

## Payments for Environmental Services in German Financial Cooperation

*Most of the land in developing and developed countries is privately owned. When private landowners make decisions on land use, other stakeholders are affected. How can we design and fund financial mechanisms that encourage landowners to manage their resources in a manner that benefits society? This article reflects on the experiences of KfW in supporting such mechanisms in Latin America, a continent that has been particularly active in developing innovative approaches to conservation. It identifies three major challenges – the institutional requirements of setting up such mechanisms, the sustainability of impacts on the farm level, and the potential to expand environmental impacts by improving cost effectiveness.*

Disenchantment with traditional policy instruments in natural resources management has led policymakers and development agencies to look for alternative approaches. One of these approaches is paying for environmental services: economic incentives instead of command and control.

The concept is intuitively appealing: by offering payments to private landowners, the public can change the financial rationale behind land use decisions that are generally based only on private costs and benefits, and induce landowners to produce more positive externalities or avoid negative ones.

A simple example would be farmers in an upper watershed who are cutting forests, thus diminishing the water retention capacity of the soil and vegetation and causing irregular water flows. Downstream water users might benefit from contracting farmers to protect their forest or plant new trees. For both parties, the payment would have to be more attractive than the alternative: lost water services to downstream users, agricultural income to upstream producers. If the farmers are poor, as those

working on marginal lands in upper watersheds often are, such payments would also contribute to reducing poverty.



Small-scale reforestation in a PES-type program in Paraguay

In this survey, we will use a very basic working definition of payments for environmental services, or PES, including all programs that offer cash payments to landowners for changing their land use. Many issues discussed here are also applicable to programs that offer other kinds of incentives to landowners (e.g. incentives in kind, or incentives in the form of higher prices for products with certain environmental characteristics such as FSC-certified wood).

The logic of rewarding or compensating landowners for the environmental services they perform is not new. An increasing share of the agricultural subsidies in developed countries is being justified on environmental grounds. Development agencies have often provided subsidies to farmers for afforestation or similar projects. What is new is the explicit use of the concept of PES in developing countries, particularly in Latin America. The increasing recognition of the environmental functions of forests, and the services their owners provide to the public at the local, national and global level, has led to great expectations. Even farmers in remote regions have heard that someone might pay them for the oxygen their trees will produce.

In designing new PES systems, it is useful to consider the lessons learnt from the first generation of programs that paid private landowners for changing their land use. In German Financial Cooperation (FC), funded by the Federal Ministry for Economic Cooperation and Development (BMZ) and managed by KfW

Entwicklungsbank (KfW Development Bank, part of KfW Group), a number of such programs have been implemented in Latin America since the mid-1990s, often in cooperation with the German Agency for Technical Cooperation (GTZ).

This article presents some of the results of a recent internal evaluation and is an interim step towards defining criteria that KfW will apply to design and evaluate similar programs in the future. Its main emphasis therefore is on how to spend funds available for environmental services, not on how to raise them. Indirectly, however, we also cover the aspect of raising funds: only well-designed programs will be able to attract financing.

#### Overview of PES programs

The following table gives an overview of the FC programs currently underway. In some cases, PES-type components are integrated into broader conservation or forestry programs, the total costs of which are stated.

Country and Region	Implementing Agency	FC Contribution to Program Costs (in US\$ million)	Types of Land Use Promoted Through Subsidies
Honduras / Biosphere Reserve Río Plátano	COHDEFOR	11.5	shade-grown coffee, improved cattle pastures
Costa Rica / Huetar Norte	FONAFIFO	12.7	reforestation, protection of existing forests, sustainable forest management
Colombia / Río Magdalena Watershed	FEDERACAFÉ	28.1	reforestation, enrichment planting, natural forest regeneration, shade-grown coffee
Ecuador / Cordillera Chongón-Colonche	Fundación Natura	9.6	reforestation, enrichment planting, shade-grown cocoa and coffee, improved cattle pastures, communal forest control
Ecuador / Biosphere Reserve Gran Sumaco	Ministry of the Environment	9.6	shade-grown cocoa and naranjilla, improved cattle pastures, reforestation
Peru / Jaén – San Ignacio – Bagua	INADE / PEJSIB	6.4	shade-grown coffee and cocoa, reforestation
Chile / regions VII. – XI.	CONAF	17.9	enrichment planting, sustainable forest management
Paraguay / central and eastern region	DINCAP	9.6	soil conservation (no-till cultivation), reforestation, natural forest regeneration
Dominican Republic / Alto Río Yaque del Norte Watershed	Ministry of Agriculture	8.9	reforestation, shade-grown coffee

Reflecting different local conditions and types of land use promoted, there are wide variations between payments per hectare and shares of costs assumed by the programs and by participating landowners. Only one of the programs mentioned here, in Costa Rica, co-financed with the World Bank and the GEF, is explicitly called a PES program.

Potential of Financial Incentives for Land Use Change: Quick and Direct Impacts

With the exception of recipients and their lobbying groups, it is difficult to find defenders of subsidies. From one end of the political spectrum, they are attacked as fiscally unsustainable and prone to political manipulation. From the other end, they are accused of undermining moral suasion and self-help processes on communal levels. Many more traditional conservationists are also reluctant to accept financial concepts in a conservation context, either because they do not want to debase nature through economic valuation or because they fear that convincing decision-makers has been difficult enough in the past, when they did not know that they might bargain for payments.

However, one might just as well turn around the argument against subsidies: in effect, today's landowners are "subsidizing" those firms and consumers who are the beneficiaries of their ecosystem services. PES can be a legitimate and effective policy instrument. It can often be more precisely targeted at a limited number of objectives and priority areas than other instruments, can provide clearer incentives to landowners with regard to desirable forms of land use, can

generate results relatively quickly, and respect individuals' rights to make voluntary decisions.

For example, in the Río Magdalena watershed of Colombia, there is no other instrument through which the Federation of Coffee Growers (FEDERACAFÉ) could have convinced its members as quickly of the benefits of converting marginal coffee lands into forest plantations. The social benefits (reduced coffee output and improved coffee quality at a time of market crisis; watershed, soil and biodiversity protection; and social stability through alternative incomes) would never have come forth on a scale sufficient to make such a notable positive difference.

In Honduras, in the buffer zone of the Río Plátano biosphere reserve, there is an urgent need to provide alternative income sources to stop the advance of the agricultural frontier towards the largest remaining forest in Central America. Farmers now receive financial assistance from the administration of the protected area when they undertake investments to switch from extensive, wasteful land use to sustainable, more intensive land use. For example, they receive part of the costs of fencing, new grass seeds, and shade trees to enable them to produce two or more heads of cattle per hectare, whereas before they could produce only one.

In Chile, as part of a campaign to diversify the sources of lumber instead of relying on monoculture plantations, and to establish a culture of sustainable natural forest management, small forest owners receive subsidies from the Forestry Agency (CONAF) to cover part of the initial costs of enrichment planting and other silvicultural measures.



In the Gran Sumaco Biosphere Reserve, participants receive financial incentives for conservation farming

In none of these cases is it apparent that alternative instruments could have produced these outcomes on such a broad scale and so rapidly. These farmers have not just benefited financially (and many of them have opened their first bank accounts in the process), they have also been accompanied by extension workers, learned new technical skills, organized themselves, and have come to understand that they provide services to the outside world for which others are willing to compensate them. PES thus became an instrument that also helped to integrate remote and marginalized regions into the mainstream of national development.

#### Challenges: Institutional Requirements, Sustainability, and Cost Effectiveness

What then are the potential pitfalls encountered in the design and implementation of this type of program? PES-type instruments were originally introduced in OECD countries, where they are still primarily used. This is a social context with strong institutional capacities and sustained willingness to pay to attain environmental and agricultural objectives. Whether these instruments can be adapted to the conditions of “marginal” regions is by no means certain. In the analysis of our Latin American PES

portfolio, we identified three main ways in which programs can go wrong:

- by underestimating the requirements of the institutional framework in which a PES system will operate,
- by not clearly spelling out strategies to make the desired land use change sustainable in the long run, and
- by not insisting on the most efficient mechanisms to deliver environmental results.

In order to understand the institutional requirements, one has to consider the typical PES-type program setup. Once a farmer's application is accepted, the executing agency will sign a contract with him or her, regulating the objective (required land use), level and sequence of payments, obligations and contributions of the farmer, duration, and monitoring. The agency's extension service then often has the dual function of advising the farmer and monitoring compliance (one or both functions are sometimes outsourced, which may reduce conflicts of interest).

While this may appear a simple setup, in many rural regions it is beyond local capacities. The land tenure situation is often far from clear. A “contractual culture” (popular acceptance of honoring contractual commitments, especially of such a novel nature) may not be sufficiently developed. In some cases, drop-out rates of participants reach 30% or more between the first and second payment, and incentive mechanisms have to be fine-tuned by asking for guarantees etc.

Extension service workers also have to be sufficiently qualified, and adequate structures to avoid corruption must be established.

Otherwise, it is easy to see how farmers and officials can collude in approving applications and certifying compliance. Some government agencies are also legally unable to pay out cash subsidies to individuals.

Especially where payments are “frontloaded” (paid out during the first years of a contract period), there may also be few possibilities to enforce contractual obligations over longer periods of time. In fact, the only program where this problem appears to have been solved satisfactorily seems to be in Costa Rica, where the legal system works comparatively well and landowners have to register the restrictions on their property (for up to 20 years) in the public land registry, ensuring that they will have to be honored by eventual buyers of the land.

It is also worth remembering what has led to the increasing distrust of and backlash against subsidies: they are particularly susceptible to manipulation by special interest groups. There is every reason to believe that PES will be subject to the same kind of political pressures. The credibility of the instrument can be seriously harmed if it is not insulated against such processes. Interest group pressure may result in the allocation of subsidies to non-priority regions, to non-priority target groups (for example, larger farmers), and in excessive levels of payments from which only the well-informed and well-connected will benefit – an issue we will take up below.

Considering the issue of contract design, all PES-type programs have contracts that might be called input-oriented – that is, they spell out in relative detail how farmers are to work their land – rather than output-oriented – i.e. specifying the environmental outcomes or

services expected from participating farmers. Output-oriented programs would leave more freedom to farmers in choosing how to reach outcomes and might be easier to monitor. For example, a biodiversity-oriented PES system might link payments to the ongoing presence of endangered species on the land, an erosion-oriented system to downstream sediment loads, a CO<sub>2</sub>-oriented system to the standing biomass on a plot etc. To our knowledge, such output-oriented systems have not yet been tried out in practice in developing countries, probably due to perceived monitoring problems.



Paying for biodiversity, carbon sequestration, hydrology and aesthetic services – the services identified under Costa Rica’s forestry law

Finally, one important institutional constraint is that subsidies must fit into the socio-cultural environment. Indigenous and other communities with strong cooperative bonds might be disrupted if individual members start receiving cash payments. Common property regimes might break down into individualistic, open access situations. However, in such situations, recipients of payments need not be individual farmers. Depending on legal frameworks and local practices of decision-making on natural resource use, they could well be farmers’ groups or entire communities.

In some of the programs supported with funding from German FC, group-based incentives are being tried out. In the Agro-Environmental Program of INADE/PEJSIB in Peru, “Learning and Training Groups” are administering incentives and distributing them among members. This may lead to forms of social control of compliance similar to those known from group credit schemes. Interestingly, some of the incentives are paid out on the basis of competitions between farmers, identifying those that have best applied the new concepts.

In the communal forestry component of Fundación Natura’s Chongón-Colonche program (Ecuador), communities receive contributions to the costs of administering their common forest resources. In Costa Rica’s PES program, small NGOs are acting as intermediaries between FONAFIFO and individual farmers in order to simplify procedures for participants. In general, we have concluded that incentives should be applied at the level where decisions are really made. Where forest ownership is communal but individual families have long-term rights of use, it may be necessary to involve both levels in an incentive mechanism.

Officials of NGOs, local functionaries and representatives of indigenous groups often argue for channeling resources through their institutions instead of directly to farmers. In some cases, funds raised for PES have even been used for rather traditional “small-scale projects” or for social investments unrelated

to land use. In each case, the benefits of strengthening local institutions have to be weighed against the transaction costs when involving such intermediaries. When asked directly, almost every individual farmer in the world would strongly argue for direct payments.

The second set of issues mentioned above refers to the sustainability of land use changes for which incentives are provided. Before designing funding mechanisms, a serious effort must be made to identify those technological packages or “Best Management Practices” that can deliver the desired environmental outcomes with the least costs to landowners and society. Having selected the most appropriate packages, the question arises under what conditions farmers will be able to adopt and sustain these new land uses. This mainly depends on how long it takes the new land use to become competitive or to break even compared to the traditional or next best use of the land.

In a highly simplified framework, the financial perspectives of a farmer considering the adoption of a new technology or land use, and of an agency considering how to support this decision, could be classified as follows:

	farmer’s perspective: new land use is...	agency’s perspective: adoption should be promoted through...
A	of immediate commercial interest	technical advisory services
B	self-sustaining after short adoption period	financing of adoption costs through credits
C	self-sustaining after longer adoption period and/or in the absence of functioning capital market	financing of adoption costs through subsidies
D	permanently requires subsidies to remain competitive (e.g. protection of primary forests)	caution advisable – will agency have permanent sources of funding?

In case “A” situations, where no major investments are necessary or the break-even point is reached quickly and only lack of access to information limits the adoption of new practices, no need for financing arises. In case “B” situations, the new land use can break even within two or three years and farmers are willing and able to obtain credits to finance the associated investment costs. In case “C”, investments are larger, new crops are slower in delivering benefits, and the local capital market is not sufficiently developed to provide financing for investment and opportunity costs. This is a typical situation in many rural regions with respect to the introduction of tree crops, reforestation and similar land uses, and it is the classic field of PES-type programs.

In most Latin American contexts, it is unlikely that substantial levels of PES can be maintained from public budgets or that local financing mechanisms will be firmly established after some years. As a general rule, therefore, externally financed programs should only promote land uses that become financially self-sustaining for landowners before payments stop. There is only one case “D” in German Financial Cooperation: the PES system in Costa Rica, which is financing the protection of primary forests and requires permanent subsidies. This is the only case involving a credible strategy for mobilizing additional funds after German support runs out, and Costa Rica has also contractually committed to reinvest in the PES program any later proceeds it may receive, as a result of the German financing, through the Clean Development Mechanism.

It is sometimes argued that (subsidized) loan schemes are a more promising alternative than cash subsidies since they involve a more permanent relationship with local institutions, can be used to establish rotating credit funds etc. However, the international experience with respect to credit programs for agriculture and forestry is quite disappointing. Especially credit schemes organized by projects have often led to low repayment rates and high transaction costs. The resulting breakdowns of credit funds not only endanger project results with respect to land use, but also cause conflicts in communities and undermine the gradual emergence of formal capital markets.

Since the underlying economics for the farmer of the introduction of a new land use is independent of the funding mechanism, and the subsidy element of the credit would have to be the same as for a subsidy paid out directly, we have concluded that it is generally preferable to avoid the additional transaction costs of setting up credit schemes.

To ensure sustainability of land use changes, there has to be a strong element of self selection by farmers. They will usually have a much better idea of the specific characteristics of their farm and household than any institution running a PES program. PES programs should therefore be “supply-driven”: the suppliers of environmental services, i.e. farmers, need to guide the programs and demonstrate their interest and their belief in the advantages of the new land use through substantive contributions to the adoption costs, usually provided in the form of land, labor and local materials. Otherwise, there is a strong risk that new land uses will be established temporarily and abandoned immediately after subsidy payments run out.

Some people will not accept this interpretation of the instrument – transitional subsidies to catalyze and speed up technology transfer – as PES. They argue that we should only talk of PSE where payments are continuous and open-ended and that sustainability should be established at the level of the PES system: tapping permanent sources of funding for permanent subsidies.



Introducing shade-grown cocoa in Ecuador's Cordillera Chongón-Colonche

In our view, in developing countries this is a realistic option only where the value of the environmental service is exceptionally high. In most cases, the appropriate way to use PES will be to finance temporary campaigns to change land use patterns in specific regions, after which costly implementation structures can and should be dismantled: “The most defensible case for subsidies is for the transfer of profitable technologies to growers who lack experience using them” (Hueth 1995). Coincidentally, this also fits much better than permanent programs with the time horizons and project cycles of international development agencies or private sector investors.

In order to maximize the ecological impacts of funds available for PES, systems should also be as cost-effective as possible. PES will quickly lose its appeal as an instrument of environmental policy if it is perceived to be overloaded with other objectives, especially social objectives, at the expense of its environmental impact.

For example, it is not generally desirable to compensate farmers for legal restrictions on land uses that already exist and that can be enforced by the state. Only where new restrictions cannot be introduced otherwise – for example, where a new protected area would restrict traditional grazing rights and is politically impossible to establish without compensation – should PES be considered. While everybody has sympathy for a poor farmer, there are other instruments much better suited for addressing rural poverty. The attractiveness and credibility of PES for taxpayers and others asked to contribute funds depends not on its ability to redistribute income but rather on its ability to effectively change environmental outcomes by changing individual land use decisions.

It is sometimes hard to convince program administrators that PES programs should pay as little as possible to individual farmers. One argument that must be overcome is that farmers should be compensated according to the value of the environmental benefits they produce. This is similar to arguing that when buying a car, one should pay the car company the value of the expected transportation services. It is certainly useful to estimate the value of the environmental services to society, but only to establish an upper limit - if society had to pay the entire value or even more, it would not benefit from the transaction.

Another misleading argument is that farmers should be paid the exact amount of the costs arising from changing the land use. For an agency executing a PES program, it is impossible to determine individual costs with any degree of accuracy. Even approaching the level of information that farmers have would incur unreasonable costs. Furthermore, this is similar to arguing that when buying a car, one should first find out how much it cost the car company to produce the car and then compensate the company by exactly that amount. Again, it is certainly useful when defining payment levels to have a general understanding of the economic situation of farmers in the region, but any attempt to establish costs for every farm and crop is bound to fail.



Maintaining an *algarrobo* plantation in the dry forest zone

In our view, the approach by some agencies to attempt to precisely identify adoption costs sometimes also reflects a paternalistic understanding that farmers need to be protected from making wrong decisions. Of course, adoption of new technologies is risky. Agencies have a responsibility to reduce the risk where they can, especially by designing appropriate technological packages and providing adequate information to farmers. This is particularly important if smaller farmers are targeted, who are generally more

risk-averse and slower to adopt new land uses.

But risks to farmers are usually limited – if the new technology fails to deliver economic benefits, they can revert to the traditional technology. And it may actually be possible to design PES-like mechanisms that only render payments when the new land use does not turn out to be economically beneficial to the farmer. Farmers could be insured, for example, against the risk that they will not receive a specified minimum price in the market for a new product. The Nature Conservancy, for example, is currently working on an interesting transitional risk insurance program in the Brazilian *cerrado*.

The desire of administrators for programs to succeed often drives them to establish levels of payments at which large numbers of farmers are willing to participate and the supply of environmental services is larger than the demand they can buy with existing budgets. For example, in several years the Costa Rican PES program had more than three times more applicants than could be accepted. The incentives are obvious: administrators can argue for larger budgets, and they get to decide which farmers will be accepted. As with any bureaucracy, this discretionary margin may be used wisely, preferring farms with added environmental benefits. But it may also lead to rent-seeking behavior and corrupt practices.



Self-selection by farmers brings better results than selection by project administrators

In general, paying more than is necessary is wasteful in terms of program objectives, it creates dependencies and frustrates farmers unable to participate, even up to a point – especially if allocation practices are unfair, corrupt or not transparent - where they will attempt to deliberately undermine the program's objectives.

Some simple microeconomic considerations show that there are generally two steps to reduce payments to farmers: first, subsidy levels can be chosen to “clear the market for environmental services.” At the equilibrium level, the demand for and the supply of hectares for participation in the program should be equal. Since the PES agency does not know the supply curve, i.e. the marginal costs to farmers for participating, it would have to approach the equilibrium price by trial-and-error and/or by conducting farm-level studies on costs and willingness-to-participate.

But even at the equilibrium level, the PES agency is still paying more than necessary. A second step towards cost-efficiency would be to differentiate payments. This is possible since farmers can only contract with the PES agency, as the only buyer of environmental services or “monopsonist”, and each hectare has a different marginal cost or supply price.

A farmer operating on poor lands far away from the market will face relatively low opportunity costs when participating in a reforestation program. He will be interested in participating even if he only receives a small payment.

By differentiating payments, the PES agency would ideally eliminate all producers' rents (payments farmers receive above the level necessary to induce participation in the program). It would also avoid the problem of establishing plantations on prime agricultural land. The agency could then invest the savings from optimizing the PES scheme in buying more environmental services, i.e. including more hectares in the program.



Preparing cocoa seedlings for an agroforestry promotion program

Differentiation would likely involve an auctioning process, where farmers can submit bids or offers for participating in the program, thus revealing their supply price, and the PES agency would first contract with the lowest bidders. Strategic behavior by sellers of environmental services can be reduced by appropriate auction design. Such relatively sophisticated allocation and pricing procedures have not yet been sufficiently tested in practice; the only country with extensive experience in auctioning

participation in agro-environmental subsidy programs appears to be the USA.

PES agencies have often been reluctant to try to improve the cost-effectiveness of programs. They may lack the economic know-how, they may argue that improved procedures are simply too complicated or unusual in the socio-cultural context of rural regions, or they may point out the political difficulties in reducing subsidies once everybody has become used to them, or in paying different subsidies to different recipients. While we accept that simple approaches have important benefits, some of this reluctance appears to be due to the rent-seeking environment in which agencies operate, which provides strong incentives to maintain relatively high and uniform payments.

### Outlook

The challenge in the years ahead is to further develop the instrument of PES on the basis of the lessons learnt so far. In order to make financing PES programs attractive to their own taxpayers, to official donors, or to private sector actors – be they CDM investors, water companies, or conservation NGOs – developing country governments and PES agencies will need to demonstrate that their proposals take into consideration the issues raised in this review – institutional requirements, sustainability and cost-effectiveness.

The case for strict targeting, monitoring and differentiation of subsidies has also been made in the context of trade policy, where agricultural subsidies have become one of the major stumbling blocks: “The blunter the green pricing instrument – in the extreme, all farmers would receive identical green payments per hectare or per unit of commodity production – the more the whole enterprise looks like (and probably is) a crude attempt to subsidize domestic farming regardless of the impacts on international trade” (Randall 2003).

Many institutions are currently considering how to scale up local pilot initiatives. The larger PES programs become, the more responsibility program designers will also have with respect to their impacts on land markets (substantial subsidies will rapidly be reflected in land prices), agricultural production, public budgets and macroeconomic parameters.

The instrument of PES is promising enough to warrant a closer look in other regions, particularly in Asia where high population densities and strong economic development are raising the value of environmental services in many regions. In times of tight public budgets, we also need feedback from developing countries to improve the efficiency of PES-type programs in OECD countries. One conclusion that may be of particular interest in this context is that temporary PES campaigns, designed to introduce new land uses that are environmentally friendly and economically profitable, may hold the greatest promise.

Contact:

KfW Bankengruppe (KfW Group) / Department LIId – Latin America  
Sector and Policy Division Agriculture and Natural Resources

Dr. Jörg Hartmann ([joerg.hartmann@kfw.de](mailto:joerg.hartmann@kfw.de))

Tel +49-69-7431-3848 / Fax +49-69-7431-3415

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