

Payment for Environmental Services (PES) to conserve agricultural biodiversity

In addition to producing food and raw materials, sustainable land-use systems fulfil many other functions that are seldom noticed and often taken for granted. They store and filter surplus water, protect the soil and water bodies from erosion, help regulate the climate, and ensure the pollination of certain plants.

But human activities are increasingly disrupting these “system services”, making it necessary to implement costly technical interventions to compensate for them. The cost of such interventions can be used as a measure of the value of the underappreciated environmental services. The “Payment for Environmental Services” (PES) approach uses these values as the basis to cover additional expenses or to compensate farmers for the loss of income if they use environmentally friendly farming methods.

Such payments also provide an incentive for farmers to adjust their land management techniques with environmentally sound methods, so avoiding the need to invest in expensive repair mechanisms such as water-treatment plants and flood-protection dams.

The conservation of agricultural genetic diversity (agrobiodiversity) is an essential ecosystem service. Local crop varieties and livestock breeds constitute a gene pool that is vital to securing our future supplies of food and raw materials and to enable us to adapt to climate change. They are also ideally adapted to the environmentally friendly use of various localities. However, local varieties and breeds often yield less than equivalent modern varieties and breeds, so farmers lack an incentive to grow and maintain them.

PES can provide incentives to maintain agrobiodiversity by using it. It can work either directly by promoting local varieties and breeds, or indirectly as a component of a broader promotion of sustainable farming systems.

How are PES schemes organized?

PES is rising in significance as society demands more environmentally friendly approaches. In 2007, about 55

Terminology

The payment of ecosystem services is known under various names. *Payment for Environmental Services* (PES) is the most common term, though *Payment for Ecosystem Services* also appears. According to the Food and Agriculture Organization of the United Nations (FAO), *ecosystem services* are all benefits of an ecosystem, while *environmental services* cover only those services for which market prices do not exist. The terms are used in different contexts and are often used interchangeably.

FAO (2007, p. 7) proposed the following practical definition: PES transactions refer to voluntary transactions where a service provider is paid by, or on behalf of, service beneficiaries for agricultural and, forest, coastal or marine management practices that are expected to result in continued or improved service provision beyond what would have been provided without the payment.

billion euros were transferred through PES; by 2020, this figure will almost quadruple to about €200 billion.

Many people and organizations are involved in PES schemes: land users, local authorities, civil society organizations, private companies and governments. These schemes are based on contractual agreements between service providers and users in the public or private domains.

Ecosystem services and benefits may be valued in monetary terms in various ways. The most common methods are indirect benefits, option values and non-use values. A frequent approach is to compare between conventional and environmentally friendly technologies; payment is made to cover the extra cost of the environmentally friendlier technique (such as organic production methods) or the income foregone (in the case of lower-yielding local varieties).



Bee pasture on field margins.

Activities that are typically funded by PES include soil- and water-conservation measures, windbreaks, river-bank protection, the creation of pastures for bees, the less intensive use of arable or pasture land, and the maintenance of cultural features in the landscape, such as dry stone walls and meadow orchards. In most such programmes, contracts are signed with the service providers for a period of five to ten years.

A large part of PES payments are drawn from public funds. In the United States, for example, this is done through the Conservation Reserve Program, which covers over 400,000 businesses; in the European Union the equivalent is the European Agricultural Fund for Rural Development (EAFRD). EAFRD's affiliated national programmes disburse more than 20 percent of the EU's agricultural budget to member countries. Examples of such programmes are Environmental Stewardship programme in England and the Cultural Landscape Programme (*Kulturlandschaftsprogramm, KULAP*) for the federal states of Brandenburg and Berlin in Germany.

Compensation in practice: The Cultural Landscape Programme in Brandenburg and Berlin

The Cultural Landscape Programme of Brandenburg and Berlin aims to promote environmentally sound agricultural practices and to conserve the cultural landscape. Part of the two states' joint rural development plan, it has been financed since 2007 by EAFRD. It includes three funding areas: (i) environmentally sound management of grassland, (ii) environmentally friendly agriculture and horticulture, and (iii) conservation of agrobiodiversity. Approximately one-fifth of the farmland in the two states receives subsidies under the programme.

To promote agrobiodiversity, the programme subsidizes the keeping of endangered local livestock breeds that have are particularly suited to environmentally friendly man-

agement. Supported breeds currently include the German Saddleback pig, the German Meat Merino and East Prussian Skudde sheep breeds, the German Black Pied cattle, and the Rhenish-German Cold-Blood horse. Stock-keepers receive subsidies for the animals they raise: €25 per sheep, and €80 for a litter of piglets.

In crops, the programme supports the cultivation of endangered types of cereals that are typical of the region but are no longer competitive or recognized by the Federal Plant Variety Office. These include 26 varieties of wheat, 19 of oats, eight of barley, and seven of rye. Farmers who cultivate these varieties can claim an annual subsidy of €150 per hectare for up to 20 hectares per variety and farm. The Association for the Preservation and Restoration of Crops (VERN) was founded to avoid conflicts with seed laws. Seed is multiplied and exchanged within this association on a non-commercial basis.



The programme's activities and effects are in accordance with the guidelines and goals of EAFRD and the states' joint rural development plan. All the subsidized areas are geo-referenced and all activities in a field are documented. A central auditing office field-inspects five percent of the applicants each year.

Considerations in the implementation of PES

The following aspects should be considered in the design of PES schemes:

- PES schemes are subject to contractual arrangements, whose compliance must be monitored. Because ecosystem processes are often complex, it is not always possible to demonstrate cause-effect relationships scientifically. For example, afforestation may result in very different levels of improvement in water quality, depending on the type and age of the trees and the soil and rainfall conditions.
- The environmental measures to be implemented must be specified as precisely as possible for example, the required tree density and the species to be planted. This minimizes differences in quality and effectiveness, and avoids disputes over whether the contract has been fulfilled.
- The eligibility for and amount of compensation are often judged differently. Problems in some cases may arise because the benefits accrue only in the future,

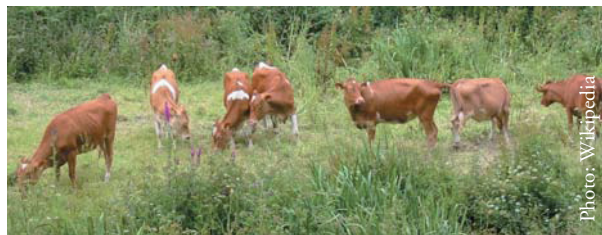
while payments are made in advance. And what is the value of genetic characteristics whose future benefits cannot even be estimated?

- To have visible effects, a large number of service providers are often needed. That increases considerably increases the costs of administration and inspection.
- PES schemes make sense only if there are no highly profitable management alternatives. In Brazil, for example, intensive plantations can generate 20 times the profits of sustainable timber harvesting. Paying compensation to convert plantations to sustainable use would entail astronomical costs.
- Incentives for environmentally friendly land-use practices do not have to be monetary in nature. Other measures may also be sufficiently attractive, such as access to further education or a guaranteed supply of seeds and equipment. However, such measures are not necessarily any cheaper.
- PES schemes do not automatically contribute to poverty reduction. Payments for environmentally friendly measures transfer funds to rural areas, but communities may be highly diverse internally, and the impact on poverty depends on many factors. For example, unequal access to natural resources may result in a lower effect on poverty because at best, landless households can benefit from PES only indirectly. PES services may increase costs for example, higher water prices may hit poor households hardest. And households will gain no extra income if the compensation merely makes up the income shortfall compared with conventional management.

PES to preserve agricultural genetic diversity

A review of current PES schemes reveals that that only a few specifically target the conservation of agrobiodiversity. However, some broad-based agro-environmental programmes, including Brandenburg and Berlin's Cultural Landscape Programme described above, and the Environmental Stewardship programme in England, promote agrobiodiversity as one of several measures. These initiatives support the cultivation of endangered plant species and the maintenance of endangered animal breeds that have special importance for the local farming systems and cultural characteristics. Other measures, such as maintaining field margins and leaving land fallow, may also indirectly benefit the wild relatives of crops.

The systems studied show that PES is generally suitable for maintaining agrobiodiversity and for promoting varieties and breeds that have low market potential. PES schemes that are limited to conserving agrobiodiversity take little effort to implement. Only a few contracted part-



Guernsey cattle are supported by the Environmental Stewardship programme in England.

ners are needed, and there are no complex cause-effect relationships, making it easy to define monitor the services. This is particularly important in developing countries, where it is hard to fund broad-based PES schemes with integrated agrobiodiversity-promotion measures. Such specific PES schemes can effectively protect agrobiodiversity, especially in genetic hotspots. Efforts to promote the use of varieties and breeds should be accompanied by initiatives such as local seed banks and the provision of advice and information. Such PES to promote agrobiodiversity can be efficiently organized on a regional basis, as crop varieties and livestock breeds are often distributed across a region, making it possible to restrict the conservation measures to the most suitable locations.

Unlike landscape restoration, erosion-control measures and other initiatives, however, grants to conserve traditional varieties and breeds must be continued year after year. This means the PES scheme must be permanent in nature.

To conserve a range of endangered varieties and breeds, comprehensive support funds are better suited than programmes that support individual varieties or breeds. Such funds can be designed to enable various funding agencies to contribute governments, donors, nongovernmental organizations (NGOs) and businesses and can be adapted flexibly to changes in the list of endangered types. A similar approach is used by the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) – see also the Issue Paper entitled *'The International Treaty on Plant Genetic Resources for Food and Agriculture – Status of Implementation'*.

The systematic conservation of globally important agrobiodiversity requires an overview of endangered varieties and breeds, as well as of existing conservation programmes. The necessary high-level coordination could be provided by existing organizations such as the network of international agricultural research centres, FAO, international NGOs, or biodiversity networks.

Conclusions and recommendations

PES schemes are suited to the conservation of agrobiodiversity, but so far have been little used for this purpose. For developing countries in particular, regional



support funds seem especially appropriate, and their activities should be coordinated regionally or globally. Since agrobiodiversity is a key element in adapting to climate change, the current orientation of international development efforts towards climate adaptation can be used to attract the necessary funding to support the conservation of agrobiodiversity. Important tasks for development cooperation in the use of PES to promote agrobiodiversity include

- The conceptual development of agrobiodiversity-oriented PES schemes and the related legal and contractual controls.
- Increased involvement of relevant private-sector stakeholders in the financing of PES.
- Support for the development of a regional agrobiodiversity-conservation fund and for the implementation of a pilot strategy in a region with high agrobiodiversity.
- Assistance to partner countries to inventory and characterize agrobiodiversity, and building their capacity to do so.
- Support for regional and international coordination of agrobiodiversity funding initiatives.

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These initiatives will contribute to the implementation of major international treaties such as the Convention on Biological Diversity and the Framework Convention on Climate Change, which the majority of developed and developing countries have signed.

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