PAYMENTS FOR WATERSHED SERVICES REGIONAL SYNTHESES

USAID PES Brief 7

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Introduction

As part of the USAID/EGAT/NRM-funded Payments for Environmental Services (PES) Associate Award, regional reports on PES activities, with a focus primarily on watershed services, were developed for Africa, Asia, and Latin America (Ferraro, 2007; Huang and Upadhyaya, 2007; Southgate and Wunder, 2007). This brief is a synthesis of the three regional reviews of Payments for Watershed Services (PWS). Payments for Watershed Services and PES are used somewhat interchangeably, but it should be recognized that PWS is actually a subset of PES where watershed services are at least one of the environmental services being targeted. This research brief provides an overview of the following PWS/PES issues if they could be characterized for the region:

- Regional trends in PWS implementation.
- Contexts and conditions that shape PWS and PES programs across the region.
- PWS and PES program design elements.
- Regional PWS program challenges.
- Regional factors that influence PWS and PES programs.

To describe PES, this brief adapts Wunder's (2007) definition:

1) There is a well-defined environmental service (e.g., specific changes in peak- or dry-season stream flow at the outlet of a watershed) or a suitable proxy for this service (e.g., hectares of forest conserved);
2) There is at least one buyer of this service or proxy;
3) There is at least one seller;
4) Transactions between buyer(s) and seller/provider(s) are voluntary; and

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5) Payments are conditional on contracted environmental services (or proxies for same) actually being supplied.

Payments for watershed services in Latin America

Payments for watershed services implementation remain incipient in Latin America, albeit much farther along than in any other part of the developing world. This analysis focuses on public policy, institutional factors, and political realities affecting PWS in Latin America. PWS programs featuring all five PES characteristics are rare in the Americas, even though the total number of PES or PES-like schemes (which satisfy most but not all of the five criteria) clearly exceeds numbers in Africa and Asia. One reason why conservation payments have been accepted more readily in Latin America appears to be that rural land tenure tends to be more secure in the region in terms of de facto control over resources. Without this control, users and owners of natural resources are in no position to be reliable suppliers of environmental services. Another reason is that commercializing rights to land use and land management practices is culturally and politically acceptable in much of the region. Major exceptions are parts of the Andes with large indigenous populations, as well as Venezuela.

Among various stock-taking assessments of PES schemes, the most frequently cited is by the International Institute for Environment and Development (Landell-Mills and Porras, 2002). IIED is currently updating its survey of watershed-focused schemes. National-level PES appraisals have been carried out by the Center for International Forestry Research (CIFOR) and its partners for Bolivia (Robertson and Wunder, 2005), Colombia (Blanco et al., 2005), Venezuela (Blanco et al., 2006), and Vietnam (Wunder et al., 2005). A major finding of these appraisals is that few genuine PES initiatives have actually gotten off the ground: Some remained in the planning stage; others were abandoned before implementation. A large number developed into “PES-like” schemes that combine user payments with more conventional project approaches and included three or more PES elements.

The Andes. Due to increasing water scarcity and upstream forest loss, there is a high potential for watershed PES in many parts of the Andes, where mountainous topography coincides in many places with large numbers of water consumers. Nevertheless, receptiveness to conservation payments varies. While some places are fairly open to market-based incentives for water management, others are not. Resistance sometimes has to do with a history of resource usurpation. Also, some people cannot reconcile the fact that water satisfies basic human needs with the reality that hydrologic resources are growing scarcer and hence more marketable – or even that channeling water from its sources to the places where it is consumed is not free, therefore must be financed by either consumers or others. In societies with a strong indigenous culture (e.g., the Bolivian highlands), PES development tends to lag. The same holds for large, closed economies, such as Venezuela.

Incentives are strong in Bolivia to protect watersheds as well as the amenity resources harnessed for ecotourism. However, skepticism is widespread toward the “neoliberal” approach to natural resource management generally and PES specifically. Related to this skepticism are suspicions of disguised privatization of public-access resources, including water. Furthermore, key preconditions for PES, such as secure land tenure, are still lacking in many places. As a result, most conservation initiatives are properly categorized as customary projects. One PES-like pioneer has been the Noel Kempff project, combining carbon and biodiversity services to protect a forest area threatened by logging, near the Brazilian border. Among the few genuine PES schemes in Bolivia is a small project administered by Fundación Natura, in the buffer zone of Amboró National Park, where irrigator and biodiversity payments are pooled to finance conservation (Asquith et al., forthcoming). Opportunities to use the same approach are more promising in the Andean foothills and the transition to Bolivia’s lowlands (Media Luna), where there is less ideological resistance to economic instruments and where irrigated, commercial agriculture and urban water

consumers are potential buyers. Various municipalities in Tarija and Santa Cruz are also experimenting with PES-like watershed schemes (Robertson and Wunder, 2005).

Experimentation with PES has been less in Peru than in Bolivia. No projects for carbon sequestration appear to be running, although some are in preparation. As for watershed schemes, the most serious efforts have been in Alto Mayo-Moyobamba, San Martín Department, and in the Jequelepeque and Piura watersheds, where German GTZ and CONDESAN have been working together in the Andean Watersheds Project (Veen, 2007). While negotiation processes have advanced noticeably, a primary obstacle has been to transform willingness to pay on the part of potential service buyers into actual monetary flows (A. Moreno-Díaz, personal communication, January 2007).

No South American nation has a richer PES portfolio than Ecuador, where ideological hostility to conservation payments is less than in Bolivia and Peru. Two pioneer schemes that fit the five-point PES definition completely have been running for years. One is the PROFAFOR carbon sequestration program, which has been operating for a decade (Albán and Argüello, 2002). The other is the Pimampiro municipal watershed scheme. These programs have inspired a new generation of local, self-organized PES schemes, including a municipal watershed project in Celica (Loja Province). Another type of scheme draws on water funds to which customers contribute to finance watershed conservation. However, these funds, which have been established in Quito, Cuenca, and El Angel, finance conservation projects rather than make payments to private providers of environmental services.

Colombia is probably the most advanced Latin American country in terms of creating innovative mechanisms for the financing of conservation. While charging users of environmental services has become widespread in the country, compensating service providers on the ground is still less advanced than in Ecuador. However, many more pilots exist than in the Southern Andes and Venezuela, ranging from the NGO CIPAV's RISEMP silvopastural project for biodiversity and carbon (now extended to watershed services), to PES-like irrigator payments for upstream projects in the Cauca Valley, PROCUENCA's water user-financed reforestation in Manizales, and recent water-user payments to upstream protection in Chaina near Villa de Leyva. A number of other relatively advanced initiatives exist, and a national PES strategy is being prepared that may well give Colombia a leading role in PES implementation in the region.

No genuine PES schemes exist in Venezuela, but in at least one case (La Jabonosa watershed, Táchira) water-user payments are being used for projects, and PES trials are being considered. Hydroelectric payments from the Guri dam have been used for financing fire and deforestation surveillance in Canaima National Park. One preexisting national program, Subsidio Conservacionista, constitutes a potential legal framework for PES.

In summary, PES in the Andean region is uneven, with Ecuador and Colombia more advanced than Bolivia, Peru, and Venezuela. Some of this variation traces to political-ideological factors. Watershed services clearly dominate other services and demand for the former is on the rise. Other than some trial initiatives in Colombia, all existing schemes are self-organized by buyers, sellers, and intermediaries, with little involvement by the central state. Basically all schemes are bilaterally negotiated deals – not quite markets in which environmental services are bought and sold continually.

Little PES activity has occurred in the Amazon. Payments have been collected from tourism operators in Peru's Madre de Dios region to finance the conservation of scenic vistas (Veen, 2007). A similar scheme exists in Bolivia's Madidi National Park (Robertson and Wunder, 2005). However, the specific mechanics of these initiatives differ from those of pure PES (Ferraro and Simpson, 2005). There has been little

interest in the Amazon in payment for hydrologic services, probably because water is abundant in the region.

The Brazilian government has launched the Proambiente program, in which payments are used to promote environmental sustainability in the Amazon. Groups of farmers are contracted to follow land-use plans that feature restrictions (e.g., no clear-cutting or burning); however, specific environmental services are ill targeted. In return, they receive payments from the central government. The program was led by movements representing the rural poor, rather than created to satisfy specific demands for environmental services. Thus, it currently faces severe financing constraints, threatening its continuation.

In other parts of Brazil, carbon initiatives have been implemented. For instance, the Plantar project, financed by the World Bank's Prototype Carbon Fund, aims to provide economic incentives for sustainable wood supplies for pig iron production in Minas Gerais state (May et al., 2004). Several cities in the southern part of the country have shown interest in PES or PES-like schemes for the sake of watershed conservation. One of these is the Ecological Value Added Tax (VAT), implemented first in Paraná and later in other states (Grieg-Gran, 2000; May et al., 2002). There are fairly advanced emerging initiatives in the uplands of São Paulo and Rio de Janeiro, and Vitória (Espírito Santo state).

Central America and Mexico. Mexico's Program for Hydrologic-Environmental Services (PSA-H) is the largest PES program in Latin America. The PSA-H focuses on the conservation of threatened natural forests for the sake of maintaining the flow and quality of water. This emphasis reflects mounting water scarcity in Mexico as well as elevated deforestation in many parts of the country (Muñoz-Piña et al., forthcoming). Funding for the PSA-H grew from $18 million in 2003 to $30 million in 2004, derived from charges paid by federal water users. Consistent with the program's basic purpose, monies are disbursed to individual and collective landowners possessing natural forests that serve watershed functions. Payments for preservation of cloud forests ($40 per hectare annually) exceed those for other tree-covered land ($30 per hectare annually).

PES implementation is most advanced in Costa Rica and is highlighted by its Payments for Environmental Services (PSA) program, established in 1997. Forest Law 7575 (1996) established four primary purposes for the PSA program: (1) mitigation of greenhouse gas emissions; (2) hydrologic services, including provision of water for human consumption, irrigation, and energy production; (3) biodiversity conservation; and (4) protection of scenic beauty for recreation and ecotourism. The same law established a regulatory framework for contracting with landowners for the provision of these services. It also established the semi-autonomous National Fund for Forest Financing (FONAFIFO) to manage the PSA.

To participate in the PSA program, landowners submit a plan for sustainable forest management, prepared by a licensed forester. Once this plan is approved, specified practices (i.e., timber plantation, forest conservation or forest management) must be adopted, which triggers payments. In 2006, annual payments for forest conservation averaged $64 per hectare. For forest plantations, about $816 per hectare are disbursed over a 10-year period. Recently, payments for agroforestry were added. Although an initial disbursement can be requested on contract signing, all subsequent annual payments require verification of compliance.

To date, the PSA program has been funded primarily with revenues from a national tax on fossil fuels, which averages about $10 million annually. Additional support has included two grants from the Global Environment Facility, a World Bank loan, and a grant from German aid agency KFW. In 2005, a new water tariff came into effect, which increased PSA revenues. In addition, new opportunities exist thanks to forest carbon finance.

Obstacles to PES in Latin America. Two principal factors are believed to be limiting watershed PES in Latin America: uncertain benefits and high costs. Since PES programs were first proposed, doubts have been expressed about their environmental benefits. One criticism is that natural variability in environmental parameters may outweigh the measurable impact of land management changes over the short term (five to 10 years). Furthermore, there is considerable scientific uncertainty over the relationships between land management and environmental impacts.

One reason for this is revealed by an analysis of Ecuadorian laws relating to PES. Virtually all these legal arrangements focus on the central government's ownership of biodiversity and other resources, obviously anticipating sizable international payments for access to these environmental assets. In contrast, existing laws and regulations are silent on the support that the national state should provide to local PES schemes (Corral and Rodríguez, 2006). As a result, the use of PES in watershed conservation remains excessively expensive, therefore is not resorted to as often as it could or should be.

Latin America summary and conclusions. Currently, most relevant operations in Latin America, as elsewhere in the developing world, are PES-like, i.e., not full-fledged examples of the approach. But the number of ongoing and emerging initiatives is much larger than in Africa and Asia combined. Many watershed schemes have failed to cultivate buyers of environmental services, relying instead on one-off contributions from external donors. Others do not feature conditionality, with implementing agencies shying away from the business-like practice of paying only when services are rendered. This reluctance has to do in part with concerns about disrupting relationships with poor farmers, which suggests that PES development and the alleviation of rural poverty may not be entirely harmonious.

Various things can be done to increase the use of conservation payments. Greater scientific understanding of key hydrologic linkages (e.g., sediment displacement due to natural and human forces) would help. So would the counteraction of strategic behavior through the use of innovative bidding procedures as well as the development of institutional arrangements conducive to collective action. Government policies, such as selling water below its cost, need to be reformed. At the same time, the public sector needs to help reduce scale-dependent transaction costs, which are especially burdensome for small communities and which counter the capture of society-wide benefits (e.g., biodiversity protection) created by watershed protection at the local level.

Beyond coming to terms with specific tasks such as these, one must bear in mind broader reasons why there is often a gap between what PES theorists have imagined in scientific articles and the reality of PES on the ground. One of these is that Latin Americans historically have made use of the natural environment for free – logging, mining, and expanding the agricultural frontier pretty much as they pleased. In light of this history, actually paying for environmental services in response to mounting resource scarcity represents a major change in attitude, which necessarily will take time.

Also, PES implementation is held back in many places because of mistrust by key stakeholders. For example, service-providers – most notably, small indigenous farmers – fear that PES represents a first step toward permanent expropriation of their resources. At the same time, service-users might suspect that they are or will be the victims of "environmental blackmail." Intermediaries, including NGOs and civil-society elements, sometimes have the confidence of stakeholders needed to overcome perceptional obstacles such as these. The presence of such fair brokers between users and providers of environmental services often catalyzes early PES initiatives, which in turn can lead to scaled-up programs such as the Costa Rican PSA or the Mexican PSA-H. Aside from being trustworthy, these intermediaries also need to be willing to invest the time and effort required for effective negotiations.

As such negotiations are pursued, there is no reason to insist always on one-size-fits-all when applying economic incentives in environmental management, with conditionality and all other features of PES in place everywhere. But while customizing schemes to local conditions may be entirely sensible, we are convinced that payment-initiatives in a number of settings would be more effective if these adhered more closely to all five PES principles. For example, when watershed PES schemes rely exclusively on external sources of support (instead of service-user payments) that will decline sooner or later, then they are bound to be unsustainable. Also, when there is no strong conditionality, service delivery is compromised in most cases. Following a complete set of guiding PES principles, then, is not just a question of academic grace. Instead, doing so directly affects the functionality of conservation payments.

Payments for watershed services in Asia

Across much of Asia, rapid transitions to market-based economies alongside demographic changes are creating an increasingly high demand for watershed services. Standard approaches to watershed management have largely failed to reverse widespread watershed degradation and protect the watershed services they provide. The past few years have witnessed a surge of interest in the development of PES programs in Asia. A number of donor-driven scoping assessments and action research pilot sites are underway – primarily in Indonesia, the Philippines, India, Nepal, Vietnam, and China – to determine the enabling conditions for establishing PES schemes. The largest number of PES and/or PES-like case studies comes from Indonesia and the Philippines, where watershed management has taken on less of a command and control approach, thus the enabling conditions for establishing PES schemes are greater. Donor-driven poverty alleviation is also being tested as an objective alongside the provision of environmental services. Few “mature” PES programs actually exist in Asia.

Five factors influencing the development of PES programs in Asia are discussed. First, governance structures in Asian countries vary from command-and-control to more decentralized, participatory approaches to watershed management. Such governance structures shape the regulations and the required capacities of local and national-level institutions to support PES. Second, in much of Asia, population density is high and land holdings per household are relatively low, potentially increasing PES transaction costs. Third, most forest and agricultural land in Asia is state-controlled, with individuals or communities possessing weak property or usufruct rights, thus bringing into question the voluntary component of the PES definition. Fourth, as within most developing countries, the lack of hydrologic data to establish a relationship between land-use patterns and environmental services raises issues of how the conditionality aspect of PES is being met. Finally, the level of awareness of the PES concept across Asia is relatively low.

Design and development of PES in Asia. With funding from the International Fund for Agricultural Development (IFAD), the World Agroforestry Centre (ICRAF) has played a prominent role in promoting the concept of both cash and in-kind “rewards” for environmental services with their Rewarding Upland Poor for the Environmental Services (RUPES) program in Asia. RUPES is actively implementing pilot action sites in Indonesia, the Philippines, and Nepal, and establishing learning sites in China and other parts of Asia to test the feasibility of PES to address both environmental protection and poverty alleviation. Also, from 2001 to 2006, IIED conducted scoping assessments in India and Indonesia. With funding primarily from external donors such as Great Britain’s Department for International Development (DFID), USAID, and the Ford Foundation, a number of international and local organizations are also exploring the feasibility of PES programs in Asia.

Improved total water yield and seasonal flow augmentation; improved quality of water; and general watershed rehabilitation and erosion control are the most commonly reported hydrologic environmental services demanded and provided under PES programs in Asia. Landslide prevention and flood control are

also mentioned as possible services, but no related PES cases were found. While environmental services demanded are based purely on downstream watershed service needs, the actual PES mechanism adopted and whether the schemes fit the five requirements of the PES definition are factors of whether market mechanisms are at work or state regulations are driving watershed management approaches, or a combination of both. In China, providers of environmental services, such as farmers, can opt to participate in the Sloping Farming Lands Conversion Program PES scheme, but the government finances the program, specifies how the land is to be managed, and farmer participation has not always been voluntary (Sun and Liqiao, 2006). In contrast, in India and Indonesia, individual households or communities participate in decision-making processes to determine how land is managed to provide an environmental service, which is more characteristic of market-based PES programs (Landell-Mills and Porras, 2002).

PES buyers in Asia have included a mix of local and national downstream users:

- State-owned or parastatal hydroelectric facilities or municipal water supply companies directly or indirectly providing cash payments or in-kind rewards to upland communities in return for the provision of reliable water flows and improved water quality, typically reduced sedimentation or erosion (Indonesia, Nepal, the Philippines);
- Private enterprises, such as local water bottling or ecotourism companies, agreeing to pay upstream land users by direct or indirect cash payments or in-kind rewards for the provision of improved water quality or quantity (Indonesia);
- Local community groups, such as water user associations, agreeing to pay upstream users by direct or indirect cash payments or in-kind rewards for the provision of improved water quality or quantity (India); and
- Central governments distributing cash subsidies and in-kind rewards to farmers in return for reduced sedimentation or erosion (China).

By far, municipal water utilities, national and local governments, and hydroelectric facilities are the predominant buyers in the case studies reviewed. Cases of private sector interest (e.g., private bottling companies) in payment for environmental services exist but are not common. In most cases, there is a single buyer.

Overall, there is limited demand from environmental service buyers in Asia, for the general concept is relatively new and potential buyers are not aware of the potential. Furthermore, there are few if any successfully implemented PWS cases; thus, potential PWS buyers are uncertain if payments will provide desired environmental services. Buyers may also require more evidence of scientific linkages between upland land-use management and downstream impacts before committing. Where buyers are already paying various taxes to the national and local government and/or putting funds aside for community development activities aimed at social responsibility, PES is also perceived by some as another unwelcome tax or fee.

Potential service providers are not homogenous across the Asian landscape. In particular, individual farmers may have limited land-use ownership or rights (private, community-owned, state-owned) or be altogether landless. The widespread lack of land tenure is often cited as a key constraint to PES in Asia (Landell-Mills and Porras, 2002; Wunder et al., 2005). As a result, some PES action pilot sites in Asia are experimenting with land tenure or land-use rights as a payment or reward for environmental services (Winrock International, 2005; Suyanto et al., 2005; Leimona, 2005).

Population density and resulting small land holdings in Asia require a high level of cooperation and coordination among land users to secure desired watershed services. Smallholders also typically tend to be poor and are at a distinct disadvantage if a capable or trustworthy intermediary is absent to advocate on their behalf. In India, watershed development program benefits often go disproportionately to rich landowners rather than the poor (Sengputa et al., 2003), because the poor are less familiar with formal contracts; are poorly educated; and, due to weak property rights, are unable to guarantee that they will be able to provide watershed services (Landell-Mills and Porras, 2002). Evidence also suggests that in some circumstances, marginalized community members and landless farmers could lose access to common areas and experience declining livelihoods unless poverty alleviation is considered in program design. Thus, group-based rewards, such as tenure security for the whole, can potentially improve coordination/cooperation and prevent the poor and weak from being manipulated or expropriated by wealthier members of the group. In fact, in most if not all cases, environmental service providers are ad hoc or formal groups of individuals such as association of water users, farmers, and forestry operators.

Intermediaries – local and international NGOs, research institutes, community-based organizations, and government officials at various levels – play a critical role in linking the providers and the buyers of the environmental services. In Asia, intermediaries provide a range of services: increasing public awareness, serving as a clearinghouse for information, training, capacity building, negotiating, monitoring and evaluation, resolving conflicts, absorbing transaction costs, and conducting scientific and socioeconomic feasibility assessments on the potential of PES in various watersheds. Intermediaries have also helped to generate collective action, providing support for weaker members of communities to better address poverty alleviation or ensure that the poor are not made worse off. Local institutional capacity to provide such services varies across Asia but is generally low. Without intermediaries, the potential of PES at many of these sites in Asia would probably not be realized, at least in the short term.

Developing payment mechanisms with the right incentives to induce long-term behavior change has proved a challenge in the Asian context as elsewhere. The appropriate length of contract, type of payments or rewards, fee structures and targeting, and transaction costs area all factors in determining the incentive package needed to convince potential providers and sellers of environmental services of the benefits from active participation in PES programs.

Typically, contracts between buyers and sellers are initially negotiated for a couple of years with the potential to be renegotiated and extended if a demand still exists once the contract period ends. In China, under the Sloping Farming Lands Conversion Program, contracts to convert farming and barren lands are recognized for up to 50 years, can be inherited and transferred, and can be extended on expiration. Farmers voluntarily convert marginal, sloping farmlands into forests and grasslands in exchange for cash subsidies and/or free grain or seedlings (Sun and Liqiao, 2006). More typical are shorter contracts, such as in the Cidanau watershed in Indonesia, where the company PT Krakatau Tirta Industri (KTI) is voluntarily paying upland communities to maintain forest cover on a 50 hectare pilot site for two years with the possibility to renegotiate and extend for another five years (Leimona and Prihatno, 2005).

Where awareness of PES exists, Asian upland communities have participated in PES schemes for cash payments. Such payments typically flow to a group with established rules, written or oral, on how to manage PES payments/community funds for the benefit of the whole. Rarely if ever is cash transferred directly to individual households.

Several RUPES sites found that royalty distributions per capita for water supply services from hydropower plants were insufficient to affect poverty. For example, in Singkarak Lake, Indonesia, the local community unit received close to $40,000, or only $1 per capita, in 2005 as its first allocation of hydropower royalties (ICRAF, site profile RUPES Singkarak). Similarly, in the Kulekhani watershed in

Nepal, payments from hydropower royalties amounted to about $1.50 per capita (ICRAF, site profile RUPES Kulekhani).

Yet local communities do appear to benefit where cash payments are complemented with in-kind rewards such as secure access to land for farming, technical assistance or training, with the potential to lead to additional incomes and benefits. In Vietnam, for instance, the average smallholder farmer received an average annual payment from a pilot PES scheme of $15, making up only 2% of household income. This low payment was attributed to the inability of poor farmers to commit more than 1.5 hectares to the scheme. However, the farmers were willing to participate in the scheme because many were seasonally unemployed, and they valued the forest management training and technical assistance provided (Bui and Hong, 2006). Thus, in designing PES programs, it would appear that some form of layering of payments or rewards is necessary to create an attractive incentive package.

The literature indicates that targeting is not commonly used to direct payments to service providers giving the greatest environmental service benefits. Rather, evidence points to cash being paid mostly as flat fees or flat fees per hectare. While implementing flat fees per hectare is easier to implement, it may be less efficient in achieving desired environmental services. Experiments with differentiated fees based on the level of services provided are few. In one case, in Sumberjaya, Indonesia, a payment scheme is being explored whereby a hydropower facility in Sumberjaya makes payments at different levels based on actual sediment reductions achieved by watershed protection activities (ICRAF, RUPES Sumberjaya). This is an exception, for few Asian PES activities have performance-based monitoring and evaluation components to determine if the intended environmental service is being supplied, in large part due to the lack of scientific data and knowledge linking upland activities with downstream impacts.

Similarly, few socioeconomic poverty indicators are being collected to determine if the poor are benefiting from PES schemes. As a start, the RUPES program has recently prepared baseline indicators to monitor the impact of PES on poverty alleviation in its six pilot sites in Indonesia, Nepal, and the Philippines. However, because poverty is so pervasive in upland areas, the poor may be service providers and thus receive payments or rewards under a PES scheme by default.

Transaction costs are those required to establish and manage a PES program. Such costs can be high where the negotiation process is long; the process of distributing payments is bureaucratic; hydrological data is missing for monitoring purposes; and awareness is low, among other factors. In most of Asia, the capacity of existing local institutions to confront and resolve these challenges is considerably low, thus potentially raising the transaction costs needed to increase capacity. In the few cases that mention transaction costs, evidence indicates that they could hinder PES program success. For instance, one study found that the estimated transaction cost to establish and operate a land tenure rights (HKm) group in Sumberjaya, Indonesia, was about $55 per household. Such costs include covering the time and effort needed to negotiate or prepare, process, and approve the HKm applications submitted to the local and national governments. Given that the average annual farm household income is $109 or less, this transaction cost was considered excessive (Arifin, 2005). Transaction costs can be lowered if payments are distributed to organizations rather than individual households, particularly where the people-to-land-area ratio is high, as is widely the case in Asia.

No country in Asia now has laws and policies at the national level explicitly and directly supporting PES. Opinions concerning the necessity of PES-enabling laws and policies range from the belief that existing national and local policies are adequate or need only minor modifications to support PES to the belief that entirely new PES-enabling legislation is needed (Padilla et al., 2005; Arifin, 2005). Across Asia, a number of key policies already address ecosystem conservation and protection, revenue generation, and poverty alleviation, providing indirect support to the objectives of PES. However, current legislation does

not specifically require that funds be earmarked directly to service providers or that beneficiaries pay for environmental services.

Summary and conclusions. Asian countries are at different stages in exploring the potential of PES programs to provide environmental services. Indonesia and the Philippines have the largest number of documented PES activities, but all of these are still in the testing/pilot program stage. Consequently, only preliminary lessons learned and best practices are available. Key questions in Asia include whether the definition of PES can be broadened to include both environmental service and poverty alleviation goals, and whether PES can exist where governments exercise tight control over land use, as in much of China and Vietnam.

While broader contextual factors, e.g., forms of governance and high population densities, affect the design and implementation of PES schemes in Asia, their feasibility is highly specific to local context. Preliminary evidence indicates that where feasible, PES schemes have the potential to be designed from the start to ensure a higher likelihood of success in Asia.

Payments for watershed services in Africa

Although there has been global experimentation with PWS schemes for almost a decade, only a couple exist in Africa. The two African PWS programs now making payments are both in South Africa. As described below, these two programs are not conventional PES programs; they are essentially public works programs oriented towards securing hydrologic services. Given that the most common definitions of PES services do not include such public works programs (e.g., Wunder, 2007; Ferraro, 2001), one could reasonably argue that there are no PWS schemes now operating in Africa. In addition to the two programs in South Africa, there are at least eight other initiatives in formal planning phases in South Africa, Tanzania, and Kenya. Presentations at recent workshops (e.g., East and Southern Africa Katoomba Group, 2006) suggest that other initiatives are being considered by field practitioners and government agencies, but these have not yet entered a formal planning phase.

For all types of PES, Africa lags other areas of the world. For example, in the global carbon offset market for 2003 and 2004, Latin America and Asia accounted for more than three-fourths of the emissions reduction projects, while Africa accounted for just 3% (Lecocq and Capoor, 2005). The Katoomba Group commissioned PES inventories for Uganda (Ruhweza and Masiga, 2006), Kenya (Mutunga and Mwangi, 2006), Tanzania (Scurrah-Ehrhart 2006) and South Africa (King, Damon, and Forsyth, 2005). These inventories list 18 biodiversity projects (of which two are making payments in cash or in kind), 17 carbon projects (of which five are making payments), and 10 water projects (of which two are making payments). Jindal (2006) lists another 13 nations with carbon sequestration programs, but none of them has more than one project (Kenya, Tanzania and Uganda together have seven). A couple of nations have biodiversity payment initiatives (Madagascar, Guinea). However, no other payments for water service initiatives were identified. Bond (2006) reported that PWS schemes were proposed but abandoned in Zimbabwe and Malawi.

The inventories' definition of what a payment for biodiversity project comprises in Africa includes community-based natural resource management initiatives, ecotourism market participation (e.g., as guides or other tourist service providers), agricultural technology transfer projects, and projects that reward communities with limited access to protected areas. A minority of the listed projects are conditional (performance-based). The Kenyan inventory lists 10 PES projects (one water, one carbon, eight biodiversity) but has a disclaimer: "The projects show elements of PES but may not necessarily exhibit explicit characteristics of the buyer-seller model." A recent workshop, Catalyzing Payments for Ecosystem Services in Africa, further illustrates the paucity of initiatives (East and Southern Africa

Katoomba Group, 2006). Of the eight African case studies presented, only one referenced an ongoing PES project.

Most African PES initiatives are funded through overseas development assistance, international conservation organizations and, increasingly, governmental agencies. There is little private-sector involvement. A common refrain at African PES meetings is that somehow conservation and development practitioners must "engage the private sector," which currently is unaware of the substantial purported gains from trade in environmental service contract schemes.

Why so few PWS schemes in Africa? Africa is the most capital-poor, inhabited continent. Thus, not surprisingly, most of its rural populations depend on ecosystem services for their livelihoods. Sub-Saharan Africa includes 11 of the 16 nations of the world having less than 1,000 cubic meters of water per person annually, a situation described as "absolute water scarcity" where food shortages are a constant threat and water shortage can only increase (FAO, 1995). With water so scarce, why are there so few PWS programs in Africa? Frequently cited obstacles to their development there and elsewhere are lack of technical and market information, limited institutional experience, inadequate legal framework, limited successful business models, suspicion of markets for public goods, and equity concerns. Other reasons for reduced PWS activity in Africa are described below.

In general, PWS come from five sources: hydroelectric power suppliers, large industrial users, municipal water suppliers, irrigation water users, and general tax revenues. It is worth mentioning that in most PWS cases in the world, existing revenue streams are being used to make the conservation payments. In only a few cases have rates paid by end-users been raised. Thus the financial health of institutions is an important prerequisite for PWS schemes, a quality for which African institutions are not well known.

Africa generates little electricity by hydropower compared with other regions of the world –less than 20% comes from hydroelectric sources (Lokolo, 2004; United Nations, 2004). In contrast, almost 70% of Latin America's substantially greater electricity production comes from hydroelectric sources (United Nations, 2004). Unlike Latin America and parts of Asia, Africa does not have high hydroelectric potential because so much of the continent has a semiarid climate with periodic droughts. Sub-Saharan Africa has hydroelectric potential of 710 Terawatt hours (TWh), of which 6% was developed in the 1990s. Latin America, in contrast, has 3,280 TWh of potential, of which 12% was developed. The hydroelectric capability of Africa is mainly in its most institutionally weak nations: Democratic Republic of Congo, Cameroon, Ethiopia, and Madagascar (Lokolo, 2004). Moreover, in terms of potential numbers of payers, Latin America has the highest electricity coverage (84%) of any region in the developing world, whereas Africa has the lowest (about 10%).

As with hydroelectric power, Africa also has the fewest public water systems and the fewest citizens connected to them. Thus there are fewer people who can be charged for domestic water. Most Latin American nations have higher rates of urban access to piped water and, more importantly, much higher rates of urbanization. About three-fourths of the Latin American population is urban. In contrast, only 35% of Africa's population is urban (UNDP, 2002).

Furthermore, investing in watershed management is not an obvious priority for African municipal water supply systems. Urban water systems are caught in a cycle of declines in investment, quality of service, and financial returns, characterized by (a) low coverage and unreliable service, (b) high levels of unaccounted-for water and unpaid bills, (c) poor financial management, (d) revenues insufficient to cover operations and maintenance costs, and (e) inadequate commercial management (World Bank, 2001; 2004).

Industrial water users are self-supplied industries not connected to a distribution network. Industrialization is certainly much lower in Africa than in other areas of the world, thus the likelihood of using funds from industrial water users is less.

The final institutional source of PWS financing is general tax revenues, which are much less than in other parts of the world. For example, compared with Latin America, Africa has smaller government budgets (just over half), larger populations (almost double), higher levels of poverty (more than three times higher), and higher rates of government expenditures expressed as a percentage of gross domestic product (GDP), despite the African GDP being much lower. All of these observations imply that Africa has much less capacity than Latin America for drawing on tax revenues to fund PWS programs.

Getting African water users to pay for hydrologic services is made difficult by high levels of poverty. Thirty-four of the 49 least developed countries are African (FAO, 2005). On the other hand, poverty also makes the required payments for PWS lower in Africa than in other parts of the world, for African suppliers' opportunity costs are lower. However, the high-profile development goal to increase Africans' access to safe drinking water makes it politically more difficult to insist that water users pay a higher fee. Even in South Africa, where the percentage of the population with access to safe water is relatively high by African standards, restricting water access to non-payers is controversial. Because water is a larger portion of their budget, poor residents likely have a much higher price elasticity of demand for water than non-poor residents.

High transaction costs are also barriers to PES development in Africa (Muramira, 2005; Grieg-Gran et al., 2006; Ochieng et al., 2007). Although transaction costs are a problem in all nations (Bellagio Group, 2007), there are reasons to believe that PWS schemes in Africa may be particularly affected by such costs.

Land ownership is much more concentrated in Latin America than in Africa (Lastarria-Cornhiel et al., 1999). Thus in Latin America, PWS schemes are more likely to contract with a smaller number of large landowners, whereas in Africa, they must contract with many small land users/owners. Note that the less concentrated distribution of land in Africa also implies that, should a PWS be feasible, it is more likely to be pro-poor than in Latin America. A PWS scheme is a contract, thus the factors typically identified as curtailing business activity apply to PWS development: regulatory environment, rates of literacy, judicial system, availability of information, trust, and corruption. This is an issue because 25 of the 64 most corrupt nations in the world (Transparency International, 2006) are in Sub-Saharan Africa.

The African land tenure situation is an important barrier to PES development (e.g., Muramira, 2005; Mwangi and Mutunga, 2005; Ochieng et al., 2007). A review of global tenure trends (Lastarria-Cornhiel et al., 1999) indicated that most land in Africa is held under customary tenure that provides access to all recognized members of the community. Thus, PWS schemes in Africa frequently must address multiple sources of formal and informal authority over a given tract.

Customary tenure systems in Africa generally do not permit land sales, particularly to people outside the community. Even leasing can be complicated by tenure insecurity (i.e., someone leasing land could gain rights over it), which makes rental rates higher than they normally would be (Lastarria-Cornhiel et al., 1999). Thus PWS programs, which typically contract for actions that curtail access and use to land, may be more difficult in Africa.

Given the likelihood of multiple property claims, payments in Africa are more likely to be at the community level than the household level. Although there are examples of community-based revenue sharing schemes (e.g., CAMPFIRE in Zimbabwe) and community-based PES (e.g., Nhambita

Community Carbon Project in Mozambique), not all African nations recognize customary tenure or communities (villages, village councils) as autonomous legal entities, particularly when the property in question is "wild" forests or wetlands. Even when such tenure systems and local institutions are recognized, designing a community-based contract that induces the required individual behaviors is much more difficult than in situations involving single owners with secure property rights.

Reports on PES related to Africa (Waage et al., 2005; Muramira, 2005; Mwangi and Mutunga, 2005; Scurrah-Ehrhart, 2006) argue that a key constraint is the lack of enabling legal, regulatory, and administration elements. Nations in which there is some PES activity (Uganda, Kenya, and South Africa) have some enabling legislation (Ruhweza and Muhumure, 2005).

In some cases, there may be legislation that explicitly forbids PWS-related activity. For example, South Africa's National Water Act prohibits some activities for which someone might want to make a payment, such as removal of vegetation from a riparian zone or stopping agriculture in a riparian zone (King et al., 2005). In other cases, authority over water and land use may be too decentralized to allow for effective coordination across a catchment (e.g., if water users' associations are defined at the sub-catchment level).

However, no clear case for the lack of enabling legislation being an important barrier to PWS development has been made. In many African nations, there is legislation for channeling user fees (called abstraction fees) to watershed management. There may be weaknesses in the systems (Scurrah-Ehrhart, 2006) and an unwillingness to charge such fees, but the authority to do so exists in many African nations. Indeed, the summary of the East African and South African PES inventories (Katoomba Group, 2006) identifies the lack of supporting legislation as a barrier but notes that "in most countries, policies establishing the right to buy and sell ecosystem stewardship services have not been essential for pilot activity in PES."

A report summarizing PES inventories for East Africa and South Africa (Katoomba Group, 2006) reported that most African countries lacked needed institutional capacity (e.g., certification bodies, financial intermediaries, national registries for ecosystem services, water management agencies, technical capacity) to facilitate PES, and this increases transaction costs.

Lack of awareness of PES and the capacity to design and implement PES schemes have also been identified as critical barriers to PES development in Africa (Muramira, 2005; Mwangi and Mutunga, 2005; Katoomba Group, 2006; Ochieng et al., 2006). The concept of PWS schemes is relatively new and, given the constraints on information transmission in Africa, one would expect PWS development to be slower than in other parts of the world.

PWS insights from South Africa. Given the barriers to the development of PWS listed above, it should come as no surprise that the majority of African PWS activity is taking place in South Africa. Relative to the rest of Sub-Saharan Africa, South Africa has a better business climate, higher income levels, greater scientific capacity, better understanding of the nation's hydrology, greater institutional capacity, a stronger national water law that makes provision for the use of economic instruments in water management (Act No. 36 of 1998), and higher rates of access to safe water.

In its two operational PWS programs – Working for Water and Working for Wetlands – South Africa has managed to address the imperative of assisting the poor and circumvent the problems that arise from complex tenure systems. They have done so by adopting a public works program approach that allows targeting of benefits to the disadvantaged and avoids contracting with land users (i.e., focuses on government lands). This approach also leads to broad national support for the programs. Moreover, the

contracts in these programs are for activities for which compliance is relatively easy to monitor (removing invasive plant species on a plot of land or rehabilitating a wetland).

Summary and conclusions. The paucity of on-the-ground PWS initiatives precludes a definitive discussion of an African PWS model or regional PWS trends in Africa. Nevertheless, there are some common elements of existing and proposed African PWS initiatives. First, and most importantly, poverty alleviation and equitable wealth distribution are key objectives in most African PWS projects. In Africa, poverty alleviation and services are viewed as equally valued joint products of PWS schemes, or the provision of watershed services is viewed as merely a co-benefit of the poverty alleviation scheme (e.g., Working for Water Program). The implied social targeting that comes with a focus on poverty alleviation will likely increase the transaction costs and decrease the level of watershed services provided by PWS in Africa. The appeal of a PWS scheme that provides employment benefits may explain the African interest in the potential role of PES to restore degraded ecosystems (Ruhweza and Muhumure, 2005).

The two existing PWS programs in South Africa depend on general tax revenues for financing. The choice of such financing stems from a strong program emphasis on economic empowerment and poverty alleviation rather than ecosystem services, and from the political controversy associated with raising water prices in a poor nation. The planned programs in Africa are hopeful for financing from water users, but none have secured such a funding source. South Africa's WfW program shows that the dichotomy some PWS proponents make between public payment schemes and self-organized private deals is not a strict one: The government can maintain an institutional infrastructure through which individual beneficiaries of ecosystem services (e.g., private companies) can make their payments to service suppliers.

Another argument frequently made in the PES gray literature and presentations is that tax-financed PWS programs are inherently less cost-effective than private payment programs. However, given that most water and hydroelectricity suppliers in Africa are government-run or regulated private entities, there is no reason to believe they will be any more cost-effective. Even when the buyer is a private enterprise, the fact that many such entities engage in these deals for reasons of corporate social responsibility and reputation also suggests that they may be no more cost-effective than tax-financed initiatives.

In conclusion, for all of the reasons discussed above, there will likely be fewer PWS schemes in Africa than elsewhere. However, these barriers to PWS development do not imply there are no opportunities for PWS. There are already a couple of large-scale initiatives and a number of incipient initiatives that may succeed in establishing PWS schemes. Further experimentation and information-sharing over the next five years should offer a clearer picture of the potential for PWS to achieve environmental and social objectives on the African continent.

Summary and conclusions

Payments for watershed services and PES programs in general are being promoted as an alternative to standard conservation programs in some circumstances. The hope with PES is that it will provide new revenue streams for protection of environmental services and that, through the use of market mechanisms, it will be more effective in achieving environmental goals. True PES programs as defined by the PES researchers involve:

1) A well-defined environmental service or a suitable proxy for this service;
2) At least one buyer of this service or proxy;
3) At least one seller;
4) Voluntary transactions between buyer(s) and seller(s); and

5) Payments conditional on contracted environmental services or proxies for same actually being supplied.

Also, poverty alleviation is commonly added as an objective by many development practitioners. PWS and PES programs featuring all five PES characteristics are exceedingly rare in the developing world. Most PES activities reviewed were actually proposals or scoping/research studies, and a significant number of proposed PES schemes had been abandoned, although new proposals have correspondingly emerged. Most PES programs reviewed did not satisfy all five PES criteria. Poverty alleviation was often an additional stated goal. PWS and PES programs are the most advanced in Latin America and the least advanced in Africa, which has only two watershed service programs with PES-like elements. Identified factors that tended to promote successful PES programs included secure land tenure; technical capacity to design and manage programs, including layering financial and non-financial incentives; the presence of fair brokers acting as intermediaries between buyers and sellers; higher standards of living; countries with high urban populations and a need for improved water resources; countries in which commercializing rights to land management is culturally and politically acceptable; countries with PES-enabling legislation; and countries with good governance. These factors are generally most positive in Latin America and least positive in Africa.

For more information on the state of PWS/PES in Africa, Asia, and Latin America, the reader is referred to Ferraro (2007), Huang and Upadhyaya (2007), and Southgate and Wunder (2007), respectively.

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This publication was made possible by the United States Agency for International Development and the generous support of the American people for the Sustainable Agriculture and Natural Resource Management Collaborative Research Support Program. The SANREM CRSP, based at Virginia Tech, operates under Cooperative Agreement No. EPP-A-00-04-00013-00.

Global Assessment of Best Practices in Payments for Ecosystem Services Programs

This work was supported at Virginia Tech through USAID Associate Award EPA-A-00-06-00004-00. This work also was supported by USAID through grant LAG-A-00-96-90016-00 to the BASIS CRSP, based at the University of Wisconsin at Madison.

THIS WORK IS INTENDED TO BE A LIVING DOCUMENT THAT WILL BE PERIODICALLY UPDATED AND EDITED. *Updates will be available from the project website. For more information or to send suggestions for changes and additions, see http://www.oired.vt.edu/sanremcrsp/pes or contact Colby at mcolby@usaid.gov*