Payments for Environmental Services and the Global Environment Facility

A STAP advisory document

Revised edition March 2010

First published December 2008

Scientific and Technical Advisory Panel

The Scientific and Technical Advisory Panel, administered by UNEP, advises the Global Environment Facility

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About STAP
The Scientific and Technical Advisory Panel comprises six expert advisers supported by a Secretariat, which are together responsible for connecting the Global Environment Facility to the most up to date, authoritative, and globally representative science.

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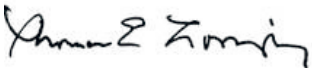
Preface

Payments for Environmental Services (PES), sometimes called Payments for Ecosystem Services, are a popular intervention in GEF projects that aim to generate ongoing financial incentives for environmental objectives. This advisory document summarizes the evidence base for PES effectiveness and the key issues to consider in the design and selection of PES programs in the GEF portfolio. The key messages and their implications for the GEF include:

1. There are three potential points of entry for PES projects in the GEF portfolio: (i) set up and pilot direct payments; (ii) co-finance multiple-service strategies; and (iii) finance PES start-up costs. **Every GEF project should identify which of these entry points are being proposed and why.**
2. There are four main threats to PES effectiveness: (i) non-compliance; (ii) poor administrative selection; (iii) spatial demand spillovers; and (iv) adverse self-selection. The threat of adverse self-selection is usually ignored in GEF project proposals, but empirical evidence suggests it is likely to be the most important threat. **Every GEF PES project proposal should describe design choices to minimize these threats and specify indicators that will permit one to evaluate the importance of these threats in the project.**
3. Financing of PES initiatives is consistent with the GEF's mandate to increase the supply of global environmental benefits. **As the only multilateral fund committed to the sustained flow of global environmental benefits, the GEF should consider longer-term funding of PES payments and carefully examine the assumed causal mechanisms underlying its current emphasis on short-term funding.**



Thomas Lovejoy
Chair, Scientific and Technical Advisory Panel

Paul Ferraro
Panel Member for Biodiversity (2007-2009)

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Acronyms

ES	Environmental/Ecosystem Services
GEB	Global Environmental Benefit
PA	Protected Area
PES	Payments for Environmental Services (also known as Payments for Ecosystem Services)
PSA	Pagos por Servicios Ambientales (National Payments for Environmental Services Scheme, Costa Rica)
PSAH	Pagos por Servicios Ambientales Hidrológicos (National Payments for Hydrological Environmental Services Scheme, Mexico)
REDD	Reducing Emissions from Deforestation and Forest Degradation
UNFCCC	United Nations Framework Convention on Climate Change

Executive summary

Payments for Environmental Services (PES) represent a new paradigm of 'conditional conservation' that promises to be more efficient and equitable, and which can also help raise additional environmental funding. As such, PES are of interest to GEF's mandate and the natural resource management focal areas and strategic objectives for GEF-5. In this paper, we provide a strategic analysis of scientific and global funding issues to guide the GEF on how to use PES to effectively deliver global environmental benefits (GEBs).

PES can be defined as (i) voluntary, (ii) contingent transactions between (iii) at least one seller and (iv) one buyer (v) over a well-defined ES, or a land use likely to secure that service. This simple five-criteria definition can serve as a 'lens' or 'template' through which specific proposals can be evaluated by the degree to which they adhere to a PES prototype or model.

PES are best suited for promoting conservation on private lands, but can under certain conditions also be applied to public lands. Both user-financed and government-financed PES exist and there are options for GEF to invest in both.

In the scientific literature, four potential threats to PES effectiveness are identified: (1) non-compliance with contractual conditions; (2) poor administrative selection (i.e., contracts are offered to areas or individuals who are not in the best position to supply environmental services cost-effectively); (3) spatial demand spillovers (a.k.a., general equilibrium effects, or "leakage") whereby protecting a resource in one location pushes pressure onto resources elsewhere; and (4) adverse self-selection, where people would have supplied the contracted PES service or activity even in the absence of a payment.

- Every GEF PES project proposal should describe design choices to minimize these threats and specify indicators that will permit one to evaluate the importance of these threats in the project.

PES are increasingly popular because of their perceived simplicity and cost-effectiveness in comparison to alternative conservation interventions. They also are seen as a way to generate conservation financing from new sources. Theory, however, suggests that PES could generate few or no environmental benefits. Thus whether current PES initiatives are successful in delivering conservation outcomes cost-effectively is an empirical question. Unfortunately, the empirical evidence is weak, with few studies designed to identify the effects of PES, particularly in low and middle income nations. The few studies that exist show little or no environmental impact from PES. Published estimates of socioeconomic impact are non-existent. The weak evidence base implies that the GEF should ensure that agencies and partners are designing PES projects with the intention of evaluating their impacts on environmental and socioeconomic outcomes.

The GEF's current focus is to fund short-term, start-up costs of PES interventions. However, most biodiversity degradation worldwide is due to permanent market failures that undervalue GEBs. Conservation faces ongoing opportunity costs and there are no quick fixes to make conservation privately more profitable than alternative GEBs-degrading land uses. Thus payments need to come from external sources like the GEF and need to be long-term. Only in exceptional cases, such as when high fixed start-up costs are key barriers to PES development, will short-term enabling investments effectively reverse degradation pressures.

Among GEF's mandate to deliver GEBs, funding for climate-change mitigation such as reducing emissions from deforestation and forest degradation (REDD) will likely become relatively abundant, while funding for global biodiversity conservation will likely remain glaringly scarce. Most donors are reluctant to make direct, contingent, long-term payments for biodiversity conservation. The GEF is one of the very few windows for international biodiversity payments to procure GEBs. We thus recommend that the GEF should not be used just to fund capacity building and feasibility studies, but also to fund payments for environmental services.

- There are three potential points of entry and any GEF PES proposal should clearly indicate which of these three points of entry is being proposed and why:

Set up and pilot direct payments: GEF should fund direct payments: a) in special cases when short-run payments are likely to shift land use, b) when tests of payment effectiveness can persuade pre-identified long-term ES buyers, or c) when long-term payments through trust funds are the most promising way to secure valuable biodiversity.

Co-finance multiple-service strategies: GEF should continue to support government-financed multi-service PES, but try to leverage what emerges as 'best PES practice'. Co-financing start-up costs in user-financed PES (piggy-backing) can deliver GEBs synergies, but combining this with explicit payments for GEBs to complement other flows of environmental service payments (layering) will yield better outcomes. Leveraging biodiversity considerations in REDD design will be particularly important.

Financing PES start-up costs: GEF will sometimes have a rationale for subsidizing high PES start-up costs, but will need to carefully scrutinize the feasibility of PES proposals (in particular who will make recurrent payments), and assess if the start-up costs are truly the only binding constraint on project implementation.

Introduction

The purpose of this paper is to provide the GEF with strategic advice on payments for environmental services (PES). Specifically, we: (i) assess which GEF investments in PES are most likely to generate global environmental benefits (GEBs), and (ii) outline the implicit assumptions in each of these main "entry points" for GEF investments. Our assessment and advice are based upon a literature review and our own international PES expertise, including vis-à-vis GEF's mandate (see Nasi et al. 2002).

PES represent a new paradigm of 'conditional conservation.' They can also raise additional funds for securing local and global environmental benefits. PES belong to the larger generic family of conditional cash transfers, which are generating encouraging results in other sectors, such as education or post-war resettlement. PES initiatives explicitly compensate rural land stewards for the losses that set-aside conservation and sustainable land use may impose upon them. Thus, although the evidence of their social impacts to date is limited, PES may be a conservation model that is more likely to alleviate poverty than most traditional GEF projects. While a few PES programs have existed for a couple of decades, most are recent, and as yet little scrutinized in terms of environmental and socioeconomic impacts. Preliminary empirical evidence suggests mixed success, with failures likely associated with shortcomings in early-stage design and implementation – especially in large-scale public schemes – rather than in the underlying PES concept.[1] More generalized lessons about PES design and implementation are beginning to emerge.[2]

PES are relevant to the Strategic Objectives 1 and 2 of the GEF-4 Biodiversity Focal Area Strategy ("To Catalyze Sustainability of Protected Area Systems" and "To Mainstream Biodiversity in Production Landscapes/Seascapes and Sectors").[3] PES are also relevant to the Climate Change and Land Degradation focal areas of GEF-4, as well as the Sustainable Forest Management (SFM) Framework Strategy and the Tropical Forest Account for the World's last great tropical forests. In GEF-5 [4], PES are relevant to Objectives 1 and 2 of the Biodiversity Focal Area Strategy; Objective 5 of the Climate Change Focal Area Strategy; the Strategy for GEF Investments in Sustainable Forest Management (SFM)/REDD-Plus and Land Use, Land-Use Change and Forestry (LULUCF); and to Objectives 1, 2 and 3 of the Land Degradation Focal Area Strategy. PES will also be addressed as part of Learning Objective 3 of the Biodiversity Focal Area ("Enhancing Impacts through Improved Understanding of the Causal Relationships between Popular Mainstreaming Approaches and Conservation Outcomes").[5]

PES investments by the GEF are currently constrained by (i) a small budget, (ii) short-term planning horizons, (iii) a resource allocation system, and (iv) a culture of acting as a traditional project-supporting donor rather than as a procurer of global public goods. While some of these are inescapable GEF framework conditions, others mainly represent inertia of institutional thinking that we will scrutinize critically in the following text.

In their review of GEF-supported PES programs, Gutman and Davidson (2007) inter alia recommended that the GEF: (i) restrain from being the principal buyer of environmental services (ES), due to post-project payment disruptions; (ii) enhance private-sector participation in PES, especially ES buyers; (iii) upscale PES schemes to increase country-wide impacts, (iv) expand PES investments beyond Latin America, (v) mainstream biodiversity into production landscapes through certification, "greening" of agricultural subsidies, financing both land/landscape restoration

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1 Efficiency seems to differ according to the scale of the PES program. Some small, user-financed schemes appear to be quite efficient in influencing land use and environmental service delivery. For instance, see two decentralized schemes in Ecuador (Wunder and Alban 2008) and the case of Vittel's watershed-scheme in France (Perrot-Maitre 2006). Correspondingly, recent empirical evidence suggests that some national-level schemes such as in Costa Rica (e.g. Robalino et al. 2007; Sierra and Russman 2006) or Mexico (e.g. Muñoz-Piña et al. 2008) are insufficiently targeted in their design to consistently achieve the desired incremental land-use effects on a significant scale.

2 See Special Issue of Ecological Economics 65(4): 663-852 (1 May 2008) – including the summary article (Wunder et al. 2008a).

3 GEF (2007). Biodiversity Focal Area Strategy and Strategic Programming for GEF-4. http://www.thegef.org/gef/node/1796.

4 See the GEF-5 Focal Area Strategies. GEF/R.5/Inf.21, November 02, 2009. URL: http://www.thegef.org/gef/fifth_replenishment.

5 The Biodiversity Focal Area Strategy for GEF-5 states that "the GEF has an opportunity to contribute the evidence base of these approaches by supporting work to answer the following question, 'How do certification, PES and transfers of information about the distribution and values of ecosystem services affect conservation and sustainable use outcomes, and in what circumstances are they likely to be most effective?' This learning objective will be accomplished primarily through support of prospective experimental and quasi-experimental project designs. When feasible, quantitative retrospective studies in programs that have received GEF funding will also be supported. (Case study approaches are not encouraged as a means to achieve this learning objective, particularly for certification and PES programs. Such approaches cannot effectively address the substantial self-selection bias that arises in voluntary conservation programs.)"

and financing activity-reducing conservation, and (vi) combine PES biodiversity goals with other internationally agreed objectives (e.g. Millennium Development Goals, climate-change mitigation, etc.). This report builds on this background and context.

Box 1. Barriers to PES effectiveness

The theory of PES is simple: the quantity of biodiversity or environmental services supplied should increase if beneficiaries, or their representatives, pay for the cost of increasing the quantity supplied (Wunder 2007; Ferraro 2008). This theory, however, is complicated by four potential threats to PES effectiveness:

1. Non-compliance with contractual conditions.
2. Poor administrative selection (i.e., contracts are offered to areas or individuals who are not in the best position to supply environmental services cost-effectively).
3. Spatial demand spillovers (also known as "leakage") whereby protecting a resource in one location pushes pressure onto resources elsewhere. Some PES programs pay for avoided ecosystem degradation or species abundance where degradation and species decline can be costly to reverse. Such programs may thus create an "option value" on resources not enrolled in the program. This value induces non-participants to protect their resources in order to preserve the option of receiving a payment in the future. Such a spillover extends the impact of a PES program, but can make evaluating the program more difficult.
4. Adverse self-selection.

The first three threats are common to most conservation interventions. Adverse self-selection, however, is unique to incentive programs and may constitute one of the largest threats to PES success. During any contract period, there are often people who would have supplied the contracted PES service or activity in the absence of a payment. This outcome is particularly likely in PES programs that pay individuals for not doing an activity, such as deforestation. People who would have engaged in the contracted activity without a payment are the most likely to participate in a PES program because they have the lowest opportunity costs. Differentiating these people from others whose behavior would be affected by PES is difficult because the actions someone would have taken in the absence of a payment is not known to the conservation payer. A poorly targeted PES program could thus end up paying largely for what would have happened anyway. Every GEF PES project proposal should describe design choices to minimize these threats and specify indicators that will permit one to evaluate the importance of these threats in the project.

Findings and recommendations

1. Establish a working definition of PES

The operational guidelines of the GEF contain no clear definition of PES. In their review of the GEF's PES portfolio, Gutman and Davidson (2007) stress that "neither the GEF nor its implementing agencies [...have] guidelines stating when a project should be considered a PES project". Such a definitional vacuum runs the risk of generating considerable conceptual confusion. Since PES is currently fashionable among international donors, proponents have every incentive 'to sell old wine on new bottles', i.e. to declare any proposed economic incentive under the label of PES, in order to jump on the donor bandwagon. While academic definitional debates can be prolonged and enervating, the use of an explicit, simple, concise definition of PES in the context of GEF finance is therefore highly recommended.

We define PES as (i) voluntary, (ii) contingent transactions between (iii) at least one seller and (iv) one buyer (v) over a well-defined ES, or a land use likely to secure that service (Wunder 2007). This simple five-criteria definition, based on the theoretical PES literature (Simpson and Sedjo 1996; Ferraro and Simpson 2002; Ferraro and Kiss 2002) can serve as a 'lens' or 'template' through which specific proposals are evaluated by the degree to which they adhere to a PES prototype or model. The core emphasis lies in criterion (ii): conditional, quid pro quo transactions where payments are made if and only if the agreed-upon ES are provided. While PES can also be about raising ES user payments for conservation (a feature that tends to make PES more efficient), spending revenues for directly 'buying conservation' is the most innovative feature of PES.

The "E" in PES has been used both for "environmental" or "ecosystem" services. We use the former, assuming for most cases a separable nature of different services. The latter has a more integral interpretation, implying that multiple services cannot always be broken up into additive components (Scherr et al. 2004).

2. The scope of PES

Both user-financed and government-financed PES exist, and GEF has invested in both types. The former are typically smaller (e.g. at the watershed scale), more focused in their interventions (e.g. target zones and differential PES rates), more conditional, and thus ultimately more efficient in delivering ES. Government-financed PES (e.g. the Costa Rican PSA[6] or the Mexican PSAH[7] programs) overall tend to be more diffuse (less targeted, uniform payments, sometimes slack monitoring and sanction systems), and are often hijacked by other political agendas (e.g. poverty alleviation, electoral support, or regional development). This typically makes the latter less efficient in achieving environmental targets. However, government-financed PES operate at larger scales and are often the only mechanism for financing environmental outcomes whose values are diffusely spread across large numbers of people (e.g., biodiversity conservation, endangered species). Moreover, they can be cost-effective due to administrative economies of scale and can be made more efficient through improvements in targeting rules and contract designs.

Using PES in a government-managed protected area (PA) context could be appropriate in certain conditions, but special care is needed. In private, community and indigenous reserves, land-use choices are typically legally less constrained, so PES can be applied in order to affect voluntary resource-management choices. Public protected areas, however, are predominantly already under stricter legal protection, which in principle renders PES obsolete. Payments in public PAs could be appropriate in the following special cases: (a) in 'sustainable-use' PAs where a range of legal or tolerated land-use options exist (pilot PES do exist in such settings)[8]; (b) when PAs have been declared 'on top of' previous private or communal landholdings, or (c) when the command-and-control potential de facto is near zero ("paper parks"). However, even under these circumstances perverse incentives from payments in a PA context can potentially arise. For instance, the action of paying illegal squatters not to deforest can create both a fairness dilemma

[6] Pagos por Servicios Ambientales (National Payments for Environmental Services Scheme, see also Box 2).
[7] Pagos por Servicios Ambientales Hidrológicos (National Payment for Hydrological Environmental Services Scheme).
[8] An example is the new Bolsa Floresta program in Amazonas state (Brazil) where residents of protected areas are paid conditionally to keep deforestation minimal.

(angering those already abiding the law), perverse reward claims (inducing the expectation that any avoided illegal activity merits compensation) and demographic 'magnet' effects (payments attract still more squatters). Using PES as a mean to raise new revenues for PA management may be an option, but it falls short of the original PES idea of compensating service providers who bear the costs of conservation. While command-and-control tools and PES can in many cases be favorably combined (as they have been in GEF-supported PES programs),[9] the use of PES in PAs needs thorough consideration and particularly careful design.

One PES context in which PAs are likely to play a role is in international PES systems, such as in a compensation system for Reducing (carbon) Emissions from Deforestation and Forest Degradation (REDD), in which carbon buyers would remunerate nation states or project developers conditionally for reducing deforestation rates below historical baselines. Recipient nations may pass on part of the REDD receipts to landowners through on-the-ground PES schemes, but another part may be used to finance improved command-and-control systems, including improved PA management.

PES are particularly well-suited to address hard trade-offs between conservation and development. Most biodiversity degradation worldwide is linked to permanent externalities, i.e. to persistent market failures undervaluing GEBs. At both local and national levels, quick fixes rarely can make conservation privately more profitable than alternative GEBs-degrading land uses.[10] The implicit win-win assumption behind GEF's "incremental cost" philosophy to biodiversity conservation thus rests on shaky ground: in-country GEF project proponents tend to use pre-existing (non-additional) resources as counterpart funds, and national development policies dominated by economic line ministries and business interests pursue actions that conflict with GEF's GEBs objectives. These actions undermine the efficiency of GEF interventions. Countries will thus often accept low payments for non-additional actions covered up as GEBs. GEF finance may often have to be more substantial to become effective. This somewhat pessimistic diagnosis has two implications.

First, payments for the conservation of GEBs will almost always (and fully) need to come from external sources, especially in the poorest countries where GEBs-led conservation tends to produce low synergies with national development priorities. Second, the time scale for GEBs payments will need to be long-term. The main problem conservation faces globally is its ongoing opportunity costs. Only in exceptional cases, such as when high fixed start-up costs are key barriers to PES development, will short-term enabling investments effectively reverse degradation pressures. In fact, most proposals that promise to 'solve the conservation problem' within a five-year project horizon may sound attractive on paper, but rest on wishful thinking and will eventually fail.

Funding for climate-change mitigation through REDD will probably become abundant, following the UNFCCC endorsement of REDD in Bali and continued interest within the Convention and support for REDD funding programs bilaterally and through the United Nations and World Bank systems. Conversely, explicit funding for global biodiversity conservation will likely remain scarce because, among other reasons, bilateral donors will increasingly prioritize climate-change mitigation and adaptation. In turn, there seems little need for the GEF to provide PES start-up or running support for climate change mitigation, other than as a collateral benefit. Biodiversity funding from bilateral and multilateral sources has already declined sharply in recent years – much more so than the simultaneous expansion in corporate funding (see Molnar et al. 2003).

GEF represents one of the very few windows for international biodiversity payments. Many bilateral donors finance capacity building, but almost none pay for direct PES. Most donors are reluctant to make direct, contingent, 'business-like' long-term payments for biodiversity conservation, in part due to their short time horizon[11], but such payments are critical for long-term supply of GEBs. More fundamentally, most biodiversity benefits are being provided as global non-excludable benefits, thus representing strong intrinsic motives for free-riding and underpayment. GEF should recognize its important niche role in procuring GEBs, and redistribute some of the eggs it has put in the 'enabling project' basket. The current

[9] For instance, in Costa Rica's PSA program, conservation-enrolled landholders are paid on the condition of not deforesting, in spite of the fact that deforestation is also legally prohibited.

[10] This is in particular true for 'activity-restricting' conservation of natural ecosystems. In contrast, in the case of 'activity-promoting' interventions of environmental restoration in already degraded areas, more win-win synergies between conservation and economic development can typically be found (see e.g. McNeely and Scherr 2003).

[11] For an Indonesia-specific analysis of in-vain efforts to find donors for a proposed biodiversity PES scheme (see Wunder et al. 2008b).

GEF structure (with a short-term project cycle) is ill-geared for long-term payments, but trust funds can, and have, been created or supported[12]. Even in the absence of trust funds, portfolio diversification options exist (see below) and GEF implementing agencies (UNEP, UNDP, World Bank) can complement capacities to engage in each of the entry points identified.

Current GEF projects linked to PES are concentrated in Latin America and forest ecosystems. A more balanced geographical portfolio could consider PES investments in other regions of the world (Africa, Asia). Although some countries may be perceived high risk investment countries due to governance shortcomings, we argue that PES can function in low-governance contexts provided de-facto property rights are clear and an agreement can be reached between service providers and service beneficiaries (see also the aforementioned case for PES investments in government-managed protected areas). PES has even the potential to improve governance structures through for example emerging demands for land title clarifications, negotiation processes, and effective monitoring and control institutions (See Rosa et al. 2003, pp. 78). A more balanced ecosystem portfolio is justified not only by the global importance of biodiversity from other ecosystems (wetlands, marine environments), but also for strategic reasons as most existing PES schemes in developing countries focus on forests. Similar to REDD investments (see below), the GEF could introduce biodiversity considerations in the design of PES schemes that cater to other environmental services, notably water services.

[12] For example, in Costa Rica, GEF Project 2884: Mainstreaming Market-based Instruments for Environmental Management Project was used in part to capitalize an endowment fund—the Biodiversity Conservation Trust Fund, established under the Ecomarkets Project—to ensure funding for environmental service contracts in areas with limited hydrological services and/or eligibility for carbon finance; URL: http://gefonline.org/projectDetailsSQL.cfm?projID=2884.

Box 2. Building the evidence for PES effectiveness

Few analyses, qualitative or quantitative, assess the degree to which changes in outcomes can be attributed to a PES program rather than to other factors. Such attribution requires knowing what outcomes would have looked like in the absence of the intervention. This counterfactual world can only be inferred indirectly through evaluation designs that control for confounding factors. The essence of counterfactual thinking is the elimination of plausible rival interpretations of observed outcomes. Many evaluations of PES programs simply characterize what can be observed (e.g., number of forested hectares under contract) without considering rival explanations for what can be observed. Below, only designs that explicitly examine and weigh alternative explanations are considered evidence. Only a few studies have such designs.

Five studies examine Costa Rica's PES program, which began in 1997. Each differs with respect to spatial and temporal scales and evaluation designs, but their conclusions are similar: three find no detectable changes in forest cover (Sanchez et al. 2007; Pfaff et al. 2008; Sierra and Russman 2006) and two find small changes (Robalino et al. 2008; Arriagada et al. 2009a). The absence of substantial effects on deforestation is partially due to poor administrative targeting and adverse self-selection. Hartshorn et al. (2005) find that 51% of the contracted forests are on lands classified as low-value for agriculture, and another 20% are on lands with "strong limitation" for agriculture. Others find that participants are less likely to have grown crops before the program began, and more likely to live off-farm, to have off-farm income, to have more education, and to own larger farms with steeper slopes (Arriagada et al. 2009b; Zbinden and Lee 2008; Miranda et al. 2003). These characteristics lower the risk of deforestation. A study in Mexico also finds that payments were concentrated on forests with low predicted risk of deforestation (Muñoz-Piña et al. 2005; 2008). One study in Costa Rica (Sierra and Russman) finds suggestive evidence that PES may accelerate the exit from agriculture (and thus forest regrowth), but although this study uses non-participants as controls, it controls for only two observable differences between participants and non-participants that affect agricultural decisions. No published study conducts formal impact analysis on the socio-economic impacts of PES in a low or middle-income nation. In OECD nations, there is some evidence of positive environmental and socio-economic impacts from agri-environmental schemes that pay farmers to change land-use practices, but even here there are few quantitative evaluations (OECD 2005; Sullivan et al. 2004). Environmental impacts are more likely for these programs because they pay for activities that few landowners are currently doing, but adverse selection and poor administrative targeting can still lead to low cost-effectiveness. In the U.S. Conservation Reserve Program, environmental impacts have increased after improvements in administrative targeting and competitive bidding (the latter reduces the effects of adverse self-selection).

PES has the potential to be an important tool in efforts to mainstream biodiversity conservation outside of protected areas, as well as to reduce emissions from deforestation and forest degradation (REDD). Nevertheless, we know little about how well PES works in practice and under what conditions or design features it works best. The evidence base for environmental investments is a global public good that is currently undersupplied. The GEF is an important PES investor and has a strong interest in catalyzing global conservation investments. The GEF is thus ideally positioned to lead the way in generating the PES evidence base. To do so, GEF PES projects will need to be designed explicitly to evaluate impacts. Key features of such a design include the use of comparison groups, which are selected to best represent how humans would have behaved or ecosystems would have fared in the absence of the PES initiative. Another key feature is that the selection criteria that determine which individuals, communities or regions experience PES interventions must have some elements that are uncorrelated with the environmental outcomes we intend to measure. GEF Project 3682: Developing an Experimental Methodology for Testing the Effectiveness of Payments for Ecosystem Services to Enhance Conservation in Productive Landscapes in Uganda will use a randomized design to test the effectiveness of PES, but other designs are also possible. Finally, all PES programs funded by the GEF must select indicators that are capable of revealing if any of the four barriers listed in Box 1 are limiting the effectiveness of the PES program.

3. Set up and finance direct payments for GEBs

In its constraints to set up and fund direct payments, the GEF is not fundamentally different from bilateral donors: the budget for PES type of investments is small, time horizons are restricted by short-term project cycles, and the institutional culture is project-oriented. There are possibilities to partly overcome these constraints (see below). In the medium run, it is important for the GEF to increasingly assume the responsibility to procure GEBs. Otherwise, GEF interventions will gradually become anachronistic vis-à-vis its GEBs mandate. While some environmental benefits can be secured through strategies of multiple ES financing (Section 4) and through investments in start-up costs (including investments in PES implementing institutions such as Costa Rica's FONAFIFO), picking these low-hanging fruits is bound to be insufficient: a lot of valuable biodiversity on private lands can only be conserved through continuous performance payments for biodiversity conservation. GEF is one of the few intergovernmental actors that would be suited to pick up this challenge.

Some of the larger players among the non-governmental international conservation organizations (the so-called BINGOs - Big International Non-Governmental Organisations) have recognized this point. They are raising corporate funds to build biodiversity trust funds, the periodical financial return of which can pay for PES payments to landowners and other recurrent costs – in principle, forever.[13] With the currently low real financial rates of return, a large frontloaded principal is needed to make this strategy work. The GEF could collaborate more with the BINGOs to achieve conservation objectives. However, in doing so, the GEF might also find a couple of constraints. On one hand, some of the GEF's donors are bound to be skeptical about (some of) the BINGOs for what they perceive as insufficiently people-oriented conservation strategies. Conversely, the fundraising machines of the BINGOs often target private or corporate biodiversity interests, where singular attribution becomes a key success factor, leading them to perhaps favor "go it alone" strategies over participation in large-scale consortia with the GEF and others. In any case, the GEF should seek more dialogue with the BINGOs to learn from their emerging hands-on experiences with biodiversity payments (Milne and Niesten 2009).

Even with the aforementioned short-run framework conditions and constraints, the GEF can (and should) set up and finance short-term pilot payments in two special cases: (a) when fixed costs prevent landowners from changing towards ES-friendly land uses, and thus short-run payments assumedly suffice to catalyze the desired land use change (e.g. the GEF-funded RISEMP project in Nicaragua, Colombia and Costa Rica[14]), and (b) when pre-identified ES users are seriously considering long-term payments, and could be persuaded by a demonstration of the effectiveness of payments in a pilot program.[15] In both cases, teaming up with learning institutions (and building in proper evaluation components) is highly desirable to produce badly needed practical lessons on PES design. In the medium run, one of the objectives must also be 'to educate biodiversity donors' to try out new strategies. Well-documented pilots (such as RISEMP) can be a powerful tool in that respect.

4. Co-finance PES for multiple services

Conservation typically provides a series of simultaneous ES. Hence, securing payments for various ES from their respective beneficiaries (e.g. carbon buyers and water users) can help make conservation economically viable. Conceptually, three main variants of joint financing for multiple ES can be distinguished (Engel at al. 2008; Wunder and Wertz-Kanounnikof 2009): (i) bundling - the same single user buys multiple ES from the same plot (this is the case of most government-financed, but also some user-financed PES);[16] (ii) layering - multiple

[13] Examples are Conservation International with their conservation concessions (now broadened to 'conservation incentive agreements' in the Conservation Stewardship Program), and the Global Conservation Fund (GCF), both providing continuous, conditional biodiversity payments.

[14] GEF project 917: Regional - Integrated Silvo-Pastoral Approaches to Ecosystem Management. URL: http://gefonline.org/projectDetailsSQL.cfm?projID=947.

[15] As an applied example supported by CIFOR, the NGO Fundación Cordillera Tropical in Cuenca (S Ecuador) has come a long way in setting up a 'layered' watershed and biodiversity protection scheme in the lower Paute watershed. A dialogue with the main targeted buyer – a large hydro-electrical producer – is in an advanced stage. But neither this buyer nor other potential ES buyers have been willing so far to match significant institutional start-up costs with resources for pilot payments. Yet, without piloting the scheme, the PES cannot be well-designed. This is one practical example of where GEF provided pilot payments could make a huge difference – not only for the specific scheme, but by the power of example for the entire Andean region.

[16] As for government-financed PES using 'bundling' strategies, the Costa Rican PSA e.g. remunerates landholders for the provision of four different services: carbon storage and sequestration, watershed protection, biodiversity conservation and the protection of landscape beauty. In the user-financed watershed PES scheme in Zapalinamé (Mexico), municipal water users have accepted to pay a premium for also protecting priority biodiversity areas (Wunder & Wertz-Kanounnikoff 2009). The strategy behind the World Banks' BioCarbon Fund is to sell 'golden carbon' (climate-change mitigation combined with biodiversity co-benefits), but actual willingness to pay a premium has been disappointingly low (B. Bosquet, pers. comm., 2007).

buyers of separate ES jointly finance start-up and recurrent costs of ES provision from the same plot (e.g. the Noel Kempff project in Bolivia exploiting carbon-biodiversity synergies); [17] (iii) piggy-backing - biodiversity investors co-finance PES start-up, but rely for subsequent recurrent payment costs on payment vehicles based on other ES.[18]

Which of these options would be the most promising avenue for GEF financing? The bundling option is most relevant for investments in government-financed schemes. The GEF should continue to support government-financed PES, such as in Costa Rica and Mexico, including feeding resources into trust funds for long-term funding (thus circumventing its own limitations in terms of short payment horizons). Co-financing trust funds for improved biodiversity outcomes is indeed compatible with the current "incremental cost" approach of the GEF. The size of government-financed schemes provides an opportunity for larger impact scale and cost-efficiency, provided the design of the program is reasonably targeted.

However, while there is still an ongoing debate around the decade of experiences with the Costa Rican PSA, some evidence is emerging that this and other government-financed schemes are not as efficient as they could be in terms of providing additional environmental services. This is because those schemes, for learning motives as well as political reasons, have been quite far from what is now emerging as 'best PES practice': differentiated payments, spatial targeting, high conditionality, only limited side-objectives, etc. The GEF should thus not necessarily provide en-bloc unconditional support to these schemes, but take advantage of its financing weight and of recent research findings to tie its support to program reforms that would bring these schemes closer to what can be assumed to be 'best practice'. The GEF should also consider spatial earmarking of funding to specific biodiversity priority areas under the umbrella of national programs (as has been done in Costa Rica).

Layering and piggy-backing options are typically more relevant for user-financed PES programs. Current limitations in GEF payment horizons would seem to favor piggy-backing over layering. Indeed, the GEF should continue to engage in co-financing privately-negotiated PES, such as for watershed protection (e.g. the Espirito Santo project[19]), to pool resources and yield GEBs outcomes by 'piggy-backing' on continuous domestic payment vehicles. However, in comparison to layered schemes, piggy-backing (point-wise, start-up) interventions are in general likely to produce inferior GEBs outcomes. ES users who are making recurrent payments will maintain leverage over conservation priorities only as long as they have the power to stop payments if they do not get conservation value for their money. Research indicates that, while conservation yields many ES, the spatial 'hot spots' and suggested priority interventions for maximizing service provisions can differ a lot (see Chan et al. 2006; or Wünscher et al. 2008). As an ES buyer, you get what you pay for. Although piggy-backing saves on recurrent costs, the chosen areas, actions, and benefits may turn out to be only second- or third-best, compared to a layered scheme where the provision of GEBs was explicitly being paid for.

As the financial mechanism of the UNFCCC, the GEF may in the future be expected to engage in REDD-related activities, which are an example of multiple-service co-financing. Because REDD payments aim to permit more cost-effective emissions reductions, substantial financial flows are expected to be mobilized for the protection of forest stocks in developing countries. Although relatively strong natural synergies exist between biodiversity and carbon-stock protection, the extent of these synergies depend on "where" and "how" REDD activities are conducted. GEF financing could leverage improved biodiversity outcomes via at least two approaches: (i) by directing some REDD investments to high-priority, high-threat biodiversity areas (biodiversity hotspots, ecological corridors, PA buffer zones); and (ii) by promoting biodiversity considerations in REDD design, e.g. in sustainable forest management plans to avoid edge effects or adverse production activities in ecologically sensitive areas. For instance, forest dwellers – even if compensated for not deforesting anymore – could turn to other income possibilities such as hunting bush meat or exploiting valuable plant species. While the overall natural forest cover

[17] Another functioning example of a layered PES scheme is the combined watershed and biodiversity protection scheme in Los Negros, Bolivia (see Asquith et al. 2008).

[18] Many watershed schemes use piggybacking, and various BINGOs have created their own "environmental service programs" to employ these synergies. The Nature Conservancy (TNC) currently seeks to replicate the FONAG model being piloted in Quito (Ecuador), where water-user payments co-finance upstream protected area management. However, the FONAG case is a 'supply-side PES' only, because no conditional payments to landowners are made.

[19] GEF project 2765: Espirito Santo Biodiversity and Watershed Conservation and Restoration Project (Brazil). URL: http://www.gefonline.org/projectDetailsSQL.cfm?projID=2765.

(and carbon stocks) remains intact, biodiversity could be degrading. GEF financing should complement REDD finance to promote explicit biodiversity considerations in the design and implementation of REDD activities. In doing so, it could build upon existing experiences such as the Climate, Community and Biodiversity Standards (CCBS).[20]

Layered schemes to complement REDD finance will offer more leverage than piggy-backing schemes. The GEF could provide initial short-term payments or consider long-term payments via sustainable financing mechanisms (e.g. GEF-led trust funds). Short-term payments can piggy-back on carbon finance to direct REDD payments towards biodiversity objectives (e.g. in location choices or in sustainable land use planning), as pursued in the Ulu Masen Ecosystem project in Aceh, Indonesia[21]. Long-term payments can yield greater biodiversity outcomes by financing recurrent costs of securing biodiversity conservation. Long-term payments can be secured through endowment funds which are either set up by the GEF or which the GEF contributes to. Examples of biodiversity conservation services that require long-term funding include annual biodiversity monitoring, buffer zone management around animal habitats in logging concession areas, or forest rangers controlling for illegal bush meat hunting and extraction of fire wood and threatened species. While REDD monitoring and control can rely to a large extent on remote sensing technology, biodiversity conservation objectives require more costly field-based monitoring and control measures. One example of a layered PES scheme (REDD/biodiversity) is the Andasibe-Mantadia Biodiversity Corridor Project in Madagascar, where carbon emission reductions are purchased by the BioCarbon Fund whereas biodiversity interests are financed by the Third Environment Program of Madagascar, with the support from Conservation International[22].

5. Reconsider financing capacity-building investments for PES start-up

High human and institutional capacities can be key requirements for effective PES design and implementation. With the GEF's current focus on short-term investments, capacity building arguably comes out as the most-favored investment. However, a focus on capacity building is misguided: in its drive to provide project-supporting investments, the GEF risks financing a lot of consultants to design PES schemes that will never see the light of the day because key attributes – especially the identification of likely ES buyers – are not present. Hence, capacity-building investments need to be realistic, strategic, and tailored to the specific case.

For example, economic valuation studies may be useful, especially for evaluating user-payment potential (e.g. Lambert 2007), but are not a precondition for PES implementation. In many cases, ES buyers and sellers will negotiate 'the right price' for a PES deal among themselves, without the need for economists to intervene. Among GEBs, for intangible benefits of biodiversity conservation (e.g. option and existence values), prices are lacking and underlying quantities (i.e. biophysical linkages) tend to be uncertain. Here, economic valuation cannot deliver reliable estimates. Often those ES that humanity 'values' most are also the hardest ones to express in monetary terms. In practice, whether government or user-financed, almost all PES rates are set according to (implicit or explicit) estimates of ES providers' conservation opportunity costs, rather than according to computed ES values. Based on contract theory from the economics literature, this emphasis on opportunity costs rather than service values is appropriate (Ferraro 2008). Thus calculating more sophisticated, spatially explicit estimates of opportunity costs, and combining these estimates with biophysical ES targets and threat estimates, represents a much higher PES research priority than attempting to place monetary values on ES. Similarly, including from the outset explicit evaluation criteria in PES design (e.g. through control groups, such as in GEF's RISEMP project - see for example Pagiola et al. 2004; 2008) are needed to enable GEF and other practitioners to solidly assess which design options for PES (and any other conservation interventions) are most efficient (Ferraro and Pattanayak 2006). Proper design for empirically testing effectiveness is thus much more fertile ground for informing decisions. Economic valuation seems to have passed a threshold of maturity where more of the same research seldom makes a real difference for decision making.

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[20] These standards are elaborated by the Climate, Community and Biodiversity Alliance (CCBA) – see http://www.climate-standards.org/.

[21] See Aceh (The Provincial Government of Nanggroe Aceh Darussalam), Fauna & Flora International, and Carbon Conservation Pty. Ltd., 2007, "Reducing Carbon Emissions from Deforestation in the Ulu Masen Ecosystem, Aceh, Indonesia – A Triple Benefit Project Design Note for CCBA Audit", project document, 2 November (www.climatestandards.org/projects/files/Ulu_Masen_CCBA_Project_Design_Nov1.pdf).

[22] BioCarbon Fund 2007. URL: http://carbonfinance.org/docs/BioCFBooklet.pdf; or http://wbcarbonfinance.org/Router.cfm?Page=BioCF).

Specifically, the GEF should avoid making large capacity-building investments in broad-based actions (e.g., international conferences, training courses, global PES syntheses, institution-building exercises, scoping and valuation studies, etc.). Bilateral donors amply finance these needs already. Rather, the GEF should emphasize targeted investments that enable tangible PES proposals to overcome binding barriers at specific sites. These barriers may be economic (e.g. buyer identification), informational (e.g. scientific ES syntheses) or institutional (e.g. contract negotiation) (see Wunder 2008). The emerging empirical evidence indicates that PES start-up transaction costs could be relatively large in comparison to the annual operating transaction costs (see Wunder et al. 2008a).

How can the GEF distinguish promising capacity-building investments from money thrown after hopeless PES cases? First, a basic assessment of the soundness of the PES case is needed, which will involve questions such as: Are the targeted service users credible as prospective buyers? Are they sufficiently organized internally to act together? Is their willingness to pay sufficient to pay for the ES providers' aggregate opportunity costs? Do the prospective ES providers effectively control access to the land and resources, or is tenure and access chaotic (overlapping land claims, frequent invasions, etc.), making land stewards unreliable service suppliers? Is there sufficient trust established between buyers and sellers – or if not, could this realistically be remedied in the short term? Can a reliable intermediary be identified to act as an honest broker between buyers and sellers? Has a proper land-use monitoring and sanctioning system been envisaged? To the extent that from the outset the majority of these questions are answered in the negative, it is probably not a PES proposal that is worthwhile to pursue.

Second, can the identified obstacles be realistically solved through investments? For instance, proper buyer-search processes make sense most of all for watershed PES, because convincing domestic buyers may be more time-consuming, and the biophysical science behind linking land-use changes to ES provision may need more careful scrutiny.[23] A recent Danida-financed watershed PES program, implemented by CARE, WWF and IIED, seems to have taken an appropriate approach: each case project was given a phase of 18 months for 'business-case preparation', after which only the convincing cases were prepared for full PES implementation.[24] GEF co-investments in watershed PES will make sense only when there is a significant synergy and spatial overlap between watershed and biodiversity conservation actions.

The frontloaded nature of most PES transaction costs provides a natural argument for targeted PES start-up subsidies, but the GEF should be careful to not slip into broad-based capacity building spending, and should carefully screen the realism of PES proposals. A desk appraisal of a short concept note may alone be insufficient to make that qualitative assessment. For instance, if the land-tenure scenario presents minor overlaps and ambiguities, GEF-financed negotiation processes might overcome that obstacle. But if potential ES providers are in open internal conflict, or if they are gradually being displaced by a sustained stream of immigrants, then the preconditions for PES simply cannot be met. If the basics are in order, GEF co-investments in rapid ES appraisals, contract negotiations, opportunity-costs studies, and monitoring and sanctioning system development are often justified. However, credible evidence is needed that these obstacles are indeed case-specific binding constraints that currently prevent PES development.

[23] In principle, this could apply to landscape-beauty services, too, but that market is generally much more restricted.
[24] For project details, see http://assets.panda.org/downloads/factsheet_pes_english.pdf .

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