



PAYMENTS *for*
ECOSYSTEM SERVICES *and*
FOOD SECURITY





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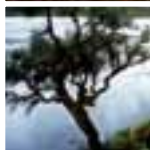
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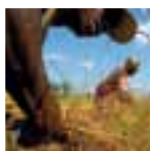


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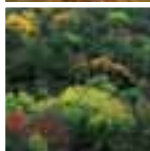


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ABBREVIATIONS AND ACRONYMS

CAFNET	Coffee Agroforestry Network
CAP	Common Agricultural Policy
CBSM	Community-Based Social Marketing
CDM	Clean Development Mechanism
CGIAR	Consultative Group on International Agricultural Research
CIFOR	Center for International Forestry Research
CIRAD	Centre de Coopération Internationale en Recherche Agronomique pour le Développement
COP	Conference of the Parties
CVI	Conservation Values Index
EBI	Environmental Benefits Index
EFTA	European Free Trade Association
ES	Ecosystem service
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FOAG	Swiss Federal Office for Agriculture
FONAFIFO	Fondo Nacional de Financiamiento Forestal / National Fund for Forests Financing
GAEP	Good Agricultural and Environmental Practice
GEF	Global Environment Facility
GHG	greenhouse gas
GI	Geographical Indication
GTZ	Deutsche Gesellschaft für Internationale Zusammenarbei
ICRAF	World Agroforestry Centre
IFAD	International Fund for Agricultural Development
IUCN	The World Conservation Union
Kagera TAMP	Kagera Transboundary Agro-ecosystems Management Project
KENGEN	Kenya Electricity Generating Company Limited
KMFT	Kodagu Model Forest Trust
MDG	Millennium Developing Goals
MEA	Millennium Ecosystem Assessment
MKEPP	Mount Kenya East Pilot Project
NGO	Non-governmental Organization



OECD	Organization for Economic Co-operation and Development
PDO	Protected Denomination of Origin (Ukraine)
PDO/PGO	Products of Distinct Geographical Origin
PEHS	Payments for Hydrological Environmental Services Program
PES	Payment for Ecosystem Services
PGI	Protected Designation of Geographic Origin (Ukraine)
PRESA	Pro-Poor Rewards for Environmental Services in Africa
RAF	rubber agroforest
REDD	reduction of emissions from deforestation and forest degradation
RES	Rewards for Ecosystem Services
RUPES	Rewarding Upland Poor for Environmental Services
SARD-M	Sustainable Agriculture and Rural Development in Mountain Regions
SFSO	Swiss Federal Statistical Office
SPP	Sustainable Public Procurement
TRIPS	Agreement on Trade Related Aspects of Intellectual Property Rights
UK	United Kingdom
UN	United Nations
UNCSD	UN Conference on Sustainable Development
UNDESA	United Nations Department of Economic and Social Affairs
UNEP	United Nations Environment Programme
UNEP-WCMC	UNEP World Conservation Monitoring Centre
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	UN Framework Convention on Climate Change
USA	United States of America
USAID	United States Agency for International Development
USGS	United States Geological Survey
WFP	World Food Programme of the United Nations
WOCAN	Woman Organizing for Change in Agriculture and NRM
WTA	willingness to accept
WTO	World Trade Organization
WTP	willingness to pay
WWF	World Wide Fund for Nature (formerly World Wildlife Fund)





FOREWORD



changing climate, loss of native forests, disappearance of biodiversity, water shortages, desertification, the reduction of natural soil fertility — all add to the scenario of a world with increasingly complex environmental challenges. But further complicating this scenario of environmental degradation is the fact that these situations are unavoidably linked with other global challenges, such as financial crises, increasing social inequality and population pressure, all of which contribute to the untenable number of people on our planet who do not have enough to eat, a number now estimated at almost a billion.

The gravity of these global challenges certainly raises questions about what, until now, has been the status quo — the way we operate agricultural production systems, the value we attribute to natural resources and ecosystems, the way our resources are shared, and how they are conserved for future generations, if at all. The concept of Payment for Ecosystem Services (PES) has emerged as a challenge to the all-too-prevalent tradition of taking the Earth's natural resources for granted. PES highlights a global continuum, illustrating the relationship between our lifestyles, the demands associated with our production and consumption patterns, and the effects those demands have on close or distant ecosystems.

PES can be used as a benchmark by which policy-makers, investors, NGOs, landowners and local people who benefit from ecosystem services can evaluate their approaches and determine if they are supporting a sustainable model of development. In this case, sustainable would mean that it recognises the right of people to guide their own development, seeks environmental integrity, enhances economic resilience, supports food security and embodies

the principles of equity and justice. Those who embrace PES embark on a journey that requires thoughtful steps, starting with putting a monetary value on natural resources and developing market mechanisms to protect ecosystem services.

The desire to stay in a comfort zone is truly a part of human nature and, if not properly designed, PES may indeed tend to favour quick, linear and easy solutions that reduce problem solving to a level of control and comfort. However, even with such a design, the actual implementation of PES will require the courage of commitment — that is, commitment to understanding the deep complexities of existing challenges. In this case, the way forward will not be toward a single, simple pre-determined solution, but instead through a process of negotiation and social dialogue that raises understanding within the community of the critical role that PES can play in protecting the Earth's natural resources and, in turn, future populations.

This book is meant to take those with background knowledge into new realms of technical understanding, but also to take newcomers to the PES mandate on a thoughtful journey, raising awareness in their consciousness as to what is needed and what can be accomplished by individuals with a strong sense of commitment. A functioning PES system has the potential to renew individuals' shared sense of responsibility and involve them in supporting initiatives that can contribute to the collective preservation of our planet. I hope that this book will awaken your enthusiasm for steering our development path in the direction of sustainability.



Alexander Müller

Assistant Director-General

Natural Resources Management and Environment Department
Food and Agriculture Organization of the United Nations



PREFACE



A healthy ecosystem can provide a variety of crucial services for public goods, such as clean water, nutrient cycling, climate regulation and food security — services that contribute directly or indirectly to human well-being. Yet today, many ecosystems are in decline; this is of particular importance to agriculture, which depends on ecosystem services. Loss of healthy ecosystems will seriously affect the production of food, both today and in the future.

Payments for Ecosystem Services (PES) is an economic instrument designed to provide positive incentives to users of agricultural land and those involved in coastal or marine management. These incentives are expected to result in continued or improved provision of ecosystem services, which, in turn, will benefit society as a whole.

Agricultural ecosystems are diverse, both in their nature and in what they produce. This means that, around the world, farmers have their own specific sets of challenges related to sustainable agricultural production, as well as linked to the socio-economic condition of their agro-ecosystem and the local cultural and business environments. For example, some ecosystems are constrained by water scarcity while others face loss of forest land, which, in turn, could lead to soil erosion and the loss of habitat for pollinators. At the same time, these agricultural ecosystems are all interlinked — through the global agricultural market.

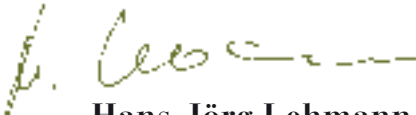
The competition among products derived from different agricultural systems and the need for affordable food prices tend to result in general disregard of public goods and of ecosystem services, as well as of the sustainable management and use of natural resources. The result of such a lack of policy for protecting ecosystems is that related conservation costs are not captured in the marketplace. Subsequently, even if aware of the loss of ecosystem services and general environmental degradation, farm families — most often, the poorer

producers — are economically unable to afford the necessary conservation measures and precautions. That is why it is important to consider positive PES incentives, which would provide remunerations through market or direct payments and, in turn, give farmers benefits needed for improving their production and livelihoods.

Some countries and international organizations already have experience in enacting PES. It is important to capitalise on their experiences and lessons learned, build upon those aspects that work and leverage political support for the wider use and further development of such policies and instruments. It is important to use these experiences to raise awareness of the benefits, and work with relevant policy-makers, including the UN, at national and international levels.

To address current environmental challenges and attempt to shape the future, it is necessary to disseminate information on options for managing ecosystems, including the public goods and services they provide, as well as on the inter-linkages of the food and agricultural sectors with other sectors. The Food and Agriculture Organization of the United Nations (FAO) is a major repository of expertise and information on food and agriculture. Its capacity and knowledge can be utilised to initiate global policy dialogue on PES that would involve the agriculture, environment, trade and finance sectors, and include partners from both civil society and the private sector.

On behalf of the Swiss Confederation, I would like to take this opportunity to express my appreciation to all those who have worked hard on this publication. In particular, I extend my sincere thanks to the farm families who participated in the case studies, the project collaborators, the national authorities, the donors, and the FAO and especially to Ms. Nadia Scialabba (FAO), the project leader.



Hans-Jörg Lehmann

Permanent Representative
Head of the Permanent Representation of
Switzerland to FAO, IFAD and WFP

**“We can’t solve problems by
using the same kind of thinking
we used when we created them.”**

Albert Einstein







INTRODUCTION

ECOSYSTEM SERVICES AND FOOD SECURITY

The Millennium Ecosystem Assessment (2005) defines poverty as the pronounced deprivation of well-being, which is achieved with provision of food and basic material needs, freedom of choice, health, good social relations and security. Poverty often arises from a broken linkage between human well-being and ecosystem services. More specifically, poverty is directly linked to food security, which refers to the supply and access to provisioning services, such as food, water, wood, fibres and fuel, that are, in turn, dependent on the healthy functioning of regulating services, such as climate change stabilisation, flood regulation, drought control, water purification, disease regulation, predation and pollination. Regulating services cannot function without supporting services, such as primary production (photosynthesis), nutrient cycling and soil formation and biodiversity. Above all, the biological diversity (including genes and species) that is found in natural environments constitutes the web of life that supports all ecosystem functioning and enables ecosystems to be resilient enough to external shocks so as not to experience significant changes in state. As such, the healthy functioning of ecosystems is affected by multiple interactions between various types of ecosystem services, resulting in a highly complex network.

Agriculture relies on the delivery of critical regulating ecosystem services

Agriculture generally also relies on the delivery of critical regulating ecosystem services, such as soil formation and micro-organism activity, erosion control, nutrient dispersal and cycling, water purification, reliable rainfall and stable climate, crop pollination, and pest and disease control. Modern intensive agriculture demands a continuous and constant trade-off between provisioning and regulating/supporting services. Productivity aims to increase the rate

of provisioning services to the detriment of regulating services; however, when regulating and supporting ecosystem services are disrupted, food production is seriously affected, the result being a vicious downward spiral. Thus, there is an urgent need for mainstreaming agricultural policies, regulations and incentives related to the adoption of sound agricultural practices that both enhances the provisioning ability and resilience of agro-ecosystems.

In this interaction between human activities and ecosystems, there is a negative reinforcing feedback loop between poverty and ecosystem conditions because poverty is often related to ecosystem degradation, while ecosystem degradation often aggravates poverty. In fact, the disruption of ecosystem services tends to have more severe impacts on the poor than on the wealthy who have the necessary financial and social capital to access scarce resources or their substitutes.

Poor farmers generally lack the resources necessary to counteract reduced agricultural productivity with investments in water management and the use of proper agricultural inputs. The misuse of such artificial inputs often impacts the long-term provisioning ability of ecosystem services and

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food insecurity*

contributes to make poor farmers ever more dependent on external inputs, increasing their dependency on cash flow and credit systems, putting them under greater financial stress and eventually putting their food security under major threat. The resulting lack of self-reliance of the food system, including the loss of control and management of farmers on their own activities and an increasing sense of hopelessness, can even bring farmers to the point of committing suicide. Globally, the suicide rate for farmers is higher than for the non-farming segment of the population due to higher indebtedness and

loss of dignity. Thus, the preservation of the healthy functioning of ecosystem services represents a long-term insurance against poverty, food insecurity and overall human well-being.

PES AND SUSTAINABILITY

Ecosystem services are public goods, but as no one actually owns them, there is generally very little incentive to preserve them. As a result, there are no direct market mechanisms to signal the scarcity or degradation of a service until it fails. Payments for Ecosystem Services (PES) aim to fill this gap by creating new marketplaces for services, such carbon sequestration, biodiversity conservation, watershed protection and landscape values.

In the most commonly-accepted definition of PES, as given by Wunder (2005), PES is a voluntary transaction whereby a well-defined ecosystem service (ES) is 'bought' by a minimum of one ES buyer from a minimum of one ES provider if and only if the ES provider continually secures the ES provision (i.e. with an element of conditionality).

A PES scheme can be put in place when: (a) the demand for at least one ecosystem service is clear and financially valuable to one or more ‘buyers’; (b) the provision of ecosystem services is threatened, but the adoption of specific land-use/management practices has the potential to address the supply constraints; (c) a trusted intermediary is available to assist both parties in developing the negotiation and provide expertise in the PES design; (d) clear criteria are able to be established to ensure compliance of the contractual agreement by both parties; (e) land tenure and usage rights are clear; and (f) there is a cross-sectoral coherence between existing policies and laws and PES requirements. Although the private sector is becoming increasingly involved in most PES schemes, the main buyer is still the public sector, which is able to raise funds at the national and international levels and act on behalf of civil society to preserve ecosystem services and promote sustainability.

Sustainability is a multidimensional concept encompassing economic resilience, environmental integrity and social development. Sustainability means ensuring human rights and well-being, as well as achieving global food security without depleting or diminishing the capacity of the Earth’s ecosystems to support life or at the expense of others’ well-being. The attractiveness of PES is that it is able to form a bridge between the complex dimensions of sustainability because a PES scheme should be economically viable, socially just and tackled to the carrying capacity of natural systems. By definition, PES aims to provide incentives (i.e. the economic dimension) to preserve ecosystem services (i.e. the ecological dimension) such that they can continue to provide benefits to the society (i.e. the social dimension). Being a direct voluntary payment mechanism, PES would be expected to be institutionally simple, effective in providing to income generation and cash flow amongst suppliers, successful in the delivery benefits to buyers as payments are conditional on performance, and able to foster practical tools for the preservation and monitoring of ecosystem services. In reality, the complexity arising from the interaction of these three dimensions (economic, ecological and social) has been revealed during the last 15 years in which more than 300 PES schemes have been implemented around the world (Landell-Mills and Porras, 2002). Each PES project has faced particular challenges linked to ecological, socio-economic, political and cultural conditions in which was implemented. At the same time and due to this, each PES project reflected in a different way the economic, ecological and social dimensions. On the basis of the experience gained so far, PES schemes have also been evaluated from different perspectives and in various ways. From the economic perspective, it has been argued whether the occurrence of a PES scheme was actually able to provide true additionality (i.e. improve the delivery of ecosystem services, everything being equal); from the ecological perspective,

PES is a bridge between the complex dimensions of sustainability by being economic viable, socially just and within the environmental carrying capacity

it is whether PES is an effective long-term option for conservation of natural resources and sustainable development; and from the social perspective, if PES reflects the principles of equity and justice and whether it can be an effective way for poverty alleviation. However, the key underlying question is whether it is indeed possible for a PES scheme to integrate these three dimensions and thereby ensure food security. If PES is not an efficient market-mechanism and does not adapt to reflect in time the true or perceived opportunity costs, it will not raise the stakeholders' interest to participate in such a voluntary scheme. In addition, if PES is not based on a robust environmental assessment and the understanding of the causes of disruption of ecological processes, the preservation/restoration of the ecosystem services will not take place. Finally, if PES is not designed to target poor landholders, to induce cooperation and to enhance community cohesion, the additional cash flow can trigger social conflicts and even aggravate food insecurity.

TOWARDS THE INTEGRATION OF THE ECONOMIC, ECOLOGICAL AND SOCIAL DIMENSIONS OF PES

In 2002, an International Conference on Sustainable Agriculture and Rural Development in Mountain Regions (SARD-M) held in Adelboden, Switzerland, established the multi-stakeholder Adelboden Group. This group, which backstopped the FAO project on SARD-M (2005-2010), identified PES as a priority for sustainability.

In order to provide insight in a new multidimensional generation of PES schemes, a stakeholders consultation on "Food security through additional income generation: From Payment of Ecosystem Services (PES) to Remuneration of Positive Externalities (RPE) in the agriculture and food sector", was convened by the FAO Natural Resource Management and Environment Department, with financial support from the Swiss Federal Office for Agriculture, from 27-28 September 2010 at the FAO Headquarters in Rome, Italy. Invitees from both developed and developing countries included researchers from the CGIAR and various universities (ICRAF, CIRAD and research institutes in India, Melbourne and Stockholm), NGOs (CARE-WWF, Euromontana, Heifer, IUCN, WOCAN), public officials from Bhutan, Chile, Costa Rica, Italy and Switzerland, the UN (i.e. IFAD, UNEP, WFP) and OECD representatives involved in the various aspects of PES.

*The FAO
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The stakeholders discussed lessons learned and enabling conditions for PES schemes, as well as innovative approaches to PES. The consultation conceived a deeper understanding of the complexity lying behind PES schemes and pointed out the need for the improved integration

of the economic, ecological and social dimensions as a way to foster real change and pave the way for sustainable and effective PES implementation. The underlying complexity of this integration is likely to bring to the fore new synergies during development and implementation, as well as trade-offs, both foreseen and unforeseen.

This publication reviews the role of PES in agriculture and examines lessons learned from agri-environmental policies in the European Union and OECD countries for a new generation of PES schemes in agriculture.

In particular, it is evident that agriculture represents one of the main anthropogenic activities influencing the preservation or the disruption of ecosystem services. Although many PES schemes, often classified as water, carbon sequestration, biodiversity and landscapes, do not specifically refer to agriculture. They often attempt to mitigate the 'lose-lose' situations found where subsistence agriculture is unable to provide food security to local people and continues to erode natural capitals, compromising even more the supply of food and related ecosystem services (i.e. the 'poverty trap').

Further interesting suggestions arise from the development of agri-environmental policies in OECD countries. In many of these countries, several certification schemes have been put in place and have shown to be successful in incentivising different types of productive systems in agriculture. Community-based approaches, such as Landcare in Australia and watershed initiatives in Europe, have also proven to be a major driving force for change in agro-ecosystems.

This review also highlights how while PES schemes have an economic structure, they are also aimed at fulfilling the ecological and social dimensions, which present opportunities and gaps in their implementation. In particular, under the ecological dimension, the use of spatially-explicit cost-benefit analysis enables one to identify PES areas with high ecosystem service provision (i.e. benefits), areas with high risks to ecosystem services (i.e. threats) and areas with low opportunity costs (i.e. costs). Under the social dimension, there is also a need to take into account the motivational, social and cultural drivers of PES success. Once these drivers are carefully tackled, PES schemes are based on stronger social consensus and can be implemented through cooperation within the community.

The new generation of PES schemes could combine community-based initiatives and certification schemes. This landscape labelling approach publicises ecosystem service delivery, together with the cultural and symbolic attributes of the landscape. Furthermore, it has the potential to improve market recognition, secure premium payments and gain access to niche markets. The derived benefits can, in turn, provide the necessary incentives needed for managing the landscape in such a way as to continue to meet the ecosystem service criteria required for certification.

This review also examines the legal enabling conditions for PES and the potential of PES for a 'green economy'. PES schemes are voluntary contractual agreements and, by definition, need only a clear allocation of land property and usage rights to be effective; in reality though, the success of PES is often affected by the existing legal and institutional frameworks in which the scheme takes place. It is essential that PES schemes are implemented within legal frameworks that are harmonised at the sub-national, national and international levels. PES projects often reveal weaknesses or incoherences in the existing legal and institutional frameworks and, as such, can constitute small-scale pilot projects for mature national PES visions.

PES projects, as innovative cross-sectoral and inter-institutional bridges, often require enabling conditions and market interventions which, on a larger scale, are also considered as important propellers for the growth of a 'green economy'. However, the real contribution of PES to the development of a green economy depends primarily on the capacity to design a new generation of PES schemes in which the economic, ecological and social dimensions are fully integrated. Such PES schemes are likely to be the small-scale field trials for the development of a truly global 'green economy'.

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