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Programme

Guidelines for Establishing Payment for Ecosystem Services Schemes in Kenya



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Kenya Forestry Research Institute
(KEFRI)

Guidelines for Establishing Payment for Ecosystem Services Schemes in Kenya

David Langat, John Otuoma, Joram Kagombe, Joshua K. Cheboiwo, Paul Ongugo
and Bernard Kigomo

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River Amala in Mulot, Bomet County illustrating dirty water due to heavy sediments from upstream areas of Mau Forest Complex

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Box 20412 - 00200 Nairobi, Kenya Tel:

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FOREWORD

Payment for Ecosystem Service (PES) has become a tool for sustainable watershed management across the globe due its versatility and capacity to engage multiple stakeholders in the public and private sectors. Its strength lies in the ability to incorporate voluntary economic incentives and market-based instruments which are superior to the conventional command and control approaches of watershed and natural resource management. PES as a paradigm in natural resource management works on the principle that upstream resource managers are rewarded for good resource stewardship through economic incentives to guarantee sustainable delivery of ecosystem services downstream.

Kenya, like many developing countries, faces the problem of watershed degradation due to high human population and high livelihood dependence on these critical watersheds. Many countries in Central America and East Asia have employed PES schemes to reward smallholder land owners for their good land use stewardship that enhances sustainable supply of watershed services with good level of success. With a vibrant PES framework, which has been lacking in Kenya, the country stands a better chance of achieving sustainable management of its various watersheds in accordance with international standards.

The use of PES in watershed management in Kenya is still at its infancy and disjointed in its implementation. This guideline seeks to fill existing gaps in PES arrangement by establishing a framework for linking the science of ecosystem management to the practice of PES implementation. It is expected to offer the much needed practical approach for mainstreaming PES scheme in the management and restoration of degraded watersheds and water towers in Kenya. Thus Kenya Forestry Research Institute (KEFRI) envisages better management of critical water towers and other watersheds through innovative approaches that build on the principles of this PES guideline to achieve sustainable ecosystem service provision, clean and secure environment and equitable socio-economic development in tandem with Vision 2030.



Ben E.N. Chikamai (PhD)
Director, Kenya Forestry Research Institute

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ACRONYMS

EMCA	Environmental Management and Coordination Act
ICRAF	International Centre for Research in Agroforestry
KEFRI	Kenya Forestry Research Institute
KEWASCO	Kericho Water and Sanitation Company
KFS	Kenya Forest Service
NGO	Non-Governmental Organisation
PES	Payment for Environmental Service
TEV	Total Economic Value
WRMA	Water Resources and Management Authority
WRUA	Water Resource Users Association
WWF	World Wide Fund for Nature

1.0 INTRODUCTION

Forests provide various goods and services. The goods include; wood and non-wood forest products while key services include; water, carbon sequestration, and regulation of air quality. Forest in Kenya are increasingly facing threats of degradation. Degradation of forest ecosystems including conversion of forests to other land uses will undermine provision of ecosystem goods and services. For example, in the past, various management approaches have been used to sustainably manage forests but the threats of forest degradation have continued. Recently, Payment for Ecosystem Service (PES) has been used to promote sustainable watershed management across the globe. The tool is versatile and promotes involvement of multiple stakeholders in public and private sectors in sustainable forest management. Payments for Ecosystem Services also known as payments for environmental services are incentives offered to owners or managers of ecosystem resources in exchange for managing their resources for provision of ecological services. A Payment for Ecosystem Services employs the principle that resource managers/owners are rewarded for good resource stewardship through economic incentives to guarantee sustainable delivery of ecosystem services. Payment for Ecosystem Services influences land-use decisions by enabling landholders/managers to capture more of the value of the environmental services than they would have done in the absence of the mechanism. The strength of PES lies in its ability to incorporate voluntary economic incentives and market-based instruments. The tool is superior to the conventional command and control approaches of watershed and natural resource management. Experiences from around the world show that the conventional approach of command and control in ecosystem management may be effective in managing natural resources in well-defined hot-spots, but not at the ecosystem level, where resource degradation results from a combination of individual actions spread over large geographical areas.

The use of PES as an economic incentive to support ecosystem conservation has become popular across the developing world. In recent years, countries in Central America and South East Asia have established PES schemes where governments pay rural communities, for ecosystem

service provision such as; climate regulation through enhanced carbon dioxide fixation by forests, water quality provision through maintenance of forest cover in critical watersheds, and species and gene pool conservation through the protection of standing forests in key biodiversity hotspots.

In Kenya, a number of PES schemes have been piloted and some experiences gained. These include; Wildlife Work Kasigau Corridor Redd+ Project in Taita Taveta County, Lake Naivasha Upper Catchment PES in Nakuru County, Upper Tana-Nairobi Water Fund Project (UTNWF), and Mikoko Pamoja Project at Ganzi Bay in Kilifi County. However, these PES schemes have evolved with high external expertise and therefore the need for simplified systematic approaches to support local entities in the up-scaling beyond donor supported project duration. Moreover, PES arrangements seem to be strong on the economic incentives that they offer rather than on the process. Another challenge facing most PES schemes is lack of national standard implementation protocol to guide local practitioners. It is therefore necessary to develop a standard guideline to provide a framework for local PES implementation.

As part of the Water Towers programme, a framework for establishing a working PES scheme is a first step in the development of PES business cases. This guideline developed by the programme seeks to address existing gaps in PES application by establishing a framework for linking ecosystem management to the principles of PES implementation. The guideline provides a listing of types of ecosystem products and services found in Mt Elgon and Cherangany Hills ecosystems. The guideline is expected to offer a practical approach for mainstreaming PES in the natural resource management with emphasis on watershed management in Kenya. The guideline provides an overview of PES concept and processes, the existing legal and policy framework that inform PES schemes in Kenya and the PES methods and procedures. The target audience for the guideline include; policy makers, natural resource managers, community based organizations, development partners, natural resource management scientists, and civil societies.

2.0 OVERVIEW OF PAYMENT FOR ECOSYSTEM SERVICES (PES)

Payment of Ecosystem Services is a transfer of a positive incentive to the environmental service providers that is conditional on the provision of an environmental service (Swallow *et al.*, 2007). Essentially, PES is the transfer of resources between groups to create an incentive with wider social benefits with the aim of aligning land use decisions to sustainable ecosystem service delivery. Although PES transactions are unique, depending on the ecosystem service and the stakeholders involved, they share certain characteristics. These include:

- a) Ability of the economic incentive to influence land use decisions and ecosystem service provision;
- b) Opportunity for individual ecosystem service providers (sellers) to receive direct or indirect benefits from the beneficiaries of the service (buyers);
- c) Extent to which the service being provided can be expressed in terms of measurable quality or quantity;
- d) Transactions are voluntary but legally-binding;
- e) Ecosystem services are well-defined and valued; and
- f) Payments are conditional on continued provision of the ecosystem service by the provider

Under a PES scheme, resource owners may accept voluntary limitation/diversification or improvement of their activities in return for an economic benefit thus merging the interests of both parties while helping to protect the ecosystem. The ecosystem service must be valuable to those who pay for it, while those who receive the payment must engage in meaningful and measurable activities to secure sustainable supply of the ecosystem services.

Three types of PES schemes are recognized namely; private PES schemes, cap and trade schemes and public PES schemes. Private PES schemes are self-organized between private entities and involve direct payments by service beneficiaries to service providers for the protection or restoration of an ecosystem, such as a watershed. Cap and trade schemes are based on an established capping (an aggregate maximum amount) allowed beyond

which payments are charged. Examples include water pollution capping or water abstractions capping beyond which beneficiaries make payments for levels above the allowable maximum. Public PES schemes are government driven which involve public agencies who collect user fees, taxes and grant rights to use land resources (Smith *et al.*, 2006). Most public schemes fund non-discriminatory activities such as forest rehabilitation, afforestation and livelihood enhancing programmes in key watersheds irrespective of individual contribution in resilience of the service under consideration.

3.0 POLICY AND LEGAL ENVIRONMENT IMPACTING ON PES

Currently there is no enabling policy on PES and as a result environmental benefits that would accrue from PES arrangements have not been fully exploited. Although, PES is not explicitly mentioned within the existing legal and regulatory framework, the Constitution of Kenya 2010 and several laws provide an enabling environment to accommodate PES schemes in Kenya.

3.1 The Constitution of Kenya 2010

The principles in the constitution are supportive of PES approaches. Chapter five of the Constitution of Kenya address itself to Land and Environment in articles 69 and 70. The Chapter seeks to eliminate processes and activities likely to endanger the environment. Article 69 states that “ (1) The State shall a) ensure sustainable exploitation, utilisation, management and conservation of the environmental and natural resources, and ensure equitable sharing of the accruing benefits; d) encourage public participation in the management, protection and conservation of the environment; and h) utilise the environment and natural resources for the benefit of the people of Kenya”. In its vision the Constitution therefore envisages a situation where critical ecosystem services like water are provided in perpetuity to the current and future generations through consultative process that secure such vision including the PES advocated principles.

3.2 Environmental Management and Coordination Act No 8 of 1999 revised 2002 and Amended in 2015

This Act states that every person is entitled to a clean and healthy environment and has a duty to safeguard the same. The Act demands that action should be taken to either eliminate or mitigate land use actions that are likely to have negative impacts on the environment. It has subsidiary legislation that addresses specific aspects of the environment, namely: Polluter pay principle and environmental aspects of the legislation can form some entry points to support PES in Kenya

3.2.1 Environmental Easements

EMCA under sections 112–116 provide for the creation of environmental easements to facilitate the conservation and enhancement of environmental conditions for various purposes including environmental services. It confers a legal right to conservation organizations or government agency the right to restrict or forbid future development on a parcel of land but may allow the owner to continue to make some use of the property. The section provides an opportunity for a negotiated temporary or permanent deferment of land uses that are injurious to provision of ecosystems services while compensating the land owner for the loss of certain uses. In terms of PES, the section can guide on where PES schemes can be practiced.

3.2.2 EMCA (Water Quality) Regulations, 2006

Environmental Management and Coordination (Water Quality) Regulations, 2006 provide guidelines on use and management of water sources and quality of water for domestic use, municipal supply and irrigation. The regulations prohibit anyone from undertaking development activities in areas where such development may pollute or interfere with water. The Regulations and PES share the same objectives of improving the quantity and quality of water for various uses.

3.2.3 EMCA Regulation on Wetlands, River Banks, Lake Shores and Sea Shore Management 2009

EMCA Regulation on Wetlands, River Banks, Lake Shores and Sea Shore Management 2009 promote conservation and sustainable use of wetlands and water resources in Kenya. The regulations recommend the use of precautionary principle when working near wetlands in order to conserve them. Wetlands, river banks and lake shore are providers of key ecosystem services and their use is highly regulated through precautionary principle that requires mitigation measures in case of development schemes. The Regulations support the objectives of PES.

3.3 The Lands Act, 2012

Land Act, 2012 requires that all land in Kenya, whether private, public or community land should be registered. The Act makes provision for the registration of land under different land tenure regimes. The Act provides ownership rights to various entities who are in charge of specific natural resources with negotiable powers on management issues and thus tenure rights are key ingredients in formulation and implementation of PES in natural resource management.

3.4 Water Act 2002

Water Act, 2002 provides guidelines on use and management of water resources in the country. The Act prohibits the pollution of water resources. Part II, Section 3 of this Act states that every water resource is vested in the state, subject to any rights of user granted by or under the Act or any other law. The Act and its subsequent supplementary legislation, the Water Regulations of 2007, requires that any organization/person intending to abstract water for supply to over twenty (20) users should obtain a permit from the Water Resource Management Authority (WRMA) through a Water Resource Users Association (WRUA). The Act further states that, the issuance of such a permit is subject to public consultation as well as an Environmental and Social Impact Assessment. The Act gives powers to WRMA to levy on water use to support catchment conservation activities including; development of catchment management plans, and

rehabilitation of degraded catchment. The WRMA actions represent some form of public PES that intend to provide support to land owners to undertake activities that mitigate watershed degradation processes.

3.5 The Forest Conservation and Management Act, 2016

The Forest Conservation and Management Act, 2016 under article 27.

(1) Establishes Forest Conservation and Management Trust Forest Fund. The objects of the Trust Fund are to nurture, promote and support innovations and best practices in forest conservation and development including support of; community forestry programmes, reforestation and afforestation programmes, forestry extension programmes, apprenticeships and vocational training, and programmes for payment for ecosystem services. The Act empowers the Cabinet Secretary to formulate rules to govern the management of the trust fund. The Act therefore provides avenues for supporting PES schemes in the country.

4.0 METHODS AND PROCEDURES FOR IDENTIFYING VIABLE PES SCHEMES

Entities interested in establishing PES schemes should ensure the following conditions are in place: a sellable ecosystem service; market demand for the ecosystem service; and a cause and effect relationship between an economic incentive and change in land use to secure increased supply of the ecosystem service. However, it is also important to identify the buyer, seller and other actors such as intermediaries and knowledge providers, and analysis of existing governance structures.

The steps involved in identifying the potential for PES schemes include; establishing baselines, developing business case for PES, analysis of possible intervention scenarios, identifying potential buyers, sellers and intermediaries, and determining willingness to pay or accept payment.

4.1 Establishing the Baseline

Establishing the baseline is a prerequisite for all PES schemes. This entails; delineating the geographical boundaries offering the ecosystem service, characterization of the ecosystem, and identification and quantification of the ecosystem service. The baseline provides information on what would happen in the absence of the PES scheme, which is referred to as the business as usual. It also provides the basis against which the performance of the PES scheme is to be measured, reported and verified.

4.1.1 Delineating the geographic boundaries offering the ecosystem service

A fundamental requirement for any PES scheme is to delineate the geographic area from which the ecosystem service is obtained. The geographic scope of a PES scheme should reflect the spatial scale at which the benefits of the ecosystem service in question accrue. For water based PES schemes, a catchment is normally considered a geographic scope.

4.1.2 Characterization of the ecosystem

Characterization of the ecosystem entails; delineating the geographic scope, definition of ecosystem service, land use, level of degradation, socio-cultural and socio-economic parameters such as; beliefs and norms associated with the resource, human population density, spatial distribution, migration status, livelihood activities, main economic activities and a diagnosis of how these parameters affect ecosystem functions. The assessment should identify key intervention hotspots that bear greatest impact from the flow of ecosystem services.

Assessment can be carried out through:

- a) Review of literature on target ecosystem;
- b) Scoping meetings with key stakeholders and experts on land use and ecosystem functions;
- c) Spatial analysis of the landscape based on remotely-sensed imagery, available maps and digital data;
- d) Gathering of local ecological knowledge of the ecosystem and

consequences of land-use options;

- e) Modeling of ecosystem services in the landscape to explore scenarios of probable land-cover change and likely impacts on key performance indicators.

4.1.3 Identification of the ecosystem service

Identification of an ecosystem service is usually triggered by emergence of a problem related to delivery of service e.g. deterioration in water quality downstream. Identification of the ecosystem service entails assessing its potential to be bought and sold. The potential would drive the establishment of a PES scheme. In order to identify a saleable ecosystem service, there are three issues to consider:

- a) Are there specific land use or resource management actions that have the potential to secure an increase in supply of the ecosystem service? A clear relationship should exist between land use or resource management intervention (cause) and ecosystem service provision (effect).
- b) Is there a clear demand for the ecosystem service in question and is its provision financially viable to potential buyers? The demand for an ecosystem service must be such that buyers are willing to pay to secure it. The willingness to purchase is often created by the emergence of a problem with the supply of an ecosystem service such as reduction in water quality / quantity or loss of wildlife habitat.
- c) Whose actions have the capacity to increase the supply of the ecosystem service? It is important to identify the land uses that are providing a particular ecosystem service and also identify the applicable land managers who should be paid in order to secure the service.

4.2 Developing a Business Case for PES

Developing a business case for PES entails carrying out cost-benefit analysis. Investments in ecosystem services must be supported by sound economic and financial analysis to justify to potential investors the motivation to invest in the service. Understanding economic value of ecosystem services enables more informed decision-making on investment and development of the ecosystem. Understanding economic value of the ecosystem ensure that decisions are justified in the context of values, benefits and trade-offs at stake. Economic value of ecosystem services is usually determined by applying the concept of Total Economic Value (TEV). The TEV of ecosystems is useful for raising awareness on the importance of ecosystems to human society and increasing acceptability of the payment schemes. However, to design payment schemes, additional benefits to stakeholders resulting from changes in better management of ecosystem services should guide the establishment of appropriate levels of compensation.

4.3 Analysis of Possible Intervention Scenarios

A PES scheme is guided by well-articulated intervention measures to counter forces that may degrade the service through a business as usual scenario. Some examples of interventions that can be considered at various levels of ecosystem management include:

- **At forest level:** controlled grazing, rehabilitation of degraded forest sites, low impact harvesting and resource protection.
- **At farm level:** environment-friendly land use, use of potential sediment filters and soil and water conservation structures such as trees, grass strips, contours and terraces, minimum tillage, organic farming and reduced use of chemicals.
- **At riparian ecosystem level:** Use of potential sediment filters and soil and water conservation structures such as planting “water friendly” plants, sensitization of the public on river bank protection and compliance with regulations for protection of river courses by creating a buffer zone of one and a half times the width of the river.
- **Biodiversity conservation:** Protection of key habitats and securing of wildlife dispersal corridors among others activities that secures vibrant breeding population of both flora and fauna.

- **Sustainable eco-tourism:** Ecotourism that include maintenance of wildlife habitats and cultural sites for recreation and co-existence of wildlife with neighboring population.

4.4 Identifying Potential Buyers, Sellers and Intermediaries of a PES scheme

A key activity in establishing a PES scheme is to identify sellers, buyers and other actors such as intermediaries and knowledge providers.

4.4.1 Sellers

Sellers of ecosystem services are landowners and resource managers whose decisions, either individually or collectively, impact on flow regimes and the quality and quantity of ecosystem services.

4.4.2 Buyers

Buyers of ecosystem services comprise beneficiaries of ecosystem services whose interests and livelihoods depend directly or indirectly on the ecosystem service. Buyers can be grouped into three categories:

- **Primary buyers** - private organizations and individuals who benefit directly from an ecosystem service and pay directly for improved ecosystem service provision (e.g. clean water, reduced flood risk or recreational access)
- **Secondary buyers** - organizations that buy improved ecosystem service provision on behalf of sections of the general public. Secondary buyers can include water utility companies, insurance companies and Non-Governmental Organizations (NGOs).
- **Tertiary buyers** – institutions that pay for improved ecosystem service provision on behalf of the wider public e.g. government or investors that provide corporate social responsibility.

4.4.3 PES intermediaries

Successful PES schemes often involve intermediaries who operate as credible brokers. They perform a variety of tasks, including:

- Helping sellers assess an ecosystem service and its value
- Introducing buyers and sellers and building rapport between them
- Establishing ecosystem service baselines and scope for additionality
- Identifying specific land use/resource management interventions that will deliver service provision
- Aggregating multiple landowners/managers for complex PES schemes
- Assisting with PES negotiations
- Monitoring, evaluation, certification and overall scheme administration

4.5 Analysis of Existing Governance Structures

It is necessary for entities promoting PES schemes to understand governance structures among sellers of the ecosystem service at both village or landscape level. This will help in appreciating the institutional dynamics in the area where the ecosystem service will be produced, managed and sold. For instance, it may be necessary to know the linkage and relationship between customary governance systems and legal administrative systems in order to understand:

- Whether local governance structures have a role in the management of natural resources
- Land tenure and how land and natural resources are governed
- Who has the legal right and capacity to participate in the PES scheme
- Whether the sale of the ecosystem service will involve more than one village or community
- How the PES scheme will be managed in a situation where land/catchment ownership varies among different villages/communities
- How existing governance structure will influence establishment and administration of the PES scheme

4.6 Determining Willingness to Pay or Accept Payment

The principle of PES schemes is based on voluntary engagements based on agreed ecosystem service values and costs for provision. Thus, transactions between contracting parties is guided by interests and preferences of beneficiaries and service providers. The price beneficiaries are willing to pay will be measured against the added cost that would result from a detrimental change in the ecosystem services supplied. In the case of a watershed, it is the marginal cost downstream from watershed degradation measured in the resulting loss of benefits or the cost of replacing the benefits. It would not be worthwhile for beneficiaries to pay a price for watershed service that is higher than expected benefits or incurred costs. The price that upstream service providers are willing to accept is determined by either the added costs they must bear to increase ecosystem service provision, or the income they must forego if they opt to give up on good land management practices.

5.0 ESTABLISHING A PES SCHEME

It is advisable to develop a project plan that maps out the principles that will underpin the PES scheme. The principles guide buyers and sellers when negotiating a PES scheme. Establishing a PES scheme usually requires that both buyers and seller have questions to address in order to establish a viable scheme. Other principles include; negotiating a PES agreement, drawing up a PES agreement, and issues to consider while drawing PES implementation plan.

5.1 Questions for the Seller

- a) What is the value of your product to potential buyers?
- b) What is the minimum level of payment would you be willing to accept?
- c) What payment terms would you expect?
- d) Would you be willing to accept part-funding of certain interventions on the basis that they will also provide you with benefits?

- e) Over what timescale are you willing to deliver ecosystem service benefits?
- f) Will you require any training to implement the necessary interventions?
- g) What might disrupt your capacity to deliver the necessary interventions and what interventions will you put in place?
- h) Would you be willing to potentially enter into a land conservation agreement?
- i) Have you considered the possible impacts of the scheme on longer-term land values?
- j) Have you considered intergenerational interests on the conservation agreements?

5.2 Questions for the Buyer

- a) What benefits are you likely to derive from the scheme?
- b) Are there any other more cost-effective means of securing the service in question?
- c) How much are you willing to pay for the service or services in question?
- d) Would you be prepared to pay for specified land or resource management interventions or only actual changes in ecosystem service provision?
- e) If you are contented to pay for specified interventions, how much uncertainty in terms of cause-and-effect are you willing to accept?
- f) Would you prefer to deal with sellers directly or through an intermediary?
- g) Do you understand the motivations of potential sellers and how best to engage them?
- h) Over what timescale do you need to see ecosystem benefits emerge?
- i) For how long are you willing to commit funds?
- j) Do you require the outcomes of the scheme to be verified and/or certified by a third party?

5.3 Issues to Consider while Drawing

PES Implementation Plan

In drawing up a PES project plan, scheme proponents should resolve the following issues:

- a) Should a steering group be established to oversee scheme development and implementation? And should this be supported by a scientific advisory panel to provide confidence in the scheme's capacity to deliver additional ecosystem service provision?
- b) Is primary evidence-gathering a prerequisite for scheme development? For example, is research necessary to demonstrate the links between management interventions and ecosystem service outcomes to reassure prospective buyers or is existing evidence sufficiently persuasive?
- c) In schemes involving multiple buyers and/or sellers, who will be responsible for liaison with the various parties? Will the buyer(s) approach the seller(s) directly or vice-versa or will an intermediary act as the go-between? Is one 'anchor' buyer necessary to secure the participation of other buyers? Are there existing organizations with strong links to sellers that could act as intermediaries? Is one intermediary sufficient or are multiple intermediaries necessary, for example to cover different geographical areas?
- d) Are the necessary skills in place to develop and implement the scheme? Establishing a PES scheme involves a range of activities, many of which may require specialist knowledge and expertise. These may include: establishing an ecosystem services baseline; identifying appropriate land management interventions; preparing a business case for investment on the part of buyers; negotiating potentially complex agreements extending over many years; handling financial transactions; and undertaking monitoring, evaluation and review. As such, establishing a PES scheme is likely to require a wide range of competencies including technical, financial, negotiating and engagement skills.
- e) Should the emerging scheme be piloted prior to being rolled out more widely?
- f) To what extent should the proposed scheme be subject to

consultation with stakeholders and the public?

- g) Who will be responsible for monitoring and verifying ecosystem service benefits? What level of monitoring will be sufficient to reassure buyers that benefits are indeed being delivered? What scale and frequency of monitoring will be acceptable to sellers? To ensure the scheme's credibility and promote investor confidence, it is recommended that ecosystem service benefits arising from the scheme are certified by an independent third party.

5.4 Negotiating a PES Agreement

A PES agreement involves agreeing on; nature of payments, level of payments, and timing of payments before drawing the agreement.

5.4.1 Nature of payments

The nature of payments for PES depends on proposed interventions. For example, some interventions may provide benefits to both buyers and sellers. In these scenarios, a match-funding approach may be appropriate with sellers co-funding the interventions. In other cases, interventions may have a clear adverse effect on outputs from the land or resource and payments will need to cover the full costs to the seller. In some instances, cash payments might be accompanied by in-kind payments such as provision of capacity building or advice on best land use practice.

Importantly in layered PES schemes with multiple buyers it may be necessary to work out the relative contributions of the interventions to the delivery of different ecosystem service benefits to determine the contributions that each buyer should make. It should be noted that most PES schemes generally have a series of payments in exchange for provision of ecosystem services. However, in practice PES schemes may also involve one-off payments, for example to cover the upfront costs of ecosystem restoration.

5.4.2 Level of payments

The price paid for an ecosystem service will be the result of a negotiation between the buyer(s) and seller(s), in some cases facilitated by an intermediary. Ultimately, the price will reflect what the buyer is willing to pay and what the seller is willing to accept in return for delivering the ecosystem service.

Negotiations to establish price can take into account:

- a) **Sellers' opportunity costs** - impact on earnings from returns forgone (e.g. from agricultural production), both now and in the future (e.g. as commodity prices change);
- b) **Start-up and ongoing maintenance costs** - to deliver agreed interventions, particularly for 'asset building' PES schemes which focus on restoring an area's ecosystem services;
- c) **Transaction costs** – to cover, for example, the costs of establishing the baseline, training, developing a monitoring framework and providing third party assurance;
- d) **Costs of alternatives** – for example, for improved drinking water quality, comparing the cost of building a water treatment plant versus investing in natural ecosystem service-based filtration; and
- e) **Degree of competition in both supply and demand** - buyers will tend to seek supplier of services with the lowest-cost.

5.4.3 Timing of payments

Timing of payments for ecosystem services should take a pragmatic approach agreed upon by both buyers and sellers. The timing of payments could be:

- **Payments-by-results.** These are payments done upon delivery of actual delivery of desired ecosystem services
- **Payments on the basis of specified actions or implementation of particular agreed measures** such as tree planting or creation of buffer strips. This is appropriate where the seller is expected to make up front investment and where the time lag between the implementation of the relevant intervention and provision of the ecosystem service is long which could be decades in some cases

5.4.4 Drawing up a PES agreement

In this step, the necessary legal agreements are drawn up and signed to formalize the PES scheme. An agreement could take the form of a simple contract between parties, but in many cases the aim of long-term ecosystem service delivery will lead to the use of land conservation agreements. An agreement should be proportionate to the scale of the PES scheme in question and the risks associated with it. In general, agreements should cover:

- a) Start and end dates;
- b) Details of the PES scheme site;
- c) Who will pay the start-up and transaction costs as well as the ongoing management and monitoring costs;
- d) Roles and responsibilities of different actors;
- e) Management inputs;
- f) Anticipated ecosystem service outcomes;
- g) What constitutes additionality in service delivery;
- h) Measures to minimize ecosystem service leakage;
- i) How results will be demonstrated and who will be responsible for monitoring, communicating, evaluating, verifying and potentially certifying;
- j) Payment terms including the nature, level and timing of payments;
- k) How risks and burden of proof will be apportioned (for example, in the event that a seller fails to deliver the contracted service or agreed interventions);
- l) Rules for modifying and updating the contract; and
- m) Accepted reasons for voiding the contract.

6.0 MONITORING, EVALUATION, REVIEW, AND BENCHMARKING OF THE PES SCHEME

A key point in implementing a PES agreement is adaptive management, which allows for successful lessons to be used to re-orient the scheme and its associated land use or resource management interventions to make progress towards agreed objectives. It is important to recognize that PES schemes are to a great extent experimental and constitute a learning-by-doing approach.

Performance of a PES scheme must be monitored, evaluated and possibly reviewed against its original objectives. A scheme is monitored and evaluated to ensure that:

- a) Land use interventions or ecosystem service outcomes are being delivered;
- b) Interventions are enhancing ecosystem services, where payments are based on inputs;
- c) Adverse impacts are not affecting ecosystem services; and
- d) Relevant regulatory requirements are being complied with.

Third-party verification may be required to ensure that the scheme is delivering on its objectives. Further benchmarking and experience sharing is useful in a PES to provide and benefit from lessons learnt.

6.1 Monitoring

Effective monitoring should be cost-effective, accurate, bias free, replicable and timely. The monitoring programme should be designed to take into account effects on other ecosystem services that are not included within the PES scheme. There are four key steps for ensuring effective monitoring:

- a) Establishing a baseline for the ecosystem service that is being marketed. This makes it easy to compare the performance of PES scheme with business-as-usual scenario. Ideally scheme proponents should incorporate data from across the scheme area in order to ensure that the baseline is not skewed by unusual conditions affecting only a limited number of monitoring points.
- b) Choosing appropriate monitoring and verification indicators.

Scheme proponents should decide whether direct measurement or modeling indicators will be used e.g. use of remote sensing techniques.

- c) Regular monitoring and verification. Regular assessment should be done on the relevant ecosystem service or the indicators that have been chosen to represent those services. Trends in the provision of the relevant service can then be compared against the baseline.
- d) Regular review and taking necessary corrections. Monitoring results should be reviewed on a regular basis to track trends and identify any deviations from the changes anticipated. If deviations are detected, it is necessary to determine whether or not they are attributable to external factors (e.g. adverse weather) or to shortcomings in the scheme design which need to be rectified. Where buffers have been reflected in the PES agreement, i.e. a proportion of the additional ecosystem service provided remains unsold to account for unforeseen circumstances that might compromise delivery, these may need to be increased if risks of under-provision cannot be adequately addressed.

6.2 Evaluation and Review

It is important that PES schemes are periodically evaluated in light of the data collected through monitoring. In particular, formal evaluations can highlight any shortcomings in a scheme design. For example, an evaluation of the first two years of a scheme on Payments for Hydrological Services Programme in Mexico showed that most of the payments had been channeled to protect forests outside critical watersheds and were too fragmented in their distribution to provide a measurable improvement in water services. Moreover, the payments were made mainly for forests that were not at risk of being lost. Thus, the design of the PES scheme had to be revised to target interventions with impact on critical watersheds. Evaluation can be carried out mid-term into the agreement. This may necessitate a review of the PES agreement.

Globally, there are relatively few formal evaluations of PES schemes and, in order for future schemes to build on previous experiences and lessons,

it is important to carry out evaluations and disseminate findings as widely as possible.

6.3 Benchmarking and Documentation

Benchmarking through exchange visits should be organized to facilitate information sharing among different PES schemes actors. This is useful in avoiding repeating similar mistakes and for sensitizing on opportunities for expansion. Success, failure and lessons learnt in PES implementation should be documented and reported for sharing with others in different sites to allow for evolution of good PES practices.

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