "property rules" leave the solution with the owners while the responsibility rules determine the solution.

So what would the result of a negotiation between Frank and Paul be? To answer this question, we need to understand another concept – opportunity cost.

Opportunity Cost[58]**:** the cost of the best alternative that was not chosen. That is, all of the money (financial return) that the provider does not receive in order to adopt an alternative activity that is not harmful to the maintenance of the ecosystem service in question. The opportunity cost for a farmer who chooses to plant trees in a field where they could have grown corn is the difference between the money that he or she may have earned from selling corn in that given year and the funds received from the PES scheme for the trees. Note that this cost will be different depending on the price of corn.[59]

Now we can see what the implications are for each possible solution for a negotiation between Frank and Paul. Remember that in this example the externality is the noise from the rooster!

When entering in to the negotiations, Paul will have to determine a monetary value for being able to sleep late. Frank will also need to determine the monetary value of his rooster which may not be just the market value, but may include the fact that the rooster will procreate and bring additional income to his farm.

When they are negotiating, both parties will keep this value in mind. To feel satisfied with the result of the negotiation, Paul should be compensated by Frank for the opportunity cost of being woken up early. The value should be defined between the two parties. On the other hand, if Paul does not agree with the value proposed by Frank, to feel satisfied with the result of the negotiation, Frank should be compensated for the opportunity cost of killing the rooster.

[58] The basis of the calculation for the opportunity cost for the conservation of the forest or other system is a cost-benefit analysis of the local land uses (including, for the cases of forests, logging) which are activities that cause the emission of greenhouse gases for their impact on the forest cover in the analyzed region.
[59] It is however noteworthy that the other direct benefits received for the sale of ecosystem services is one of the ways in which the local community can benefit from PES schemes. Another form would be through positive impacts of PES on the environment or in the local economy (called indirect benefits).

Frank negotiates with Paul *1. Value of the rooster > externality* Paul is compensated for the opportunity cost of waking up early *2. Value of the rooster < externality* Frank kills the rooster is not compensated	**Frank pays Paul** *1. Value of the rooster > externality* or *2. Value of the rooster < externality* Paul has to live with the noise, but he is compensated by Frank
Paul negotiates with Frank *1. Value of the rooster > externality* Paul wakes up early and is not compensated *2. Value of the rooster < externality* Frank is compensated for the opportunity cost of killing the rooster	**Paul pays Frank** *1. Value of the rooster > externality* or *2. Value of the rooster < externality* Frank has to kill the rooster, but he is compensated by Paul

Returning to our example, independently of what type of agreement Frank and Paul establish, there will always be a cost related to the process. This is called the **transaction cost**. That is, all of the time and money that is spent in the development and implementation of an agreement. In the case of Frank and Paul, it will be highly related to the time that both of them use to resolve the problem.

Paul waiting in line to file a claim against Frank.

In the case of PES schemes, **transaction costs** are all of the costs related to the participation in the exchange of goods and services (and their implementation). For water and biodiversity projects, this includes the process of quantifying the service you are selling, finding a buyer, writing a contract, and all of the other necessary steps necessary in order to sell the service.

These costs depend on the type of project (small or large scale), on the existence of an adequate methodology that can be replicated in the project context, the degree of participation by technical staff and local consultants, the method and intensity of the scale required, and the quantity of certificates emitted.

Any sort of payment or compensation that the community agrees to must be sufficient to cover both the opportunity and transaction costs involved in participation in a PES agreement. It is wise to have these amounts assessed, potentially by reliable external advisors, prior to engaging in a PES transaction.

Steps for Developing PES Projects[60]

Once you have concluded a feasibility analysis, assessed risks and opportunities and held community consultations, it is time to begin developing your project. The four basic steps outlined below can be used for the development of carbon, water or biodiversity projects. It is important that communities are involved in all steps of project development.

Step 1: Identify the Ecosystem Service

Identify ecosystem service for sale

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

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

Answering these questions will allow you to determine what ecosystem service is for sale, who the potential buyers are and how the ecosystem service can be restored and maintained.

For example, if Ugandan farmers were interested in gaining access to the carbon market, they would need to develop plans for projects that reduce greenhouse gases. Farmers could consider reforesting portions of their land or making changes in agricultural practices. In both of these cases, ecosystem service sellers would need to document how the adoption of specific resource management practices would sequester carbon and exactly how much carbon they would sequester per hectare. It is also important to consider who the buyers will be – especially since there may not yet be a sufficiently high demand for certain project types.

Measure the ecosystem service

These questions are highly technical and you will likely need experts to assist with this step.
To measure the ecosystem services that will be the focus of the PES deal, it may be in the best interest of all parties to engage scientists and other experts since there are various methods of measuring each of the different services. Important questions to answer include:

- How certain are experts that a particular set of management practices will result in a specific set of ecosystem service-related outcomes?
- How certain is it that the desired ecosystem service outcomes will be achieved given the potential for other unanticipated dynamics such as natural disasters?
- How certain is the buyer that the sellers will fully implement the deal agreement?
- What level of uncertainty is the buyer willing to accept?

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

Payment for a PES project is contingent on the reliable delivery of the services being bought. The seller or sellers of a PES project will therefore need to provide documentation about the baseline. The **baseline** is a scenario representing the situation that would occur in the absence of the proposed project activities. In the case of REDD projects, the baseline serves as a parameter of comparison to see how efficient the project is in reducing the deforestation within the project

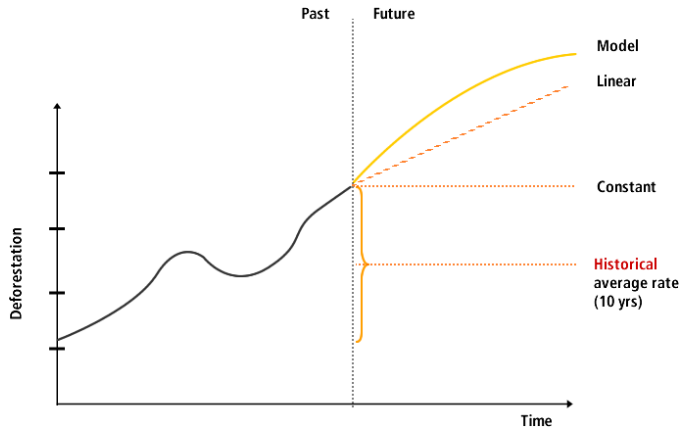
[60] These steps are from The Katoomba Group. (2008) Payments for Ecosystem Services: Getting Started. Please see that publication for greater detail.

area. For reforestation, the baseline serves as a parameter to see how efficient the project is sequestering and/or maintaining the carbon stock in the project area.

There are basically two types of baseline:

Historical baseline: Experts look to the past to predict what would happen in the future without the implementation of the project. For carbon projects, this could be the average deforestation rate for the last 10 years. For a water quality project, looking at the past 10 years could show that water quality has deteriorated and will likely continue to decline in the future.

Future baseline: When the baseline is based on a "projection" or future estimate for service delivery in the region. This estimation can be based on (1) the rate (percentage) of current deforestation; (2) linear growth; or (3) models that simulate the expansion of deforestation in the region. Modeling allows one to take into account more realistic future scenarios such as the construction of a new road, the increase in migration, etc.



Determine market value

The price for an ecosystem service is ultimately determined by what the buyer is willing to pay and what the seller is willing to accept and deliver. Negotiations can include a range of reasons for setting a price, such as:

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

Buyers will tend to seek the lowest-cost suppliers of services, though there is growing interest in – and a premium placed on – the 'co-benefits' from some PES deals including habitat conservation, poverty alleviation and other factors. That is, there is a growing number of buyers

who are looking for deals that have proven benefits to the surrounding community or that have been endorsed by a credible NGO. In these cases, while cost is important, it is secondary to the 'quality' of the product or even the 'story' associated with the PES deal.

Identify potential buyers

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

Some questions you may want to ask yourself to determine the most likely buyers for the ecosystem service you are interested in selling include:

- Who are the largest employers in the province, country or region?
- Who relies on the ecosystem services from a prospective PES deal site in a significant way through:
  - Using significant resources (e.g. downstream water users)
  - Owning large landholdings and affecting habitat / biodiversity on these lands
  - Emitting greenhouse gases like carbon dioxide?
- Are there regulatory requirements that a PES deal could help a company meet?
- If there are no regulations, are there other business benefits that may motivate businesses to invest?
- Has a particular industry or company been receiving negative press about their environmental practices lately?
- Has a company been losing ground to competition – either on social issues or more generally in the marketplace?
- Has a company been a leader on other social or environmental issues?

Aggregating Multiple Buyers and Sellers

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

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

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

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

- Cooperatives
- Legally-registered organizations
- Government managed aggregation entities

Consider whether to sell as individuals or as a group

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

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

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

- Who will implement the agreement terms on the ground?

- How will the monitoring, certification and verification be carried out?
- Who receives the revenues and how are they distributed?

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

Buyers and Motivations for Participation in PES Transactions	
BUYER	**MOTIVATION**
Private Company	***Regulatory Markets:*** • Regulatory compliance ***Voluntary markets*** • Reduction of operating and maintenance costs • Hedging of risks • Increasing investor confidence • Enhancing brand and improving public image • Maintaining license to operate by investing in good relationships with communities, non-governmental organizations and regulators
Private Intermediary	• Simplifying the supply chain for buyers • Turning a profit
Government	• Implementing international policy • Adhering to national regulations to protect the environment • Investing in long-term natural resources supply • Responding to public pressure • Averting environmental cataclysmic events (e.g. floods due to degradation) • Reducing costs
Donor Agency	• Act on environmental and/or development mission • Increase sources of revenue for conservation
NGO	• Acting on environmental and/or development mission • Reducing organization's environmental footprint
Private Individuals	• Acting on environmental and social concerns • Investing in new business ventures

Source: The Katoomba Group. (2008) Payments for Ecosystem Services: Getting Started. Washington DC: Forest Trends

Step 2: Assess Institutional and Technical Capacity

Assess legal, policy and land ownership context

Before designing and implementing a PES scheme, it is necessary to make sure that laws, practices and institutions in a potential PES deal site support, or at least do not obstruct, the development of these schemes. In many countries there are still significant gaps in government policy and regulation around transactions for ecosystem service payments. Other organizations or entities in your region that have gone through the process themselves and learned the permitting and legal requirements are good sources of guidance.

Learning the local land tenure and use rights context is also essential. Important questions to ask include:

- Do prospective ecosystem service sellers have legal rights to engaging in economic activities on the land that is the focus of the potential PES deal?
- Are there other users of this land?
- Are there people who would be impacted by a PES deal in terms of their current resource access or land use patterns?
- Will the act of managing the land to provide the marketed ecosystem service detract from the ecosystem's capacity to provide other services? If so, who depends on these other services, and how will their rights to the service be affected?
- Do local and/or national laws enable (or at least not prohibit) PES?
- If people in rural communities do not have legal and practical access to an ecosystem service, a buyer will likely find the risks of forging a PES deal too great.

Examine existing rules for market trading

The rules for ecosystem service markets vary depending on the service and regulatory or voluntary market in question. They could also refer to the terms set by private buyers or sellers in specific transactions. These rules depend on what type of PES is being pursued. It is essential to understand which rules are defined and which are not before structuring a deal.

Ensure presence of support institutions and organizations

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

These services may add transaction costs, but without them, there may be no deal. Areas where competence will be essential, either from within a community or externally include:

- **Scientific and technical knowledge** for measuring and documenting the existence and current status of ecosystem services that sellers wish to provide (see Step 2) and also for comprehensive land management plans.
- **Negotiation sills and contractual experience** (including financial planning) that ensure that both the buyer and seller can, with full knowledge, agree on all contract terms.
- **Implementation, monitoring and verification expertise** that can help get a project running and also ensure the buyer that the benefits for which they are paying are being reached.

Where highly specialized expertise is needed for limited time periods – such as designing ecosystem monitoring methods, or developing service contracts – specialized companies, public agencies or experienced NGOs can provide business and technical support services. When selecting support institutions, it is essential to compare the costs of "hiring in" expertise with the risks of going it alone or without adequate support. It is also wise to check references and the track record of the organization with which a partnership is being explored.

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

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

Step 3: Structure Agreements

The process of structuring agreements can be time-consuming and external experts and advisors can help save time and ensure that the agreements are entered into knowledgably on all sides. It is advisable to begin with a Term Sheet where the basic elements of the project are stated and agreed upon by the parties. This Term Sheet can then be used as a negotiation and discussion tool to help parties clarify the specifics to be included in a contract.

Design management and business plans

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

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

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

If you are considering working with a private sector buyer, they will likely want to use the transaction to strengthen their reputation. Thus, sellers should be clear on how the company is allowed to transmit its message about the PES deal to the world at large and what the message will be. Issues to consider include:

- Can the buyer use the seller's name in descriptive literature?
- Do the sellers wish to engage with the media?
- Any other questions relevant to the community?

Another important component is a preliminary listing of the management activities required. This list of activities provides the basis for discussing whether environmental objectives can be met throughout the duration of the contract period. The PES management plan should be adaptable with new information over the lifetime of the project. **Adaptive management** means that projects are assessed throughout and findings about what works and what does not work are incorporated into revisions of the activities and work plans. This underscores that resource management is a complex domain in which assessment and mid-course corrections are the norm, not the exception.

Reduce Transaction Costs

Transaction costs include all of the time and money expended developing and implementing a PES deal. Oftentimes, the time spent on a project is easily overlooked. This includes the time to perform all of the tasks presented thus far as well as the implementation of the agreement, monitoring of the project, and verification that the goals of the agreement are being met.

In cases where communities and land managers have little prior organizational expertise, start-up and transaction costs can absorb a significant portion of the seller's hoped-for profit. This is why it is critical to estimate and review transaction costs throughout the process.

To reduce transaction costs, sometimes it is possible to add PES implementation to other reliable, pre-existing conservation or rural development or sustainable management projects which have already established an infrastructure for handling the detail-oriented and costly tasks on monitoring and managing. It is also possible to create cost-sharing mechanisms where institutions can solicit monetary or in-kind contributions from national or state agencies, overseas NGOs, private-sector companies, municipal utilities and the local communities themselves.

Establish the equity, fairness and distribution of benefits

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

- **Direct financial payments**, usually as compensation or opportunity costs or loss of livelihood incurred by ecosystem service protection, such as the conversion of managed farmland to natural forest
- **Financial support for specific community goals** such as building a school or health clinic
- **In-kind payments** such as receiving equipment to help with another development project that does not affect the delivery of the ecosystem service
- **Recognition of rights**, such as increased land rights and increased participation in decision-making processes

No matter which payment mechanism is selected, all stakeholders must agree to it in the early stages of project design. Choosing the appropriate payment types will ensure more durable transactions between buyers and sellers. Payments for services from communally-managed lands have the potential to be more long-lasting if they are managed transparently and in a way that is appropriate to the local circumstances, where local people affected are pleased with the outcomes over time.

It is important to make sure that PES agreements are both fair and flexible. Sometimes the unfairness of a deal (whether beneficial for the buyers or for the sellers) does not emerge until after implementation has begun, so sellers should proposed clauses that allow for re-negotiation under clearly-defined and pre-determined circumstances and also ensure that sellers have the know-how to re-negotiate.

Select contract type

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

- Memorandum of Understanding (MoU or Memorandum of Agreement (MoA)
- Legal contracts
- Customary law agreements
- 'Handshake' agreements
- Quid-pro-quo arrangements

It is critical to keep the agreements realistic, for they are of no use if they cannot be fulfilled. This does not mean one should not strive to be bold, enthusiastic and proactive; just that potential limitations must be well-understood.

These agreements should include:

- **Terms and types of payment:** when, how much, how often, to whom, cash or in-kind, etc.
- **Timing of payments** in terms of when the ecosystem service activities are carried out by the seller, when the buyer ensures that monitoring of the action occurs, or a combination of both.
- **Requirements that need to be met** for payment, such as periodic monitoring, reporting and verification needs
- **Managing risks**, particularly those beyond a seller's control
- **Signatories to the contract** should be directly affiliated with the buyer and seller, though it may be useful to have provisions for the specific roles of support institutions

If these agreements are to be realistic and sustainable, they need to meet the needs of both sellers and buyers, because sellers need to continue to make use of products derived from the land, and buyers need to be sure the promised services are being delivered.

Step 4: Implement PES Agreements

Finalize the PES management plan and begin activities

During this stage, the project must not only be managed effectively, but also consistently monitored and evaluated for service delivery and adequate distribution of benefits in accordance with the agreement. Detailed land management plans should be finalized and the implementation of activities should begin.

Verify PES delivery and benefits

Depending on the level of certainty required by the buyer, it may be necessary to verify that the delivery of the ecosystem service promised in the agreement is being provided. This **certification** may occur as early as the design and contracting phases or as late as a few years into the implementation. The contract may also specify a periodic re-verification of the service provision as the project progresses.

Sellers must never forget that, no matter how much work goes into the project, payment only comes when verifiable results are delivered.

Monitor and evaluate the deal

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

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

The M&E plan should be developed with the input of all key stakeholders to ensure all parties are satisfied with the parameters that are being monitored. In addition, the plan should be evaluated and modified over time as the project progresses, ideally with the input of all stakeholders throughout.

Important issues to consider:

- Who selects indicators and to whom do they report?
- Selection of indicators
- Selection of monitoring sites

In addition to monitoring and evaluating the effectiveness of ecosystem service delivery, it is also important to monitor and evaluate the impacts of the project on project proponents. PES projects can affect stakeholders in both positive and negative ways. It is important to ensure that participation in a PES initiative is not harmful in order to reduce risks and ensure social sustainability of the project. These impacts include changes in one or more of the following:

- Lifestyle of the population
- Culture
- Community: cohesion, identity, independence, etc.
- Political systems or governability
- Physical environment
- Levels of education, well-being or health
- Personal and property rights
- Fears and aspirations

The methodologies for defining social impacts are not as well defined and those for environmental impacts and are often more difficult to measure. Strides are being made to ensure their inclusion in future PES projects.[61]

[61] See *Manual for Social Impact Assessment of Land-Based Carbon Projects* (http://www.forest-trends.org/publication_details.php?publicationID=2436) for one methodology to measure social impacts in carbon projects.

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