

# Policy Brief

## Payments for Ecosystem Services: Towards their Development and Implementation

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### Main Message

Ecosystems and their underlying biodiversity are being degraded at an alarming rate in most if not all parts of the world. In consequence, the services provided by these ecosystems, which are critical for human living and well-being, are also increasingly threatened. This generates serious problems to sustainable development and requires new approaches to manage natural resources. Programmes that provide payments for ecosystem services (PES) can be part of the solution. Through market-based and often policy-induced or regulated mechanisms, PES link managers of ecosystems or “sellers” to “buyers” who benefit from the services of the ecosystem. These include carbon sequestration, water quality maintenance, or the regulation of water flows and levels. While the conservation or sustainable use of biological resources is usually the prime objective, PES schemes can also contribute to alleviating poverty and enhancing livelihoods, in particular if being embedded in effective strategies for sustainable development. Although pursuing such dual objectives may imply trade-offs between efficiency and equity, evidence shows that a PES design adapted to local conditions

can address these trade-offs effectively. For instance, non-monetary benefits - such as support for local development - can provide important additional incentives to engage in PES schemes. However, reasonably secure property or use rights are essential for the sustainability of a scheme and may at the same time constitute its major limiting factors.

Designing, implementing and managing a PES scheme is demanding for all actors involved. In addition to sellers and buyers, actors often include intermediaries as well as administrative and regulatory governmental and non-governmental bodies at different levels. Expertise is a critical success factor, in particular as related to: building on existing institutions or establishing seller groups, stimulating inter-sectoral cooperation, managing conflicts and efficiency-equity trade-offs, facilitating fair negotiations, developing business plans, and mobilising start up funding. With this broad array of know-how necessary for successful implementation of a PES scheme, capacity development is an important issue for its long-term performance. Adaptive management, with a structured, iterative decision-making process and a system monitoring component, can be a useful tool in designing and implementing PES schemes. In many cases, starting small and expanding gradually has proved successful as it allowed for continuous learning and adaptation.

Because of their potential as an instrument to maintain or restore ecosystem services and support livelihoods, we recommend to strengthen the development and application of PES approaches by providing necessary resources to: fill research gaps, establish and assess pilot schemes, monitor successes and failures and elaborate supporting guidelines.

## **1 Threats that Matter**

Forecasts for 2050 suggest that the world will be inhabited by nine billion people. Natural resources are the basis for human life on earth, but maintaining this basis is a challenge. Overexploitation is threatening ecosystems, and related services are at risk in numerous parts of the world. Concerned are vital ecosystem services such as the provisioning of food, fibre or fresh water, regulating of air quality, climate and water protection, erosion control, and supporting services like soil formation, photosynthesis, nutrient and water cycling (Millennium Ecosystem Assessment, 2005). The impact of climate change with increasing incidences of floods, droughts and other extreme weather conditions increases land use pressure on ecosystems. Their degradation is a serious concern across countries and continents. The associated unprecedented loss of biodiversity reduces the basis for future nature-based livelihoods and innovations. Tipping points for population sizes of many species have been reached, indicating difficult or impossible conditions of recovery. More than a third (36%) of the global population lives in water scarce regions and 39% of the global grain production is not sustainable in terms of water use. Increasing food prices, partly caused by food scarcities, repeatedly trigger riots and food insecurity in numerous countries (Food and Agricultural Organisation, 2010).

In this situation, advanced concepts, policies and instruments are urgently needed that are able to effectively safeguard natural resources for current and future livelihoods. In recent years economic approaches that encourage monetary or in-kind payments or transfers from beneficiaries of ecosystem services to those that conserve, restore or manage them, increasingly became considered as part of the solution. Experience from more than 300 PES schemes existing around the globe range from village based initiatives to internationally

agreed regimes. The schemes generate incentives for conservation and sustainable use by compensating resource users for benefits forgone.

This policy brief aims to raise awareness and understanding among decision-makers concerned with aspects of sustainable development for PES as an instrument with potential to solve some of the current and future problems on earth. It summarises the discussions and suggestions of an international expert workshop, held in 2010 on the Isle of Vilm in Germany<sup>1</sup>.

## **2 PES – What they are and how they work**

Payments for ecosystem services are direct and flexible incentive-based mechanisms, under which a user or a beneficiary of an ecosystem service makes a direct payment in cash or in kind to an individual or community whose decisions on the use of natural resources have an impact on the ecosystem service provision (OECD, 2010). While there are debates as to the most appropriate definition of PES, generally, a PES scheme is characterised by complying with all or at least most of the following ideas: The scheme involves a voluntary, conditional agreement between at least one “seller” and one “buyer” over a well-defined environmental service or land use presumed to continuously produce that service (Wunder, 2005). It is crucial that the conditionality provision applies. Accordingly, the transfer of resources or payments is carried out once it is proved that, for instance, land users have managed their land in a way that has delivered the ecosystem service desired by the service beneficiary. Monitoring is thus also a key aspect of PES design in order to ensure service delivery.

A PES scheme can involve, for example, flood control services between up-stream and down-stream users in a river catchment or a mechanism for land users rewarding biodiversity conservation, water protection or carbon sequestration in soils or forests. Since schemes range from small local projects to global international agreements, the number and organisational form of selling or buying participants, the service specification, payment and monitoring models, and many other features vary substantially. Participants could include individual land users, communities, private companies or the general public. As such, tenure structures can be private-private, private-public or public-public. The shape of a PES scheme depends on regulations and norms as well as relevant political, social, economic and ecological conditions in a specific location. Thus, while PES schemes differ substantially, all of them have in common that costs for the maintenance or restoration of defined ecosystem services are rewarded by beneficiaries (beneficiary-pays principle) (Engel et al., 2008).

In general, PES aim to achieve specific environmental outcomes related to maintenance or restoration of ecosystem functions. In developing countries, however, schemes often additionally aim to pursue socio-economic goals associated with poverty alleviation and equity (Wunder, 2008).

With the term PES a name has been given to market-based mechanisms, whose concept is not new. The Clean Development Mechanism, as set up by the Kyoto protocol, some of the European Union’s agri-environmental measures and the certification of products according to ecological and or socio-economical criteria, for example, have been in place for quite some time. More recently, Reducing Emissions from Deforestation and Degradation (REDD) and

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<sup>1</sup> Payments for Ecosystem Services: Towards an Implementation Strategy (13-16 December 2010, Isle of Vilm, Germany; [http://www.bfn.de/0610\\_v\\_payments-ecosystemservice.html](http://www.bfn.de/0610_v_payments-ecosystemservice.html))

the Green Development Initiative (GDI) found their way into the focus of PES researchers and practitioners (Angelsen et al., 2008). In their initial conceptions, they all emphasize the relevance of directly rewarding benefits by market-based mechanisms that are policy supported and regulated. Further developments of PES schemes, especially those under the REDD mechanism, advocate the importance of biodiversity protection and enhanced development, addressing issues such as local people's livelihood and poverty alleviation (Vatn et al, 2009).

### 3 Circumstances Matter

PES are one but a potentially influential instrument in a set of regulations and incentive mechanisms. **Embedding PES in an effective strategy for sustainable development** can generate synergies for the environment and livelihoods and avoid negative side effects for the local population.

Where PES schemes pursue dual environmental and social objectives, trade-offs between **efficiency and equity** can be expected. A clear formulation of the desired outcomes, for instance, area under protection (efficiency) or number of poor land-users receiving payments (equity) helps designing appropriate schemes that fit the intended objectives. Minimum social and environmental standards could emphasise the significance of, and provide safeguards for, the respective objectives. In general, equity considerations improve the sustainability of PES schemes over time (Pascual et al, 2010).

In a number of projects evidence showed that **remunerations for benefits other than or beyond cash payments** were of significant importance for service sellers. These additional non-monetary benefits of a PES scheme included enhanced recognition by governments and an associated support for local development that empowers communities and also provides assets in terms of education, improved infrastructure, etc.

Reasonably secure and long term **property or use rights** for ecosystem services are important prerequisites for viable PES schemes because they enable service sellers to maintain altered resource management decisions over time and to guarantee project permanency. Under some circumstances, the existing de jure or de facto property or use right systems constitute severe limitations to pro-poor outcomes. On the other hand, the process of establishing a PES programme can clarify and strengthen property and use rights (Swallow and Meinzen-Dick, 2009).

### 4 Critical Issues and Challenges

For administrative or contracting purposes, PES tend to separate ecosystem functions and ecosystem services from each other. Services like carbon sequestration or water quality maintenance are, hence, usually considered in different projects. Yet, ecosystems usually provide multiple benefits. The joint consideration or **bundling of various functions** could generate synergies and co-benefits, but adds on scheme complexity and, thus, impedes on implementation (Karousakis, 2009).

The effectiveness of PES schemes may be reduced by **leakage** that occurs when the provision of ecosystem services in one location reduces ecosystem services in other sites. This predicament can be addressed through respective specifications in the contracts between

buyers and sellers, by appropriate monitoring as well as through the coordination of environmental and development policies and activities at local and regional level.

In practice the actual payment for ecosystem services can be informed, but is not necessarily determined by the **value of the ecosystem service**. However, the payment should at least cover service providers' **opportunity costs** that arise with the adoption of practices determined by the scheme. A comprehensive valuation, capturing major provisioning, regulating, supporting and cultural services can be cumbersome to obtain and might still not reflect a potential price, because buyers are not in the position or willing to offer that price. Thus, although a comprehensive valuation provides useful information, it should not be a prerequisite for scheme implementation. Instead, opportunity costs, prices obtained from willingness to pay investigations or inverse auctions can provide practical indications on potential prices (The Economics of Ecosystems and Biodiversity, 2010).

Caution should be taken with the way PES are portrayed to key stakeholders. Especially in indigenous societies, schemes could be misunderstood as a way of **commoditizing** peoples' ways of life. The delivery of monetary payments for the provision of environmental protection may **undermine the intrinsic motivation** for nature's good stewardship existing as a norm among some groups of land users, especially in the longer-run. To avoid this problem, clear safeguards should be put in place to guarantee that PES do not undermine the positive effect of already existing informal institutions such as collective action (Huberman, 2008).

Most existing PES schemes still ignore **additionality**. This implies that in practice not only those activities are rewarded that generate "additional" benefits which would not be produced without the scheme, but also activities which land users would be willing to carry out in the absence of the scheme. Critics argue that the consideration of additionality is essential in promoting environmental and market integrity and the economic efficiency of PES programs. Yet, some countries, for example Costa Rica, intentionally ignored additionality and, for fairness reasons, paid for services from forestland that would have been provided also without incentives (Bennett, 2010). Strong eligibility requirements seeking to implement additionality, for example by defining baselines, may also lead to rising monitoring and enforcement costs and sometimes to adverse strategic behaviour of potential sellers.

## 5 Scheme Design is Key

The design phase is crucial for the success or failure of a PES scheme. In many cases **intermediaries** such as governmental and non-governmental organizations, research teams, or consultancies play a vital role in initiating and subsequently implementing a scheme. Thus, their expertise, skills and competence to accomplish the following **central technical and coordinating tasks** are crucial:

- identify the **ecosystem** to be targeted and its current and desired status;
- link potential buyers and sellers and involve other relevant **stakeholders** in the design process;
- screen existing **institutions** in terms of regulations and organisational structure on which a PES scheme could be built (e.g. existing certification or labelling schemes, etc.);

- develop a plan that outlines financial requirements over time and acquire adequate **start-up financing**, establish **risk funds** if necessary, and implement capital budgeting;
- stimulate and institutionalise **inter-sectoral coordination and cooperation** (depending on the objectives of the scheme, this can include sectors like water affairs, forestry, social development, economic affairs, etc.);
- provide **information and juridical support** to contract parties and stakeholders (e.g. on environmental monitoring or the negotiation of legal transactions);
- to guarantee sustainability, try to develop **local capacity** beyond scheme activities;
- promote **transparency and local acceptance** for the scheme beyond contract parties;
- manage **efficiency-equity trade-offs**;
- manage **expectations** and resolve occurring **conflicts** through stakeholder dialogues;
- facilitate fair **negotiations on prices**, payment modalities, etc.;
- avoid high **administrative and transaction costs** and consider **costs for missing the target**;
- develop a **business plan** and draft **contracts**.

Generally, starting with small and clearly focussed pilot arrangements and subsequent **scaling-up** allows to gradually develop knowledge and institutional arrangements, and to be flexible to unforeseen and changing framework conditions. As an example, the South-African environmental support programme “Working for Water” that started to operate in 1995 with wetland restoration (eradication of invasive alien species), continuously expanded and developed new components like fire prevention, land care, provision of energy over time (Turpie, Marais and Blignaut, 2005).

Where land is substantially fragmented, as for example in many agricultural landscapes in Africa, well established **local smallholder cooperatives** proved to be suitable entities to represent seller groups. Whereas, examples from Central and Eastern Europe rather suggest a **differentiation of payments** to smallholders in fragmented agricultural landscapes. Thus, actual approaches are situation specific to a large extent, but, learning from case studies helps in scheme design.

## 6 Selected Implementation Issues

**Adaptive management** is an approach that foresees structured, iterative decision-making processes, which incorporates a system monitoring component and evaluates results on the basis of what has been learned. This approach could also be useful for PES implementation (Waters, 1986). In practice, it is important to avoid the one-size-fits-all trap and to facilitate joint bottom-up and top-down approaches.

The **facilitating process** in PES implementation is essential. This applies specifically in situations where local sellers and non-local buyers that often come from different social, economic, and cultural backgrounds, face the challenge to build an effective mechanism based on mutually trusted monitoring and adjudication as well as just and effective payment proce-

dures. Facilitating this process, for instance through intermediaries which are trusted by both sides, is a critical success factor.

Specific **mechanisms** that have been initiated in the design phase, like inter-sectoral coordination and conflict resolution will have to be further developed over time, and new procedures related to contract enforcement, monitoring, etc. have to be put in place during implementation. MRV (monitoring, reporting and verification), which is often not sufficiently covered in PES discussions, should be an essential component of PES implementation. It assures that the conditionality criterion which relates payments to predefined conditions is met.

**Changing conditions**, for instance, in terms of service supply or demand, property rights or other institutional structures, pose specific challenges to PES implementation and require adjustment mechanisms to be in place.

## **7 Capacity Development - A Means for Further Implementation**

Human capacities are critical for PES design and implementation. The spectrum of know-how involved in the design and implementation of PES schemes, however, is broad and includes physical, environmental, social and economic aspects. Building on existing knowledge and experiences of stakeholders, it is important to clearly identify training needs for each individual stakeholder group (sellers, buyers, intermediaries, etc.). Based on existing guidelines, module based training material that addresses different stakeholders as well as typical challenges and constraints in terms of technical implementation and social implications are useful. Best practice PES case studies should be incorporated into various disciplinary and interdisciplinary related course curricula to demonstrate practical applications and challenges of market-based and/or policy induced instruments.

## **8 Further Requirements to Develop PES**

1. PES are one currently promising and widely applicable component of a spectrum of solutions to address the degradation of ecosystem services. Hence, assistance in further strengthening the approach is recommended.
2. In this context we suggest to provide the necessary resources to:
  - further investigate and develop the potential of PES,
  - consider PES as instruments in sustainable development and strategies and policies,
  - establish and critically evaluate pilot schemes,
  - identify best practices that deserve dissemination and
  - elaborate design and implementation guidelines to support application.

Due to varying conditions across locations, schemes need to be tailor-made and draw on local experiences, while highlighting and integrating context specificity.

3. Capacity building for the development and management of instruments that link environmental, economic and social concerns is central to address sustainable development across continents. Thus, building capacity for PES application at various levels is recommended.

## References

- Angelsen, A., Streck, C., Peskett, L., Brown, J., Luttrell C. (2008). What is the right scale of REDD? Implications of national, sub-national and nested approaches. CIFOR, Bogor Barat, Indonesia.
- Bennett, K. (2010). Additionality: The next step for ecosystem service markets. *Duke Environmental Law & Policy Forum*, Vol 20, 417-438.
- Engel, S., Pagiola, S., Wunder, S. (2008). Designing payments for environmental services in theory and practice: An overview of the issue. *Ecological Economics*. 65(4):663-674.
- Food and Agricultural Organisation (2010). FAO Water. <http://www.fao.org/nr/water/issues/scarcity.html>
- Huberman, D. (2008). A gateway to PES: Using payments for ecosystem services for livelihoods and landscapes. *Markets and Incentives for Livelihoods and Landscapes Series No. 1*, Forest Conservation Programme, International Union for the Conservation of Nature (IUCN), Gland, Switzerland.
- Karousakis, K. (2009). Promoting biodiversity co-benefits in REDD. OECD Environment Working Papers, No. 11, OECD Publishing, Paris.
- Millennium Ecosystem Assessment (2005). Ecosystems and Human Well-being. Synthesis Report. Island Press, Washington.
- Organisation for Economic Co-operation and Development (2010). Paying for biodiversity: Enhancing the cost-effectiveness of payments for ecosystems. OECD, Paris.
- Pascual, U., Muradian, R., Rodríguez, L.C., Duraiappah, A. (2010). Exploring the links between equity and efficiency in payments for environmental services: A conceptual approach. *Ecological Economics*. 69(6):1237-1244.
- Swallow, B., Meinzen-Dick, R. (2009). Payment for environmental services: Interactions with property rights and collective action. In: Beckmann V., Padmanabhan, M. (2009): *Institutions and Sustainability*. Springer, Berlin.
- The Economics of Ecosystems and Biodiversity (2010). <http://www.teebweb.org>
- Turpie, J. K., Marais, C. and Blignaut, J. N. (2005). The working for water programme: Evolution of a payments for ecosystem services mechanism that addresses both poverty and ecosystem delivery in South Africa. *Ecological Economics* Vol. 65, No. 4.
- Vatn, A., Vedeld, P., Petursson, J.G., and Stenslie, E. (2009). The REDD direction – The potential for reduced forest carbon emissions, biodiversity protection and enhanced development. Noragric Report No. 51. Department of International Environment and Development Studies, Norwegian University of Life Sciences.
- Walters, C.J. (1986). *Adaptive Management of Renewable Resources*. Mc Graw Hill. New York.
- Wunder, S. (2005). Payments for Environmental Services: Some Nuts and Bolts, Occasional Paper No. 42. CIFOR. Bogor Barat, Indonesia.
- Wunder, S. (2008). Payments for environmental services and the Poor: Concepts and preliminary Evidence. *Environment and Development Economics*, (3): 279-297.

## Link

International Workshop "Payments for Ecosystem Services: Towards an Implementation Strategy" 13-16 December 2010; Program, Presentations and Policy Brief

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