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Rewarding the upland poor for saving the commons? Evidence from Southeast Asia

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The Southeast Asian uplands provide livelihood opportunities for more than 100 million people. Many of these are poor smallholder farmers who are economically, socially and politically marginalized, suffer from tenure insecurity and have few options other than drawing on the uplands' natural resources to sustain their living. Forest conversion, inappropriate land use practices and timber logging by a variety of actors have caused widespread resource degradation problems, such as deforestation, decline of biodiversity, erosion, water pollution, and flooding of downstream areas (often referred to as 'negative externalities' in the economic literature). On the other hand, sustainable resource management practices, such

as community forestry, paddy rice terracing, and in-situ conservation of plant and animal genetic resources through local ecological knowledge, have generated a range of valuable environmental services (or 'positive externalities') that have remained often unnoticed and largely unrewarded by downstream dwellers, urban citizens, national governments, and international donors. These ecological services can be classified into *local or regional commons*[1], such as erosion and flood control, seasonal stream flow regulation, and clean drinking water, and *global commons*, such as carbon sequestration and biodiversity.

Since local and global demand for environmental services provided by upland ecosystems is continuously rising against the background of climate change and increased global ecological vulnerability, public support for conservation programs and for direct payments to land managers maintaining or restoring such services is slowly gaining popularity among national policy-makers and in the international donor community (Landell-Mills and Porras 2002; Tomich et al. 2004; Wunder 2005; Ahlheim and Neef 2006; Heidhues et al. 2006; Smith et al. 2006; Corbera et al. 2007; Hope et al. 2007; Porras et al. 2008; Wunder et al. 2008). Payments for Environmental Services (PES) is an approach that tries to overcome market failures in managing environmental externalities, following Coase's argument that effective legal structures with well-defined and enforceable rights can lead to systems of voluntary contracts that can provide positive externalities or reduce negative ones (cited by Coase 1960; Bulte et al. 2008; Zilberman et al. 2008). Given clearly delineated property rights and low transaction costs, Payments for Environmental Services hold the promise to be more effective in halting environmental degradation in sensitive upland areas than conventional command-and-control approaches that have largely failed in fostering resource conservation, particularly in developing country contexts. Payments for Environmental Services have been defined as voluntary arrangements where well-defined environmental services (ES) are bought by at least one ES buyer who compensates at least one ES provider if the provision of the ES is continuously secured by the latter (Wunder 2005). Bulte et al. (2008) divide Payments for Environmental Services schemes into three broad categories according to their function. The first category is "Payments for pollution control" where the payments serve as a complement or alternative to the "polluter-pays" principle. A typical example in upland watersheds of Southeast Asia would be payments for the provision of improved water quality by upstream farmers who agree to reduce the use of agro-chemicals on their agricultural plots. Downstream residents and/or drinking water companies, who benefit from this service, are supposed to pay a regular fee to the upstream service providers (cf. George et al. this issue; Sangkapitux et al. this issue). The second category is "Payments for the conservation of natural resources and ecosystems", for example payments by international donors for the conservation of pristine forest areas in Southeast Asia providing habitats for endangered wildlife species, such

[1] Such local or regional commons are often referred to as 'club goods' (see e.g. Berge 2006).

as tigers or elephants. The final category is "Payments to generate environmental amenities". One example would be a national government (e.g. the Vietnamese government in the hypothetical case of Jourdain et al. this issue) paying upland farmers for setting agricultural land aside to plant trees for carbon sequestration (a global commons) and/or for stabilizing the soil to prevent flooding of downstream areas (a local or regional commons).

While some donors and policy-makers regard Payments for Environmental Services (PES) as the new emerging paradigm in environmental conservation, programs established in Latin America, Africa and Asia have produced mixed results to date. Most pilot schemes are small in size, difficult to manage and involve relatively high transaction costs. Recent scholarly debate has raised particular concerns about how smallholders, the landless poor and other marginalized groups are involved in and affected by PES schemes (Rosales 2003; Grieg-Guan and Bishop 2004; Pagiola et al. 2005; Swallow et al. 2005; Antle and Stoorvogel 2008; Bulte et al. 2008; Porras et al. 2008; Wunder 2008; Zilberman et al. 2008). The question whether such schemes should be seen as an instrument for both environmental protection and poverty alleviation has remained highly controversial. Corbera et al. (2007) stress that PES markets have been created in a very short time and are thus relatively immature which cast doubts on their ability to address local socio-ecological contexts. Recent empirical evidence from Latin American countries – such as Costa Rica and Mexico, where national PES programs have been established – suggests that "inclusion of small farmers is case-specific and happens more by accident than design" (Porras et al. 2008, 4). Some authors have cautioned expectations towards PES as a poverty alleviation tool because of the high transaction costs[2] that are involved when addressing numerous poor smallholders (Pagiola et al. 2005; Wunder 2005; Arifin 2006; Pham et al. 2008). Many studies also show that cash payments are often too insignificant to have a broader impact on poverty alleviation and to provide sufficient incentives for land use changes (Porras et al. 2008; Leimona et al. this issue). In a recent study in Vietnam, government staff expressed their view that poverty alleviation was an issue that needed to be addressed directly rather than through environmental mechanisms (Pham et al. 2008). Jack et al. (2008) state PES policies are most likely to help alleviate poverty when the poorest providers are those with the lowest opportunity costs and highest potential for ecological service provision.

Drawing on welfare-theoretical considerations, Zilberman et al. (2008) argue that poverty impacts of PES schemes depend on a variety of factors, such as category of PES programs (land-diversion vs. working-land programs), distribution of land, land quality, labour markets, and elasticity of food supply. They show that

[2] The major transaction costs involved in PES schemes are (1) costs of gaining information on environmental service providers, (2) costs of negotiating PES contracts and (3) costs of monitoring and enforcement (e.g. Arifin 2006; Bromley 2008; Pham et al. 2008).

land-diversion programs, e.g. setting land aside for reforestation, could benefit the poor when they are owners of land that has low agricultural productivity, but high potential for provision of strongly demanded ecological services. Working-land PES programs, e.g. terracing of sloping land to prevent erosion, could benefit the landless poor through positive effects on labour demand, but such effects may only be temporary unless such improvements result in increased farming profitability. Based on empirical evidence, Wunder (2008) identifies several anti-poor conditions in PES schemes, such as insecure land tenure and high transaction costs on the side of potential buyers when dealing with numerous smallholder service providers. While he concludes that PES often has "point-wise, quantitatively small poverty-reduction effects", he holds that poverty reduction "is an important PES side objective", but that "it should never become the primary goal of PES" (Wunder et al. 2008, 296).

Another element in this debate is whether payments to providers of environmental services should be made in cash or in kind. It is argued that non-financial benefits, such as strengthening of tenure security, increases in human and social capital, and gains in social reputation vis-à-vis downstream dwellers, urban citizens, and/or state resource management agencies are often more important for participants in PES schemes (Porras et al. 2008; Wunder 2008; Leimona et al. this issue). As Swallow et al. (2005, 47) have put it, the most significant benefit of PES models probably lies in "stimulating a change in attitude toward poor smallholders in environmentally sensitive areas: a shift from the state as protector to the smallholder as steward".

Basic prerequisites for payments for environmental services (PES)

In reviewing several studies on PES pilot schemes in various Southeast Asian countries, we have identified three types of prerequisites for functioning PES 'markets' related to (1) identification of a PES market, (2) key processes and relationships, and (3) the institutional environment. Each type of prerequisite has three important elements.

1. Identification of the PES market

There are three basic components that must be clearly identified before a PES scheme can be established: the specific environmental service(s) involved, the potential buyers of the service, and the potential providers of the service.

- *Environmental services to be provided are clearly defined*

In most existing PES schemes the environmental services requested by downstream buyers are (1) provision of reliable water flows and reduced sedimentation, e.g. in the case of hydro-electric facilities in the Philippines, Indonesia and China, and (2) improvement of water quality, e.g. in the case of local water suppliers in Indonesia (Munawir and Vermeulen 2007). In Lao PDR much current debate centres on carbon sequestration and participation in international carbon trade by refraining

from clearing existing forestland. In Indonesia, China and the Philippines, environmental services are mostly provided through tree planting (e.g. Huang and Upadhyaya 2007; Munawir and Vermeulen 2007) or community-based forest conservation schemes (e.g. Wunder 2005), although the causality between tree planting and water supply remains a hotly debated issue often marked by myths and misconceptions (Bruijnzeel 2004; Calder 2004).

Definition of the environmental service also includes identification of feasible means for maintaining and/or improving the service. Flexibility in land use decisions under PES schemes appears to be much higher in Indonesia and the Philippines than in China and Vietnam (Huang and Upadhyaya 2007; Munawir and Vermeulen 2007; Bennet 2008). Farmers in the Brantas catchment, East Java, Indonesia, for instance, have chosen high-income tree crops, while dismissing civil engineering measures, such as terracing, as too costly (Munawir and Vermeulen 2007). In northern Thailand, where PES schemes have only recently entered into conservation policy debates, it is likely that upland farmers would be presented with a set of measures proposed by state land management authorities, such as building check-dams, establishing forest trees and planting of *vetiver* grass (cf. Sangkapitux et al. this issue).

- *Potential buyers of environmental services are aware of the PES concept and willing to pay*

In Indonesia the PES concept has become popularized in recent years through several pilot projects. However, since potential buyers of environmental services are already paying various taxes to national and local government, additional payments are regarded as another unwelcome fee (Munawir and Vermeulen 2007). A recent study in the Philippines found that most potential buyers of environmental services had limited understanding of the PES concept (Villamor et al. 2007). In China and Vietnam, private sector demand for environmental services is still low, but governments may impose obligatory fees for environmental service provision. The Vietnamese Ministry of Agriculture and Rural Development, for instance, started to charge fees from hydro-electricity plants, irrigation projects, water supply works and industrial estates for forest environmental services on a trial basis in Central Highland Lam Dong province and northern mountainous Son La province in 2008. In Thailand, a research project under the Uplands Program has found that urban residents in northern Thailand are willing to pay moderate additional fees for environmental projects in the uplands that would improve tap water quality (Ahlheim et al. 2006).

- *Providers of environmental services are able and willing to cooperate on a voluntary basis*

Most farmers in upland Southeast Asia are smallholders and tend to be among the poorest and most marginalized groups. There has been an intensive debate on whether or not small-scale farmers take a long-term view in their decision-making. Economists have argued that resource-poor farmers are forced to focus

on short-term survival, thus valuing future benefits of long-term investments in soil, water and tree conservation much lower than immediate increases in productivity. On the other hand, there are numerous examples that even resource-poor farmers take a long-term perspective in their decision-making and prospects for receiving payments for investments in environmental services provision may certainly increase their motivation. A major challenge is to design PES schemes that provide sufficient incentives for smallholders to cooperate in an environmental services market (Jourdain et al. this issue; Seeberg-Elverfeldt et al. this issue). Some scholars have expressed doubts whether participation of farmers in countries where governments tend to exercise tight control over natural resources use, such as China, Vietnam and Laos, would be truly voluntary (e.g. Wunder 2005; Huang and Upadhyaya 2007; Bennet 2008; Pham et al. 2008). Reports from Indonesian pilot projects suggest that farmers are concerned that trees planted under PES schemes will ultimately be claimed by the government (Munawir and Vermeulen 2007). Such fears are also widespread in the northern Thai hillsides, where farmers leaving their land fallow for more than three years – thereby allowing trees to re-grow – risk loss of their land rights to the forest department (cf. Neef et al. 2003).

2. PES processes and relationships

Once the PES market components have been identified, key processes and relationships need to be developed with participation of stakeholders. The nature and magnitude of rewards to be provided must be clearly defined and agreed upon, as well as the rules for deciding under what conditions rewards will be paid or denied.

- *Types, forms and levels of rewards are clearly defined and adapted to local contexts*

Most PES schemes in Southeast Asian uplands use cash payments to groups rather than to individual farmers as reward mechanisms (Huang and Upadhyaya 2007). Pilot case studies in both Indonesia and the Philippines conclude that cash payments are not enough to provide sufficient incentives for reliable ES provision and to make a meaningful contribution to poverty alleviation (Munawir and Vermeulen 2007; Huang and Upadhyaya 2007; Leimona et al. this issue). Combining rewards in cash and in kind is often seen as a more attractive reward package. Rewards in kind can include technical training and provision of more secure access to natural resources. When PES rewards are made in kind, however, it may be more difficult to maintain conditionality, particularly when they are provided as a one-off reward.

- *PES mechanisms and payment schemes are transparent and based on conditionality*

One of the key factors that differentiates PES mechanisms from more conventional tax-and-regulate schemes is the element of conditionality, i.e.

providers are only rewarded if the specified environmental service is delivered. In principle, a PES scheme can be established as long as buyers believe that a specified behavioural change by providers will result in improved provision of the specified environmental service, whether or not that may actually be true. When empirical evidence is lacking, however, such perceptions and associated willingness to pay can change rapidly. Thus, at least longer-term viability of PES schemes is enhanced by means to verify and measure links between the actions of environmental service providers and actual delivery of specified environmental services in the form and amount that environmental services buyers need. This has often not been easy. Hard evidence of delivery of watershed services, for example, has proved elusive, and reported impacts of PES-induced land use changes are often based more on local perceptions than on measurements (Porras et al. 2008). Since these conditions can result in divergence of perceptions, they can reduce the credibility and acceptability of decisions about when a reward should be paid or not, and thus undermine the principle of conditionality.

Transparency is a key factor in helping to maintain the credibility of PES mechanisms. Monitoring is one key means for insuring the credibility of links between actions and environmental service provision and thus enabling enforcement of conditionalities. Increased transparency of monitoring processes can be provided by neutral outside parties, or by direct participation of environmental service providers and buyers. In Sumberjaya, for example, local people are measuring sediments in local river water (Porras et al. 2008). In northern Thailand, villagers have demonstrated their ability to use simple science-based tools for monitoring watershed services (Saipothong et al. 2006) that could be used in a PES scheme. A second key aspect of transparency involves processes of paying and distributing PES rewards, where increased transparency improves credibility and trust among participating parties. Finally, transparency is crucial in setting up contractual arrangements between ES buyers and sellers that delineate the nature of activities, obligations, services and rewards as well as appropriate monitoring mechanisms and sanctions in case of default and free-riding.

- *Trust between buyers and sellers of environmental services is established*

Lack of trust between potential buyers and providers of environmental services is probably one of the most constraining factors in setting up viable PES schemes. In a pilot project in the Brantas catchment, Indonesia, the district government did not believe that local people would be able to perform civil engineering works for soil and water conservation and argued that the necessary standards could only be met by professional contractors (Munawir and Vermeulen 2007). Evidence from Thailand suggests that trust levels between potential buyers of environmental services (e.g. water work authorities or drinking water companies) and upstream sellers of environmental services cannot be taken for granted and would need to be gradually built up in the course of designing PES schemes (Sangkapitux et al. this issue). Another often cited problem is that sellers of environmental services

are not treated as equals in PES negotiations and have little influence on decision-making (e.g. Munawir and Vermeulen 2007).

3. Institutional environment of PES

In order for PES markets and associated processes and relationships to develop and function well, there is also a set of prerequisites that relate to the broader institutional environment in which a PES is implemented. Experience has already demonstrated that intermediaries, legal frameworks and property rights are often particularly important.

- *Credible intermediaries facilitate the PES mechanism*

Experienced and reliable intermediary organizations can play a crucial role in facilitating PES designs and negotiations. Evidence from pilot case studies suggests that intermediaries can both reduce and increase transactions costs, depending on experience of agencies, scale of interventions and local contexts. The majority of intermediaries in recent case studies in the Philippines and in Indonesia have been local NGOs and international donors and organizations (Huang and Upadhyaya 2007; Suyanto et al. 2005). Especially in cases where providers of ES are not familiar with formal contracts, where farmers' groups are not formally registered and cannot operate bank accounts (a case reported by Munawir and Vermeulen 2007) or where corporate buyers are not used to negotiate directly with farmers, intermediaries are essential for the success of PES mechanisms. The diversified NGO scene in Thailand could be a major enabling factor for PES schemes in the uplands (cf. George et al. this issue), while in China, Vietnam and Lao PDR, national NGOs still face problems of legal recognition. Recent pilot projects in Northern Thailand suggest that development of local river sub-basin organizations with broad stakeholder participation may provide another useful alternative (Thomas 2005).

- *Supportive legal and regulatory framework is in place*

Many Latin American countries have established national frameworks for PES schemes, which explains some of the success stories reported from countries like Costa Rica and Mexico (Pagiola et al. 2005; Porras et al. 2008). In Southeast Asia, such national frameworks are still lacking. Indonesia is probably the Southeast Asian country with the most conducive legal and regulatory framework for PES schemes. Although policy-makers have not yet come up with a specific framework for PES in Indonesia, "several laws and policies can be interpreted as providing basic rules and incentives" (Munawir and Vermeulen 2007, 15), such as the Water Resources Act, the Environmental Management Act, and the decentralization program kicked off in 2001. Pilot schemes in Vietnam's Son La and Lam Dong province have been backed by the Decision No 380, which provides general guidance for provincial administrations on how to collect fees from hydropower

companies, water companies and tourism businesses, yet fails to address details on how the income from such fees should be distributed (Pham et al. 2008). The least supportive legal framework currently exists probably in Thailand, where the state is still regarded as the major if not sole protector of forest resources in upland areas and neither individual nor communal rights to forest management in sensitive watershed and forest conservation zones are recognized by official law.

- *Well-functioning property rights are defined prior to the introduction of the PES scheme or introduced as part of the PES package*

While current PES arrangements in Latin America tend to regard clearly defined ownership rights as a sine qua non-condition for participation in reward schemes, some pilot projects in the Southeast Asian uplands – where such rights rarely exist – have included more secure individual or communal property rights in the PES portfolio, thereby increasing the likelihood of desirable outcomes of smallholders' natural resource management practices (cf. Porras et al. 2008; Rosales 2003). The land allocation program in Vietnam that included both agricultural and forest land certificates for individual farm households provides a relatively sound basis for the establishment of PES schemes. A RUPES pilot project in Sumberjaya, Indonesia has helped farmer groups to get access to conditional community forestry permits which now cover around 70% of the protection forest in the area (Suyanto 2007). In the northern Thai hillsides, where ethnic minority farmers enjoy neither individual nor communal property rights to land, water and forest resources, the allotment of secure resource tenure rights could be an important incentive to comply with certain environmental regulations (Sangkapitux and Neef 2006). Yet, these rights may need to be attached to certain management practices, as recent studies found that upland farmers with less secure rights appear to adopt environment-friendly practices primarily to gain a reputation as 'conservers of the environment' (Neef 2007; Sangkapitux et al. this issue) and may resort to their former resource-mining practices if unconditional land titles were bestowed on them or if specified conditions are not enforced.

In sum, the jury is still out on the degree to which PES can provide positive and sustainable effects on both environmental conservation and poverty alleviation and promising results from on-going pilot projects in the Southeast Asian uplands still need to stand the test of application on a wider geographical scale and range of conditions. Especially important challenges include identification of buyers of environmental services committed to long-term payments, choice of trustworthy intermediaries, and the economic viability and sustainability of PES schemes beyond the limited duration of donor-funded projects and policy-makers electoral terms.

Additional evidence from Southeast Asia

This special issue provides further evidence from Southeast Asia regarding many of the issues raised above. Evidence is drawn from a set of recent studies conducted

in the Philippines, Indonesia, Vietnam, Thailand, Lao PDR, and Nepal, where uplands have become hotspots of environmental degradation, and deforestation rates range among the highest in the world. Throughout these fragile areas severe problems of soil erosion, soil fertility loss, watershed deterioration and destruction of biodiversity habitats have been reported. Yet, PES schemes are still in their infancy, confined to several pilot schemes in Indonesia, the Philippines and Vietnam and in the stage of pre-appraisal in countries like Thailand and Lao PDR. The successes and failures of these pilot programs will be of pivotal importance for the formulation of national policy agendas and future allocation of funds towards environmental conservation.

The first paper by Alana George and her co-authors assesses the potential and limitations of payments for environmental services to address rapidly deteriorating watershed functions in parts of northern Thailand and northern Lao PDR. Drawing on in-depth surveys in the Mae Thang watershed in Thailand and the Houay Xon watershed in Lao PDR they identify the specific factors that enable or hinder the successful implementation of PES schemes in the two countries' institutional and socio-political context. The most significant finding of this study is that a clear-cut division between providers of ecological services (i.e. potential sellers) and users of such services (i.e. potential buyers) often proves difficult within a local watershed context. At the study site in northern Lao PDR, upstream and downstream communities were found to contribute in equal measure to water pollution, making the establishment of a PES market elusive. At the site in northern Thailand, upstream and downstream stakeholders belonged to the same community. As downstream stakeholders were mostly subsistence-oriented paddy rice farmers, they were not willing to pay compensation for wealthier cash crop farmers in the upstream part of the watershed. Government officials also did not support the idea of paying upland farmers for provision of ecological services as they considered them as illegal occupants, endangering state-managed conservation projects. Both of these case studies raise questions about whether PES assessments at larger scales might be able to identify more promising groups of potential providers and buyers.

Based on an in-depth study in the Mae Sa watershed in northern Thailand, Chapika Sangkapitux and her colleagues attempt to determine willingness of upstream resource managers to accept compensation for changing their agricultural practices towards more environment-friendly practices, thus contributing to an improvement of water quantity and quality for downstream resource managers who need water for both agricultural purposes and household consumption. Downstream willingness to pay for such improvements was also assessed. The authors applied choice experiments for both stakeholder groups. Downstream farmers in the Mae Sa watershed were willing to contribute around 1% of their annual income for an improvement of water resources through changes in upstream land management. Results also suggest that a high share of non-farm income negatively affects willingness to pay, which is of major significance for

the design of future PES schemes, given the decreasing contribution of agriculture to rural people's income in less remote areas. Another finding of this study was that the poorer groups among the upstream resource managers were more likely to engage in compensation schemes for ecological services, because payments would provide a rather secure and regular benefit stream and the establishment of such schemes are likely to improve their tenure security in this protected watershed area.

The paper by Damien Jourdain and his co-authors shifts the focus to northern Vietnam and the poorest groups in upper catchment areas, managing small rainfed areas with limited access to markets. By applying a recursive dynamic land use decision model, the authors scrutinize the potential response of these shifting cultivators to a PES scheme that would compensate them for setting aside part of their land for the provision of ecological services. The modelling results suggest that these marginalized smallholders are not likely to participate in a voluntary PES program that would reduce available land for agricultural production unless they receive in-kind compensation for foregone food production or get access to productivity-enhancing technologies on the remaining land. The model also predicts that a non-voluntary land retirement program would generate an overall negative impact on both poverty alleviation and environmental protection.

In their comparative study on the impact of various reward schemes for environmental services on the upland poor in the Philippines, Indonesia and Nepal, Beria Leimona and her colleagues apply an innovative methodical mix of quantitative and qualitative tools. In the quantitative part they model the potential of a reward scheme based exclusively on cash payments and determine the necessary downstream–upstream ratios of population density, income per capita, and area coverage that would be necessary to make a substantial contribution to poverty alleviation. The results confirm the authors' proposition that only under specific circumstances cash payments as stand-alone measures will help reduce upland poverty through PES mechanisms. In the qualitative part of their study, the authors attempt to capture local stakeholders' perspectives on factors contributing to poverty and on constraints for implementing PES schemes. They also elicit local preferences for various types of environmental service rewards. The findings from focus group discussions at the different sites suggest that there is a substantial variation among communities concerning poverty concepts and reward preferences, which provides important insights into the various dimensions that well-targeted reward schemes need to address.

The final paper by Christina Seeberg-Elverfeldt and her co-authors addresses the potential impact of payments for carbon sequestration on cacao-based agroforestry systems in Sulawesi, Indonesia. The authors use a comparative static linear programming model to explore *ex ante* the adjustments in resource allocation and land use changes that are likely to occur when compensation payments are provided for adopting or maintaining low-intensity, shade-grown cacao-production systems that are considered more sustainable in ecological terms than highly intensified

systems where all forest trees have been removed. The authors also applied the model to determine the minimum prices in carbon markets that are needed to stop deforestation activities by individual farm households at the forest margins of the Lore Lindu National Park. These results are particularly relevant for Clean Development Mechanism measures under the Kyoto protocol framework and the future of REDD (Reducing Emissions from Deforestation and Forest Degradation) in a post-2012 climate agreement. The authors conclude that poorer, indigenous farm households are more likely to benefit from carbon payments than better-off migrants and that both deforestation processes and poverty could be reduced if well targeted carbon payment schemes can be put in place.

As evidence in these papers indicates, further development, testing and refinement of viable, effective and sustainable PES mechanisms in the context of the diverse conditions found in Southeast Asia will be a complex and long-term process. As in many of the PES studies reported in the literature thus far, most of the case studies providing evidence presented in this special feature were undertaken in the context of various types of on-going projects. This approach often imposes some limits on the nature of the research, and on abilities to generalize various types of findings to broader regional conditions. Yet these papers also provide examples of some of the important contributions such case studies can make to the overall body of knowledge needed to better inform national and international policy agendas, where measures to improve environmental services that are part of both local commons and global commons are being viewed with a growing sense of urgency.

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