



**Financial Incentives
to Communities for
Stewardship of
Environmental Resources
*Feasibility Study***

November 30, 2004



USAID
FROM THE AMERICAN PEOPLE

wi Winrock International



Winrock International has received an award under the U.S. Agency for International Development (USAID) Leader with Associates Cooperative Agreement (Number LAG-A-00-99-00037-00) "Increased Use of Renewable Energy Resources." The purpose of this Associate Award is to assess the feasibility of offering financial incentives to communities for their stewardship of environmental resources, with emphasis on those activities related to hydroelectric production and community-based natural resources in Asia.

**Financial Incentives to Communities for
Stewardship of Environmental Resources
Feasibility Study**

LWA: LAG-A-00-99-00037-00

Submitted to

U.S. Agency for International Development
Asia and the Near East Bureau/Office of Technical Support
Washington, D.C. USA

Contact: Mary Melnyk
Senior Advisor, PhD
Natural Resources Management
MMelnyk@usaid.gov

Submitted by

Winrock International
1621 North Kent Street, Suite 1200
Arlington, Virginia 22209 USA

Contact: Marjorie Huang
Forestry and Natural Resources Management
mhuang@winrock.org

www.winrock.org

TABLE OF CONTENTS



Acronyms	iv
Acknowledgements	v
Executive Summary	vii
Introduction	1
Payments for Environmental Services	5
Status of Payments for Environmental Services	9
Lessons Learned	13
Feasibility of Payments for Environmental Services	19
Model and Guidelines	23
Case Studies	31
Applicability of the PES Model to Asian Countries	41
Summary and Recommendations	45
References	47

Boxes

1 Definitions: Payments for Environmental Services	1
2 Definitions: Associated Costs of Payments for Environmental Services	5
3 Environmental Services	9
4 Commodities Commonly Associated with Payments for Biodiversity Services	9
5 Commodities Commonly Associated with Payments for Carbon Sequestration Services	10
6 Commodities Commonly Associated with Watershed Protection Services	11
7 Ecuador: Pimampiro	12
8 New York Watershed Management	12
9 Multistakeholder Board/Committee: Roles and Responsibilities	27
10 Participatory Performance-Based Monitoring	29

Figures

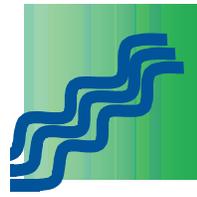
Figure 1. “Beneficiary Pays” Model	6
Figure 2. Payment Flow of Environmental Services	23



Acronyms

AMORE	Alliance for Mindinao and Multiregional Off-Grid Renewable Energy
CDM	Clean development mechanism
CER	Certified emissions reduction units
COP	Conference of the Parties
DDC	District development committee
DENR	Department of Environment and Natural Resources
DLF	Development and Livelihood Fund
DOE	Department of Environment
DOED	Department of Electricity and Development
EF	Electrification Fund
ETWTF	Environment and Tribal Welfare Trust Fund
FUG	Forest users group
IR	(USAID's) Intermediate Result
LGU	Local government unit
LULUCF	Land use and land-use change and forestry
MAFI	Mount Apo Foundation Incorporated
MOF	Ministry of Finance
NEA	Nepal Electricity Authority
NGO	Nongovernmental organization
NIPAS	National Integrated Protected Areas
OEM	Office of Environmental Management
PAMB	Protected Areas Management Board
PES	Payments for environmental services
PhP	Philippine pesos
PNOC	Philippine National Oil Company
RWMHEEF	Reforestation, Watershed Management, Health, and Environmental Enhancement Fund
RUPES	Rewarding Upland Poor for Environmental Services
SO	(USAID's) Strategic Objective
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
VDC	Village development committee

ACKNOWLEDGEMENTS



We would like to acknowledge the information and insights provided by a great number of people during the preparation of this feasibility study. In the Philippines, special thanks for the great support Rene Acosta, USAID/OEM/Philippines, provided. His in-depth knowledge of environmental issues and extensive network enabled the time in the Philippines to be both stimulating and productive. Very busy people graciously set aside time to patiently explain and discuss current policies and activities. These included Romy Acosta of the Department of Environment and Natural Resources (DENR) Forest Management Bureau, Antonia Galvez of the National Irrigation Administration, Mylene C. Capongcol of the Electric Power Industry Management Bureau, Ramon Alikpala of the National Water Resources Board, and the staff of the Local Water Utilities Administration in Quezon City. In Mindanao at Makilala, North Cotabato, thanks also go to local government officials, “watershed stakeholders,” and the staff of the Philippine National Oil Corporation/Geothermal Facility, especially Raymundo Onggona, the community relations officer, for his insights. Ernesto Guiang, Chief of Party, and Nick Uriarte, Central Mindanao team leader, of the USAID/EcoGovernance Project also went above and beyond the call in providing information and support.

Shyam Upadhyaya, Winrock/Nepal and team leader for the RUPES project in Nepal, skillfully organized a multistakeholder workshop on the progress of the project to coincide with the country visit. The lively discussion between the Nepal Electricity Authority (NEA) and community members, and follow-up visits to officials and the Kulekhani watershed greatly assisted in framing a potential model. The project staff funded by the Japan International Cooperation Agency in Pokhara offered lessons learned on ward-level community organizations, including both opportunities and constraints.

In New York, Mike Saviola and Karen Router of the Watershed Agricultural Council, Larry Beckhardt of the New York City Department of Environmental Protection, and Diane Galusha of the Catskills Watershed Corporation provided us valuable information and the opportunity to take part in site visits of the New York City watershed management program.

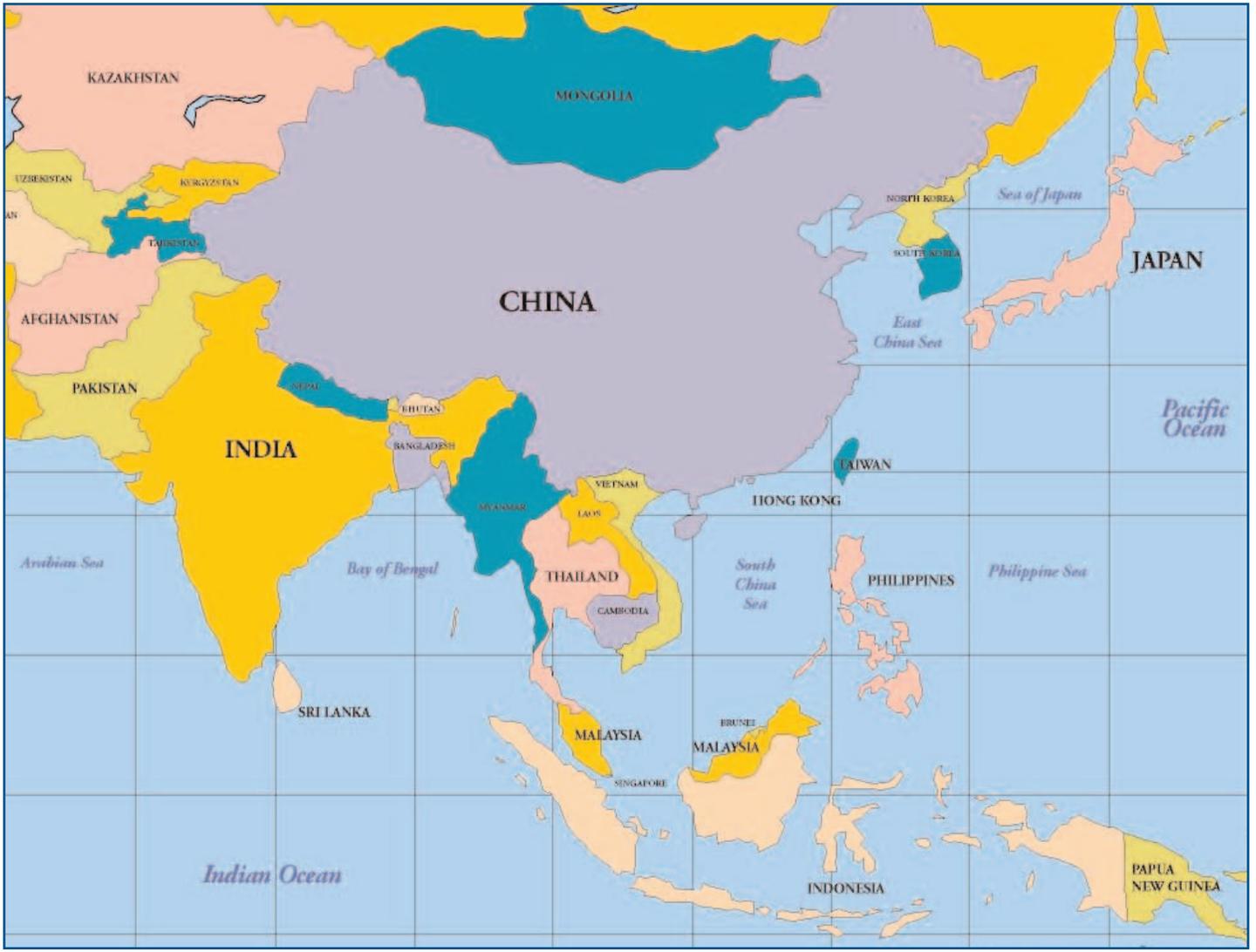
In Washington, Jason Berry, Isaac Boyd, Camille McCarthy, and Ericka Sjogren of the Capstone Project of the Elliott School of International Affairs, George Washington University, prepared a background review and comprehensive report on potential payment mechanisms for watershed services based on fieldwork in the Kulekhani watershed. Thanks also to Mary Melnyk of USAID and Sylvia Tognetti, independent consultant, for their guidance on the subject matter. Winrock colleagues in Clean Energy and Ecosystem Services units were generous with their time in responding to technical questions and providing “reality checks” regarding the feasibility of new approaches.

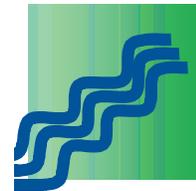
As part of the research process, we also received insightful feedback during a workshop to review a draft of the feasibility study in October 2004 in Washington, DC. Thanks to all of those from USAID, the World Bank, and the development community who attended and made suggestions to strengthen the draft.

We hope that this feasibility study will make a contribution to current discussions and future programs on payments for environmental services.

Again, thanks to all from the Winrock team,

Katherine Warner
Marjorie Huang
Darlene Middleton





Many communities in Asia, especially those in the uplands and mountains, manage landscapes that provide environmental services to outside beneficiaries. These services include providing clean and abundant water supplies from watersheds, conserving biodiversity, and maintaining stocks of carbon to alleviate global warming. Payments for environmental services (PES), if effectively designed, could ensure that those who benefit from or demand services provided by such sustainable use of natural resources actually pay for them and that these payments reach the natural resource managers who generally provide or supply these benefits.

The purpose of this study was to assess the feasibility of offering financial incentives to communities for their stewardship of environmental resources, with an emphasis on activities related to hydroelectric production and community-based natural resources in Asia. Of special interest was identifying best practice transfer payment mechanisms that compensate service providers, reinforce their commitment to conserving natural resources, and in turn, safeguard their livelihoods. Also of interest was to provide on-the-ground practical examples of how innovative institutional arrangements and financial mechanisms can support local development/poverty alleviation, while preserving and restoring the environment. As land users, the poor often play an important role in environmental protection.

Key findings. The feasibility study reviewed current payments for environmental service programs to identify lessons learned and best practices that would be applicable for hydroelectric facility payments to environmental stewards in Asia. Payments for environmental services programs, both in developing and developed countries, are in a nascent, experimental

phase with a diversity of approaches that reflects geographic and cultural variation, services provided, and preferences of buyers. PES programs for biodiversity and carbon sequestration have not met original expectations, however, as a result of a number of factors. These include international beneficiaries of environmental services (the *buyers*) showing a preference for good natural resource providers (or *sellers*) in *developed* countries, especially for biodiversity; the narrow criteria for carbon trading under the Kyoto Protocol;¹ and high transaction costs. Many proponents of PES in developing countries are, therefore, now shifting their attention from international to national markets that link domestic/regional buyers of water services with watershed providers/sellers as a more promising area in which to introduce PES programs.

Lessons learned from current PES programs highlight the importance of such factors as low transaction costs, monitoring, resource rights and tenure, transparency, and equity. This study suggests that potential is strong for designing and implementing environmental service payment programs that enable stewards of watersheds to receive payments from national/local programs, especially where hydroelectric facilities are involved. Hydroelectric plants can provide royalties for as long as the facility is operational, and the lifespan of a facility (30–50 years) enables a long-term, self-sustaining program. A gap exists, however, between the sellers of watershed services and potential or existing buyers. The prevailing purpose of existing royalty or fee payments is to compensate for displacement and other impacts of hydroelectric facilities, not as a reward for ongoing management of environmental services; nor is the target of such

¹ Such criteria have limited the portion of an Annex 1 country's emissions that can be bought and sold on the international (rather than domestic) carbon trading market.

payments the environmental stewards of watersheds. This gap must and could be bridged by clearly linking payments to effective watershed management. It should be clear for which services the payments will be made and who is providing the services through a “transfer mechanism.”

What is needed is work at the national and local levels to bridge the existing gap in payment programs to reward environmental stewards for providing recognized services.

This study, therefore, proposes a model that builds on what is already taking place in the region: establishment of royalty structures, growing recognition of the dependency of hydroelectric facilities on environmental services provided by watersheds, poverty alleviation becoming a national priority in response to poverty alleviation strategies in many countries in the region, and decentralization of government services from national to local levels. The model is based on several principles, including:

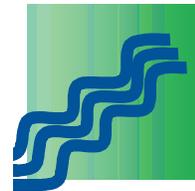
- Promoting financial self-sustainability
- Minimizing transaction costs
- Encouraging transparent flow of funds and information
- Targeting smallholders as service providers
- Providing women and other disadvantaged groups with opportunities to participate and targeting them in poverty reduction efforts
- Monitoring locally defined best management practices for implementation and environmental benefits.

The model contains five key elements:

- 1 Clearly defined royalty and fee assessments
- 2 Earmarked funds with transparent processes and procedures for disbursement
- 3 Multistakeholder committees or boards with strong representation and voice by environmental stewards
- 4 Locally determined payment priorities and mechanisms
- 5 Participatory planning and performance monitoring.

This report presents case studies of two sites in the region, a geothermal facility in Mindanao, Philippines, and a hydroelectric facility in Kulekhani, Nepal. In both, although key pieces of the model are in place, current payments compensate for displacement and labor provided by the community for tree planting and similar activities and not explicitly for PES for watershed management. The potential for application of the PES model presented here to these and other Asian countries is discussed.

Recommendations. The rising demand for clean and abundant water, growing recognition of the failure of current watershed management programs, ongoing decentralization, and increasing focus on poverty reduction in Asia support the development of a new paradigm for watershed management. PES have the potential to serve as this new paradigm if it can be shown to result in effective watershed management. What is needed is work at the national and local levels to bridge the existing gap in payment programs to reward environmental stewards for providing recognized services. A potential role for the U.S. Agency for International Development could be to support pilot projects to design and implement PES programs that can test models such as the one presented in this feasibility study.



INTRODUCTION

Winrock International has received an award under the U.S. Agency for International Development (USAID) Leader with Associates Cooperative Agreement (Number LAG-A-00-99-00037-00) “Increased Use of Renewable Energy Resources.” The purpose of this Associate Award is to assess the feasibility of offering financial incentives to communities for their stewardship of environmental resources, with emphasis on those activities related to hydroelectric production and community-based natural resources in Asia.

Sound natural resource management in uplands often provides *environmental services* and benefits for downstream users. The protection of forests in upland areas, for instance, often reduces soil erosion, landslides, sedimentation, and flooding and provides a cleaner supply of water for lowlands and beyond. Encouraging good stewardship of natural resources through innovative approaches, such as financial incentives, can potentially promote good land management. The development of mechanisms to compensate natural resource stewards or *sellers* can serve to *reinforce* their commitment to conserving natural resources and, in turn, safeguard their livelihoods. The links between sustainable natural resource management in upland areas, including by poor communities, to beneficiaries or *buyers* downstream, such as hydroelectric facilities, and beyond are becoming clearer; yet upland communities rarely receive compensation for providing these services. *Payments for environmental services* are a mechanism for compensating natural resource stewards for the services they provide.

Although documented cases of environmental service transfer payment mechanisms can be readily found in the Americas and developed countries, comparatively little information is available regarding the Asian context. This feasibility study is intended to identify if and where such opportunities

exist in Asia. Although there are many factors to consider in effectively designing a PES program, such as the economic valuation of an environmental service, the key question addressed here is whether payments can be readily transferred from the buyers or beneficiaries to the sellers or providers of environmental services. In particular, this study focuses on transfer mechanisms most suitable for

1

Definitions: Payments for Environmental Services

Environmental services. The provision of natural resources and healthy, functioning ecological systems that produce environmentally and economically valuable goods and services (Conservation Finance Alliance 2002).

Payments for environmental services. Compensation for providing environmental services. The actual payment that is transferred can take many forms: cash, in-kind assistance, exemption from taxes, tenure security, skills training, and other types of compensation. PES can apply to services provided by watersheds, biodiversity, carbon sequestration, landscape beauty, and bundled services.

Sellers. Natural resource stewards “producing” environmentally and economically valuable goods and services. In the case of watersheds, sellers are typically individual landowners or collective resource user groups of upland farms or forests.

Buyers. Beneficiaries willing to pay for the benefit of receiving environmentally and economically valuable goods and services. In the case of watersheds, buyers are most likely public or private companies, irrigators, hydroelectric power generators, industries, local and national governments, and downstream users.

payment programs between hydroelectric facilities and upland resource stewards providing effective watershed management.

Encouraging good stewardship of natural resources through innovative approaches, such as financial incentives, is a potential approach to promoting good land management.

The report begins with a brief overview of the concept behind payments for environmental services. The report then describes the global status of payments for environmental service programs, particularly those related to biodiversity conservation and carbon sequestration, to understand the shifting emphasis to watershed-based services. Next, lessons learned from documented case studies in Latin America and elsewhere provide part of the basis for deciding whether payments for watershed-based environmental services are or are not feasible. Potential constraints are highlighted. The report then discusses the rationale for concluding that payments for environmental services are feasible given certain enabling conditions.

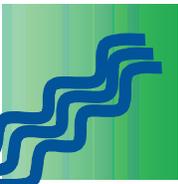
The next section introduces a model and guidelines for implementing payments for environmental service programs related to hydroelectric production and community-based natural resources. Included are discussions of methods and approaches necessary for monitoring and verifying environmental services, negotiating agreements, developing proper institutional

arrangements, and ensuring transparent and equitable distribution of payments to communities and their members, including women and the disadvantaged. The next section presents findings from site visits to Nepal and the Philippines, highlighting critical missing factors and potential opportunities for implementing this model in these and other Asian countries. Next, the report reviews countries in Asia where establishing payments for environmental services are emerging and potentially feasible.

The report concludes by recommending how USAID can move forward in identifying enabling conditions and developing programs where payments for environmental services are feasible.

Payments for environmental services are a mechanism for compensating natural resource stewards for the services they provide.

Objective. The objective of this study is to review and analyze the feasibility of offering financial incentives to communities for their ongoing stewardship of natural resources, including activities that incorporate renewable energy resources and technologies. Of special interest is identifying best practices in transfer payment mechanisms, demonstrating how benefits can be captured by the poor, and providing on-the-ground practical examples of how innovative institutional arrangements and financial mechanisms can support local development,



while also preserving and restoring the environment. Best practices and lessons learned are highlighted and a functional model and guidelines presented to demonstrate the feasibility of designing successful environmental service programs in Asia, with a specific focus on hydroelectric production.

Methodology. A review of global PES programs in biodiversity conservation, carbon sequestration, and watershed protection provided best practices and lessons learned applicable to hydroelectric-related payments to natural resource stewards in Asia. This feasibility study included not only a literature review of the experience of past and current PES programs, but also interviews with practitioners in the field, research at field sites and projects in the Philippines and Nepal, participation in the Katoomba Group

meetings,² and collaboration with the Rewarding Upland Poor for Environmental Services (RUPES)

The objective of this study is to review and analyze the feasibility of offering financial incentives to communities for their ongoing stewardship of natural resources, including activities that incorporate renewable energy resources and technologies.

program, including participation in a RUPES multistakeholder workshop in Nepal.³

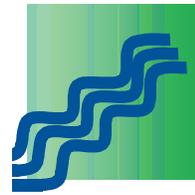
2 “Beyond Carbon: Emerging Markets for Ecosystem Services,” October 29–30, 2003, Rüşchlikon, Switzerland. The Katoomba Group involves international representatives of forestry and finance companies, environmental policy and research organizations, government agencies, and influential private and nongovernmental groups. The Katoomba Group facilitates strategic partnerships to launch new green projects in the marketplace, build collective understanding of how market-based instruments for environmental services can be constructed, identify the conditions in which they work, and provide technical support to pilot projects of broad relevance. The meeting included a working group on watershed service markets. Winrock has been involved in the Katoomba Group since its inception.

3 Rewarding Upland Poor for Environmental Services (RUPES) is a program funded by the International Fund for Agricultural Development and implemented by the World Agroforestry Centre (ICRAF) for developing mechanisms for rewarding upland poor in Asia for the environmental services they provide. The goal of the program is to enhance the livelihoods and reduce poverty of upland poor, while supporting the environment through biodiversity conservation, watershed management, carbon sequestration, and landscape beauty at local and global levels. Five sites currently exist in the Philippines (Kalahan Reserve and Ancestral Domain), Nepal (Kulekhani), and Indonesia (Bungo, Sumberjaya, and Singkarak). Winrock has been involved in the RUPES program since its inception.



Photo: Roberto Faiduth of the Food and Agriculture Organization





The logic and economic theory behind payments for environmental services is conceptually simple. PES are based on a “beneficiary pays” model (Pagiola 2004). Placing an economic (or qualitative) value on the environmental service provided through conservation potentially enables those who are managing the natural resource, the sellers, to receive payments from downstream buyers, those who would otherwise have to pay a higher cost given the negative impacts of unsustainable forest and land conversion in the uplands. It is assumed that the sellers will then have an incentive to *continue* to protect the watershed and other natural resources in receiving PES. Figure 1 (next page) illustrates the PES theory, describing the minimum and maximum payment required for a PES scheme to be feasible (based on Pagiola 2004).

From an economic standpoint, the payments the sellers receive must be equivalent to the *opportunity costs* of foregoing alternative land-use practices (*minimum payment*).⁴ In other words, the sellers should not feel any financial loss in foregoing alternative land-use practices. At the same time, buyers must be convinced that their payments for environmental services are *cost-effective* and less than the costs of unsustainable natural resource management in the uplands (*maximum payment*). In the case of watersheds, PES programs are ideally most suitable where opportunity costs are low upstream and benefits are high downstream.

For example, in Costa Rica, private owners of forest land (sellers) are providing watershed services for a

hydroelectric facility, Energia Global (the buyer). The company provides electricity for approximately 40,000 people and depends on two subwatersheds for its water supply. The company is interested in decreased reservoir sedimentation and increased water flow during the dry season. The company, the government, and a local nongovernmental organization (NGO) (covering some administrative expenses) are paying the sellers who are providing watershed services. Energia Global pays \$18/hectare⁴ to the National Forest Office and National Fund for Forest Financing (FONAFIFO), from which an additional \$30/hectare (primarily from fuel tax revenue) is contributed to the total \$48/hectare PES program. The government then makes cash payments from the fund *via the local NGO* to land owners in the watershed who agree to engage in land management activities, such as *conservation*, to ensure the provision of environmental services. This payment is presumably equivalent to the *opportunity cost* to the sellers of foregoing alternative land-use practices. The local NGO oversees the conservation activities, enrolls landowners, provides technical assistance,

2

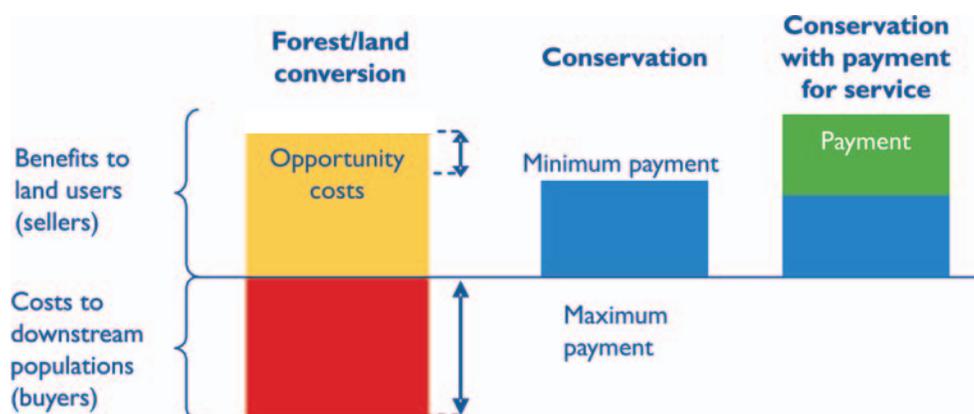
Definitions: Associated Costs of Payments for Environmental Services

- Opportunity costs.** The cost of passing up the next best choice when making a decision.
- Transaction costs.** Costs associated with buying, selling, or creation of investment. In the development of a water-based finance mechanism, examples of transaction costs include stakeholder coordination and planning activities, outreach, feasibility studies, and legal fees (Conservation Finance Alliance 2002).
- Cost-effective.** Something economical or of good value given the money spent.

⁴ In this report, all dollar amounts are U.S. dollars unless otherwise noted.

Figure 1. “Beneficiary Pays” Model*

Source: Based on Pagiola 2003.



*Note: The “beneficiary pays” model does not incorporate transaction costs, an important factor to consider in designing PES programs.

develops management plans, monitors, and manages the legal and financial aspects of the project (Perrot-Maitre and Davis 2001).⁵

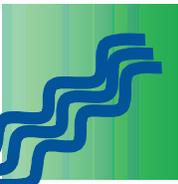
The type of “reward” assumed in most PES conceptual models involves two private parties agreeing on cash payments. Although cash payments between two private parties is theoretically possible, they raise many issues, such as *how, how much, and who* in the upland communities will be paid. Both sellers and buyers of environmental services must also feel confidence and trust that they will receive payments and environmental services, respectively. Individuals and/or households providing the environmental service could be rewarded either in cash or in kind. It should be noted that, although possible, few examples of direct *cash* payments for PES occur in developing countries. In-

kind payments, such as skills training and service provision, are more common.

As the application and objectives of PES continue to evolve, however, besides protecting the environment, PES programs could also play an important role in poverty alleviation.

The objective of most PES programs to date has been environmental protection. As the application and

⁵ NGOs commonly play the role of intermediary in Latin America.



objectives of PES continue to evolve, however, besides protecting the environment, PES programs could also play an important role in poverty alleviation. As the majority of upstream communities are often poor, landless (or lacking recognized tenure) households that depend on natural resources for their livelihoods, PES programs could provide additional resources to existing means of subsistence and to support environmental stewardship. Payments from PES programs could help diversify livelihood portfolios for poor groups to reduce income shocks, acquire technical and other skills, and increase stability. Because of this potential, major international development actors, such as the World Bank and USAID, have shown interest in using PES as a tool or entry point for poverty alleviation and are now asking practitioners to determine if PES programs to both protect the environment and alleviate poverty can be designed.

It should be emphasized, however, that environmental service payments alone will not alleviate poverty and

protect the environment. It is critical that PES programs complement ongoing broader initiatives to promote sustainable development and poverty alleviation.

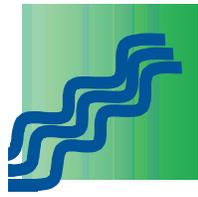
It is critical that PES programs complement ongoing broader initiatives to promote sustainable development and poverty alleviation.

After discussing the current status of payments for environmental services, this feasibility study will address key factors for successfully linking beneficiaries or buyers to suppliers of environmental services or sellers.



Photo: Roberto Faiduth of the Food and Agriculture Organization

STATUS OF PAYMENTS FOR ENVIRONMENTAL SERVICES



The development of environmental service payment programs is rooted in the growing interest in market-based instruments to improve natural resource management. The majority of payments for environmental services—watershed protection, biodiversity conservation, carbon sequestration, and landscape beauty (see box 3)—have evolved during the past decade. Most programs are nascent and emerging and are found in developed countries and Latin America (Colombia, Costa Rica, Ecuador, El Salvador, Mexico, Venezuela, and elsewhere). Programs vary based on the objectives of the PES program, type of payments (in-kind or cash), the targeted sellers and buyers, scale (local versus distant), level of maturity, government versus private sector involvement, and mechanisms for payment, among other factors (Landell-Mills and Porras 2002). Some programs are highly sophisticated and complex in their design, such as open trading systems in developed countries; others are straightforward: payments, in kind and less frequently cash, flow directly from buyers to sellers of environmental services. Payments for environmental service programs reflect geographic and cultural variation from continent to continent of particular institutional and local arrangements. A brief review of the current status of payments for environmental services—biodiversity conservation,

carbon sequestration, and watershed services—provides examples of best practices and lessons learned that can be applicable for payments by hydroelectric facilities to watershed communities in Asia.

Biodiversity Conservation Services

Box 4 illustrates examples of biodiversity conservation service commodities. Buyers of these commodities range from private corporations (the most prevalent), international NGOs and research institutes, donors, and governments to private individuals (the least prevalent). In the case of payments for biodiversity services, international buyers tend to dominate the market for these commodities. Mostly development banks and foundations from the United States and Europe, they tend to focus on species-rich habitats or global hotspots in which to invest. Yet, such investment in protection and management of forest environmental services, particularly for protected areas, appears to be declining (Jenkins, Scherr, and Inbar 2004). It is questionable if such approaches to payments for biodiversity conservation services will be sustained.

Private corporations commonly provide site-specific payments for (a) *eco-labeling products*, such as organics and Forest Stewardship Council-certified wood, (b) biodiversity-friendly companies, such as those that

3

Environmental Services

- ◆ Biodiversity conservation
- ◆ Carbon sequestration
- ◆ Watershed protection
- ◆ Landscape beauty (addressed under biodiversity conservation in this report)

4

Commodities Commonly Associated with Payments for Biodiversity Services

- ◆ Protected areas
- ◆ Biodiversity management contracts
- ◆ Bioprospecting rights
- ◆ Ecotourism
- ◆ Biodiversity-friendly products (eco-labeling)
- (Landell-Mills and Porras 2002)

5

Commodities Commonly Associated with Payments for Carbon Sequestration Services

Carbon credits/offsets:

- ◆ Assigned Amount Units
- ◆ Emission Reduction Units
- ◆ Certified Emission Reduction Units
- ◆ Removal Units

(Landell-Mills and Porras 2002)

provide financial support to protect the environment or (c) pharmaceutical *bioprospecting*, that is, royalties paid for the collection of biological and genetic materials (Landell-Mills and Porras 2002). Although there has been discussion at international fora on intellectual property rights and payment of premiums for rare flora and fauna, bioprospecting has not been successful in attracting the level of international funding originally anticipated. Markets for eco-labeled products, however, are still anticipated to grow; the fastest growing component is eco-labeling of crop, livestock, timber, and fish products (Jenkins, Scherr, and Inbar 2004). But, again, because buyers of biodiversity conservation services are typically international actors and for reasons, such as lack of market demand, significant direct payments are not reaching the natural resource stewards for the services they provide, as anticipated.

On the other hand, ecotourism or other related payments for private access to species or habitats have

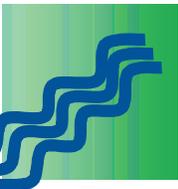
been highly successful. Ecotourism is indeed growing rapidly; tourists show a willingness to pay entrance and other fees, especially where rare or unique fauna/flora or “pristine” areas are found. Where communities are increasingly benefiting from such programs, however, fees are commonly paid as compensation for lost land and income, rather than as a PES directly linked to resource management.

Carbon Sequestration Services

Given the Kyoto Protocol’s attempt to address global warming, *carbon sequestration* has also received a great deal of international attention. When countries sign onto the Kyoto Protocol, agreements are then between *countries* where projects are to meet the requirements of the United Nations Framework Convention on Climate Change (UNFCCC).⁶ The Kyoto Protocol also created the expectation that developed countries would purchase carbon from developing countries and communities would have the opportunity to participate in carbon trades and receive payments for environmental services. The delay in approval of the Kyoto Protocol and the Conference of Parties’ process of narrowing criteria for trading of certified emissions reduction units (CERs), however, have significantly hampered development of a market for carbon.⁷ Subsequently, international markets and buyers have

⁶ UNFCCC standards include adequate documentation on the present state of the environment, analysis of environmental and/or socioeconomic impacts, and a description of additional assessment of impacts considered significant.

⁷ Interest in international trade in carbon emerged from the Kyoto Protocol. Of the articles in the Kyoto Protocol, Article 12 defines the “clean development mechanism” (CDM), the mechanism relevant to developing countries. It is a project-based mechanism between Annex 1 (industrial countries that agreed under the UNFCCC to take the lead in reducing greenhouse gas emissions) and non-Annex 1 countries, whereby projects are implemented in the latter countries. The market instrument used is the “certified emissions reduction (CER) unit” derived from CDM projects and issued by the CDM registry. Developing countries can sequester carbon and then trade CER units with developed countries. With the advent of the Marrakech Accord (Conference of Parties [COP] 7), land use and land-use change and forestry (LULUCF) is acknowledged as a vehicle for carbon sequestration, but is limited to reforestation (vegetation introduced onto nonforested land as of December 31, 1989) and afforestation (conversion of land not forested for at least 50 years to forested land). The Marrakech Accord sets a limit on CERs from afforestation and reforestation activities to 1 percent of base-year emissions for Annex 1 countries—thereby limiting the portion of an Annex 1 country’s emissions allowed to be bought and sold on the international (rather than domestic) carbon trading market (see Scherr, White, and Khare 2004).



6

Commodities Commonly Associated with Watershed Protection Services

- ◆ Watershed protection/best management practice contracts
 - ◆ Protected areas
 - ◆ Water quality credits
 - ◆ Water rights
 - ◆ Stream flow reduction licenses
 - ◆ Reforestation contracts
- (Landell-Mills and Porras 2002)

been slow to emerge. Outside the Americas, on-the-ground payments for carbon sequestration are limited, and early projections of large amounts of funding for carbon sequestration in developing countries have yet to be realized. The sellers, especially rural communities, are further disadvantaged by the high transaction costs of carbon projects. The BioCarbon Fund,⁸ based on the World Bank’s experience with the Prototype Carbon Fund, estimates that the cost of formally identifying baselines, establishing additions, setting up monitoring programs, and arranging independent verification amounts to approximately \$100,000 per project—a very large investment by hopeful sellers for a declining oversupplied market. The result is a buyer’s market, assisted by the 1 percent cap by developed countries to offset their emissions with “clean development mechanism” (CDM) projects in developing countries.

Watershed Services

Watershed/hydroelectric-based PES do not share many of the inherent constraints of other environmental services, such as carbon sequestration and biodiversity conservation. They do not, for example, require international signed agreements or protocols, because they are mostly domestic or regionally focused. In addition, a review of case studies illustrates that mechanisms in many countries are often in place to collect a royalty or fee for energy generation.

Three types of watershed-based payments for environmental services are typically mentioned: public payment schemes, self-organized private deals, and open trading. Most experience with public payment schemes and self-organized private deals are found in

Latin America and developed countries. Box 6 illustrates examples of watershed-based commodities.

- **Public payment schemes** involve the government or a public sector institution paying for an environmental service. Financing may come from royalties, general tax revenues, bond issues, or user fees. Hydroelectric generators, municipal water systems, irrigators, and industrial users, rather than the general population, are most likely to pay for watershed services (Scherr, White, and Khare 2003).
- In contrast, **self-organized private deals** are mainly limited to local initiatives with little government involvement. Water user fees are a widespread form of financing for these transfer payments.
- Of less relevance to developing countries are the few cases of **open trading schemes** in which governments set regulatory standards or caps. These schemes are found primarily in developed countries where legal models, institutions, and monitoring systems are more sophisticated (Perrot-Maitre and Davis 2001).

Regardless of the payment mechanism, one general lesson is that the smaller the watershed area, the more likely that upstream actions can be scientifically linked to hydrological benefits downstream, buyers and sellers

⁸ The BioCarbon Fund of the World Bank proposes achieving environmental and social benefits through projects that sequester and conserve carbon in forests, agriculture, and other ecosystems. Established as a public-private initiative, with a minimum contribution provisionally set at \$2.5 million, the target size of the fund is \$100 million; however, the current (October 2004) fund totals only \$15 million.

7

Ecuador: Pimampiro

An upland area covered by forests and grasslands in the Ecuadorian Andes is a source of water for downstream populations in the city of Pimampiro. Concerned with water supply degradation, downstream users established a local payment system with upstream communities in Nueva America in 2000. Funds are transferred either directly in cash in exchange for sound management and protection of designated lands or in kind as technical assistance in improving agricultural productivity. The municipality collects a 20 percent additional water fee from users—about \$500 a month—that goes into a multistakeholder-managed fund. A local NGO provided \$15,000 to set up the scheme. About 20 families participate and receive varied payments depending on activities undertaken. One survey showed that upstream households receive an average of \$21 a month per property as supplementary income, about 30 percent of their total income. Demand from new participants (sellers) from areas outside of Nueva America to enroll in the program is high (IIED 2002b; Perrot-Maitre and Davis 2001).

more clearly identified, and administrative and transaction costs lowered (Pagiola 2003).

Although watershed-based transfer payment mechanisms are commonly categorized based on the level of government involvement, as noted above, with hydroelectric facilities, private and public ownership is often blurred. In the Philippines and Nepal, for example, hydroelectric companies are parastatals (large state-owned enterprises) that attempt to operate as “commercial” enterprises whose client is the government, not shareholders. Public payment schemes are most suitable where governments or

parastatals at the national, regional, and/or local levels operate hydroelectric power companies. Governments are expected to play multiple roles in buying, selling, and serving as an intermediary in administering, providing technical assistance, and monitoring watershed-based financial mechanisms.

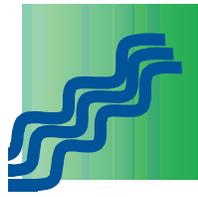
In conclusion, PES theory and practice has slowly evolved from mostly large-scale conceptualization to greater applicability at the local level. Focusing primarily on *international buyers* and markets, experience in biodiversity conservation and carbon sequestration has not attracted the level of funding originally anticipated. Many proponents of PES, in turn, have shifted their emphasis to local issues, such as watershed protection, as a response to increased water demands (and growing awareness of the links between upland land uses and the quality and quantity of downstream water resources). This feasibility study reviews the *national or local* payment mechanisms in place associated with hydroelectric or utility facilities and proposes building on these programs as a promising entry point into environmental service payments in the Asian region.

The lessons learned described below provide a basis and highlight critical preconditions necessary for incorporating both environmental protection and poverty alleviation objectives in designing PES “best practice” programs.

8

New York Watershed Management

New York City’s nine million people receive 1.2 gallons of water daily from three watersheds. The city has historically had high-quality drinking water, but nonpoint source pollution has threatened to degrade the water system. Rather than pay \$4–6 billion to construct filtration plants and \$300–500 million more for annual operating costs, city commissioners developed a far more cost-effective and comprehensive watershed protection program—“whole farm planning.” The city agreed to invest \$1–1.5 billion within ten years, principally financed by additional taxes on water bills, bonds, and trust funds. The program requires the city to pay the operating costs of the program and the capital costs for pollution-control investments on each farm as an incentive to farmers to join. The Watershed Agricultural Council, an NGO, provides technical assistance and monitors farmers’ best management practices. The program has successfully reduced watershed pollution loads, enabling the city to save millions of dollars, and demonstrating that watershed management can be more cost effective than water treatment for maintaining a drinking water supply (Perrot-Maitre and Davis 2001).



Although most PES programs are in their pilot stage, preliminary lessons can still be drawn and some best practices identified. These lessons come primarily from experience on payments for environmental services related to watershed protection in Latin America and developed countries.

Demand for water, including watershed environmental services, is also projected to double or triple within the next 50 years primarily in developing countries with increasing needs not only for electricity, but drinking water: 30–40 percent of the world’s largest cities rely on forest areas for water.

National Rather Than International Programs

To be sustainable, PES programs should be designed to operate at national and local levels independent of external financial resources. Compared with programs in carbon and biodiversity, which generally depend on international buyers, national- and local-level PES programs, particularly related to watershed management and hydroelectric activities, actually have greater potential for providing a continuous flow of funds and, therefore, for being self-sustaining. Demand for water, including watershed environmental services, is also projected to *double or triple* within the next 50 years primarily in developing countries (Scherr, White, and Khare 2003)

with increasing needs not only for electricity, but drinking water: 30–40 percent of the world’s largest cities rely on forest areas for water (Dudley and Stolton 2003). In Latin America, payments for watershed-based PES programs exist at both local and national levels, in which NGOs and governments serve various roles, and payments (in kind or cash) *are* being made. Although integrated watershed PES programs are not in place in Asia, the potential exists to reframe hydroelectric royalty and fee programs to go beyond current compensation for displaced households and undesignated development funds toward payments to environmental stewards for watershed management.

Minimizing Transaction Costs

Minimizing transaction costs is necessary to make PES of interest to both potential buyers and sellers of services. Transaction costs from the design and implementation of PES programs can be high, compared with other management options, especially where cash or in-kind payments are made directly to individuals responsible for land-use decisions or where large numbers of community members are involved. Buyers, including private companies and government parastatals, such as the Nepal Electricity Authority (NEA), are reluctant to be involved in programs that require individual payments to a large number of individuals and/or households, because such buyers often lack the staff, expertise, interest, or mandate to do so. For sellers, transaction costs, especially from paperwork or delayed receipt of payments, may also make the investment costs of the program too high, especially for the poor and marginalized. As a result, PES programs could be of less interest to either buyers or sellers of environmental services.

To be sustainable and attractive, PES programs must have economically viable transaction costs. One way of addressing high transaction costs is by using existing, viable institutions, which may not only facilitate distribution of funds, but also play a key role in negotiations between buyers and sellers. Payments to a local fund, instead of direct payments to individual households, is another approach to lowering transaction costs for both buyers and sellers.

Payments to a local fund, instead of direct payments to individual households, is another approach to lowering transaction costs for both buyers and sellers.

Role of Intermediaries

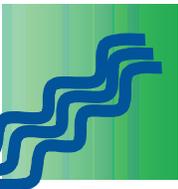
Intermediaries, such as government, local, or international NGOs, and community organizations often link buyers to sellers of environmental services. Providing this linkage is an important role, especially initially for experimental or pilot PES initiatives. In a review of 61 global watershed cases, 44 percent involved intermediaries (Landell-Mills and Porras 2002). Intermediaries typically absorb much of the transaction costs, raise public awareness of PES programs, and oversee the administrative flow of payments from buyers to sellers of environmental services. Intermediaries, however, can also increase transaction costs by charging buyers and/or sellers relatively high fees. Intermediaries, to maintain their own role and control in the program, may also not be committed to building the capacity of the sellers to

negotiate and manage funds; thus, in designing PES programs, intermediaries that provide services that local-level natural resource stewards could more cost-effectively carry out if trained may initially play an important role, but should be gradually phased out.

Monitoring and Evaluation: Cause-and-Effect Relations

Monitoring environmental services for downstream buyers is commonly perceived as essential to an environmental service payment program, but baseline assessments and performance-based monitoring linking payments and the provision of environmental services have not been integral to many watershed programs. The negotiated agreement is often based only on assumptions that best management practices upstream by sellers will improve water quality and benefit buyers downstream, rather than on monitored improvements (Rojas and Aylward 2003). In the PES program in Pimampiro, Ecuador, despite lack of hydrological studies, downstream residents perceive that land degradation upstream negatively impacts local water supplies (Alban 2002). In Costa Rica, a study found that hydropower facilities do not know if their payments for watershed services are actually resulting in improvements in water quality and quantity. Such PES programs are based on assumptions that more trees will improve the services a watershed provides. Tree planting is a central activity of many programs; yet there is little monitoring and evaluation on whether this type of activity actually results in improved water quantity or quality.

These cases demonstrate that *perceptions* of watershed degradation or protection may be sufficient to establish PES programs. Lack of monitoring and evaluation, however, could ultimately bring the downfall of PES programs, as buyers may be



increasingly unwilling to pay if it is not clear that payments are cost-effective or that sellers of environmental services are maintaining and improving resource management. Monitoring must demonstrate that watershed protection activities are actually providing environmental services, such as minimizing sedimentation downstream, and payments should be linked to measurable, rather than assumed, impacts.

Monitoring and evaluation of socioeconomic impacts are also critical and are discussed in more detail below.

Monitoring needs to demonstrate that watershed protection activities are actually providing environmental services, such as minimizing sedimentation downstream, and payments should be linked to measurable, rather than assumed, impacts.

Resource Rights and Tenure: A Critical Cornerstone

Most PES schemes reward those with legal access, use, and control of land. In Costa Rica, only landowners can participate in the PES scheme (Rosa, Kandel, and Dimas 2003). Lacking title and/or recognized tenure to land, the poor are typically excluded from receiving payments for environmental services. Yet, as land and resource *users*, the poor often play an important role in watershed management. More secure tenure or access could, therefore, serve as an incentive for improved

land management. In many cases, because the landless are excluded, it is questionable whether PES schemes targeting watershed protection will result in effective conservation. A “best practice” for addressing the problem of the nonlegal land user comes from Costa

. . . as land and resource users, the poor often play an important role in watershed management. More secure tenure or access could, therefore, serve as an incentive for improved land management.

Rica where peasant and indigenous groups were included in a PES scheme. The National Fund for Forest Financing created a separate, parallel contract that enabled the poor, without recognized title, to access payments provided by specific private service buyers (Rojas and Aylward 2003). Programs such as these are not common, so recognized resource rights for payment remain a critical constraint in the design and implementation of PES programs.

Policies and Procedures: Enabling Policies without Perverse Regulation

The lack of a specific legal model is not a critical obstacle. For the most part, self-organized private deals in which buyers and sellers directly negotiate an agreement have moved forward despite lack of legal policies. Legal models, however, would formalize the right to collect, disburse, and enforce payments for environmental services.



Only a few countries implementing payments for environmental service programs actually have legal models in place. The often-cited Costa Rica PES program has a legal model to support payments for watershed, biodiversity, carbon sequestration, landscape beauty, and bundled services. Many other

A number of complex issues, such as tenure and rights, and incorporation of gender and marginalized community members, are critical to consider with any poverty alleviation objective.

countries have mandated royalties and fees to be paid by hydroelectric facilities. In Colombia, hydroelectric facilities are mandated to transfer 3 percent of power sales toward regional governments for watershed

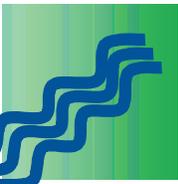
management and an additional 3 percent to municipal governments where hydropower plants are located for watershed, conservation, and sanitation projects (Tognetti 2001). In Asia, hydroelectric facilities pay similar royalties with a portion earmarked for watershed protection.

Royalties, however, do not necessarily result in payments for environmental services to watershed natural resource stewards. It is also worthwhile to note that legal models that mandate bureaucratic regulations may actually serve as a disincentive for PES programs by increasing transaction costs. In addition, PES programs have at times been politically imposed that do not correspond to the demand and economic valuation of the service itself. Regulations that do not consider the market demand for services can also result in an unsustainable and costly program. Legal models of PES programs should thus be carefully designed to avoid perverse regulations.

Designated Funds/Trust Funds

In many cases, the need exists for a trust fund⁹ or similar type of transparent, accountable, and flexible fund to pool cash flows specifically designated for PES. Experience has grown with the use of trust funds. In Quito, Ecuador, for example, individuals and associations of water users pay differentiated fees toward a water protection trust fund, pooling them as payments for sound natural resource management. A private asset manager serves as the intermediary and administers the fund. The management organization has a board of directors with multistakeholder

⁹ Trust funds can be broadly defined as money or other property that (a) can only be used for a specified purpose or purposes, (b) must be kept separate from other sources of money, such as a government agency's regular budget, and (c) must be managed and controlled by an independent board of directors. Whether endowment, sinking, or revolving door based, trust funds vary in terms of their structure, scope of activities, priorities, procedures, purposes, and situation of the host country (GEF 1998).



representatives and collects 10–20 percent of water user fees to cover administrative costs. This fund is self-sustaining with relatively low transaction costs. It should be noted, however, that environmental protection, not poverty alleviation, is the purpose of this trust fund.

Experience has also been gained in Asia with conservation trust funds, typically targeting biodiversity protection. Such funds have supported protected areas, led to the generation and management of financial resources, involved civil society institutions in resource conservation, and increased public awareness of conservation issues (GEF 1998). But in these cases, the funds have been used more as an incentive to achieve community buy-in into a program than as a tool for poverty alleviation in and of itself. The establishment of development funds may also make conservation a secondary objective. In both cases it should be noted that the link between conservation and development/poverty alleviation should be explicitly linked or monitored; that is, it should be clear that watershed services improved because of payment incentives.

Poverty Reduction

In most of the case studies reviewed, payments for environmental services were used for conservation and only indirectly intended to benefit the poor; however, PES programs are increasingly considered a mechanism for transferring financial resources to the socially and economically vulnerable. Due to lack of monitoring and data collection, it is unclear, however,

what socioeconomic impact payments for environmental services are having on poverty alleviation; because poverty alleviation is not the main objective of most PES programs, baseline assessments and performance-based monitoring of social impacts on the poor are not typically considered. The challenge is to develop PES programs that both protect the environment and address poverty alleviation. A number of complex issues, such as tenure and rights, and incorporation of gender and marginalized community members (e.g., where caste systems exist) are critical to consider with any poverty alleviation objective.

PES programs need to ensure that the poor do not lose their land rights; their ability to harvest products or provide environmental services; their employment; and their control and flexibility over local development options (Scherr, White, and Khare 2003). Participation in PES programs should be voluntary (e.g., not force people to resettle or force farmers to make conservation investments) and do no harm (e.g., damage or deny access to cultural or religious sites or divert water to urban users) (Scherr 2003). Payments for environmental services do not have to be in cash at the household level, but could go to community development funds. Some trust funds have also channeled payments into a development fund to improve schools, health facilities, and other basic needs for the community rather than to individual farmers. Concerns have been raised on whether community funds for development activities provide sufficient motivation to influence individual behavior. Examples of community-based organizations

Summary of Lessons Learned

In summary, implementing PES programs can best occur where the following exists:

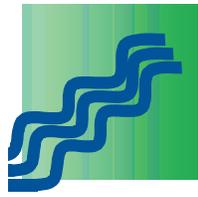
- ◆ Transaction costs are low.
- ◆ Rights and responsibilities of all parties, including intermediaries, are clearly defined.
- ◆ Baseline assessments and monitoring link payments to performance.
- ◆ Resource rights and tenure are given.
- ◆ Policies and procedures support PES programs.
- ◆ Mechanisms exist for fees to be assessed, collected, and effectively disbursed.
- ◆ Poverty reduction is addressed.

exist, however, such as the community forestry user groups in Nepal, that are successful in using such funds for development.

Summary of Lessons Learned

In summary, implementing PES programs can best occur where transaction costs are low and rights and responsibilities of all parties, including intermediaries, are clearly defined. Baseline assessments and monitoring should also link payments to performance; resource rights, and tenure should be ensured. It is also essential that policies and procedures support PES programs and that mechanisms exist for fees to be assessed, collected, and effectively disbursed. Poverty reduction should also be addressed.

FEASIBILITY OF PAYMENTS FOR ENVIRONMENTAL SERVICES



The review of current PES programs suggests that watershed-based payment programs are feasible given certain preconditions. Real potential exists for designing and implementing PES programs that enable stewards of watersheds to receive payments from national and local programs, especially those involving hydroelectric facilities. Hydropower plants can provide a steady stream of royalties for as long as the facility is operational, and the lifespan of a hydropower plant (30–50 years) enables a long-term self-sustaining program. Financial resources currently being collected through royalties and fees could be channeled to environmental stewards who continue to adopt appropriate land-use practices for effective watershed management.

It is necessary to bridge the gap that currently exists between environmental stewards—the sellers of services—and hydroelectric companies and utilities—the buyers of such services.

For this to occur, it is necessary to **bridge the gap** that currently exists between environmental stewards—the sellers of services—and hydroelectric companies and utilities—the buyers of such services. This bridge can be built by identifying the services for which the payments will be made and who is providing the services, and by developing a “transfer mechanism”

that clearly links payments to effective watershed management. The potential outcome is a flow of benefits that provides incentives to upland communities and results in cost-effective, improved, and maintained watershed management and, in turn, improved water quality and/or quantity for hydroelectric facilities.

Environmental Services for Hydroelectric Producers

Important parameters for hydropower production are water quantity and salinity (Koteen, Alexander, and Loomis 2002). Adequate water quantity can improve production efficiency, lower production costs, and reduce prices for consumers. Inadequate water supply can cause inefficient power production and increase costs for producers and consumers. Water quantity for hydropower must also meet seasonal demands for production. If salinity is too high, turbines and other equipment may deteriorate more quickly. Measurement of benefits from improvements in salinity levels may be estimated by determining the increase in equipment lifespan and savings in replacement costs (Koteen, Alexander, and Loomis 2002). In addition to water quantity and salinity, siltation of rivers and reservoirs also represents a significant cost and can severely cut the period of operation of the hydroelectric facility.

The best scenario for efficient production of hydropower is *adequate water quantity* throughout the

year with low levels of sediment and salinity. Deforestation, poor agricultural practices, and lack of vegetative cover in watersheds can cause extreme fluctuations in water quantity and increase siltation and salinity, in turn, adversely affecting power production. Payments for watershed-based services must address these water quantity and quality issues directly at the micro and macro watershed levels.

Environmental Stewards of Watersheds

Watershed communities are in many instances already providing the environmental services that hydroelectric facilities need and for which they are willing to pay. In

“Good stewardship needs to be
more profitable than
bad stewardship.”

Jenkins, Scherr, and Inbar 2004:35

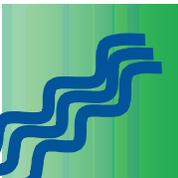
many places, watershed communities are utilizing agricultural and forestry practices that effectively reduce the amount of sediment and other pollutants entering waterways, prolonging the productive lifespan

of hydroelectric facilities and providing improved water quality and quantity downstream. The challenge is for “buyers” to provide payments that enable natural resource stewards (the “sellers”) to capture the financial benefits from conserving an ecosystem; if not, alternative land-use systems that overexploit forest and other natural resources may occur. “Good stewardship needs to be more profitable than bad stewardship” (Jenkins, Scherr, and Inbar 2004).

Critical Missing Factor: Linking the Royalties to Protecting the Watersheds

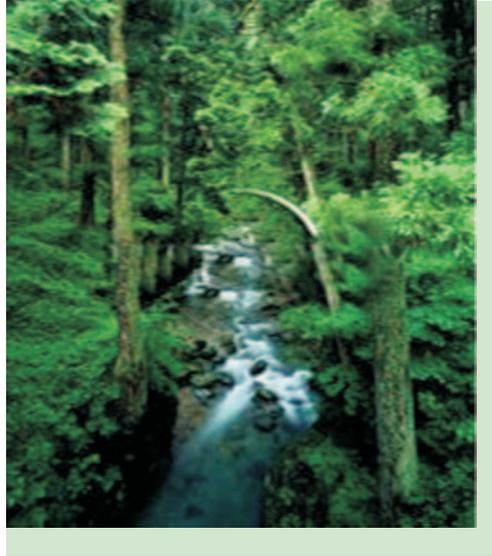
The *prevailing purpose* of existing royalty and fee payments is not for payment of ongoing management of environmental services, nor is the target the environmental stewards of the watershed. The fees are primarily payments for *compensation*. For example, in Nepal, until recently, funds from royalties paid by the central government to local governments were established to compensate communities displaced by the construction of dams.¹⁰ Royalties are earmarked for displaced communities for services such as electrification (as in the Philippines) or development activities that often do not include watershed communities. Although the importance of watersheds is recognized, *effective programs* for watershed management are not currently being designed and

10 Of the fees paid by the hydroelectric companies, the new policy doubled the portion allocated to local governments, but opened entitlement to communities in the entire region, rather than those areas immediately adjacent to the dams.



implemented. In part, this is due to the complexity—and contradiction—of governance and tenure/rights, not only of residents of watersheds, but also of government agencies.¹¹

For watersheds to be maintained or improved, environmental service payments must be linked to their management. Compensation for displacement will not result in improved watershed protection, nor will stand-alone activities such as tree planting.¹² To *bridge the gap* between the payment and the service, environmental stewards must be recognized, not as program laborers, but as watershed managers with *appropriate rights and responsibilities*. Payments should be linked to performance with agreed-on criteria and indicators.



The next section proposes a model and guidelines to design a sustainable payment for environmental service programs.

¹¹ In the Philippines, for example, as noted by Rosales (2003: 35), conflicts and contradictions exist among the following:

- The National Integrated Protected Areas Act mandates creation of protected areas to conserve biodiversity within a basic model for conservation and management of protected areas, and establishment of an Integrated Protected Area Fund to finance related projects.
- The Local Government Code provides for local governments to share as much as 30 percent of the nation's wealth for all types of resources found within their jurisdiction.
- The National Water Resources Board claims it is the sole government entity that can issue and distribute water rights. Accompanying such rights is the payment of fixed fees, which it interprets as including watershed protection fees.

The forestry sector has its own sets of user fees and charges, which can overlap with resource user fees implemented by some protected area management boards.

¹² Tree planting is ubiquitous in watershed projects; however, tree planting may have relatively little impact if not made an integrated component of land-use planning. Seedling survival rate on public lands is usually very low, and payment for tree planting can create perverse incentives (seedlings might be deliberately neglected or destroyed so that replanting will be needed, which will result in more payments for the replanting).





MODEL AND GUIDELINES

The proposed model builds on what is already happening in the Asian region: establishment of royalty structures for hydroelectric utilities, growing recognition of the dependency of utilities on environmental services from watersheds, poverty alleviation becoming a national priority in many countries in the region in response to poverty alleviation strategies, and increasing decentralization of roles and responsibilities from national to local governments.

Principles

Several principles are inherent to the model:

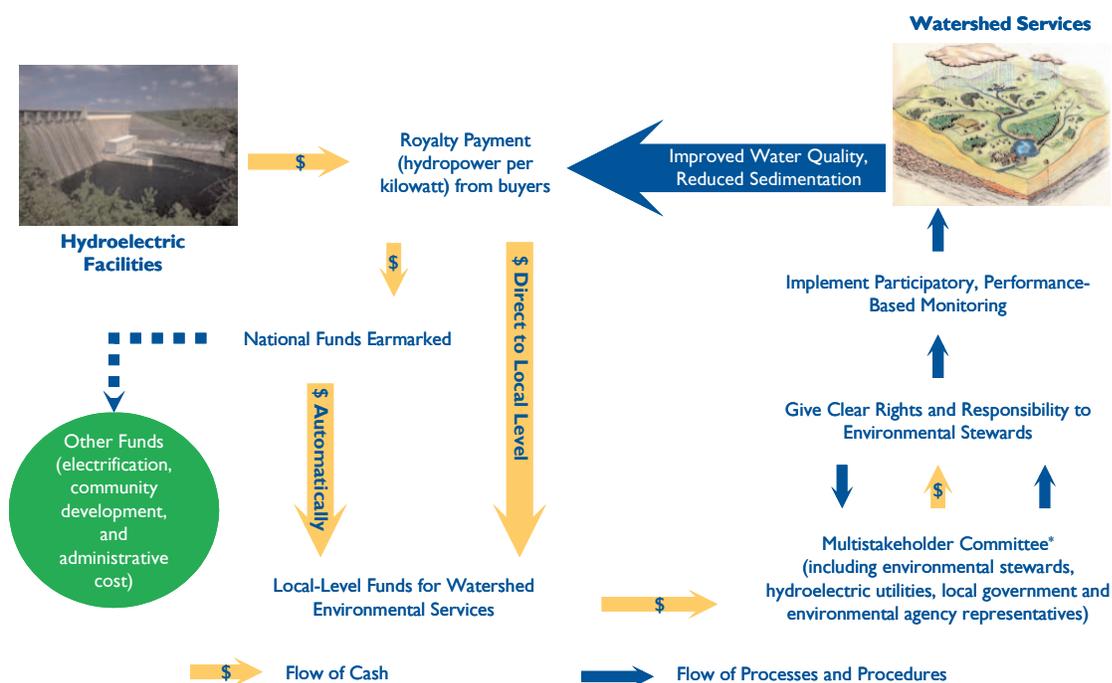
- Programs should be financially self-sustainable. Although external funds may be necessary for assessment, design, and initial implementation, the program should be cost-effective and market based with clearly identified sellers and buyers.

- Transaction costs should be minimized.
- Flow of funds and information should be transparent.
- Smallholders should be targeted as service providers where appropriate.
- Poverty reduction activities should make special efforts to include women and other disadvantaged groups.
- Best management practices should be locally defined and monitored for implementation and environmental benefits.

Process

The model is based on the flow of funds from hydroelectric utilities to environmental stewards for maintaining and improving watershed management (see figure 2). The PES program is explicitly linked to

Figure 2. Payment Flow of Environmental Services



* The committee should—with input from the hydroelectric utilities—prepare the best management practices criteria. For instance, they could determine exchange ratios for improving water supply and quality (e.g., two hectares of woodlot established for every metric ton of soil erosion reduction credit). The committee could also set up baseline assessments of participating environmental stewards.

watershed management and monitoring of environmental benefits.

Key Elements

Based on case studies, interviews, and site visits, the proposed model is based on five key elements demonstrating the flow of cash and processes from hydropower facilities (the buyers) to natural resource stewards (the sellers):

- Clearly defined royalty and fee assessments
- Earmarked funds with transparent processes and procedures for disbursement
- Multistakeholder committees or boards with strong representation and voice from environmental stewards
- Locally determined payment priorities and mechanisms
- Participatory planning and performance monitoring.

Key Element #1: Royalty and fee assessment clearly defined

Royalties or resource levies are typically calculated as a fixed percentage of gross revenues, either from the sale of power or free power based on kilowatt-hours generated. What are needed are policies supported by legislation and regulations that enable collection and channeling of a percentage of royalties into a specialized account or accounts for clearly defined purposes, such as payments for environmental services. These policies provide legitimacy to the process and legal backing in the case of misused funds.

Key Element #2: Earmarked funds with a transparent process and procedures for disbursement

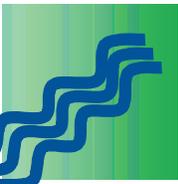
Hydroelectric facilities currently pay royalties to national- and local-level funds that are earmarked, in part, to *compensate* displaced communities, with a focus on development, livelihood, and income-generating community activities. National-level funds are difficult to access—commonly requiring a proposal—rather than automatically flowing to earmarked local, designated funds. In the Philippines, for example, the local

Establishment of a mechanism in which payments are channeled to a local, legally recognized, tax-exempt fund is, therefore, recommended.

government must prepare a proposal to the Department of Environment (DOE) to receive hydroelectric funds, a process that substantially delays receipt of funds and results in a large proportion of funds unallocated.

Growing concern about the negative impacts of degraded watersheds on hydroelectric generation, however, provides an opportunity for change.¹³ Where conflicting policies on delegation of authority leads to contradictions in roles and responsibilities, a new procedure building on current procedures, with supportive policy changes, could be put in place that

¹³ The director of the NEA in Nepal, for example, expressed concern about the status of the watershed and strong interest in a cost-effective program that would channel funds to effective watershed protection. It should be noted, however, that the NEA does not want to assume responsibility for the allocation of funds; it does not have the mandate or the staff to implement a PES program.



would enable the automatic flow of funds to key watershed areas. This would require decisions on allocation of funds to support watershed protection activities, development, livelihood and income-generating community activities, and overall administrative costs to manage the funds both at the national and the local level.

A general, national-level fund typically receives royalties from hydroelectric facilities. The challenge is to develop and implement transparent processes and procedures that will enable allocation of funds from a national account to areas providing the environmental services. In current practice, a “gap” exists: royalties are being collected, but disbursement of funds is not linked to protection of critical watersheds.

Based on past experiences, communities are generally pessimistic that they will actually receive payments for environmental services and especially skeptical about the transfer of cash payments; therefore, the need exists to build trust and cooperative action through transparency and openness of processes and procedures. At the same time, transparency and open communication will decrease the likelihood that corruption and misuse of funds will occur, both factors key to ensuring fulfilled agreements.

Assistance may be needed in developing a transparent process that is rigorous without being overly cumbersome with high transaction costs. Identifying existing institutions that can provide an intermediary role may reduce transaction costs, improve the political acceptability and economic feasibility of a PES program, and facilitate its start-up. Current institutional

arrangements requiring approval (a proposal process) from the national level for local-level initiatives substantially delay implementation. High transaction costs may also indicate that institution(s) are too bureaucratic and unable to function efficiently. Case studies indicate that institutional arrangements at the

It should be formally recognized that environmental stewards and their representatives have the “strongest voice” in establishing priorities for environmental service payments.

local level are less bureaucratic and more capable of disbursing funds in a transparent, flexible, and accountable manner (Pagiola 2003). Establishment of a mechanism in which payments are channeled to a local, legally recognized, tax-exempt fund is thus recommended.

If payments from a hydroelectric facility are already being channeled through a fund or similar financing mechanism, existing or additional funds could be channeled through the same mechanism, but designated for a separate, targeted purpose. Such streamlining of transfer payments could lower transaction costs. Where bank systems function properly, earmarked payments could also be deposited or debited directly into a designated fund account also reducing transaction costs.

Key Element #3: **Multistakeholder board or committee with strong representation and voice by environmental stewards**

Oversight of funds at the local level is a critical element of a PES program. Based on experience in the region, a multistakeholder board or committee could provide this oversight. Determining the right composition of this board or committee to administer the fund is critical. The governance structure of the fund should reflect the diversity of stakeholders, but not be too large or cumbersome¹⁴ to impede its function. Members should include representatives of environmental stewards, local government units, hydroelectric utilities, government agencies with watershed protection in their mandate (such as the Department of Environment and Natural Resources [DENR] in the Philippines), and if appropriate, representatives of water boards or districts, energy agencies, and regional development councils.¹⁵ Advisory and technical committees or task forces can also be established to provide technical input to proposed projects and/or provide monitoring services for watershed management plans.

Board and staff members of the fund should have clear roles and responsibilities for ensuring that designated payments reach targeted resource managers (see box 9). Failure of payments to reach their intended beneficiaries may indicate that strict adherence to roles

and responsibilities is lacking. It should be formally recognized that environmental stewards and their representatives have the “strongest voice” in establishing priorities for environmental service payments.

Although intending to encourage participation of multiple stakeholders, decisions may be difficult to reach given diverse interests. Assessing the motivations of each of the stakeholders and their incentives for participating is critical to resolving potential conflicts. Conflict management techniques, such as mediation and facilitation, and stakeholder participation, may result in reconciliation of divisive issues to prevent disputes and mitigate emerging conflicts. In Asia, culture and tradition are important to consider in reaching agreements. Taking advantage of cultural holidays that bring communities together can set the tone for reconciliation (Rosales 2003).

It is essential to understand that stakeholders come to the bargaining table with different levels of negotiating skills and awareness of the program itself. Agreements should recognize the needs and constraints of poor upland communities in addressing poverty alleviation (such as ensuring that smallholders are not at a disadvantage compared with wealthy powerful landowners). Many poor are excluded from market information, lack legal title or clearly defined ownership of land or rights, and are often illiterate. Although on paper it may appear that marginalized groups, such as poor indigenous people and women,

14 Protected areas management boards provide examples of what to avoid. As noted in the case study, the board for Mount Apo is so large (well more than 250 members) that it has difficulty reaching either quorum or consensus. As a result, Mount Apo is not being actively managed and is under serious threat from large commercial agricultural interests as well as encroachment by the local elite.

15 In the case of the Environment and Tribal Welfare Trust Fund (ETWTF) in Mindanao, the Mount Apo Foundation Incorporated (MAFI) was established to manage the ETWTF. It is registered and receiving funds from geothermal power plants. Note that these funds are specially designated funds for community relations.

are participating in negotiations simply by their presence at meetings, in reality, their voices often go unheard; thus, activities may be needed to build the capacity of traditionally marginalized people to negotiate.

Certain caveats are worth mentioning. Elected officials on the board may be politically motivated to advocate projects or ensure that funds be allocated in a certain manner to ensure their reelection. Criteria for selection of projects should be decoupled from politics to the extent possible. For instance, selection of projects should be conducted in a participatory manner. Frequent changes in board members may also cause instability within the institution; thus, defining at the onset the terms for which members may remain on the board would smooth the transition and composition of the multistakeholder board (GEF 1998).

Key Element #4: **Locally determined payment priorities and mechanisms**

Local stakeholders are more knowledgeable of local conditions, such as specific areas where high erosion occurs and the social fabric of upland communities, and can identify how best to utilize funding resources. Focusing on local institutions also develops much-needed social capital and a sense of local ownership for the program. Yet, communities, especially marginalized members, have not had an opportunity to be involved in decisions concerning the watersheds in which they reside.

9

Multistakeholder Board/Committee: Roles and Responsibilities

Roles and responsibilities include:

- ◆ Administering agreements
- ◆ Managing funds
- ◆ Organizing communities
- ◆ Assisting with community site development/watershed activities
- ◆ Overseeing collection and disbursement of payments
- ◆ Accessing technical assistance (such as soil stabilization through revegetation, and managerial training)
- ◆ Participatory monitoring and enforcing that suppliers are maintaining and adopting sustainable land-use practices.
- ◆ Facilitating conflict management
- ◆ Raising awareness of environmental services.

Even if the mandate of the board and the role of the board members is agreed and clear, the danger exists that resource allocation and activities will reflect the priorities of local government more than watershed communities. Decentralization of government is occurring throughout Asia, giving increasing responsibility to local governments, albeit with little increase in resources. Local governments, especially if heavily politicized, as in the Philippines, are more interested in receiving funds for development activities such as infrastructure, health, and education, than for watershed management. In the Philippines, local governments utilize the Reforestation, Watershed Management, Health, and/or Environment Enhancement Fund (RWMHEEF) as a development

fund with a greater portion allocated for health and development activities *outside* of watersheds. The benefits to communities in watersheds are primarily as payments for providing labor for tree planting, rather than being environmental stewards.

If a strong and explicit link between the environmental services and payments does not exist, stewards will not

Focusing on local institutions also develops much-needed social capital and a sense of local ownership for the program.

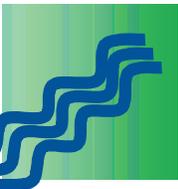
have an incentive to maintain the watershed; thus, communities and their representatives should be the ones to recommend payment priorities. It should also be stressed that *financial payments* may not necessarily come in the form of *cash payments*. Site visits in the Philippines and Nepal revealed a surprising resistance by community representatives to individual cash payments. As noted above, community members are skeptical that cash will actually be paid either in total or in part. In Nepal, in discussions with forestry user groups, a local trust fund was of more interest than individual payments, because it could be closely monitored; payments would come to the community in the form of specified benefits (funding for secondary school students, especially girls, health clinics, and medical care).

Key Element #5: ***Participatory planning and performance monitoring***

Governmental environmental agencies are often skeptical that watershed communities can effectively manage watersheds and perceive them as lacking technical knowledge and skills. Appreciation for indigenous watershed management, however, is increasing. The reality is that community involvement in monitoring and enforcement is critical to developing a sense of ownership for the program.

If properly designed with checks and balances, monitoring and evaluation of funds and environmental services can be carried out at the local level. In general, smaller watersheds are easier to manage and would lower transaction costs. Local government officials and community watchdogs, for instance, are more familiar with community land-use practices, cultures, and traditions.

High transaction costs provide a disincentive to engaging in environmental services, so low-cost, cost-effective solutions for monitoring and enforcing environmental services are needed. For water, for example, local watch groups can be trained to measure and monitor sediment loads, stream flows, and water quality parameters using water-sampling kits. Key indicators should be agreed on by the multistakeholder board or committee for local measurement and integrated into the monitoring program of the hydroelectric utility.



10

Participatory Performance-Based Monitoring

Key elements include:

- ◆ Determining baselines for water supply and water quality in the target watershed
- ◆ Implementing best management practices through participatory processes with local communities and technical experts
- ◆ Using “exchange ratios” for improving water supply and quality that can be monitored, that is, 2 hectares of woodlot established for every metric ton of soil erosion reduction credit.

Simple baseline studies on socioeconomic, environmental, and biophysical aspects of the system provide a starting point for monitoring and evaluation (see box 10). Indications of failures to monitor might be new land clearings, additional houses being built in designated watershed protected areas, increased water sedimentation loads, or payments not reaching environmental resource stewards. It is the multistakeholder committee that should agree on best management practices. Each best management practice should have an agreed on, determined value for improving water quality (e.g., reduced sedimentation) based on best current information, rather than requiring further intensive scientific research. For example, to reduce sediment in the reservoirs, establishing X meters of vegetative barriers on hillsides would reduce erosion by X amount per year. Best management practices and their contributions to improving water quality would be determined on a site-by-site basis within the watershed each year with participatory monitoring plans developed.

A PES program is only effective to the degree that its enforcement mechanisms are strict. Bookkeeping of funds should be transparent so that no question exists on how funds are used. For instance, periodic financial reports could be made publicly available. Any indication of corruption should be duly reported. Enforcement mechanisms could be either formal, such as through a judicial system, or informal, for example, in some communities, trust and social customs play a key role in ensuring enforcement. Where land managers have reneged or failed to uphold their

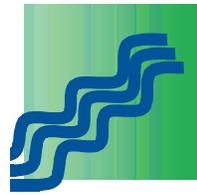
responsibilities, they have sometimes been forced to return the payments they have received. Personnel, including environmental stewards, who oversee monitoring and enforcement of the PES program should be integrated into the administrative cost of the fund budget.

Monitoring of perverse incentives is also necessary. Resource stewards may on occasion deliberately degrade the environment or delay sustainable land-use practices until guaranteed payment, targeted in the PES program, or qualified for additional payments (Pagiola 2003). Focus on improving one environmental service may inadvertently degrade another environmental service. Awareness of such potential perverse incentives is critical.

The next section analyzes the applicability of the proposed model and guidelines based on findings from site visits to the Philippines and Nepal.



Photos: Roberto Faiduth of the Food and Agriculture Organization



Environment and Tribal Welfare Trust Fund Mount Apo, Mindanao, Philippines

The Philippines has one of the lowest percentages of forest cover in Asia. Although the critical importance of watersheds is widely recognized, especially in relation to water and energy (hydropower), there has been little success in maintaining or improving watersheds. Watershed protection policies, lack of clarity and/or overlapping authority of agencies, conflicting objectives, and historical and current political realities have hindered effective management.

Hydroelectric Power and Royalties

In the Philippines, fees paid (one half of one centavo per kilowatt-hour of total electricity sales) by hydroelectric companies to the Department of Energy are for the “financial benefit of the host communities of such generation facility” and are to be used for their “basic needs.” The fee assessment is divided into three funds: the Electrification Fund (EF), the Development and Livelihood Fund (DLF), and the Reforestation, Watershed Management, Health, and Environmental

Enhancement Fund (RWMHEEF). Half of the assessment is allocated to the EF for electrification in host communities, whereas the DLF and RWMHEEF receive the remainder (Rosales 2003). A portion of the RWMHEEF is earmarked for watershed management, but environmental stewards are not the primary recipients of the funds, nor is there explicit recognition of the important role communities could play in managing the watershed.

Decentralization of government in the Philippines has provided local government units (LGUs) with increased responsibility, albeit with little increase in resources. It is, therefore, not surprising that the DLF and RWMHEEF are primarily utilized for development activities in the vicinity of the LGUs, rather than in more distant upland areas. It is to be expected that the focus of the LGU is more on

accessing funds for development activities, such as infrastructure, health, and education, than on watershed management. The LGUs utilize the RWMHEEF as a development fund with the greater portion of funds going to health and development activities



outside the watersheds. The benefits to communities in watersheds are primarily in receiving payments for providing labor for activities such as tree planting.

The legislative process makes it difficult to reach agreement among overlapping agency mandates on watersheds; the result is continuous ambiguity about roles and responsibilities. Watersheds that are classified as “critical,” such as those supporting hydroelectric dams, are the responsibility of the DENR; as a result many watersheds are now classified as protected areas. The National Integrated Protected Areas Act (NIPAS) permits only protected areas to charge for environmental services. Areas not designated as protected areas do not have a legal basis for collecting fees. Protected areas are to be managed by a protected area management board, which is mandated to include a wide range of stakeholders.

PAMBs collect user fees in designated protected areas. These fees are then channeled to a national-level fund, the Integrated Protected Area Fund (IPAF). Seventy-five percent of the fees collected are to be used by the PAMB for conservation and management activities for on-site protected area. Twenty-five percent of the fees are to be used for programs in protected areas that do not generate revenue and to pay for the operation of the fund’s governing board at the national level. The PAMB then provides a project work plan and requests the release of the IPAF funds. Due to several layers of bureaucracy, it takes an average of five months to get approval of the release of funds. In the meantime,

upstream communities have begun to lose confidence that they will see rewards for their environmental stewardship (Rosales 2003).

In the case of the Mount Apo National Park on Mindanao, the PAMB has so many stakeholder representatives (250) that it can take years for a major decision to be reached, because of the difficulty of gathering a sufficient number of representatives for a meeting (Rosales 2003). The ineffective management of this critical watershed area has resulted in encroachment by commercial agriculture and local elites.

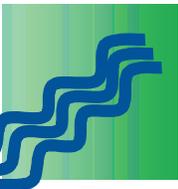
Mindanao Geothermal Facility

Within the Mount Apo National Park, the Mindanao Geothermal Production Field operated by the Philippine National Oil Corporation provides an example of an alternative to currently ineffective watershed management. The site for the geothermal facility was extremely controversial. It was not only forested in an area of rapid deforestation, but was of special cultural importance to the indigenous peoples of the area. In response to these environmental and cultural concerns, the geothermal facility¹⁶ has a community relations program¹⁷ and supports a trust fund, the Environmental and Tribal Welfare Trust Fund (ETWTF), which is managed by the Mount Apo Foundation Incorporated (MAFI). In addition, the facility provides local employment, royalty fees, and tax revenue to the area.¹⁸

16 The facility includes a steam field and power plant.

17 The community relations program includes education, livelihood and infrastructure skills training assistance, health and sanitation, and community coordination. Between 1992 and 2002, almost PhP 11 million had been allocated to the program, which primarily focused on the relocation of the village.

18 The royalty payments to the three LGUs (Cotabato Province, Kidapawan City, and Barangay Ilomavis) between 1998 and 2002 totaled more than PhP 28 million; property tax payment for the power plant facilities for 2001 and 2002 totaled more than PhP 53 million.



As with hydroelectric facilities, geothermal facilities depend on watersheds for water. In contrast to the management of the national park, the geothermal facility in Mindanao has jurisdiction over the area of the facility (a 701-hectare reserve) and a large portion of the immediate watershed, which has clearly marked boundaries. Households residing in areas in which the steam field and power plant were built were relocated and offered compensation. Since 1992, almost 600 hectares have been reforested outside the facility reserve. Reforestation, slope stabilization, agroforestry, and nursery operations are contracted to a farmers' association organized by the geothermal facility.¹⁹

The ETWTF received more than 35 million in Philippine pesos (Php) 1997–2003. The MAFI vision is “to empower upland dwellers and cultural communities to be capable of self-direction consistent with their common aspirations and values, working in cooperation and unity among themselves and with other groups” (Mindanao Geothermal Production Field 2003). The MAFI Board of Trustees includes representatives of the Philippine National Oil Company (PNOC) (the chairperson is a PNOC representative), the DENR (vice-president), the DOE (treasurer), the LGU (secretary), NGOs, and representatives of the indigenous peoples group. The MAFI's day-to-day operations are carried out by the director, who reports to the board. This multistakeholder board agrees on priorities and programs.

Focusing on families within 10 kilometers of the facility, MAFI is implementing a five-point program: educational development, environmental consciousness, health services, livelihood support, and social welfare and infrastructure.²⁰ More than 60 percent of MAFI expenditures have been for educational programs, which include collegiate scholarship, high school financial assistance, school facility assistance, and adult literacy programs. These programs have had a great impact on educational opportunity for families in the area. In 2002–03, for example, more than 4,500 high school students in the area received financial support.

Within a national park area that is experiencing serious management problems due to pressure from commercial agricultural enterprises (e.g., a banana outgrower program is highly evident along the rivers well into the park) and encroachment (e.g., wealthy families from Davao are building vacation homes within the park), land managed by the geothermal facility has been reforested and the well-being of communities improved. Having the financial resources to invest in the watershed has been an important component of its success. Clear jurisdiction to manage and protect the watershed and the commitment to do so has also been critical.

But what about the communities? Are they perceived as being environmental stewards? Even with formation of the associations, communities are still perceived as providing labor for contracts, rather than providing

19 Between 1998 and December 2002, 24 farmer associations have been formed with a total membership of 964. Each of the associations has a capital build-up fund that is taken from 10 percent of the contracted amount the farmers receive for watershed management activities.

20 Of the Php 35 million received by the ETWTF, Php 21 million has actually been expended on the program.

environmental services, especially on their own lands. The communities, however, are becoming aware of the importance of their land-use activities on the watershed-and the geothermal facility.

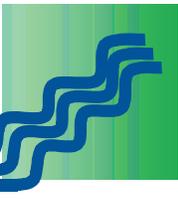
Although its program extends beyond the displaced community, the MAFI program is perceived as providing compensation for displacement rather than an environmental service payment to the communities. Yet, the current program contains four of the five critical elements suggested in the proposed PES model above: clearly defined royalties, earmarking of funds, multistakeholder committee or boards, and priorities determined at the local level. What is missing is the link between the payments for the environmental services with a participatory monitoring system.

Conclusions

In the Philippines, although watershed management, especially in protected areas such as the Mount Apo National Park, has proved problematic, the PNOC Mindanao geothermal facility program is successful.

Clear jurisdiction over an area, a commitment to watershed improvement, compensation to communities, and the royalty model have supported the emergence of an effective program that can serve as a model for other areas. The recent decision by the Philippine government to expand the number of geothermal facilities makes this example of special relevance. For replication to occur, new facilities need to be granted clear jurisdiction over an area, such as was provided to the Mindanao facility, with a similar royalty model that provides benefits to local government and communities.

For the greater watershed areas, outside the reserves, the opportunity exists to bridge the gap between compensation and activities. Negotiation and agreement regarding activities, payments, and monitoring can be reached by building on best management practices for watershed management and working through multistakeholder committees. For the long-term viability of the geothermal facilities, it is necessary to look outside the reserve to the larger watershed and provide incentives for management by its environmental stewards.



Kulekhani Watershed in Nepal

This case study describes current transfer mechanisms from the Nepal Electricity Authority (NEA) to local governments and explores the potential of financial payments through national and local government institutions to reach households in watershed communities for the payment of environmental services.

Hydroelectric Power and Royalties

Nepal comprises three main geographical regions, the Himalayas to the north, the mid-hills extending from east to west, and the Terai to the south, an extension of the floodplains of the Ganges. Snowmelt from the Himalayas and heavy summer monsoon rains feed into many rivers in the mountains and mid-hills, providing the potential for hydroelectric power in Nepal. A number of dams have been constructed, primarily in the central regions, and hydroelectric energy is the chief source of energy for the country.²¹ Nepal's electricity grid, however, remains underdeveloped; less than a fifth of households have access to power.

The Kulekhani dam and power plants produce significant amounts of power in Nepal, accounting for about 17 percent of total renewable energy production. Completed in 1982, the facility²² was built on the Kulekhani and the Upper Rapti rivers in

the Makwanpur District and supplies water to two hydroelectric power plants. The NEA owns and administers both the dam and the power plants.

Environmental factors, such as high rates of sedimentation brought about by the combination of torrential monsoon rains, continued upward shift of the Himalayas, and anthropogenic erosion impede the viability and longevity of hydroelectric projects. It is not surprising, therefore, that siltation is the primary threat to the operational life of the Kulekhani reservoir. The reservoir was designed with an anticipated lifespan of more than 50 years; however, the annual sedimentation rate is much higher than anticipated.²³ A devastating storm in 1993, in which the watershed area received as much as 540 mm of rainfall within a 24-hour period, caused major landslides and erosion; within three days,



21 As of 2001, hydropower accounted for 91 percent of energy produced in Nepal.

22 The Kulekhani facility is the only reservoir type of project in Nepal.

23 A study using geographic information system technologies on the Kulekhani watershed concluded that “geology was found to be the most important factor influencing landslide activity; other important factors were elevation and land use/cover” (Dhakal, Amada, and Niya 1999). The study adds to the understanding of human impact in watersheds and supports the role community members of the Kulekhani watershed can play in mitigating the siltation of the Kulekhani reservoir.

sedimentation reduced the lifespan of the Kulekhani reservoir to about 25 years. Because the reservoir and dam structure was not designed for such catastrophic events, even relatively low sedimentation rates now have a large negative impact on its capacity.

The Electricity Act, passed in 1992, mandates that both publicly owned and private hydroelectric facilities are to pay royalties to the government of Nepal.²⁴ Before passage of *The Local Self-Governance Regulations* of 1999, which stipulate that 10 percent of the royalties a hydroelectric facility generates must be distributed to district developing committees (DDCs) governing the district in which the facility is located, no set guidelines existed for distribution of royalty monies to local government administrations. The central government began distributing royalty payments to DDCs in late 2001. These royalty payments made a significant contribution to the 2001–02 income of recipient DDCs—up to 72 percent of annual funds collected.

The NEA currently makes royalty payments to the Department of Electricity and Development (DOED). The DOED transfers 90 percent of the funds to the Ministry of Finance (MOF) and the national treasury and sends the remaining 10 percent to DDCs located in districts where hydroelectric facilities operate. The DDCs direct the funds to village development committees (VDCs) and municipalities within the district. To receive funds, the VDCs and

municipalities propose development projects. Originally conceived as a means to compensate communities and individuals displaced or impacted by construction of dams and hydropower generation facilities, the hydroelectric royalty system of Nepal is increasingly valued as a source of local development revenue.

Recent changes to the royalty distribution model (February 2004) propose increasing the proportion of royalty funds allocated to the DDCs from 10 to 50 percent. Of this amount, 24 percent would be earmarked for the DDC in which the hydroelectric plant contributing the royalty is located; the remaining 76 percent would be distributed among the DDCs within the same development region.²⁵ These changes will distribute the funds to more DDCs²⁶ within a far wider area and serve to limit severely the funds that can be potentially utilized for environmental service payments for watershed management.

Despite political instability due to the Maoist insurgency in parts of Nepal, the NEA continues to function at the national level by maintaining dams, producing electricity, and providing electrical services. The NEA, however, has paid only 63.8 percent of the total royalty due to the government (Upadhyaya 2003). Within the Kulekhani watershed, the NEA maintains a presence in the form of dam technicians and workers.

24 The royalty rates consist of two calculations, which increase after a fifteen-year period. The first rate is a flat fee per kilowatt of energy produced at a facility; the second rate depends on the amount of tariffs that plants collect. In 2000–01, the contribution of the hydroelectric royalty to the national budget was approximately 1.19 percent (Upadhyaya 2003).

25 Nepal has five development regions: far-western, mid-western, western, central and eastern. The 75 DDCs play a substantial role in implementing government policies, decentralization, and development efforts. Within each DDC, there are a number of VDCs and municipalities. Nepal has nearly 4,000 VDCs, which are each divided into nine wards. Between the DDC and VDC levels are clusters of VDCs or *illakas*.

26 Of the 75 DDCs throughout Nepal, only 17 received royalty payments in 2001.



Kulekhani Watershed

The Kulekhani watershed is located in the Makwanpur district approximately 50 kilometers southwest of Kathmandu and covers two basins of different river systems, that is, the Kulekhani and, to the south, the Upper Rapti. At an altitude of 1,400 and 2,300 meters, this watershed encompasses 12,496 hectares and a population of 43,003, most of whom comprise disadvantaged ethnic groups and lower caste people. Socioeconomic and gender divisions in the Kulekhani watershed are similar to those throughout the country. High-caste Brahmans and Chetris, who make up roughly a fifth of the population, command a relative advantage over lower-status groups in irrigated land distribution, employment in the formal sector, and participation in wage labor. Low female literacy rates reflect the relative disadvantage of women, as does their responsibility for agricultural labor and gathering of water, fodder, fuel wood and other natural resources, as well as domestic tasks. In the Kulekhani watershed, food sufficiency is a major concern, as the number of months with sufficient food averages an estimated four and a half, and less than 5 percent of the land is under irrigated agricultural production.

The Makwanpur District is subdivided into 43 village development committees (VDCs). The Kulekhani watershed encompasses parts of eight VDCs of Makwanpur district: Bajrabarahi, Chitlang, Daman, Fakhel, Kulekhani, Markhu, Palung, and Tistung Deurali. Infrastructure is noticeably wanting in all

VDCs: in two VDCs in the watershed with statistics, walking distance to the health post was 6 and 8 hours respectively. In both VDCs, the median for walking to one of the 18 primary schools was two hours; access to drinking water ranged from zero to four hours.

Community forestry²⁷ is widely practiced in the Kulekhani watershed; 69 registered forest user groups (FUGs) manage forests covering nearly 7,000 hectares. These groups provide an opportunity for community members to be actively involved in improving forest resources, building local capacity for planning and implementing resource management, and working with government agencies. Similar to groups throughout Nepal, the management practices of FUGs in the Kulekhani watershed consist primarily of tree planting, forest protection, managed harvesting, trimming, and collection of leaf litter and deadwood. Most if not all households are members of at least one FUG in the area, and some households may be members of more than one. FUG management of forests in the watershed has resulted in a significant amount of reforestation of previously deforested land and improvement of existing forests. Since 1992, more than 1,590 hectares of land has been reforested (Banskota and Chalise 2000). Women have taken significant leadership roles in Kulekhani FUGs; some FUG committees consist entirely of female representatives. Many FUGs have assumed roles beyond forest management, undertaking social and economic development projects and representing communities in lobbying local governments for financial assistance. Many of the FUGs reported that

27 Under community forestry legislation, FUGs are entitled to manage and use forests and forest products according to forest management plans approved by the Department of Forestry. Forest legislation has been instrumental in promoting gender equity in resource management decision making at the local level.

they know of the original payments made to those people displaced by the dam; however, few knew about current legally mandated royalty provisions.

The insurgency and political instability, mentioned above, have resulted in on-the-ground dysfunction of local government. The Ministry of Local Development currently directly appoints all DDC secretaries and members and VDC secretaries and administers and monitors all the monies involved in district development and royalty funds. Removal and replacement of elected chairpersons with appointed ones has also undermined the legitimacy of the DDCs. Because the elected committees no longer exist and thus cannot fulfill their role of providing local input into prioritization of development activities, DDC chairpersons have complete control of activities and monies within the district. Furthermore, although records exist on the flow of money into DDCs, none exist on its outflow.

The elected VDC representation has also been dissolved with an appointed VDC secretary now in control. In Makwanpur, the VDCs do not function, in part, due to the political instability of the country. The VDCs are not able to compile demands for development programs from communities and submit them to the DDCs. Implementation of development projects in rural areas has become very difficult due to insurgency problems. The Makwanpur DDC has allocated a large amount of hydropower royalty money for building a hospital in Hetauda municipality. At

present, of the community groups, the FUGS are currently the most visible and continue to function in the Kulekhani watershed (and at the national level). FUGs provide certain social services that current VDCs and DDCs are not able to fulfill.

Implementation of PES Model in the Kulekhani Watershed

Although a payment structure currently exists in terms of formal policy and procedures for substantial royalties paid by hydroelectric facilities to flow to local governments, it was not designed for payment of environmental services, but rather, for providing funds to DDCs to compensate for displacement associated with the hydroelectric facilities. The demands of some politically powerful and vocal community members, which may not reflect the true development aspirations of the majority of people, have served as an effective barrier for the funds to move out of the DDCs to the villages. Although in theory, DDCs and VDCs are supposed to prepare development projects by holding budgetary planning workshops at ward, *illaka*, VDC, and DDC levels, it is not happening because of insurgency. Even under normal circumstances, influential members of society may manipulate such processes. Due to lack of awareness, some do not know what to demand and where and how to request the money. Such communities or VDCs do not receive adequate development budgets.



Whatever its past weaknesses, local government in the Kulekhani watershed, partially due to Maoist insurgency targeting, is not functioning. It should be emphasized that transfer of payments for environmental services will not be feasible without political stability. What is recommended as an alternative to the current payment structure can only be implemented with stability and strengthening of local institutions, both government (DDCs, VDCs, and wards) and community-based groups (FUGs).

Conclusion

The proposed PES builds on the current payment structure, but would earmark the funds to the DDCs in the hydroelectric generation areas, such as the Kulekhani watershed, for watershed management and improvement. The NEA is aware that its facilities, especially Kulekhani, are extremely vulnerable to sedimentation. The NEA is willing to consider a new royalty model that would channel payments for watershed improvement. The challenge is to establish a new model through which upland communities in the Kulekhani watershed—the environmental stewards—receive a long-term sustainable flow of funds for providing environmental services to the NEA with few delays in payment and minimum bureaucratic obstacles to overcome. Of special concern is the need to keep transaction costs low (as the NEA does not have the resources nor the desire to make payments to local organizations or individual households) and procedures transparent (e.g.,

preventing corrupt individuals from siphoning off funds before they reach the upland communities).

The PES model proposed here appears to be *feasible* in the Kulekhani watershed. Part of the model is already in place; earmarked payments currently go through a national agency to the DDC. It is in the flow of funds *from the DDC* that the major changes should occur. In the proposed new model, monies would automatically flow into a *PES fund* that would be specifically established for payment of environmental services in the Kulekhani watershed. A *PES multistakeholder committee* would include representatives of the NEA, DDCs, VDCs, and communities. An *advisory group* to provide technical assistance to the PES committee

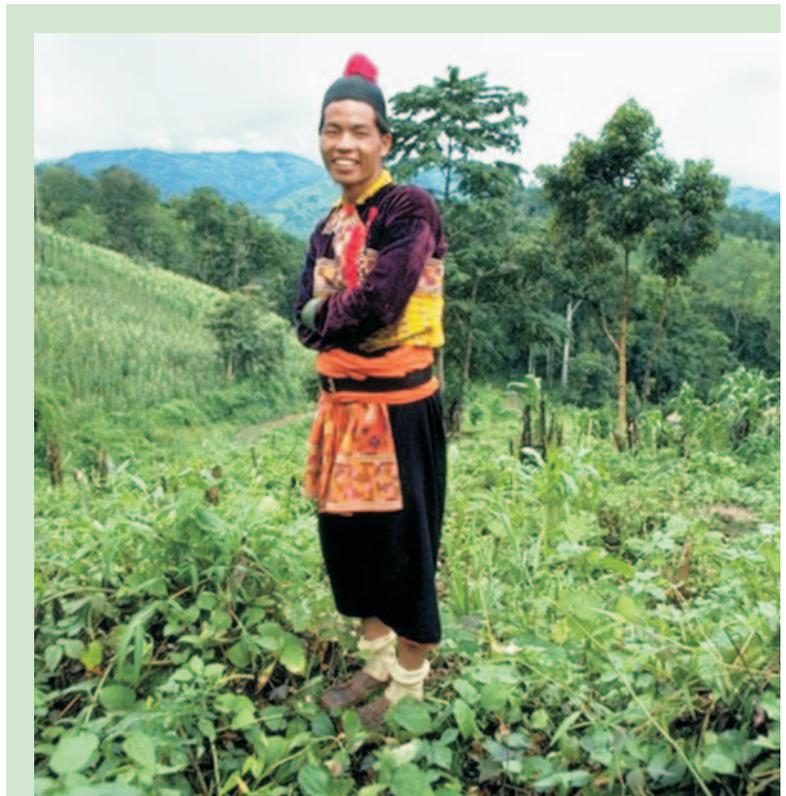


Photo: Roberto Faiduth of the Food and Agriculture Organization

would include representatives of the Department of Forestry and NGOs, among others. A salaried *PES fund manager* would be hired by the committee to provide oversight of the fund. The communities in the watershed would elect representatives on the PES multistakeholder committee who would be the major stakeholders²⁸ in the disbursement of funds and project implementation. The funds would primarily be dedicated to community-wide assistance, rather than individual payments. Although FUGs in the communities have been utilizing monies generated from forestry activities for small development activities, the proposed funds would provide larger financial resources for a longer (life of dam) period. FUGs or similar resource user groups could potentially implement management activities.

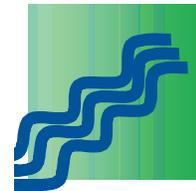
Under this model, the ongoing transfer of funds is contingent on implementation of effective watershed management. The linkage of payments to performance with a participatory monitoring system would be the innovation introduced. The NEA is currently monitoring the flow of water and sediment into the reservoir. Representatives from the NEA,

communities, and advisory group would decide on best management practices as a way to reduce soil erosion and discharges of sediment to the reservoir.

Despite the complexity and uncertainty of the current political situation, Nepal could serve as a site for the design and implementation of a PES program. Many preconditions necessary for the operation of a transparent and equitable payment transfer model are already in place: potential for hydroelectric production, strong community participation in a community FUG (with experience in resource management planning and implementation), and the legislative model for accountable local governance. In meetings with community members in the Kulekhani watershed, they expressed strong interest in participating in a program that would reward them for the services they are providing the NEA and broadening their opportunities for local development. If implemented in a way that enhances the ability of community members to realize their goals, PES programs can make a significant contribution to development and poverty alleviation in selected regions of Nepal.

²⁸ The elected members would include members of disadvantaged groups and women to ensure equitable representation of typically marginalized populations. The reserving of nominated posts for representatives of marginalized groups is already being conducted in Nepal in VDC, ward, and village councils.

APPLICABILITY OF THE PES MODEL TO ASIAN COUNTRIES



Several Asian countries currently have some of the elements of the proposed model to develop a program to implement payments for environmental services, especially those related to hydroelectric production and community-based natural resources. The relevance of environmental service payment programs to USAID’s strategic objectives (SO) and intermediate results (IR) in selected countries is highlighted in this section, where information was available.

The Philippines

The Philippines has certain enabling conditions, such as policies and procedures, which could provide a basis for implementing payments for environmental services. For instance, under the Water Resources Authority of the Philippines, a legal basis exists for charging water users for protection of watershed resources. Fees can be charged to water districts, resort owners, and geothermal and electric power generators, among others, to finance watershed management and alternative livelihood activities. In addition to the Development and Livelihood Fund (DLF) and the RWMHEEF under the Department of Energy Act of 1992 (Republic Act No. 7638), as described in the case study, another piece of recent legislation, the Universal Charge, requires that end users of electricity, including all self-generation entities, pay a watershed rehabilitation fee of PhP 0.0025 kWh. Communities living in relevant watersheds can submit watershed rehabilitation project proposals for funding (Rosales 2003).

Many of these policies and procedures earmark payments, and a funding mechanism may already exist. Changes to the legislative model, however, are

needed to channel and earmark payments specifically to a special fund designated for PES and allow collection of such funds outside designated protected areas. The Philippines has a successful model of a multistakeholder, locally driven board or committee in operation in the geothermal case study noted above; however, performance-based, environmental service monitoring is still needed.

Two of USAID/Philippines’s strategic objectives—“environmental governance and energy”(SO) and “electrify communities of former rebel soldiers using renewable energy to promote peace by improving their standards of living” (SO/IR)—provide opportunities to implement payments for environmental services programs. In particular, the proposed Alliance for Mindanao and Multiregional Off-Grid Renewable Energy (AMORE II) Program contributes directly to USAID/Philippines’ Strategic Plan for 2000–04. AMORE II has a component that promotes innovative approaches to raising funds for watershed management activities through market-based and other incentive-based approaches. The program plans to identify micro-hydro and/or sustainable agriculture projects in *barangays* upstream of existing large or small grid-connected hydroelectric projects to employ these market-based techniques. AMORE II will explore the interest of hydroplant operators in supporting upstream watershed protection.

Nepal

As noted in the case study above, potential exists for implementing PES schemes related to hydroelectric production in Nepal. Policies and procedures and clearly defined royalties provide an enabling environment for payments for environmental services.

In turn, local governments are required to spend these proceeds to improve the conditions of local communities directly providing this water service. The royalties provided at present are not for environmental services, but compensation for impacts from construction to project-affected people; thus, changes to the legislative model are needed to enable a portion of the royalty to be earmarked for payments for environmental services. A multistakeholder board or committee is needed to oversee the designated fund and ensure local participation. A performance-monitoring plan should be established.

USAID/Nepal is preparing its new strategy. PES could offer a new focus area that would build on its previous programs in forestry, rural development, and energy. In addition to the proposed Kulekhani watershed, the West Seti Hydropower Project is another potential site for testing a PES program. Once this hydroelectric facility is in operation, royalties could provide a substantial source of finance for watershed programs.

Indonesia

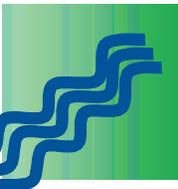
No enabling model of policies or procedures appears to be in place in Indonesia to support development of PES. Under USAID/Indonesia's Integrated Water Management and Environmental Services Program (2004–08 strategic objective), however, the planned Environmental Services Program (ESP) will promote improved management of water sources. This project will concentrate its resources on areas already served by existing water utilities. Significant improvements in the quality and quantity of water distributed are possible without capital infrastructure investments. A component of this project will work to involve water companies and their customers in properly managing watersheds upstream and water distribution networks

downstream. The development of a sustainable financial mechanism and valuation of and payment for upper watershed environmental services by lower watershed users is necessary. No mechanism has yet been identified on how this will be accomplished. The ESP provides an opportunity to use the PES model to identify any royalty or fee assessed, earmark funds for PES, develop a funding mechanism, ensure local participation, and develop a participatory monitoring program.

USAID has also worked in East Kalimantan in managing the Sungai Wain and Manggar watersheds, which provide more than 90 percent of freshwater supply for Balikpapan City. The Balikpapan city government took an integrated approach to managing these watersheds. Through USAID-supported agroforestry projects, more than 2,000 hectares surrounding the Manggar reservoir has been reforested and the Sungai Wain forest strengthened and protected. Balikpapan has formed a public-private alliance with Pertamina, the national petroleum company, whose refinery in Balikpapan depends on Sungai Wain for processing water. Pertamina now transfers funds to the city government to pay for 24-hour patrols of the Sungai Wain forest. Under a PES program, such funds could also be earmarked to natural resource stewards as PES.

Sri Lanka

USAID's strategic objective for Sri Lanka will end in 2005 and a new strategy will be developed. The new strategy presents an opportunity to incorporate environmental services and the PES model where applicable, including developing enabling policies, assessing royalties and fees, earmarking funds for payments for environmental stewards, developing a



multistakeholder committee or board to oversee collection and disbursement of funds, and ensuring local participation and establishment of a monitoring program. Improved natural resource management activities are currently being implemented under the South Asia Regional Initiative. Under this initiative, funds could be set aside to improve utility management and increase private sector participation in energy generation.

Lao People's Democratic Republic

Although USAID's current strategy does not support water or energy development, Lao does have an enabling policy in place to support a PES model. Lao's Forestry Law of 1996 allows for establishment of a Forest and Forest Resource Development Fund. The statute sets out only the broadest outline of the fund, declaring that it may collect income from the state budget and contributions from other entities and that it can be used only for forest activities. The statute gives examples of forest activities that stress conservation and protection of forests rather than commodity extraction, but leaves open the possibility of all forest-related uses of the fund. The statute also specifically says that the fund may be used for education activities related to forests, forest laws, and conservation (Legal Authority: Forestry Law [effective Nov. 2, 1996], Article 48) (Rosenbaum and Lindsay 2001). USAID's future strategy could then provide an opportunity to incorporate environmental services and the PES model where applicable, including developing enabling policies specifically to assess royalties and fees, earmark funds for payments for environmental stewards, develop a multistakeholder committee or board to oversee collection and disbursement of funds,

and ensure local participation and establishment of a monitoring program.

For instance, developers of a proposed US\$1.3 billion hydroelectric dam have agreed to make payments of \$1 million per year for 30 years into a watershed conservation fund. The proposed fund is to be used to protect pristine forests and endangered wildlife on the steep mountain slopes above the dam. Conserving these forests will also prevent the dam from silting up and thereby extend the dam's useful economic life by more than 50 percent. This watershed conservation fund has the potential of becoming of PES program.

India

USAID's strategic objective (2003–07) for India presents an opportunity to implement payments for environmental services. The strategic objective "improved access to clean energy and water in selected states" is intended to improve the energy sector and water resource management, while reducing greenhouse gas emissions from use of cleaner, more efficient technologies in the power sector. Moreover, one of the intermediate results (IR) calls for fostering partnerships among electric utilities, NGOs with water resource management and community development expertise, and village-level electricity and water user groups. The PES model could be implemented under this strategy as a mechanism to help improve and pay for better management of water resources. Essential to its success are an enabling policy, assessment of royalties and fees, earmarked payments for environmental services, local participation, and establishment of local multistakeholder committees or boards and a monitoring program.

Vietnam

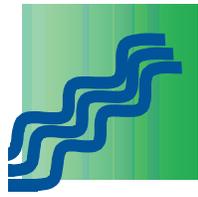
Through the regional U.S.-Asia Environmental Partnership (US-AEP) program, USAID expects to strengthen ongoing activities and develop new ones that focus on improving the regulatory model, industrial and urban environmental management, and civil society partnerships for environmental management in Vietnam. The goals are environmentally sustainable growth and improved quality of life, as well as improved environmental governance, urban management, and industrial management. Under the US-AEP/Vietnam strategy, efforts include strengthening enforcement and environmental governance to work with key leaders on innovative approaches that leverage economic incentives and citizen involvement. This will include establishment of a pollution charge program in Hanoi with a link to national- and city-level funds, providing resources for strengthening institutional capacity and private sector environmental investment. The strategy also creates a range of activities that strengthens agency capacity for increased citizen and community involvement and facilitates greater integration and cooperation among line agencies for improved environmental governance. These innovative initiatives present an opportunity for US-AEP to introduce the PES mechanism in its 2005 strategy for Vietnam.

Similarly, Vietnam has put in place policy that supports a PES mechanism. Through state forest enterprises, the government pays households and individuals through its Programme 556 on behalf of downstream beneficiaries for protection and special

use forests. Participation is voluntary and requires negotiation of protection contracts. The forest protection unit is used as the mechanism to transfer funds and monitor implementation.

Cambodia

USAID's Interim Strategic Plan 2002–05 for Cambodia does not explicitly address environment and natural resource management issues. Nevertheless, as corruption is a major factor in natural resource degradation, anticorruption measures under USAID's IR could be directed to building support for increased transparency and accountability in natural resource management. In addition, issues related to human rights, particularly minority and ethnic rights, are also very much affected by conflicts about natural resources; thus, efforts to protect human rights under USAID could also contribute to strengthening natural resource management at the local level. The creation of new fora for discussion and debate of local governance issues would also provide a mechanism for raising the profile of threats to Cambodia's forests and biodiversity, particularly in those parts of the country where environmental degradation is becoming a serious threat to livelihoods. USAID could also include key individuals engaged in environment and natural resource management issues to participate in U.S.-based participatory training. The current Interim Strategic Plan ends in 2005, presenting an opportunity for the USAID Cambodia Mission to address specific environmental issues as one of their objectives for 2006 onward.



The recent global emergence of payments for environmental services provides opportunities to apply current best practices and lessons learned to designing and implementing PES programs in Asia. There is growing consensus among researchers and practitioners on what preconditions need to be in place for a PES program to be successful in both providing environmental services and reducing poverty.

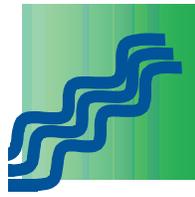
Yet ground remains to be broken in successfully implementing PES programs that achieve both environmental protection and poverty alleviation. Most PES programs currently focus on environmental protection and benefit larger, wealthier landowners. Given the inherent links between poverty and dependency on natural resources, designing PES programs where the poor receive compensation for being good natural resource stewards is essential in many cases. As this feasibility study highlights, PES programs can be successful when designed to operate at national and local levels independent of long-term external financial resources; transaction costs are minimized; rights and responsibilities of all parties, including intermediaries, are clearly defined; monitoring links payments to performance; resource rights and tenure are given; policies and procedures are supportive; fees are transparently assessed, collected, and effectively disbursed; and poverty reduction explicitly addressed.

This feasibility study argues that real opportunities exist to develop payments for environmental services particularly related to hydroelectric production and community-based natural resources in Asia. USAID can play an important role in creating opportunities and supporting pilot projects for PES programs that test models that address both environmental protection and poverty alleviation in Asia. The rising demand for electricity and water, growing recognition of the failure of current watershed management programs, ongoing decentralization, and increasing focus on poverty reduction all support development of **a new paradigm** for watershed management in Asia.

PES has the potential to serve as this new paradigm, if it can be shown to result in effective watershed management. In Asian countries, many of the critical elements of the proposed model are already in place. What is proposed is to build on existing royalty and fee assessment programs currently occurring in the region. The model departs from current programs by redirecting a portion of the funds from local government to the environmental stewards in the watersheds by means of transparent processes, multistakeholder participation, locally determined priorities, and participatory planning and performance monitoring. What is needed is to work at the national and local levels to bridge the current gap in existing programs and create a PES program that rewards environmental stewards for providing recognized services.

Developing and piloting new PES hydroelectric/watershed programs based on the proposed model can have a broader impact on programs for other environmental services in both Asia and other regions. As biodiversity and carbon programs further develop, they will face similar challenges in implementing programs in which the payments for environmental

service reach the stewards and support effective natural resource management. The best practices and lessons learned from pilot programs based on the proposed model can serve to provide a new model for PES programs that strive to achieve sustainable resource management and improved livelihoods for the poor.



- Alban, M. 2002. "Emerging Recognition of Watershed Services in Ecuador Pimampiro and Cuenca Case Studies." Watershed Market Meeting 2002. Presented at the IIED Meeting, "Market for Watershed Protection Services and Improved Livelihoods," September 24–25, 2002, Regent College, London.
- Arocena-Francisco, H. 2003. *Environmental Service "Payments": Experiences, Constraints, and Potential in the Philippines*. Indonesia: World Agroforestry Centre (ICRAF).
- Banskota, M. and S. R. Chalise, eds. 2000. *Waters of Life: Perspectives of Water Harvesting in the Hindu Kush Himalayas*. Proceedings of the Regional Workshop on Local Water Harvesting for Mountain Households in the Hindu Kush Himalayas, Kathmandu, March 14–16, 1999.
- Berry, J., I. Boyd, C. McCarthy, and E. Sjogren. 2004. *Rewarding Upland Poor for Environmental Services Provision in Nepal*. Elliot School of International Affairs, George Washington University, Washington, D.C.
- Bui, D. T., T. H. Dang, D. N. Thus, and Q. C. Nguyen. 2004. *Rewarding Upland Farmers for Environmental Services: Experiences, Constraints, and Potential in Vietnam*. Indonesia: World Agroforestry Centre (ICRAF).
- Conservation Finance Alliance. 2002. *Conservation Finance Guide*. Available at <http://guide.conservationfinance.org/chapter/index.cf>.
- Dhakal, A. S., T. Amada, and M. Aniya. 1999. "Landslide Hazard Mapping and the Application of GIS in the Kulekhani Watershed, Nepal." *Mountain Research and Development* 19(1): 3–16.
- Dudley, N. and S. Stolton. 2003. *Running Pure: The Importance of Forest Protected Areas to Drinking Water*. World Bank/WWF Alliance for Forest Conservation and Sustainable Use. Washington, D.C.
- Echavarría, M., J. Vogel, M. Alban, and F. Meneses. "The Impacts of Payments for Watershed Services in Ecuador: Emerging Lessons from Pimampiro and Cuenca." *Markets for Environmental Services* No.4. London: International Institute for Environment and Development.
- GEF (Global Environment Facility). 1998. *Evaluation of Experience with Conservation Trust Funds. Monitoring and Evaluation Team*. Washington, D.C.
- IIED (International Institute for Environment and Development). 2002a. *Markets for Watershed Protection Services and Improved Livelihoods*. Proceedings from meeting, March 12, 2002, Mary Ward House, London.
- . 2002b. *Markets for Watershed Protection Services and Improved Livelihoods*. Proceedings from meeting, September 24–25, 2002, Regent's College, London.
- Jenkins, M., S. J. Scherr, and M. Inbar. 2004. "Scaling Up Biodiversity Protection: Potential Role and Challenges of Markets for Biodiversity Services." *Environment*, Vol. 46 No. 6. Forest Trends, Washington, D.C.
- Jensen, C. 2003. *Development Assistance to Upland Communities in the Philippines*. Indonesia: World Agroforestry Centre (ICRAF).
- Johnson, N., A. White, and D. Perrot-Maitre. *Developing Markets for Water Services from Forests: Issues and Lessons for Innovators*. Washington, D.C.: Forest Trends.
- Kerr, J. 2002. "Sharing the Benefits of Watershed Management in Sukhomajri, India." *Selling Forest Environmental Services: Market-Based Mechanisms for Conservation and Development*. Edited by Stefano Pagiola, J. Bishko, and N. Landell-Mills. London: Earthscan Publication Limited.
- Koteen, J., S. J. Alexander, and J. B. Loomis. 2002. *Evaluating Benefits and Costs of Changes in Water Quality*. U.S. Department of Agriculture and U.S. Forest Service, Washington, D.C.
- Landell-Mills, N. and I. Porras. 2002. *Silver Bullet or Fools' Gold. A Global Review of Markets for Environmental Services and Their Impact on the Poor*. London: International Institute for Environment and Development.
- Landell-Mills, N., I. Powell, and A. White. 2002. *Developing Markets for the Environmental Services of Forests*. Forest Trends, Washington, D.C.

- Liu C., L. Wenming, N. Landell-Mills, L. Jinlong, and X. Jintao. 2002. *Getting the Private Sector to Work for the Public Good: Instruments for Sustainable Private Sector Forestry in China*. London: International Institute for Environment and Development.
- Mindanao Geothermal Production Field. 2003. "Community Relations and MAFI Updates." PNOC Energy Development Corporation, Philippines.
- Miranda, M., I. T. Porras, and M. L. Moreno. 2003. "The Social Impacts of the Payments for Environmental Services (PES) Scheme in Costa Rica: A Quantitative Field Survey and Analysis of the Virilla Watershed." In *Markets for Environmental Services* No.1. London: International Institute for Environment and Development.
- Molnar, A. 2003. *Forest Certification and Communities: Looking Forward to the Next Decade*. Forest Trends, Washington, D.C.
- Molnar, A., S. Scherr, and A. Khare. 2004. *Who Conserves the World's Forest? Community-Driven Strategies to Protect Forests and Respect Rights*. Forest Trends, Washington, D.C.
- Pagiola, S. 2003. "Economics Overview." *The Importance of Forest Protected Areas to Drinking Water: Running Pure*. Edited by Nigel Dudley and Sue Solton. World Bank/WWF Alliance for Forest Conservation and Sustainable Use. Washington, D.C.
- . 2004. "Environmental Services Payments in Central America: Putting Theory into Practice." Presented at the "Environmental Economics for Development Policy" Training Course. World Bank Institute, July 19–30, 2004, Washington, D.C.
- Pagiola, S., A. Arcenas, and G. Platais. 2003. *Ensuring that the Poor Benefit from Payments for Environmental Services*. Proceedings from "Reconciling Rural Poverty Reduction and Resource Conservation: Identifying Relationships and Remedies." International Workshop, May 2–3, 2003, Cornell University, Ithaca, New York.
- FAO (Food and Agriculture Organization of the United Nations). 2003. *Payment Schemes for Environmental Services in Watersheds*. Proceedings of a Regional Forum, Arequipa, Peru, June 9–12, 2003. Rome, Italy.
- Perrot-Maitre, D. and P. Davis. 2001. *Case Studies of Markets and Innovative Financial Mechanisms for Watershed Services from Forests*. Forest Trends, Washington, D.C.
- Richards, M. 2004. *Certification in Complex Socio-Political Settings: Looking Forward to the Next Decade*. Forest Trends, Washington, D.C.
- Rojas, M. and B. Aylward. 2003. *What Are We Learning from Experience with Markets for Environmental Services in Costa Rica? A Review and Critique of the Literature*. London: International Institute for Environment and Development.
- Rosa, H., S. Kandel, and L. Dimas. 2003. *Compensation for Environmental Services and Rural Communities: Lessons from the Americas and Key Issues for Strengthening Community Strategies*. Mexico: Prisma.
- Rosales, R. 2003. *Developing Pro-Poor Markets for Environmental Services in the Philippines*. London: International Institute for Environment and Development.
- . 2004. *Markets for Watershed Protection Services and Improved Livelihoods*. Proceedings from an international workshop on "Environmental Economics of Tropical Forest and Green Policy," March 2–5, 2004, Beijing, China.
- Rosenbaum, K. L. and J. M. Lindsay. 2001. *An Overview of National Forest Funds: Current Approaches and Future Opportunities*. Prepared as a contribution to the "Oslo Workshop on Finance for Sustainable Forest Management," Oslo, Norway (January 22–25, 2001). Available at www.fao.org/DOCREP/003/X6821E/X6821E09.htm.
- Rewarding Upland Poor for Environmental Services (RUPES). *Third International Steering Committee Meeting, July 7–9, 2004. Meeting Report (Draft) Lijiang, China*. Funded by the International Fund for Agricultural Development (IFAD) and ICRAF.



- Scherr, S. J. 2003. "Social Overview." *The Importance of Forest Protected Areas to Drinking Water: Running Pure*. Edited by Nigel Dudley and Sue Solton. World Bank/WWF Alliance for Forest Conservation and Sustainable Use. Washington, D.C.
- Scherr, S. J., A. White, and D. Kaimowitz. 2002. *Making Markets Work for Forest Communities*. Forest Trends, Washington, D.C., and CIFOR, Bogor, Indonesia.
- Scherr, S. J., A. White, and A. Khare. 2003. *Current Status and Future Potential of Markets for Environmental Services of Tropical Forests: An Overview*. Prepared for the International Tropical Timber Organization. Yokohama, Japan.
- . 2004. *For Services Rendered: The Current Status and Future Potential of Markets for the Ecosystems Services Provided by Tropical Forests*. ITTO Technical Series No. 21, International Tropical Timber Organization. Yokohama, Japan.
- Shilling, J. D. and J. Osha. *Paying for Environmental Services: Using Markets and Common-Pool Property to Reduce Rural Poverty While Enhancing Conservation*. Technical Paper. Economic Change, Poverty, and the Environment. Macroeconomics for Sustainable Development Program Office, World Wildlife Fund, Washington, D.C.
- Shovha S. 2004. "Payment for Watershed Protection Services. The Case of the Segara Basin, Indonesia." Presented at World Bank Water Week 2004 session. Washington, D.C.
- Skutsch, M. and E. Zahabu. 2003. *Revised Field Protocol for Measuring Carbon Sequestered in Forest: Research Project "Kyoto: Think Global, Act Local."* United Nations Framework Convention on Climate Change. Netherlands Development Cooperation.
- Tognetti, S. S. 2001. *Creating Incentives for River Basin Management as a Conservation Strategy: A Survey of the Literature and Existing Initiatives*. Prepared for the Ecoregion Conservation Strategies Unit, World Wildlife Fund, Washington, D.C.
- Tognetti, S. S., G. Mendoza, D. Southgate, B. Aylward, and L. Garcia. *Assessing the Effectiveness of Payment Arrangements for Watershed Environmental Services (PWES)*. For presentation at the Third Latin American Congress on Watershed Management, Regional Forum on Payments for Environmental Services, June 9–12, 2003, Arequipa, Peru.
- Upadhyaya, S. K. 2003. *How Can Hydropower Royalty Lead to Social Equity and Environmental Justice?* Equitable Hydro Working Paper 2. Winrock International. Washington, D.C.
- USAID. 2004. "Environmental Valuation for Watersheds and Water Resources. A Guide for USAID Missions." Latin America and Caribbean Bureau and EGAT/WATER Team. Environmental Evaluation. USAID. Washington, D.C.
-

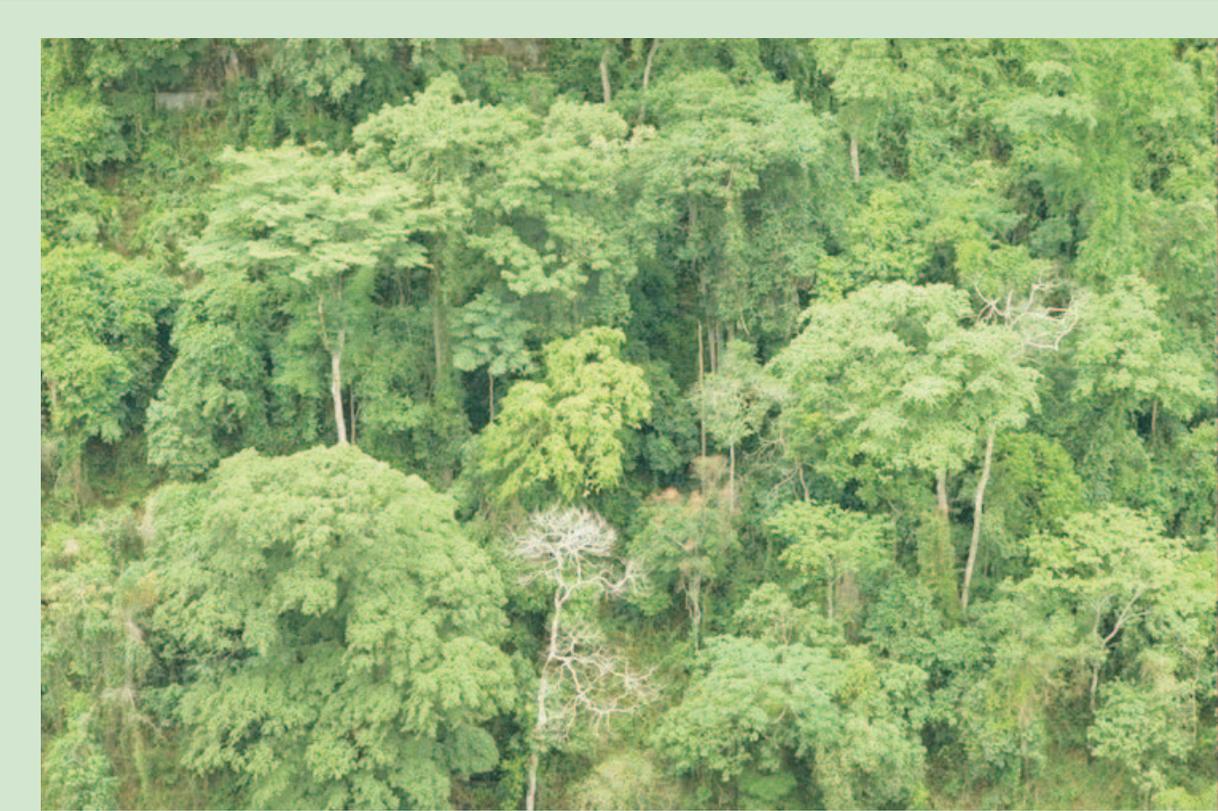


Photo: Roberto Faiduth of the Food and Agriculture Organization

Winrock International
1621 North Kent Street, Suite 1200
Arlington, Virginia 22209
www.winrock.org