OCCASIONAL PAPER

Payments for forest environmental services in Vietnam

From policy to practice

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Occasional Paper 93

ISBN 978-602-1504-10-9

Pham TT, Bennet K, Vu TP, Brunner J, Le ND and Nguyen DT. 2013. *Payments for forest environmental services in Vietnam: From policy to practice*. Occasional Paper 93. Bogor, Indonesia: CIFOR.

Photo by Karen Bennett/USDA Forest Service
Land uses in Son La Province, Vietnam.

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Abbreviations

3Es	Effectiveness, Efficiency, Equity
AR-CDM	Afforestation and Reforestation Clean Development Mechanism
CIFOR	Center for International Forestry Research
CPC	Commune People's Committee
CSO	Civil Society Organization
DARD	Department of Agriculture and Rural Development
DoNRE	Department of Natural Resources and Environment
EVN	Electricity of Vietnam
ES	Environmental Service
FPDF	Forest Protection and Development Fund (provincial level)
FIPI	Forest Inventory and Planning Institute
GDP	Gross Domestic Product
GIZ	German Agency for International Cooperation
IFAD	International Fund for Agricultural Development
IUCN	International Union for Conservation of Nature
MARD	Ministry of Agriculture and Rural Development
MoNRE	Ministry of Natural Resources and Environment
NGO	Nongovernmental Organization
PES	Payment for Environmental Services (general)
PFES	Payment for Forest Environmental Services (Vietnam)
PPC	Provincial People's Committee
PRA	Participatory Rural Appraisal
REDD+	Reducing Emissions from Deforestation and forest Degradation and enhancing forest carbon stocks
SWOT	Strengths, Weaknesses, Opportunities and Threats
USAID	United States Agency for International Development
VND	Vietnam Dong
VNFF	Vietnam National Forest Protection and Development Fund
VNFOREST	Vietnam Administration of Forestry

Acknowledgments

Many people were involved in this work, without whose support the study could not have been completed.

This work forms part of the policy component of CIFOR's Global Comparative Study on REDD+ (http://www.forestsclimatechange.org/global-comparative-study-on-redd.html), led by Maria Brockhaus. The methods and guidelines used in this research component were designed by Maria Brockhaus, Monica Di Gregorio and Sheila Wertz-Kanounnikoff. A large number of people contributed to the Vietnam country case study, including the media analysis, policy network analysis and country profile, and supported the data analysis. Data were collected and analyzed by various teams, in collaboration with the country case study leader (Pham Thu Thuy). In particular, we thank Nguyen Tuan Viet and Bui Thi Minh Nguyet.

We would like to express our special thanks to Associate Prof. Dr. Nguyen Ba Ngai and Pham Hong Luong (Vietnam Forest Protection and Development Fund, Ministry of Agriculture and Rural Development) for their kind support and guidance during the study. We are also indebted to Luong Thai Hung and Le Manh Thang (Son La Forest Protection and Development Fund), Vo Dinh Tho, Vo Minh Tham, Tran Van Ke and Pham Van An (Lam Dong Forest Protection and Development Fund), Nguyen Viet Cach (Xuan Thuy National Park) and Vu Quoc Anh (Oxfam Hong Kong) for their support during our field trips to Lam Dong, Son La, Nam Dinh and Dak Nong Provinces.

Our study has benefited greatly from input and timely support from Patrick Smith (USAID Vietnam), Barry Flaming (USAID Regional Development Mission for Asia), Rosario Calderon and Tran Chinh Khuong (USAID Mission in Vietnam), Peter Kanowski (CIFOR), Maria Brockhaus (CIFOR), Terry Sunderland (CIFOR), Cecilia Luttrell (CIFOR) and Darcy Nelson (US Forest Service), as well as many others.

Special thanks are due to Akiko Inoguchi (FAO Vietnam), Eiji Egashira (Japan International Cooperation Agency), Pham Hong Luong (Vietnam Forest Protection and Development Fund), Dam Viet Bac and Do Trong Hoan (World Agroforestry Centre), Dang Thuy Nga (Winrock International), To Xuan Phuc (Forest Trends) and Daniel Murdiyarso (CIFOR) for their valuable feedback on this paper, which enabled us to improve it considerably.

We are also grateful to Lauren Sorkin (Asian Development Bank), Eiji Egashira (JICA) and Pham Thanh Nam (SNV) for their use of field data, GIS and satellite for forest inventory monitoring and their willingness to coordinate methodologies, and to Ho Manh Tuong (FIPI) for sharing information on the National Forest Inventory. Special thanks are also sent to Imogen Badgery-Parker for her excellent job editing the paper; and CIFOR's Communication Unit for bringing the manuscript to life.

We thank all the workshop participants and key informants who gave up their time to participate in our study. They brought to this study their extensive knowledge on and experience in payments for environmental services in Vietnam.

We gratefully acknowledge the support received from the US Agency for International Development, the US Forest Service, Norwegian Agency for Development Cooperation and the Australian Agency for International Development.

Executive summary

The basic idea of "payments for environmental services", or PES, is to create incentives for individuals and communities to protect environmental services by compensating them for any costs incurred in managing and providing those services. In 2004, the government of Vietnam, drawing on the concept of PES, laid the foundations for a nationwide program of Payments for Forest Environmental Services (PFES), set out in the revised Forest Protection and Development Law. In 2008, Decision No. 380 established conditions to support PFES pilot projects in Lam Dong and Son La Provinces, and in 2010, Decree No. 99 mandated the implementation of PFES nationwide from 1 January 2011. Vietnam is the first country in Asia to initiate a nationwide PFES scheme.

The goals of the PFES program in Vietnam are to improve forest quality and quantity, increase the forestry sector's contribution to the national economy, reduce the state's financial burden for forest protection and management, and improve social well-being. To date, however, there has been no comprehensive review or analysis of the program or of its progress toward achieving these goals.

This study assesses the implementation of PFES since 2008 with the aim of providing policy makers with practical policy recommendations for achieving effective, efficient and equitable outcomes. We focus on the following three aspects of PFES: (1) institutional setting (rules of the game and organizational arrangements); (2) benefit-sharing mechanisms (distribution of payments among suppliers and participation in processes); and (3) monitoring and evaluation (monitoring of environmental services, contracts, financial flows and social impacts).

First, a review of the literature was undertaken to understand the institutional setting and the state of PFES implementation in Vietnam and to identify lessons learned from past experiences, both in Vietnam (in relation to PFES) and in other countries (in relation to PES more generally).

Then, 210 semi-structured interviews were conducted with representatives of central and local authorities, research institutions, donor agencies, nongovernmental organizations (NGOs), civil society organizations (CSOs), and buyers and suppliers of environmental services. Case studies in Bac Kan, Son La, Hoa Binh, Nha Trang, Nam Dinh, Thua Thien Hue, Quang Nam, Dak Nong and Lam Dong Provinces were used to identify key lessons. In addition, two technical seminars were held to elicit comments from experts and policy makers on the findings of this review.

Major achievements of Vietnam's PFES program

The government of Vietnam has made a strong commitment to PFES. Twenty legal instruments — Decrees, Prime Ministerial Decisions and Circulars — form the legal basis for PFES implementation. Of the four environmental services listed in Decree 99 (see below), the PFES program for watershed protection services has the most advanced legal setting and offers the most useful lessons.

The operation of PFES relies heavily on Forest Protection and Development Funds (FPDFs), established at both central and provincial levels. As of December 2012, 35 out of the 63 provinces in the country had established a steering committee to oversee the implementation of PFES, in accordance with legal requirements; 27 of those provinces are also managing a provincial FPDF. With this government support, PFES implementation (2009–2012) has resulted in stronger capacity of government agencies and greater public awareness of the role of forest and forest protection and development and generated total revenue of VND 1,782 billion (about USD 85 million); of this sum, payments from hydropower plants account for nearly 98%, water companies for about 2% and tourism for 0.1%. Overall, PFES revenue represents 0.8% of the national forestry budget.

Key findings on the institutional setting

A general legal framework is in place

Since 2008, the national legal framework for PFES, the institutional setting, organizational arrangements, and contractual and financial management regimes of the program have been refined through 20 legal instruments issued at different levels of government (four Decrees and Prime Ministerial Decisions, 16 Decisions and Circulars). Five legal instruments provide guidance on the establishment, organization and management of FPDFs at national and provincial levels, and 11 provide general guidance on payments for watershed protection and landscape beauty services.

Provincial FPDFs dominate the institutional setting for PFES. Provincial FPDFs sign contracts with buyers of environmental services and collect payments. They also prepare payment plans, monitor and release payments to service suppliers, and submit periodic reports to the central Forest Protection and Development Fund. Service suppliers are individuals, households, communities or organizations that have been verified by the provincial FPDF as having land-use-right certificates. Buyers, as defined in Decree 99, are water supply companies, hydropower plants and tourism companies; however, all of these can pass on their PFES fees to end users (the public).

Only two of the four officially targeted environmental services are subject to payments because institutional arrangements and clear guidance are lacking

Following are the four environmental services set out in Decree 99:

1. watershed protection (including soil protection; reduction of erosion and sedimentation of reservoirs, rivers and streams; watershed protection; and regulation and maintenance of water sources for production and people's daily needs)
2. protection of natural landscape beauty and conservation of biodiversity of forest ecosystems for tourism services
3. forest carbon sequestration and retention, reduction of greenhouse gas emissions through prevention of forest degradation and loss, and forest sustainable development (carbon sequestration)
4. provision of spawning grounds, sources of feeds and natural seeds, and use of water from forest for aquaculture.

Vietnam's Ministry of Agriculture and Rural Development (MARD), which is responsible for implementing PFES, has issued clear guidelines and procedures for the implementation of watershed protection and landscape beauty services only. Buyers of these services must pay a fixed payment, of 20 VND/kWh produced for hydropower plants, 40 VND/m^3 of clean water produced for water supply companies and 1–2% of gross revenue for ecotourism companies. To calculate the per-hectare payment received by service suppliers, the sum after the management fee (10% of total gross revenue) and reserve fund contribution (5%) have been deducted is divided by the number of hectares in the forest area under contract to provide environmental services.

Although the program is underway for the landscape beauty and biodiversity service to some extent, tourism PFES is difficult to apply and controversial because of the wide range of stakeholders, types of operations and complicated supplier–broker–buyer relationship. Persevering with developing compliance mechanisms and protocols for bringing this environmental service fully into the program could be rewarded by substantial revenues, which could then be used to support the maintenance of landscape beauty and biodiversity across the country. To date, challenges with implementation include the following:

- Buyers do not fully appreciate how landscape beauty contributes to their business.
- The willingness to pay of buyers of environmental services in the tourism industry differs according to their turnover (the higher the revenue, the higher the willingness to pay).
- It is unclear which sectors in the tourism industry should be paying for the service. Collecting PFES fees from some commercial tourism companies is difficult because they wield considerable political power, which enables them to lobby local authorities so they can avoid paying the fee, and because their accounting systems tend to lack transparency (e.g., unclear bookkeeping, no public disclosure of the revenues of large companies, no bookkeeping by smaller enterprises such as homestay accommodations).
- There are wide discrepancies in the payment calculations; for example, some are calculated based on revenue from entrance fees whereas others are based on overall revenue.

Although many donor-supported pilot activities related to the other two services, carbon sequestration (e.g., UN-REDD program in Lam Dong and Lowering Emissions in Asia's Forests Program funded by USAID in Nghe An Provinces) and spawning and aquaculture (e.g., Xuan Thuy National Park, Ben Tre Province), are underway, it is too soon to obtain clear results. MARD has suggested to the Prime Minister that these pilot activities continue for another 2–3 years so that the results can inform the design of formal procedures and steps to apply the PFES scheme nationally for these environmental services.

Forest carbon sequestration services are tied in with reducing emissions from deforestation and forest degradation and enhancing forest carbon stocks (REDD+), for which the government has approved a national action plan as the basis for reducing greenhouse gas emissions from forestry. In addition, with the support of the UN-REDD Programme, Vietnam has completed the first phase of REDD+ ("readiness") and is moving into the REDD+ pilot phase (2013–2016), during which the criteria and payment scheme for carbon sequestration will be tested, with the results to be used to inform the development of legal frameworks for payments for this service. MARD has not yet determined how best to link PFES and REDD+ and is assessing various mechanisms for beginning payments for carbon sequestration services. For this reason, this paper does not discuss REDD+ specifically but rather draws on lessons from pilot projects where applicable. Results on PFES payments for spawning and aquaculture services are still pending, as MARD, with support from GIZ (German Agency for International Cooperation), IUCN (International Union for Conservation of Nature) and CIFOR (Center for International Forestry Research), is testing various policy options, including payments based on revenue, benefits, forest area or water volume; fixed payments; and certification-based payments. These options are assessed in this paper to provide suggestions for PFES schemes.

The average disbursement rate of PFES revenues is low

Overall, FPDFs have disbursed to service suppliers only 46% of the total revenues collected to date. This low disbursement rate has been attributed to the following factors: incomplete forest inventory, the slow process of land allocation, the large numbers of individual suppliers of environmental services (who are often scattered and in geographically isolated areas), weak technical and financial capacity at both central and local levels, and weak coordination among agencies. Prioritizing technical support for improving data on forest areas, forest quality and legal forest managers is a necessary step for the efficient and effective implementation of PFES. Stakeholders in the PFES scheme would also benefit from training that explains the benefits of forest protection and reveals the potential value of PFES payments for improving their livelihoods. Additional guidance on how to use undisbursed PFES funds and systematic internal or third-party monitoring of financial transactions might help to accelerate the disbursement rate.

Transaction costs are high

Transaction costs tend to be high because of the large number of forest owners, the complexity of administrative structures, the limited capacity of public servants, conflicts of interest, and weak coordination and information sharing between and within government agencies. One option for reducing transaction costs would be to group individual households in a region. Engaging banks might be of value in areas with high population density, although working with the Social Policy Bank in Son La Province was not effective because individual service suppliers were scattered, bank staff visited suppliers infrequently and payments were small. Use of mobile phone technologies could also be considered in regions with high population density.

Local communities have become discouraged about forest protection and development because they do not have legal status to enter into PFES agreements

Under Decree 99, only those with a land title, whether households, communities, state-owned companies or private companies, are eligible to receive PFES payments. The legal status of communities has varied over time: the 2004 Forest Protection and Development Law states that communities are legal subjects that can manage and protect forests, whereas under the 2005 Civil Code, communities are not considered legal entities that can enter into civil contracts. One option would be to require communities to register as a "Forest Cooperative", as occurred in a case in Thai Nguyen Province.

Buyers and suppliers are not well defined

The PFES system does not clearly define what is a "buyer" or a "seller". Buyers, which according to Decree 99 are water supply companies and hydropower plants, actually simply pass their PFES costs on to the end user. The companies, therefore, are effectively brokers and the public are the real buyers in the PFES system, although they are unaware of this fact. As water supply companies and hydropower plants do benefit from the protection of forests and watershed protection, especially from less sedimentation in their reservoirs, they should be expected to pay for these environmental services as a cost of doing business. Identifying buyers, raising awareness among the public and buyers of how PFES can benefit their health and welfare, and inviting buyers to participate in the development of PFES could all help strengthen the program.

In many cases, such as national parks and the service of landscape beauty and biodiversity conservation, buyers are also suppliers; this complicates the PFES scheme. Although both commercial tourism companies and national park and protected area authorities are carrying out tourism-related enterprises, the debate on tourism PFES at the central level is limited to national parks and protected areas, which are important for tourism PFES. The role of protected area and national park authorities in the payment process is unclear and can vary, depending on how the PFES scheme is set up. National park and protected area authorities and forest organizations are established in law as forest managers; as such, they are seen of a type of supplier of environmental services and are entitled to receive PFES payments. At the same time, they derive benefits from running tourism activities, which makes also them buyers of environmental services. In addition, as they often contract households to protect forests, they also function as intermediaries or brokers, channeling PFES payments to forest managers; fulfilling this intermediary role entitles a park to keep 10% of the PFES payment to cover its management costs. It is therefore important to balance the benefits that national parks gain for the services they sell with the payments they should be entitled to receive as suppliers of an environmental service.

In all cases, buyers, sellers and brokers should be exchanging information regularly to ensure transparency of the system. Developing an information-sharing system is essential to connect PFES suppliers and buyers and ensure full community engagement in the program.

Private sector buyers are at a disadvantage compared with state-owned companies

When Decree 99 was passed in 2010, private hydroelectric plants were already under contract with Vietnam's national electricity company to supply electricity at fixed rates. As a result, they were not allowed to pass on their PFES fees to end users, as state-owned companies could. Although this issue was resolved in 2012, it remains unclear whether or by what mechanism private companies will be compensated for the PFES fees they absorbed into their business costs in 2010–2011. Similarly, many water supply companies and tourism companies cannot pass on the PFES fees to end users. As a result, private companies have different cost burdens.

PFES in Vietnam may not be a true PES scheme — but does that matter?

PFES schemes in Vietnam deviate from classic definitions of PES in that the level of payment is set by the government rather than being a voluntary transaction between buyers and suppliers; as such, PFES payments effectively function as a water and electricity use fee or tax. However, the discussion should focus not on whether PFES policies in Vietnam are truly "PES" but rather on whether Vietnam's PFES policies have a clear and coherent legal framework that can ensure good governance and effectiveness, efficiency and equity in public PFES schemes.

Key findings on benefit sharing

The level of PFES payments is low but opportunity costs are high

A recurring threat to the PFES scheme for watershed protection services is the high opportunity costs of converting forest to other land uses. PFES payments are too small to cover the forgone economic gains from clearing forest, specifically conversion to maize or coffee or of

mangrove forests to shrimp farms. However, PFES alone cannot solve all problems. One option could be to combine PFES with other forestry or economic support programs to channel more sources of funding for forest protection initiatives. Combining direct cash payments with nonmonetary program benefits, such as increased education and capacity building in communities or initiating programs that could alleviate poverty over the long term, may increase community commitment to PFES, even in the case of low payment levels.

Trade-offs between effectiveness, efficiency and equity are necessary

The present benefit-sharing mechanism is designed to meet local expectations and ideas of equity, namely that everyone should be paid the same regardless of their legal, social or economic status and regardless of the condition of the forest they are paid to conserve. To this end, the system does not account for forest quality (K factor). However, this approach does not create incentives to protect the forest or enhance its quality, which renders it ineffective. In addition, each household receives only a small PFES payment because they manage only a small area of forest (as seen in Son La), which renders the program inefficient. Accounting for forest quality and using group contracts (see point above on transaction costs) rather than individual contracts would improve program effectiveness and efficiency.

PFES payments are calculated at a per-hectare rate: the total PFES fee paid by buyers of environmental services (after management fees and the reserve fund contribution are deducted) is divided by the total area of forest protected (in hectares). Using this method of calculation, watersheds with a higher percentage of forest area receive a smaller PFES payment per hectare, and watersheds with a lower percentage of forest area receive a larger PFES payment per hectare. Although the larger payments create a greater incentive for forest protection in areas with less forest, the smaller payments stimulate land conversion in areas with more forest. Either way, buyers of environmental services gain little value from PFES because they pay the same rate regardless of the condition of the watershed. This finding suggests that PFES could be combined with other conservation programs to enhance overall watershed protection. Some of the policy options worth considering are as follows:

- Evaluate the payment rates for buyers, and compare the current fixed rate with an adjustable rate based on a percentage of the revenue earned from the supply of power or water (similar to the approach used in charging tourism companies).
- Determine whether payment rates should be based on the percentage of watershed that is forested.
- Direct PFES funding to key areas that supply specific environmental services. For example, forests adjacent to streams could receive a higher level of payment for watershed protection than forests at a greater distance, or forests with high biodiversity value could receive a higher level of payment for landscape beauty and biodiversity services than forest areas that do not supply these services.
- Use some of the fees collected, or pair PFES with other government programs, to improve the overall health of watersheds, for example by restoring forests or applying soil and water best management practices in other land uses to reduce erosion and sedimentation.

Lack of detailed guidelines on how to use the money received from PFES can open the way for corruption in villages and communities

There is little guidance on how provincial FPDFs, communities or village management boards can spend PFES revenue, and suppliers of environmental services are not included in spending decisions. The lack of any oversight mechanism in villages and communities makes it possible for local authorities to misuse PFES revenues. A model of a multi-stakeholder trust fund, with representatives of buyers, suppliers, NGOs, academia and government agencies, was trialed in Hoa Binh and a cooperative model was tested in Thai Nguyen. These models earned the trust of both buyers and suppliers of environmental services, and should be used in the PFES program across the country. In most cases, suppliers of environmental services have expressed a preference for both cash and in-kind payments, such as education and capacity building. In some cases, the Commune People's Committee (CPC) has taught villagers ways to maximize their payments and use them to improve their socioeconomic

conditions. Suppliers of environmental services thus require assistance in optimizing the use of their PFES money, although any guidelines should be flexible enough to allow suppliers to adapt them to their local context and employ a multi-stakeholder decision-making panel.

Key findings on monitoring and evaluation

The PFES program does not include a clear monitoring and evaluation system

Most of the policy guidelines on PFES focus on the institutional setting, the operation of the FPDFs and financial reporting, but the government has provided no clear direction on monitoring and evaluation. The current guidelines are highly ambiguous, so local authorities may either interpret them too freely or resist doing anything out of fear of making mistakes. Monitoring and evaluation programs could range from simple to sophisticated, depending on the financial and technical capacity of the particular provincial FPDF. A simple monitoring design might be appropriate initially, looking only at the inputs and on self-reporting. By the fifth year of a program, however, monitoring activities should be well documented and sufficient to demonstrate any progress toward achieving positive socioeconomic and environmental outcomes. A monitoring program should cover baseline setting, monitoring of PFES program inputs and setting target outcomes. A key component of any monitoring and evaluation system is to use information gained through open dialogue and feedback from stakeholders to continually refine the process and improve both the policy and delivery system to achieve the desired outcomes.

No clear environmental or socioeconomic baselines have been established

According to Decree 99, PFES payments should be calculated based on both forest quality and quantity; in reality, however, forest area is used as the main proxy to monitor all other environmental services. Although Vietnam conducts a nationwide forest inventory, provincial forestry department officials claimed that the available data are not sufficient to delineate forest areas or assess forest quality at the local level. Also lacking are photo-based maps and/or boundary markers in the field showing the borders around the land over which people have tenure. Images from satellites, Google Earth or other technologies would be useful in obtaining this baseline information, which is essential for numerous programs underway or proposed in Vietnam, including REDD+. Organizations should work together to obtain the baseline data so that all projects and programs are using the same information when assessing their own effectiveness. Morever, forest owners self-report the status of the forest area they are contracted to protect, with 10% of the contracted forest area subject to a validation check by forestry department staff in the case of any disputes. Given its lack of transparency and quantitative records, this monitoring system cannot demonstrate whether environmental services are being properly provided. Use of remote sensing technology and field verification could support these goals.

Findings on the social impacts of PFES are mixed, and credible data showing PFES as having a positive impact on local incomes are lacking. All agencies involved in monitoring social and economic impacts should work together to set the baselines for communities engaged in the PFES program. This initial assessment can then be used as a benchmark for evaluating the benefits of PFES in conjunction with or separate from other programs.

Although the core aim of PFES is to protect forests, developing a more holistic program would help support the full delivery of environmental services. In particular, PFES could be paired with complementary conservation and socioeconomic programs to optimize its outcomes. For example, protecting existing forest alone cannot resolve the erosion and sedimentation problems facing hydropower plants and water supply companies because the erosion is caused by land uses, such as agriculture and roads that are of socioeconomic benefit to communities in non-forested areas. The government could consider sponsoring soil and water conservation programs that would support these land uses while protecting the watersheds.

Transparent monitoring of PFES contracts, financial flows and grievances is needed

Core steps in PFES implementation are identifying buyers and sellers, developing and monitoring

contracts, and ensuring proper distribution of revenue. Although Decree 99 identifies some buyers of environmental services, its list is not exhaustive and a strategy to identify more buyers is needed.

Transparency must be embedded into all steps, from drawing up contracts to verifying compliance to receiving and distributing payments. Internal checks or multi- or third-party monitoring would boost the accountability of the system. In addition, changes must be made to the current grievance mechanism, as many PFES participants — that is, local suppliers of environmental services — cannot fully access it for various reasons: because they do not understand the system, they do not know their rights, they cannot read or write or their village leader does not forward their concerns to higher-level officials for resolution. A process for handling grievances in which people's complaints are addressed in a timely manner and without fear of reprisals needs to be established and monitored.

In addition, delays in verifying and distributing payments create mistrust among both buyers and sellers, which is likely to reduce their engagement in the program. The following weaknesses in enforcing PFES contracts were identified:

- shortage of human resources and staff capacity in local government departments
- insignificant penalties for illegal activities
- lack of an authority for enforcing compliance
- absence of a functional grievance-handling system.

Monitoring is generally based on reports by individual landowners, which tend to be biased and inaccurate. Without strong law enforcement, buyers become less willing to pay for services, which diminishes the program's effectiveness. All of these issues need to be addressed to improve PFES program delivery.

Conclusion

PFES is a major breakthrough for Vietnam's forestry sector and it underwent numerous refinements and improvements during the pilot phase. In particular, major achievements have been made in establishing legal frameworks and institutional arrangements, generating substantial revenue, and gaining political commitment and interest in supporting PFES at both central and provincial government levels and among local people, all of which suggest a bright future for PFES.

For PFES to have outcomes that are effective, efficient and equitable, however, policy makers need to work toward developing a functional monitoring and evaluation system, with an accessible grievance mechanism, to ensure transparency and accountability in the distribution of PFES revenues from central to local levels. PFES could also benefit by being part of a more holistic program, working with complementary conservation and socioeconomic development programs. PFES program delivery would be further supported by long-term capacity building for government staff and households, communities and their representatives.

1 Introduction

The basic idea of "payments for environmental services", or PES, is to create incentives for individuals and communities to protect environmental services by compensating them for the costs incurred in managing and providing those services (Mayrand and Paquin 2004). According to Wunder's (2005) classic definition, PES consists of five key elements: voluntary transactions, a well-defined environmental service, at least one buyer of that service, at least one supplier of that service, and conditionality (the buyer makes payments only if the service supplier continuously secures the provision of that service). In this paper, "PES" refers to any compensation for service, merit or effort, and/or any reward for maintaining or enhancing environmental services that is received by suppliers or paid by buyers. Compensation and rewards may take the form of direct payments, financial incentives or in-kind incentives such as access to markets (Gouyon 2002; Van Noordwijk 2005).

Various scholars have asserted that PES offers a win–win solution for people and the environment (Pagiola *et al.* 2005; Swallow *et al.* 2005; Wunder 2005, 2006; Wunder *et al.* 2005) but few case studies have validated this claim, particularly in developing countries. More research is urgently needed on the underlying institutional, economic and social differences between developing countries and how individual contexts affect PES (Swallow *et al.* 2005; Wunder 2006; Dudley *et al.* 2007; Lee and Mahanty 2009). This study draws on case studies from Vietnam to contribute to our understanding of the specific conditions that may enable or hinder PES.

In 2004, the government of Vietnam laid the foundations for a nationwide program of PES through the revised Forest Protection and Development Law (2004). In 2008, Decision No. 380 established a national program known as Payments for Forest Environmental Services (PFES), and first was piloted in Lam Dong and Son La Provinces. Following the pilot period, Decree No. 99 in 2010 mandated the nationwide implementation of PFES. Vietnam thus became the first country in Asia to initiate a nationwide PES scheme — although PES schemes in Vietnam deviate from the classic definition of PES (Wunder 2005) because the government sets the level of payment, such that it effectively functions as a water, electricity or tourism tax or fee.

Several studies have reviewed the lessons learned from the implementation of PFES in Vietnam (e.g., To and Laslo 2009; Nguyen 2011; McElwee 2012). However, these focused on a single province (Hess and To 2010; Nguyen 2011), on a single issue, such as land inequality or biodiversity loss (McElwee 2012; To *et al.* 2012), or on economic benefits alone (MARD 2010b; Tran 2010). In addition, past assessments were based on analysis of results in the PFES pilot provinces (Lam Dong and Son La Provinces) and PES-like projects underway before Decree 99 (e.g., Hoang *et al.* 2008; Kolinjivadi and Sunderland 2012; To *et al.* 2012). Moreover, although donors and government have paid considerable attention to the social and economic aspects of PFES, there has been little analysis of the implications of legal and institutional arrangements for achieving effective, efficient and equitable PFES delivery systems. Discussions of the legal issues have mostly been limited to theory and general recommendations.

In this study, we conduct a comparative review of PFES in Vietnam to assess the current status of the program, compare approaches to implementation and identify lessons learned and issues that can be generalized to other regions. Based on our review, we offer policy recommendations for achieving effective, efficient and equitable outcomes from PFES. In our analysis, we take into account principles and lessons learned from other PES schemes, both international and regional.

We focus on three aspects of PFES:
(1) institutional setting (rules of the game and organizational arrangements), (2) benefit-sharing mechanisms (financial distribution and procedural participation) and (3) monitoring and evaluation

(monitoring of environmental services, contracts, financial flows and social impacts of PFES). Data were collected through case studies, semi-structured interviews with open-ended questions, focus group discussions and technical seminars.

This CIFOR Occasional Paper consists of seven sections. We begin by explaining the rationale for the research in Section 1 and describing the conceptual maps and research methods in Section 2. Section 3 covers the evolution of PFES in Vietnam, with Section 4 providing a detailed analysis of the three major environmental services covered by the program, namely watershed protection, landscape beauty, and spawning, feeding and natural breeding resources. This analysis includes an examination of the policies for each of these environmental services, and the related institutional setting, benefit-sharing mechanisms and monitoring and evaluation. In Section 5, we discuss the institutional and organizational elements of PFES and their implications for the program's outcomes. We close with concrete policy recommendations for future PFES in Section 6 and a summary in Section 7.

2 Conceptual framework and methods

2.1 Conceptual framework

The conceptual map guiding our analysis throughout the research is depicted in Figure 1.

The success or failure of PES schemes and benefit-sharing mechanisms depends largely on the institutional framework and setting (Archer *et al.* 2008; Corbera *et al.* 2009; Neef and Thomas 2009; Zabel and Roe 2009; Clements *et al.* 2010; Vatn 2010). Institutional frameworks influence actor relationships, funding flows and financial distribution, motivational factors such as the level of interest and involvement of beneficiaries, and the overall outcomes (Kosoy *et al.* 2008; Corbera et al. 2009). Therefore, the first step in our research was to review Vietnam's laws and regulations on PFES to identify both enabling factors and constraints for PFES implementation. We assess the PFES schemes in terms of their ability to deliver 3E outcomes (effectiveness, efficiency and equity). Effectiveness refers to whether environmental services are in fact maintained and improved as a result of the PFES scheme (environmental performance). Efficiency considers whether PFES schemes are set up, implemented and monitored at minimum cost (financial performance). Equity refers to both distributive equity (the fair distribution of PFES payments) and procedural equity (the inclusiveness of PFES processes) (social performance).

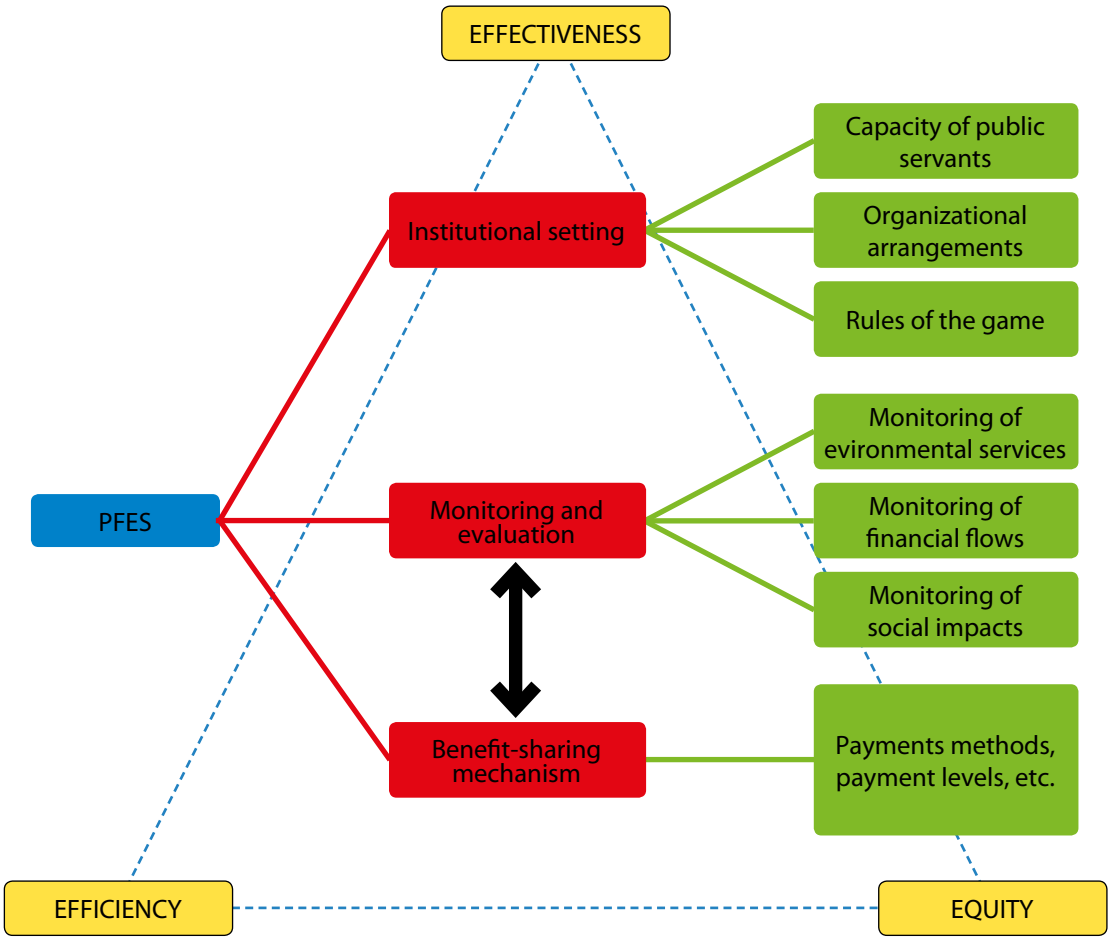


Figure 1. Conceptual framework.

We then turn our attention to two major elements of a PFES scheme that greatly influence whether it will have 3E outcomes: the benefit-sharing mechanism and the monitoring and evaluation system. We argue that environmental service suppliers enter into a PFES scheme to obtain certain benefits. These benefits could be received in kind or in cash — suppliers appreciate benefits not solely for their economic value but also for the indication that society respects their efforts in forest protection and development. Poorly designed or inequitable benefit-sharing mechanisms can not only cause environmental service suppliers to lose interest in engaging in PES but also provoke conflicts between stakeholders and thus undermine the effectiveness of the scheme. For this reason, we review not only the amount distributed, but also, and more importantly, the rationales and mechanisms for the distribution and its equity.

Similarly, we consider the design of monitoring and evaluation systems and examine how contracts are developed and monitored to ensure that both buyers and suppliers of environmental services comply with their contractual obligations. We also look at any impacts that PFES is having on local communities' livelihoods, well-being and social cohesion.

2.2 Research process and methods

The data presented in this paper are drawn from two studies: the comparative PES review on lessons learned from PFES in Vietnam, funded by USAID[1] and conducted by CIFOR and the US Forest Service, and Module 1 of CIFOR's Global Comparative Study on REDD+ (reducing emissions from deforestation and forest degradation and enhancing forest carbon stocks),[2] funded by Norad. Methods used in the study are presented in Figure 2.

Literature review: The purpose of the literature review was to determine where and how PES is underway in Vietnam and to identify lessons from past experiences with PES, both in Vietnam and internationally. We drew on these lessons throughout the rest of the study, including in developing the selection criteria for the case studies and the Participatory Rural Appraisal (PRA) methodology. The findings from the literature review were also used to establish a framework within which to embed the policy recommendations arising from the study, to ensure that the recommendations are realistic, practical and feasible given Vietnam's legislative and policy environment.

Case studies were conducted in Bac Kan, Son La, Hoa Binh, Nha Trang, Nam Dinh, Thua Thien Hue, Quang Nam, Dak Nong and Lam Dong Provinces (Figure 3), with key lessons learned extracted from the findings.

Semi-structured interviews with open-ended questions: In total, 210 in-depth interviews were conducted with respondents in various stakeholder groups (Table 1). Interviews elicited information on respondents' perceptions of PFES, opportunities and constraints for implementation, and suggested improvements.

Focus group discussions were held with local communities in Lam Dong Province (Lam Ha and Di Linh Districts in 2011 and Lac Duong

1 USAID's Regional Development Mission for Asia (RDMA) recently extended a new grant to the Center for International Forestry Research (CIFOR) in Bogor, Indonesia, to conduct a review of Payment for Forest Environmental Services (PFES) policies and practices across the Mekong region, including a comparative review of the innovative PFES experiences in Vietnam.

2 CIFOR conducted the Global Comparative Study on REDD+ (GCS-REDD+) in 13 countries in 2009–2013 with the aim of assessing international, national and subnational REDD+ experiences and identifying challenges in designing and implementing effective, efficient, and equitable REDD+ policies and projects. Module 1 of the GCS consists of four main elements: (1) a country profile, to analyze the effects of a nation's policies, political economy and institutional arrangements on achieving effective, efficient and equitable PES and REDD+; (2) a REDD+ media discourse analysis, to identify the key actors that shape REDD+ and PES and discourses on PES and REDD+ in Vietnam; (3) an analysis of the policy network developed and used by PES and REDD+ actors and the interactions among those actors; and (4) a flexible research design, so studies can either analyze the main drivers of deforestation or look at specific factors that can enable or hinder PES/REDD+ implementation (Brockhaus et al. 2012; Brockhaus and Di Gregorio 2012).

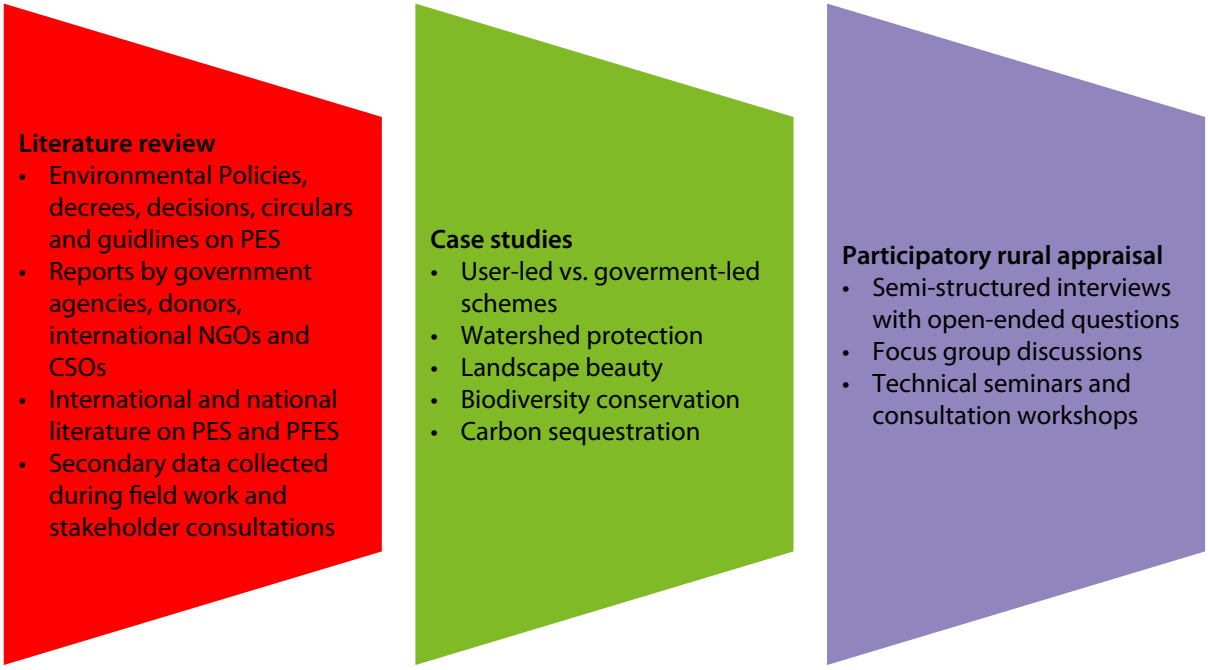


Figure 2. Research methods.

District in 2013), Son La Province (Son La Town, Yen Chau District and Muong La District in 2012) and Dak Nong Province (Dak Glong and Krong No Districts in 2013). The aim was to understand the drivers of deforestation and forest degradation in each area and the perceived strengths and weaknesses of PFES, including of any benefit-sharing mechanisms and monitoring and evaluation systems. Community samples were selected based on ethnicity, literacy, household income, gender and participation in PFES (balanced selection from all groups). In the focus group discussions, we used the following PRA tools: wealth ranking, brainstorming, mapping, transect and historical mapping, and SWOT (strengths, weaknesses, opportunities and threats) analysis.

Technical seminars were held in Hanoi with the following aims: (1) to facilitate open dialogue and learning among provinces in which PFES schemes are or were underway; (2) to present lessons learned from the initial research findings; (3) to elicit stakeholders' comments on the findings; and (4) to work with stakeholders to propose future directions for the scaling-up of PFES schemes. The first seminar, in May 2010, was attended by representatives of nine international and national agencies implementing PFES in Bac Kan, Quang Nam, Hoa Binh, Lam Dong, Son La and Dak Nong. The second seminar, in May 2013, was attended by more than 60 representatives from central government agencies, donors, policy makers, civil society organizations (CSOs), provincial authorities and academia.

Table 1. Number of interviewees in each stakeholder group.

Stakeholder category	Total number (individuals)
Central government agencies	8
Media outlets	5
NGOs	8
National research institutes	3
Donors	12
CSOs	5
Buyers of environmental services	11
Suppliers of environmental services	93
District, commune and village authorities	53
Provincial government agencies	12
Total	210

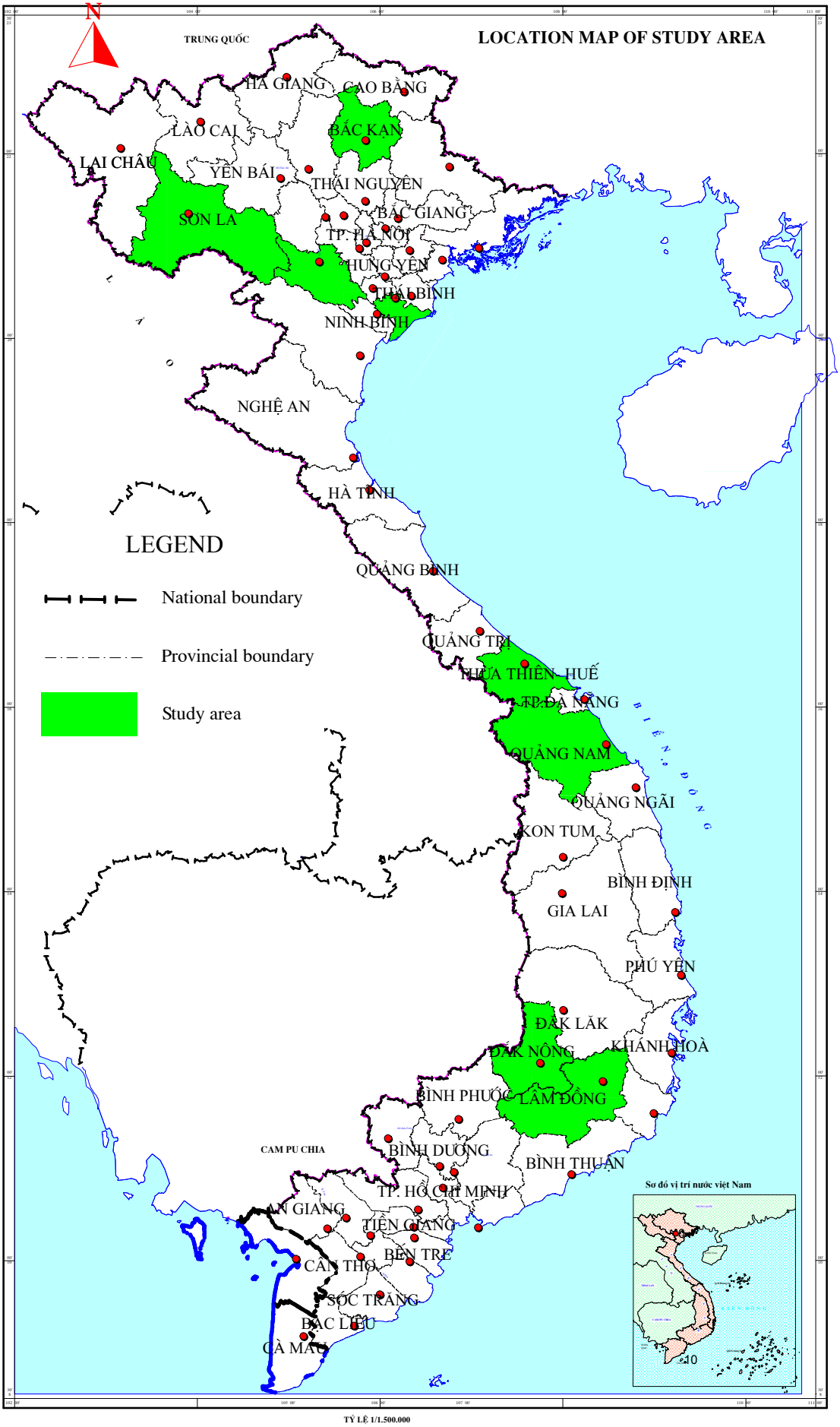


Figure 3. Location of case study provinces in Vietnam.

3 Overview of PFES in Vietnam

Highlights:

- The government of Vietnam has made a strong political commitment to PFES, and has issued numerous decrees, guidance notes, circulars and decisions to guide its implementation. However, the monitoring and evaluation framework is still in its infancy.
- The institutional setting for PFES in Vietnam relies heavily on the Forest Protection and Development Funds established at central and provincial levels. The rate of disbursement of provincial funds is generally low (46%) because most provinces have not finished delineating the areas allocated to each forest owner.
- Major achievements in PFES in Vietnam:
  - Institutional and organizational arrangements at the provincial level are in place
  - Revenue generated from PFES is promising, particularly the contribution of hydropower plants and water supply companies
- Major challenges for PFES in Vietnam:
  - Low disbursement rate
  - Progress in establishing and running provincial Forest Protection and Development Funds (FPDFs) is still slow
  - Performance of FPDFs needs some improvement
- Of the four environmental services covered by Decree 99, the PFES scheme for watershed protection has the most advanced legal setting and comprehensive lessons learned.
- Only watershed protection and landscape beauty services are covered by the current legal framework. Policies on other services, namely carbon sequestration, aquaculture and water for industrial zones and factories, have been postponed until 2015.

3.1 Evolution of PES and PFES

After Vietnam imposed a logging ban in 1995, the forestry sector was undervalued compared with other sectors because of its small contribution to the country's gross domestic product (GDP). The revised Forest Protection and Development Law 2004 changed this by recognizing the important role of forests in providing environmental services such as soil erosion control, water regulation, carbon sequestration, regulation of microclimates, biodiversity conservation and landscape beauty for recreational purposes. Following this law, a forest development strategy for 2006–2020 was approved. The strategy set out the need for a financial assessment of the value of forest environmental services. The Ministry for Agriculture and Rural Development (MARD) made a strong call for data that would form a solid foundation for PFES policies. Several economic valuations of forests, particularly of their environmental services, were carried out, mainly by the Vietnamese Academy of Forest Sciences (Vu *et al.* 2007; Vo *et al.* 2008), and provided forest management agencies with a better understanding of issues relevant to developing policy on PFES.

In addition to these government-led studies, donors also have been actively supporting the introduction of PES through pilot projects run in Vietnam since 2002. Some of best-known projects (Table 2) gave policy makers in several provinces an opportunity to explore the emerging concept in practice and provided better understanding of the challenges in implementing PES in Vietnam, such as high transaction costs, low willingness to pay of buyers, and lack of transparency and accountability benefit sharing (see Annex 2 for a more detailed analysis).

Table 2. PES pilot projects in Vietnam since 2002

Project	Services traded	Buyers	Suppliers	Intermediaries	Payment mechanism
Sustainable financing: Case study from Nha Trang Bay Marine Protected Area (Khanh Hoa; 2002–2005)	Landscape beauty	Tourists, large tourism businesses (Eco Games Centre in Vinpearl and dive shops)	Local communities; Nha Trang and Hon Mun Marine Protected Areas	Village Development Fund	Tourists are charged PES fees as follows: 5000 VND per tourist sightseeing by boat; service charge of 30,000 VND per diver in Hon Mun; 10,000 VND per tourist visiting the core zone of Nha Trang Bay. Of fees collected, 10–15% is put into Village Development Funds; the provincial treasury keeps the rest.
Sustainable financing opportunities in protected areas (Thua Thien Hue; 2007–2008)	Watershed protection and landscape beauty	Tourists, water companies, tourism companies	Local communities, national park	WWF	Taxes on water use for drink-bottling companies Higher entrance fees for foreign tourists Establishment of a conservation trust fund Tourism companies make in-kind payments for bus services and roads to the national park based on their social responsibilities.
Creating incentives for Tri An watershed protection (Dong Nai; 2008–2009)	Watershed protection	Water supply companies	Vinh Cuu Nature Reserve, Tan Phu protection forest management board, local communities	Danish International Development Agency; WWF; Dong Nai Department of Agriculture and Rural Development (DARD); Dong Nai Department of Natural Resources and the Environment (DoNRE)	Funds were used to support and encourage local communities to shift to more sustainable land-use practices that will help improve water quality. A proportion of the funds may also go to Vinh Cuu Nature Reserve and the Tan Phu protection forest management board to maintain and support forest protection and restoration activities around Tri An reservoir.
RUPES (Reward for Use of and Shared Investment in Pro-poor Environmental Services) (Bac Kan; 2008–2012)	Water, carbon and landscape beauty	IFAD/3PAD project	Up-, mid- and down-stream communities of Ta Leng River Basin	World Agroforestry Centre, International Fund for Agricultural Development (IFAD), Bac Kan local line agencies (e.g., DARD, DoNRE, mass organizations)	Local communities proposed both in-kind and cash payments.
AR-CDM (Clean Development Mechanism: Afforestation/ Reforestation) (Hoa Binh; 2009–2012)		Undefined	Forest Development Fund	Japan International Cooperation Agency, Nippon Koei, Vietnam Forestry University, nonprofit organizations Forest Science Institute of Vietnam Japan Association of Charitable Organizations	The Forest Development Fund was established in April 2008 by Honda; USD 25,000 was transferred for the first year and VND 1 billion over the 3 years to a local nonprofit organization responsible for managing the Forest Development Fund and paying local people for their labor. The organization and households share the benefits from timber products in a ratio of 25:75 and carbon credits in a ratio of 50:50. The nonprofit organization re-invests the funds in forest establishment using rotation, technical assistance, monitoring and carbon trading procedures.

Sources: Dang (2008), Vu (2008), Pham *et al.* (2009), Hoang *et al.* (2008), personal communications from Nguyen, Dam and Vu (all 2013)

The political will of provincial governments, as demonstrated in these pilot projects, inspired central government and attracted financial and technical support from USAID through Winrock International. The central government issued Decision No. 380/QD-TTg on Piloting Payment for Forest Environmental Services (PFES) in 2008 and the first pilot projects began in Lam Dong and Son La Provinces. In 2010, Decree 99 took PFES to the whole country. All government interviewees described PFES as a major breakthrough for Vietnam's forestry sector because of the innovative financing mechanism that it establishes.

Since 2008, the national PFES legal framework, institutional settings, organizational arrangements, and contractual and financial management regimes have been refined, with 20 legal instruments issued at different levels (including 4 Prime Ministerial Decrees or Decisions and 11 Decisions and Circulars. Of the total, 5 documents provide legal guidance on the establishment, organization and management of Forest Protection and Development Funds at national and provincial levels, and 11 documents provide general guidance on implementing PFES (Annex 1).

Decree 99 lists four environmental services that are eligible for inclusion in PFES:

1. watershed protection, including soil protection, reduction of erosion and sedimentation of reservoirs, rivers and streams, and regulation and maintenance of water sources for production and living activities of the society
2. protection of the natural landscape and conservation of biodiversity of forest ecosystems for tourism
3. forest carbon sequestration and retention, reduction of emissions of greenhouse gases through measures for preventing forest degradation and loss, and for forest sustainable development
4. provision of spawning grounds, sources of feeds and natural seeds, and use of water from forest for aquaculture.

Clear procedures and guidelines for PFES programs for watershed protection and landscape beauty have been in place since 1 January 2011. The legal frameworks for services related to carbon sequestration and aquaculture are in their infancy. The Prime Minister has agreed to postpone the national implementation of PFES for these two services until 2015.

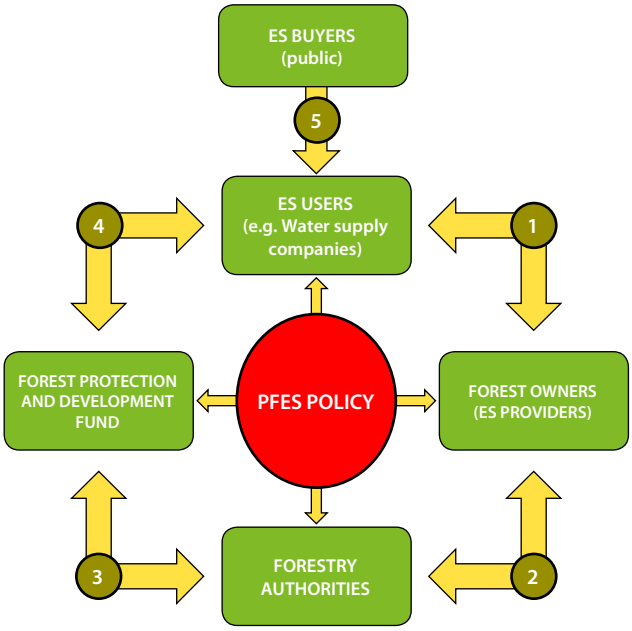
MARD interviewees claimed that carbon sequestration services will be dealt with under the REDD+ framework, which was approved in Prime Ministerial Decision 779 of 2012. Decision 779 states that payments for carbon sequestration must comply with the general principles of Decree 99 and that for indirect payments, a REDD+ fund is to be established, as a subfund of the Vietnam National Forest Production and Development Fund (VNFF). The REDD+ fund will receive and manage REDD+ grants and trust funds provided by other countries, organizations and individuals and make payments for REDD+ services. However, it remains unclear how the REDD+ fund will operate and how payments will be collected and distributed. For provision of spawning grounds, sources of feeds and natural seeds, and use of water from forests for aquaculture (aquaculture services), numerous policy options have been proposed (see Section 4.3) and will be tested in the next 2–3 years.

This progressive refinement of the legal framework undertaken by the government of Vietnam is evidence of the government's growing interest in and strengthening commitment to achieving effective, efficient and equitable outcomes from PFES.

3.2 Institutional setting for PFES

The institutional setting for PFES in Vietnam relies heavily on the FPDFs that were established at central and provincial levels (Figure 4). In the arrangements, stakeholders' roles and responsibilities are clearly defined.

Circular No. 85/2012/TT-BTC states that the FPDF is not operated for profit. The VNFF signs contracts with buyers that set out the amounts they must pay for environmental services; the VNFF also collects, coordinates and monitors payment to provincial FPDFs in areas where environmental services are supplied from two or more provinces and supports the operations of the provincial FPDFs. The VNFF extracts 0.5% of the total revenue from PFES payments, including any interest accrued, to cover its operations. All provincial government staff interviewed stated that the VNFF is active in mobilizing funds, but that it has not been able to meet technical needs in a timely manner because of limited staff and capacity.



1. Relationship between environmental services (ES) buyers/users and sellers/providers (applies to direct payment agreements).
2. Traditional relationship for control and management of forest quantity and quality outside PFES scheme.
3. Relationship in monitoring and evaluation by checking randomly 10% of the forest area under PFES scheme.
4. Relationship in signing contracts for PFES (applies to agreements for indirect payments).
5. The PFES scheme covered by Decree 99 establishes a fixed payment rate for hydropower plants and water supply and tourism companies (20 VND (around 1 cent) for 1 kWh, 40 VND for 1 m3 of clean water, 1–2% of revenues, respectively), but payments may be included in the price of electricity and clean water and any entrance fees.

Figure 4. Institutional design for PFES policies and relationships between actors, as set out in Decree 99.
Source: Adapted from Pham (2013)

The provincial FPDF signs contracts with service buyers and collects payments for services supplied within the province. It also prepares payment plans, monitors and releases payments to service suppliers, and submits periodic reports to the VNFF. The provincial FPDF is allowed to use 10% of the total revenue from PFES to cover its operations and can extract a further 5% of the total revenue from payments collected and other sources for a contingency fund, which is used to support service suppliers in the case of natural disasters (Circular 85/2012/TT-BTC). Circular 85/2012/TT-BTC sets out details on financial management of the FPDF but provincial authorities interviewed said that more detailed guidelines were needed on penalties for late payments and contract violations and on how to use the 10% management fee, specifically procedures for payments and monitoring protocols. Provincial authorities interviewed in both Lam Dong and Son La said they were not sure how to penalize buyers in the case of late payments or if they refuse to make payments.

Service suppliers are individuals, households, communities or organizations that the provincial FPDF deems to be qualified to supply a service based on their land-use right certificate. They must sign a commitment to forest protection. Service suppliers that are organizations, such as management boards for protection and special-use forests, can take 10% of payments collected to cover their costs of management and running activities related to forest protection.

Procedures for making payments from central to local levels and between buyers and suppliers are set out in Circular 62 (issued in 2012 by MARD and the Ministry of Finance) and Circular 20 (issued in 2012 by MARD) (Figure 5). The roles and responsibilities of central and provincial authorities in collecting and delivering funds are clearly defined and the process includes several internal checks.

When a forest area is assessed, its owner is required to join the verification team. The provincial Department of Agriculture and Rural Development (DARD) forms the verification team to carry out checks on forest protection by service suppliers that are organizations, and the district Forest Protection Unit forms the team to conduct checks on service suppliers that are households, individuals or village communities. A written assessment of the quantity and quality of the forest in the contracted area is produced and signed by a representative of the verification team and the forest owner. Before the check, service suppliers submit a self-assessment to the village,

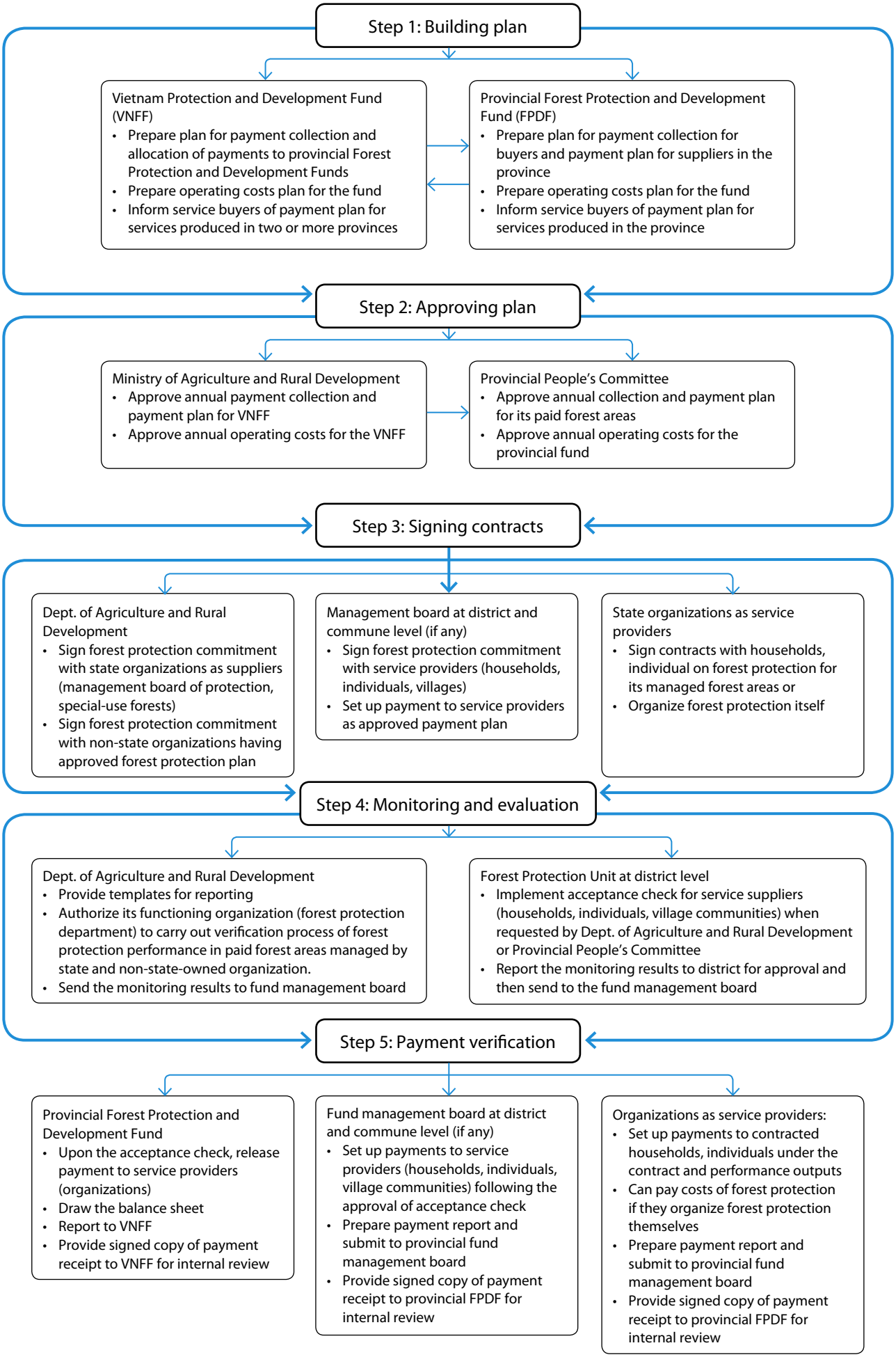


Figure 5. Procedure for distribution of PFES payments.

which is then sent to the commune and finally to the Forest Protection Unit. Verification checks are only required when service suppliers, the village or the commune lodge a complaint about the forest protection performance assessment. The Forest Protection Unit finalizes reports on service suppliers' performance, which it then submits to the District People's Committee for approval. Once approved, the report is sent to the provincial FPDF, which then releases payments to service suppliers.

The provincial FPDF is responsible for sending water companies and hydropower plants that made payments directly into the FPDF information on the following: the total amount received in the year; the amounts distributed to the FPDF and forest owners; use of revenue by forest owners; use of revenue by the FPDF; enterprises' comments on payments; and any other relevant information. In addition, the FPDF is responsible for monitoring contracting procedures, making quarterly payments to forest owners, reporting on forest management and protection in the pilot area, reviewing financial documents and delivering a quarterly progress report on PFES implementation.

3.3 Major achievements in PFES in Vietnam

3.3.1 Institutional and organizational arrangements at the provincial level are in place

As of December 2012, 35 of the 63 provinces in Vietnam had established a steering committee to oversee the implementation of Decree 05/ND-CP and Decree 99/2010/ND-CP, and 27 provinces had set up and were running a provincial FPDF. Most of those provinces are in areas with high potential for hydropower: the northwest, the central highlands and central Vietnam. The VNFF has signed 27 trust contracts on PFES with hydropower plants and water supply companies that have watershed areas covering two or more provinces. Provincial FPDFs have signed 94 contracts on PFES, including 62 on hydropower, 11 on clean water and 21 on tourism. Provinces with the most contracts are Lam Dong (40), Lao Cai (19), Dak Lak (8), Quang Nam (7), Dak Nong (6) and Kon Tum (5). FPDFs in these provinces have carried out awareness-raising programs; most are now developing plans for payment collection and distribution and are defining boundaries and forest areas for each forest owner in the watersheds that provide forest environmental services. PFES revenue in 2012 totaled VND 1172.44 billion (USD 55 million) and the government plans to establish a further 30 provincial FPDFs to increase the revenue from environmental services by around USD 50 million in 2013.

3.3.2 Revenue generated from PFES is promising, particularly the contribution of hydropower plants and water supply companies

PFES generated total revenue in 2009–2012 of VND 1782 billion (about USD 85 million). Payments from hydropower plants accounted for nearly 98% of this, with 2% coming from water supply companies and 0.1% from tourism (Central Forest Protection and Development Fund 2013). Details of revenue from buyers of environmental services are shown in Table 3. Lai Chau Province has received the most, with payments totaling USD 11 million, followed

Table 3. PFES revenue from service buyers, 2009–2012.

Year	Total revenue from service buyers (in million USD)			
	Hydropower plants	Water companies	Ecotourism	Total revenue
2009	10.5	0.48	0.016	11.00
2010	4.9	0.43	0.018	5.35
2011	13.38	0.72	0.034	14.13
2012	57.73	0.85	0.044	58.62
Total	**86.51**	**2.48**	**0.112**	**89.1**

Source: VNFF (2012)

by Kon Tum Province (USD 9.5 million), Dien Bien Province (USD 7.4 million), Son La Province (USD 6.3 million) and Lam Dong Province (USD 6.15 million); Ba Ria–Vung Tau Province received the least, with payments totaling USD 3.53 million (VNFF 2012). Environmental services revenue from hydropower plants and clean water reached about 85–90% of the total amount expected.

3.4 Major challenges for PFES in Vietnam

3.3.4 Low disbursement rate

The average disbursement rate of PFES funds is relatively low at 46% (VNFF 2013) because most provinces have not finished defining forest areas for each forest owner as they lack adequate information and detailed guidelines on payment management. Whereas some provinces have high disbursement rates (e.g., Lam Dong: 90%; Lai Chau: 98%; Yen Bai: 80%), others have been very slow in making payments to forest owners (e.g., Quang Nam: 2%; Lao Cai: 6%; Dien Bien: 15%). Most international and national nongovernmental organizations (NGOs) and CSOs interviewed expressed some skepticism about the causes of the low and slow disbursement because it remains unclear what is happening to this unspent money.

However, interviewees from the VNFF and from provincial authorities in Lam Dong, Son La and Dak Nong offered several explanations for the low disbursement rate. First, the rate of disbursement depends on the number, scale and geographic accessibility of forest owners involved in PFES. For example, whereas most forest owners in Lam Dong are state forest enterprises with assigned bank accounts, Son La Province has more than 64,000 individual forest owners living in geographically remote areas with no banking access. As a result, where Lam Dong authorities can distribute PFES payments within a month, those in Son La require 3 months to complete the same task. On the other hand, political and financial instability in Lam Dong Province can cause large fluctuations in the amount of payments made by buyers, but service suppliers want PFES payments to increase over time, regardless of whether environmental services have been improved, and decreases in the level of payments can trigger social conflicts. As a result, the provincial FPDF has adopted a strategy of withholding some of the money collected each year and keeping it in a reserve fund.

Table 4. Performance of central and provincial Forest Protection and Development Funds.

Indicator (examples)	Performance
Support for PFES project development (scientific research and project planning)	The VNFF (central fund) supported the establishment of provincial funds (FPDFs) and undertakes annual and quarterly planning for PFES at the central level. It also acts on behalf of the government to discuss strategic investments with international donors. It takes the lead in filling any regulatory gaps. Stakeholders interviewed for this study, however, noted that VNFF staff have limited skills and understanding of PFES, which creates difficulties in providing practical and timely guidance for provincial agencies.
Fundraising (collecting and managing finances; enforcing laws, regulations and contracts)	Both provincial and central funds have been active in fundraising and payment collection. However, the position of a fund in the political system influences its ability to enforce payment collection.
Management of access to information and participation (capacity building, stakeholder dialogues, facilitation of negotiations, conflict resolution)	The VNFF has disseminated information on PFES to international donors, NGOs, and local authorities and local communities. It has also informed the media about the progress of PFES and payment distribution, and it provides training for government implementing agencies. However, few awareness-raising activities have been carried out for the private sector. It has not been able to establish an effective grievance mechanism.
Monitoring compliance (managing contractual obligations and public funds)	Neither central nor provincial funds have been able to carry out proper monitoring because of insufficient staff and lack of protocols.

Source: Adapted from Greiber (2009).

3.3.5 Progress in establishing and running provincial FPDFs is still slow

Progress has been slow, especially in Dien Bien, Bac Kan and Ha Giang Provinces, because of passivity on the part of local government, delays in staff recruitment and lack of detailed guidelines on fund management. As PFES is a rather new concept, many provincial policy makers are afraid of making mistakes (Pham 2013; personal communication from Dang). In addition, some provinces have not been effective in raising awareness public awareness of the scheme, which has resulted in lack of attention, support and consensus among stakeholders.

3.3.6 Performance of FPDFs needs some improvements

To be deemed adequate, the institutional setting for PFES must meet several requirements; although the FPDF system has been successful in some areas, in others it still needs to improve (Table 4).

4 Analysis of case studies for each environmental service

Highlights:

- High transaction costs are a major problem in provinces with large numbers of forest owners.
- Buyers' concern about double payments (e.g., company was buying water from irrigation companies, and both were required to pay a PFES fee on the same water) and about delivery of payments.
- The private sector is not homogeneous and private companies are often disadvantaged when complying with PES, compared with state-owned companies.
- Lack of detailed guidelines on using money received from PFES can open the way for corruption at village and community levels.
- Monitoring and evaluation for watershed protection is rather weak because of: lack of staff and capacity; incomplete forest inventory; low penalties for illegal activities; lack of enforcement capacity of both local authorities and local communities; the absence of a functioning grievance mechanism; and unclear boundaries between forest owners and between provinces. Payments are assessed according to forest quantity (forest cover), but factors such as forest quality, soil erosion and water regulation are overlooked.

4.1 Watershed protection

4.1.1 Institutional arrangements

Of the four services covered by Decree 99, arrangements are most advanced for watershed protection services. In 2003, payments from large hydropower plants totaled nearly USD 40 million, and payments in 2013 may total about USD 80 million. The revenue raised through payments by hydropower plants by region is shown in Table 5; as seen, about USD 26 million (50.2%) comes from the north, nearly USD 19 million (36.1%) from the central region and more than USD 7 million (13.7%) from the south.

Rules for payments for watershed protection services are clearly established in Article 7 of Decree 99 as follows:

- Hydropower production facilities must pay for services for soil protection, reduction of erosion and sedimentation of reservoirs, rivers and streams, and for services for regulation and maintenance of water sources for hydropower production.

Table 5. Projected revenue from PFES payments made by hydropower plants, 2013.

Region	Number of hydropower plants	Projected revenue		Share (%)
		In billion VND	In million USD	
North	28	541.5	25.7	50.2
Central	31	389.2	18.5	36.1
South	14	148.1	7.1	13.7
Total	**73**	**1078.8**	**51.3**	**100.0**

Source: VNFF (2013)

- Clean water production and supply facilities must pay for services for regulation and maintenance of water sources for clean water production.
- Industrial manufacturing facilities that use water directly from water sources must pay for services for regulation and maintenance of water sources for production.

Reasons for buyers' failure to make timely payments

Article 11 sets the amount to be paid for forest environmental services (ES) at 20 VND/kWh of commodity electricity produced by hydropower plants and 40 VND/m^3 of commodity water produced by clean water production facilities. However, for the first 2 years of the PFES scheme, buyers in both Lam Dong and Son La delayed payments for more than a year and many others have refused to sign a contract on PFES. Reasons for delays and refusals are as follows.

The private sector is not homogeneous. Private sector buyers of watershed protection services fall into three categories, based on their business models, as follows:

1. **State-owned companies**, such as Electricity of Vietnam (EVN), are completely financed by the state budget. EVN is a government monopoly that controls hydropower production for the national grid. State-owned companies function as intermediaries, collecting PES money and paying it into the government fund. The additional charge is passed on to consumers through increased electricity and water bills.
2. **Joint-stock companies** are jointly owned by state and non-state organizations. In Vietnam, these companies are usually state dominated. For example, Saigon Water Company, the company that supplies water to Ho Chi Minh City, is a joint-stock company in which the government owns a 51% share.
3. **Private companies** sell electricity or water to state-owned companies.

Representatives of most state-owned and joint-stock companies described the regulations on fees and payment principles as clear and simple; it is easy for them to comply with the law and easy for the FPDFs to collect their payments. However, interviews conducted with private companies in Son La in 2011 revealed strong concerns with PFES policies. Unlike state-owned companies, these private companies had signed a contract with EVN for 25–50 years (Decision No. 18/2008/QD-BCT) before Decision 380 and Decree 99 were issued. These contracts required them to sell electricity at a fixed price for the duration of the contract. In other words, the private companies cannot pass on the PFES costs to either the state (direct buyers) or the public (end users), but must bear these costs themselves. To address this issue, the Ministry of Industry and Trade revised Decision No. 18/2008/QD-BCT on prices charged by small-scale hydropower plants and the Ministry of Finance requested EVN to revise the contracts and make additional PFES payments to these companies, starting in 2012.

Water supply companies in Son La and Lam Dong also said that they cannot make the payments on time because of the lack of supportive policies and the complex bureaucracy. Although they are allowed to pass on PFES fees to water users through the water bills, it took them 2 years to get the Provincial People's Committee (PPC) to approve the increase in water prices. Moreover, some provinces have created subsidies to assist poor groups (e.g., in Son La); the company is unable to pass on the additional PFES fee to these buyers because provincial authorities require them to provide these disadvantaged groups with water at no charge. Interviewees stressed that the company could not afford to assist low-income groups and that their operating costs (for example, for transporting water to isolated areas) already outweighed the benefits.

Double payments. Lam Dong Water Company was buying water from irrigation companies, and both were required to pay a PFES fee on the same water. Similarly, in both Lam Dong and Son La, many hydropower plants and water suppliers in the same catchment area are paying for the same watershed, even though one hydropower plant can sell its water to others.

Buyers' concerns about delivery of payments. All buyers interviewed in Lam Dong and one buyer in Son La said that they delay making payments mainly because they doubt their payments will be used effectively for forest protection and development. They called for clear, detailed and transparent reports on how the money is used; these are not currently a feature of the process.

Challenges in identifying suppliers of environmental services

The biggest challenge for PFES is accurately defining forest areas and determining the forest owners; this is particularly challenging where forest owners are households and individuals as they often own only a small area, but community forests cover large areas that are easily detected on maps and in the field. Progress tends to be slow both in defining boundaries for each forest owner in a watershed that provides environmental services and in drawing up forest protection contracts, although completing these is the target of the current cycle of the national forest inventory and statistics program, ending in 2016.

Many watersheds span more than one province, which creates a need for careful analysis to demonstrate the link between environmental performance and PFES payments. Fifty percent of NGO representatives interviewed claimed that forest boundary maps produced through the "5 Million Hectare Reforestation Program" (also known as Program 661, which focused on reforestation and supported payments for forest protection) are either out of date or of poor quality because of inadequate investment in forest map development. Many provinces, especially in the south-central, northwest and central highlands areas of Vietnam, cannot afford the costs of demarcating forest borders and ownership boundaries. MARD and the VNFF have paid USD 570,000 to support some provincial FPDFs in undertaking forest inventory and monitoring: USD 195,000 to Dak Nong Province, USD 245,000 to Son La Province and USD 130,000 to Lam Dong Province (VNFF 2012).

High transaction costs

All interviewees said that transaction costs for PFES for watershed protection are high because of the large number of service suppliers. Decree 99 allows each provincial FPDF to keep 10% of the total PFES payments to cover its administration and operating costs, but this fixed rate might not be sufficient in all cases. For example, in Lam Dong, where relatively few suppliers have been identified, 10% is generally enough to cover the costs. By contrast, in Son La, 10% is not enough because the provincial fund needs contracts with 64,000 individual households that are forest managers. Son La FPDF spent most of its 10% management fee on checking the forest protection performance of more than 3500 people and distributing funds.

4.1.2 Benefit-sharing mechanism

Different levels of payments

According to Decision 380 and Decree 99, payments to forest owners are calculated using the formula below.

During the pilot phase, considerable differences were observed in the payment rate per hectare and the average area of forest per household in Son La and Lam Dong Provinces. Payments to households were smaller in Son La than in Lam Dong for several reasons.

First, in Son La, each household managed less than 1 ha (average 0.3–0.5 ha), compared with 30 ha per household in Lam Dong in 2008. The payment per hectare of forest managed by a household in

Total amount paid to forest owner (VND)	=	Average fee per hectare of forest (VND/ha)	×	Forest area managed for services (ha)	×	Coefficient K

where:

(a) The average fee per hectare of forest (VND/ha) is the total received from use of the environmental service (less the management costs incurred by provincial authorities), divided by the total area of forest in the catchments, as approved by the responsible agency for the PFES agreement.

(b) The forest area that is managed for services includes allocated forest areas, leased areas and contracted areas.

(c) Coefficient K depends on the forest categories managed (protection forests, special-use forests, production forests), the forest status (rich, medium, poor, restoration forest) and the forest history (natural forest, plantation), as based on the justification by the Provincial People's Committee.

Son Law ranged from USD 3.5–6.0, whereas in Lam Dong it ranged from USD 7.5–10.0. Second, the amount paid to a household is determined by the total payment received in the province and area: Lam Dong has more than 10 buyers to collect payments from, whereas Son La has only three buyers, one of which has not made any payment; as a result, the total is much smaller in Son La than in Lam Dong. At the same time, Son La is the second largest province in Vietnam, whereas Lam Dong is small and the area under PFES is small; the payment per hectare is therefore higher in Lam Dong than in Son La.

Differences between payment rates in provinces are also attributable to differences in the amounts collected from buyers (Table 6). In Lam Dong, the amount received by households differed across parts of the pilot project area (Nguyen 2011). The amount of hydropower production and the size of the forest and watershed area above the reservoirs meant that larger sums were collected from the Da Nhim, Dai Ninh and Ham Thuan hydropower plants and forest owners in those watersheds should therefore have received larger PFES amounts. The relevant legal instrument (Circular 80) makes no mention of sharing and/or coordinating payment revenues and other sources for forest protection among or within provinces. As a result, in some cases, forest owners on one side of a mountain may receive payments because their land lies in a watershed supplying services to a downstream buyer whereas forest owners right next door but on the other side of the watershed divide might receive less or even nothing because the payment would come from a different source (e.g., payments made under National Forest Protection Program 661). To avoid conflict and social unrest, interviewees in Lam Dong FPDF said they even out the funds and pay the same amount to all communes.

With the release of Decree 99, PFES was restructured in both Son La and Lam Dong Provinces. For example, in Son La Province, forest owners were grouped to reduce the number of individual forest owners and to increase community forests. The average forest area per

Table 6. Per-hectare payment rate for each watershed in Lam Dong, 2012.

Da Nhim hydropower plant watershed	Dai Ninh hydropower plant watershed	Ham Thuan hydropower plant watershed	Dong Nai hydropower plant watershed	Serepok hydropower plant watershed
350,000[a]	400,000	400,000	300,000	300,000

a Units: VND/ha/year

Source: Lam Dong FPDF (2013)

Table 7. Payments made to forest owners in Son La and Lam Dong, 2011–2012.

Province/Site	Type of forest owner Number	Average land area (ha)	Average payment (ha) (1000 VND)	Payment received (1000 VND/year)
Son La	Individuals 32,396	3	220	660
	Household groups 1242	14	220	3080
	Community forests 1497	140	220	30,800
Lam Dong	Individuals 2000	1–3	350	350–1050
	Patrols 7000	333.9	65	8000

Source: Lam Dong FPDF (2013); personal communication from Le (2013)

individual owner as of mid-2013 is 3 ha in Son La and 1–3 ha in Lam Dong. The payment rate to individual forest owners was increased, and the average payment for 2011–2012 was 11 USD/ha/year in Son La and 17 USD/ha/year in Lam Dong. The comparison in Table 7 reveals that payments received by individual households and household groups are quite small; however, payments to communities are sizeable and, if used effectively, are large enough to improve environmental and social well-being.

Challenges in applying the K-coefficient

A K-coefficient is used to adjust the payment level for PFES. Under Decision 380/QD-TTg, the People's Committees of Lam Dong and Son La must set this factor, using results of forest monitoring confirmed by the responsible agency.

The value of each K-coefficient is provided in Circular 80/2011/BNNPTNT on methods to determine payments for forest environmental services (issued by MARD), as follows:

- K1 (forest volume status): 0.9 for regrowth and poor forest; 0.95 for medium forest; 1.0 for rich forest
- K2 (forest function): 0.9 for production forest; 0.95 for protection forest; 1.0 for special-use forest
- K3 (origin of forest): 0.9 for plantation; 1.0 for natural forest
- K4 (difficulty of forest protection): 1.00 for very difficult; 0.95 for difficult; 0.90 for not very difficult.

Officials from commune governments in Son La and Lam Dong agreed that the use of different K-coefficients is appropriate but said that it is difficult to explain the system to communities and can provoke conflicts between community members. An additional problem is that local communities have not agreed on the values of the K-coefficients. Given the lack of forest inventory data, their inability to classify forest quality and the high costs incurred in determining forest area in each K-coefficient class, authorities in Lam Dong and Son La decided to apply a K-coefficient of 1 for all service suppliers to ensure they all receive equal payments. Respondents in the provinces revealed that at no time were all four K-coefficients used in allocating payments, with K2 and K3 used most often. According to interviews with provincial government staff and households, setting a uniform K-coefficient has not led to improved forest quality. Applying a flat rate might not always be efficient and effective because, as many households pointed out, everyone received the same payment regardless of whether they had successfully enhanced forest quality, which community members found to be unfair.

Options and factors influencing benefit sharing

In interviews, local community members in Lam Dong, Son La, Xuan Thuy and Dak Kong indicated that they used money received from PFES for childcare, education and their daily food needs, with very little being used to improve their livelihoods.

In the context of community forestry, Pham *et al.* (forthcoming) observed five options for the use of revenue collected in Son La:

1. making payments to members of forest protection groups
2. buying and upgrading equipment for the community hall
3. making equal payments to all households in the village
4. building infrastructure (e.g., roads)
5. making other payments, mainly to create microcredit schemes under which poor households can take out low-interest loans for projects to improve their livelihoods.

Each of these options has strengths and weaknesses. For example, distributing funds equally among all villagers gives them a greater sense of responsibility for forest protection and reduces the risk of elite capture by village management boards. However, this option means that each household receives only a small amount of money (USD 1/ha/year; by contrast, the opportunity costs of corn production in Son La are around USD 1500/ha/year).

Local people's lack of trust in their local authorities and village leaders and local ideas of equity were found to determine preferences for the distribution of benefits in Son La (Pham *et al.* forthcoming). Corruption and misuse of PFES payments by village leaders and management boards have engendered mistrust among local people, which led to the failure of PFES schemes; the lesson here is that failure to incorporate appropriate monitoring

and evaluation and grievance mechanisms into the system, combined with poor understanding of the social and political context and human psychology, might prevent PES from having outcomes that are effective, efficient and equitable.

Group contract or individual contracts?

Monitoring of environmental services is crucial given that payments are conditional on actual service delivery, but it tends to be difficult in fragmented landscapes with large numbers of smallholders. This is a major problem in Vietnam because of the large number of poor households, each of which manages only a small area of land (Bui *et al.* 2004; Wunder *et al.* 2005; Huang and Upadhyaya 2007). Group certification and collective action have been proposed as solutions to the problems with transaction costs, as these mechanisms may enable farmers to work together in providing environmental services over large areas, thus reducing the cost of monitoring — usually a major cost in PES (Swallow *et al.* 2007). However, government interviewees noted numerous challenges with this approach, including establishing criteria for forming a group (e.g., in Quang Nam), avoiding elite capture in the group (e.g., in Son La) and ensuring that households' rights were protected in the payment agreement (e.g., under group contract or individual contracts).

Moreover, where communities do not have the legal status needed to enter into a PFES agreement, they lose interest in forest protection and development (Hoang *et al.* 2008). Vietnam's 2005 Civil Code gives communities limited rights to enter into contracts and other civil legal relationships. In particular, Article 84 of the 2005 Civil Code sets out the following conditions for an entity to enter into civil legal relationships: being legally established; having an organizational structure; having assets independent of those of other organizations and individuals, and being responsible for those assets; and being able to participate in legal relationships independently and in their own name. Because communities do not meet all of these conditions, they cannot be parties to a civil legal relationship (Warner 2008).

Ineffective and inefficient use of PFES payments

All Son La villagers and government officials interviewed saw buying and upgrading equipment for the community hall as the best way to optimize community collective action in forest protection and development. This approach also ensures that those who are vulnerable and marginalized (e.g., poor, elderly or landless households) can still benefit from PFES. However, in most villages studied, PFES payments were found to have been spent, rather ineffectively, on physical assets only, whereas opportunities to use the money to invest in better livelihood opportunities had been overlooked. For example, Pham *et al.* (forthcoming) found that a large number of villages in Muong La District, Son La Province, had received more than VND 315 million (USD 15,000) per year for protecting the community forest but all of this money had been used to buy goods (e.g., furniture and karaoke systems) rather than being invested in livelihoods, social well-being or further forest protection and development. This occurred partly because the village leaders and management boards do not have sufficient capacity and knowledge to manage the fund and invest in appropriate activities, and partly because the Provincial, District and Commune People's Committees (CPCs) had implied that the villages should spend on this budget line. In interviews, members of these village management boards claimed that they had had to follow suggestions made by their superiors. This reveals a need for capacity building for these village leaders and management boards, along with clear guidelines and enough flexibility for leaders to use payments according to their villages' needs.

4.1.3 Monitoring and evaluation

Monitoring of environmental services

Vietnam has not yet introduced any requirements or protocols for environmental monitoring of forest quality, soil erosion or water regulation, even though PFES targets all of these environmental services.

The monitoring and evaluation system set out in Circular 20 refers only to the maintenance of existing forest cover as a proxy for environmental services and to final outcomes (Table 8 and Figure 6).

Although several reports have shown an improvement in forest quality attributed to the PFES scheme (e.g., MARD 2010a; Lam Dong FPDF 2012; Son La FPDF 2012; VNFF 2012), these assessments use only the subjective

Table 8. Criteria and indicators for PFES monitoring and evaluation, as set out in Circular 20.

Checking criteria	Indicators and payment rules
1. Forest areas	Forest that is not degraded or is slightly degraded and still eligible to provide the forest environmental service: will be verified as satisfactory and 100% of its value paid
	Forest area that is degraded (including by harvesting, cutting, encroachment, fire, illegal conversion, damage caused by disaster, etc.) and unable to provide the forest environmental service: will be verified as unsatisfactory and no payments made
	Minutes of verification decision for the validated forest area providing the forest environmental service
2. Forest quality	Identify the appropriate K-coefficient (to be decided by the validating agency)
3. Identification of forest	Defined as an ecological system mainly consisting of long-term tree and cocoa species with a height of at least 5 m (excluding new plantation forests and mangrove forests) or bamboo species, which can provide timber and non-timber forest products and has direct or indirect values such as biodiversity conservation and landscape conservation Plantation forest is defined as a plantation forest or newly regenerated forest after harvesting of plantation forest, with average tree height of at least 1.5 m for slow-growing species and 3.0 m for fast-growing species and a density of at least 1000 trees per hectare
	Canopy cover of the main species of the forest is 0.1 or more
	The minimum area is 0.5 ha. In the case of forest corridors, the corridor must be at least 20 m wide and with at least three rows of trees.

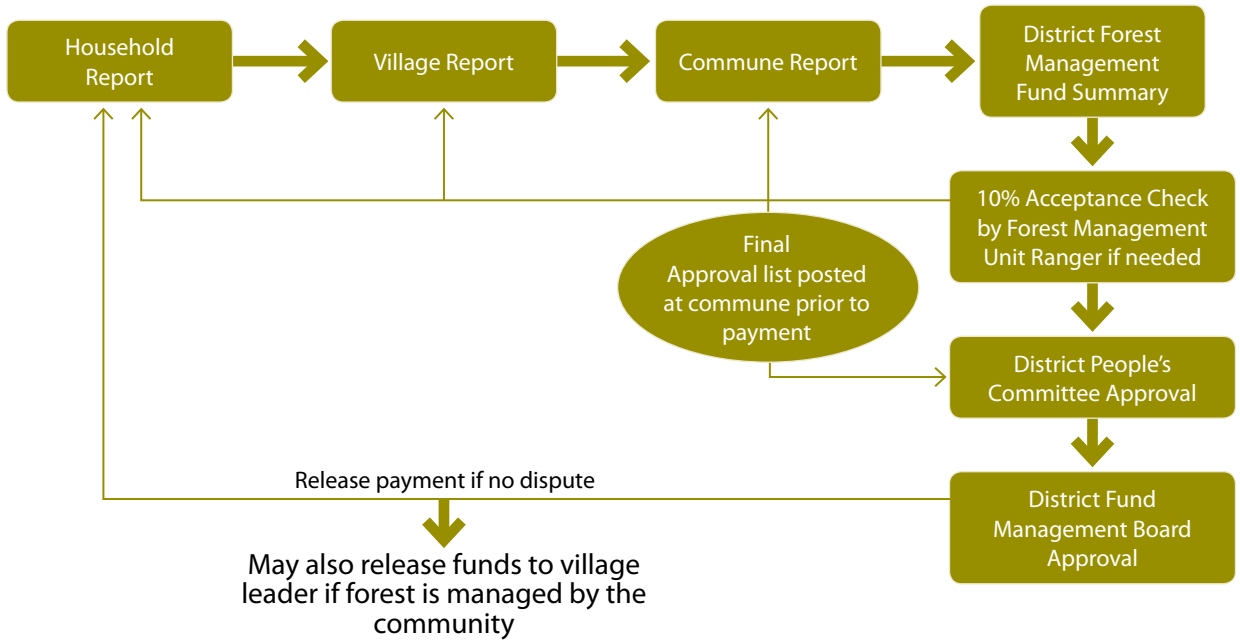


Figure 6. Monitoring and verification process.

perceptions and beliefs of household members, communities and provincial government staff, rather than presenting concrete scientific evidence of improvement or proof of a link between any improvement and PFES. Neither these reports nor any interviews compared the forest quality or condition before and after PFES, using clear and comprehensive criteria for the baseline.

All government interviewees from Son La admitted that they were not sure whether the forest quality had indeed been improved, as they have no data, and they noted an urgent need to carry out studies. In Lam Dong, studies by MARD (2009) and Lam Dong FPDF (2012) reported that government agencies and households interviewed claimed that PFES had helped to reduce the incidence of forest

violations by 10–20% (e.g., conversion of forest to agriculture, illegal logging, encroachment, etc.) and improve local livelihoods. However, it is unclear to what extent PFES contributed to these outcomes, as the province had also benefited from numerous government and international programs both on forest protection and development and on poverty reduction, and successes may be the result of previous programs. Moreover, data collected are subjective and, particularly in Lam Dong, are often contradictory.

Furthermore, MARD (2009) and Lam Dong FPDF (2012) reported a decrease in deforestation and forest degradation. By contrast, interviewees from CSOs and international NGOs that have projects in Lam Dong said that deforestation and forest degradation had continued to expand in the province because people had little capacity or incentive to undertake forest protection and illegal activities incurred only low penalties when prosecuted.

The lack of a clearly documented land tenure system is also problematic. Only if a province has clear records of what land each individual is responsible for can provincial FPDF officials tie a forest, its condition and the responsible owner to a piece of land. Marking ownership, forest areas and forest condition on a photo-based map (e.g., from Google Earth) and posting it in a public space in each community is one approach that makes clear exactly what PFES is funding and what each individual, household, community or organization is responsible for protecting. Disputes about boundaries need to be resolved before contracts are signed, which creates more transparency in making payments. All this information is fundamental for the conditionality intrinsic to PFES payments and, in its absence, deforestation and forest degradation may go unreported.

Monitoring of watershed protection services

As very few data on the effect of different land uses on runoff and erosion in Vietnam are available, further work is needed to measure the quantity of each kind of service from each land use and vegetation type. Knowing these values would improve the scientific basis upon which the amount and value of services are quantified and performance measured (Winrock International 2011). For example, the value of conserving 45,000 ha of pine forest in the Da Nhim watershed, rather than converting the area to agriculture, was found to be USD 3.75 million a year, with avoided erosion accounting for more than 80% of the projected values (Winrock International 2011). This estimate was made using the Soil and Water Assessment Tool, which, although technically sound, relied on a dataset that had been partly imported from an earlier study completed in an area in northern Thailand that had similar biophysical and socioeconomic conditions (Winrock International 2011). There is a need to establish a more complete and relevant dataset for establishing the values of water regulation and soil conservation services in Vietnam.

USAID (United States Agency for International Development), through Winrock International, funded four streamflow-gauging and sediment-sampling stations in Lam Dong Province. Analysis of the data from gauges in the first year clearly showed significant differences in the effect of different land uses on sediment delivery. The total sediment yield for a watershed with broadleaf forests was estimated to be 30 tons/km^{-2} and that for a watershed with pine forests was 47 tons/km^{-2}. The estimated sediment yield for a watershed with mixed agriculture and pine forest was 143 tons/km^{-2}, and the estimated sediment yield from a watershed with agriculture only was nearly 1200 tons/km^{-2}, or 40 times that of the broadleaf forest watershed (MacDonald 2011). Overall, the results show that the conversion of forests to agriculture will greatly increase sediment yields but will probably have relatively little effect on the amount or timing of runoff.

Collecting quality data on runoff and sediment yields in specific river basins is a challenging task. Although Lam Dong Department of Agriculture and Rural Development (DARD) staff have been trained in data collection, the equipment is not only highly sensitive and must be imported but also needs considerable technical skill to install, operate and repair, and then hydrology and physical science skills are required to analyze and interpret these data; as these skills are missing in Vietnam, especially at the province level, this type of monitoring is not sustainable. The Lam Dong provincial FPDF ran these stream gauges for a year at a cost of USD 25,000. However, they ended up removing the equipment because the gauges broke down frequently and no one in Vietnam knew how to repair them, and they could not get support

for monitoring nor could they afford the costs. Provincial authorities suggested that donor support be given to adapting equipment to Vietnamese conditions and properly training Vietnamese staff in their use, with coaching by international experts for the first few years; they noted that the Vietnamese government could assist by facilitating the transfer of knowledge from staff that have been trained in other countries to those that will have to carry out the monitoring over the long term.

The situation then is complex, and the real impacts of PFES will remain unclear in the absence of scientific and evidence-based investigation. Other monitoring methods that are more feasible in the context and hence more meaningful should be considered; options include assessing the use of best management practices to protect water quality, seeking direct evidence of soil erosion, and looking at what is happening in the landscape and the factors that lead to or inhibit runoff and erosion.

Monitoring of contracts

As of 31 December 2012, the VNFF and provincial FPDFs had signed 113 contracts for PFES for water protection services. MARD recently established a process for monitoring payments made to forest managers (Table 9). However, given the current institutional arrangements for monitoring environmental services contracts, this process is unlikely to be followed in practice because of various constraints, as listed in Table 9.

Article 3 of Joint Circular No. 62/2012/TTLT-BNNPTNT-BTC states:

> Forest environmental service users transfer payment quarterly according to conditions of [the] authorization contract; if payment is delayed, forest environmental service users have to pay additional interest based on total volume of delay[ed] payment [and the] basic interest rate regulated by Central Bank at the time of payment.

However, according to interviewees from both Lam Dong and Son La, this does not help address the problem because interest rates are generally too low (around 0.065% per year). Companies can reinvest PFES payments in their own businesses rather than paying the suppliers, and even if the government forces them to pay a late fee, they still profit more from delaying the payment.

The Son La FPDF signed contracts on forest protection with organizations as forest owners. These organizations readily signed the contract, but passively and without really understanding it. In Lam Dong, 30% of household members interviewed cannot read or write the Kinh language, so the head of the village signed the contract on their behalf. These household members claimed that that they do not understand what they have to do except that it involves a general commitment to protect the forest. They also admitted that they do not know why they received the money, what the source of the money is or how much money they are entitled to under PFES. Many households do not even have a copy of the contract. Our interviews in many districts and communes of Lam Dong and Son La revealed that no contract had been drawn up between the provincial FPDF and the suppliers. Water supply companies and hydropower plants interviewed claimed that they had only received a letter from the FPDF requesting them to pay PFES fees with no actual contract signed.

Although a verification process has been established, it is not being followed effectively. The current monitoring system actually creates a disincentive to report deforestation or forest degradation: if a landowner reports forest degradation, that landowner will not be paid. The use of independent third-party or participatory monitoring would eliminate some of these concerns. Currently, stakeholders do not know how to participate in monitoring, as the mechanism has not been well established. To be effective, verification should involve not only suppliers and intermediaries but also other stakeholders such as media outlets, CSOs, NGOs and, especially, buyers. In Son La and Lam Dong, representatives of the hydropower plant and water company said that they do not have the staff or time to participate in regular verification, but indicated that they would like to be a part of and get information from a verification board that meets once or twice a year.

Interviewees from both Son La and Lam Dong FPDFs also emphasized that even if suppliers are found to have violated contracts, there is no clear guidance on how to set about prosecuting or penalizing them. All interviewees who belong to village forest protection groups in Son La and Lam Dong said that they cannot arrest or punish

Table 9. Process for monitoring PFES payments to forest managers.

Steps	Challenges
Every year before 15 November, forest owners prepare an assessment of their forest protection performance (forest area, quality, logging, land conversion) and submit it to the head of the village.	People do not make accurate assessments and cannot produce their own reports. They too often rely on the village head to do it for them and often do not keep a copy. This is especially true among poor households and in Son La.
The head of the village consolidates reports from individuals and households and posts a public list of the areas for which households are receiving PFES payments for villagers to comment on.	Most villagers interviewed for this study said they were not aware of this requirement; most members of ethnic minority groups and older people in remote areas in Lam Dong and Son La cannot read or write and thus cannot access the list. Interviewees from Son La indicated that it is impossible for the village head to complete this assignment within 2 weeks given the distance between households and difficulties in measurement and that in practice this step was carried out by commune and district authorities.
If villagers make any comments, the head of the village first attempts to address them. If they are not addressed at the village level, the village head reports them to the Commune People's Committee (CPC). Before 30 November, the head of the village submits the list of forest managers and forest areas that are eligible for PFES payments, along with any unresolved comments from villagers, to the CPC.	Interviews with local government representatives and focus group discussions with household members revealed that no reports on villagers' claims had been made to the CPC. Provincial authorities in both Lam Dong and Son La are aware of many conflicts at the village level that are not reported to commune authorities because of corruption in the village management board, including the village head, and the village head does not report them. This leads villagers to mistrust local authorities. Moreover, neither the PFES village management boards nor their supervision units include regular community members, which means there is no channel for expressing grievances. Furthermore, most information about PFES is not publicized and people are not aware of their rights and responsibilities.
Before 15 December, the CPC monitors and measures forest areas in the commune that are subject to payment and sends the results to the district Forest Protection Unit. If there are any comments from households, individuals or communities, the CPC and the head of the village address them if possible. If a problem is still not resolved, the CPC sends a profile (including comments from households, individuals and communities and official documents) to the Forest Protection Unit. Before 31 December, the Forest Protection Unit finalizes data on forest areas under payment in the district.	Assessment is only conducted by commune officers and based on visual assessment, and little information is given to local households. Although few complaints have been officially reported, interviews conducted in Lam Dong and Son La revealed a high level of dissatisfaction among local people with the system that is not communicated to higher levels.

Source: MARD Circular No. 20/2011/TT-BNNPTNT, dated 7 May 2012, and authors' observations and interviews.

illegal loggers because they are often community members, family members and friends; as a result, such logging persists.

Legally, any complaints that are made and not resolved at the village level are transferred to a higher level, but this has never occurred, according to all interviewees in both Lam Dong and Son La. Interviewees from Son La FPDF pointed out that, as many people cannot read or write, they do not know how to report a contract violation or complain about inadequate verification by technical agencies, even if they wanted to. Generally, they said, people do not know their rights and their main contact is the village head; if the village head does not take a grievance to

a higher level, it is not dealt with. This lack of a formal channel for submitting claims and grievances serves to reinforce inequity among stakeholders.

Decree 99 sets out buyers' and suppliers' rights and responsibilities (Box 1). Buyers in Lam Dong are aware of their rights and reported that they had asked the FPDF for evidence that payments had been made to local households; they also checked with local households and communes to see if they had received the payment. By contrast, no household member interviewed in either Lam Dong or Son La was aware of these rights; rather, they tend to see the provision of PFES information as a personal favor by the village head rather than as compliance with the households' right to transparency.

Monitoring of financial flows and social impacts

Provincial FPDFs dominate financial flows, as they prepare the funding distribution plans and inform buyers and suppliers of the process. As buyers and suppliers are not involved in the process, they tend to be passive participants rather than fully engaged in the outcomes of the PFES scheme. In particular, they do not have information on how, why and from whom the funding is acquired or on the process for distributing payments.

Interviewees from hydropower companies in Lam Dong said that they find the PFES rate to be high compared with the cost of power production. However, according to Winrock International (2011), there are financial gains to be realized by protecting forests in the catchments of the hydropower companies, although those gains will only be realized in the mid to long term. Awareness of this and of the possibility that they could gradually pass on to their customers any additional future costs associated with the production and distribution of actual environmental services helped to alleviate the companies' concerns (Winrock International 2011). In addition, seminar participants pointed out that there is no evidence supporting the current PFES water and hydropower rates and that these should be modified based on clear scientific evidence.

Tran (2010) argued that PFES makes an important contribution to household cash income in Lam Dong and that poverty in the pilot area was 15% lower than the national standard for similar low-income households. However, that study was unable to demonstrate clearly how much of the income generated from forest protection and development payments comes from PFES. Moreover, the study considers local people's perceptions of how PFES has improved their livelihoods without conducting a thorough analysis based on concrete evidence of its actual impacts. In both provinces, benefit sharing seems to be marked by inequity and the inability of the poor to access PFES because of local elite capture and their lack of land titles (Pham *et al.* forthcoming; To *et al.* 2012).

As seen in these cases, therefore, Vietnam's PFES system for water protection services needs a clear and transparent system for tracking payments to ensure that individuals receive the payments they are due. Where communities have elected to spend a portion of their PFES funds on community betterment projects, community leaders need to be transparent in what they receive and how they spend that money. Because there is a lack of detailed guidance on how to use the money received from PFES, money is not spent directly on forest protection and development (Son La FPDF 2012).

Box 1. Rights of environmental service suppliers in law and practice.

Suppliers have the following rights:

- to request users of forest environmental services (in the case of direct payment) or the provincial FPDF (in the case of indirect payment) to pay for use of forest environmental services as stipulated in Decree 99
- to be informed of the value of forest environmental services
- to participate in the monitoring of state agencies' payments for forest environmental services.

Organizations that are forest owners also have the right and obligation, under the Forest Protection and Development Law, to request revision of the K-coefficient (a payment coefficient determined by forest owner, type of forest, origin of forest and the level of difficulty or easiness of forest protection).

Source: Decree 99/2010/ND-CP by Vietnam's Government on the Policy for Payment for Forest Environmental Services.

4.2 Landscape beauty and biodiversity

Highlights:

- Only Lao Cai and Lam Dong Provinces have introduced PFES schemes based on landscape beauty services, under Decree 99, with contracts with tourism companies. Other provinces have only piloted tourism-related PFES schemes.
- It is often difficult to collect PFES fees from commercial companies because of their strong political power (ability to lobby local authorities to avoid paying PFES fees) and lack of transparency (e.g., unclear bookkeeping, no public disclosure of revenue by large companies, lack of bookkeeping by smaller enterprises such as homestay accommodations).
- Lack of clarity in law enforcement guidelines reduces buyers' willingness to pay, thus undermining the effectiveness of PFES.
- Willingness to pay differs between groups, often according to the amount of revenue generated (the higher the revenue, the higher the willingness to pay), the basis of payment (e.g., whether payments are calculated based on revenue from entrance fees or from overall profits), the buyer's awareness and understanding of the value of environmental services (large companies with dedicated public relation campaigns are more willing to pay) and the quality of the working relationship between the company and the fund. It may also be influenced by how the fund can support buyers and reinvest the money to help them.
- Buyers may not appreciate how landscape beauty contributes to their business. Tourism PFES is difficult to apply and controversial because of the wide range of stakeholders, types of operation and complicated supplier–broker–buyer relationship.
- Empirical evidence demonstrating the effectiveness of benefit-distribution systems in tourism PFES pilot projects is lacking.
- No monitoring and evaluation system for landscape beauty and biodiversity conservation services is in place. The conditions for making payments for landscape beauty services remain unclear.
- One of the many challenges for PFES is to define which service users should be responsible for making payments. In the case of national park authorities, for example, the buyers are also sellers, which complicates the PFES scheme.

4.2.1 Institutional setting

Few PFES contracts are operating in the tourism sector, so revenue generation is limited

Decree 99 creates an opportunity for tourism-related PFES schemes in Vietnam and offers a possible solution to poverty in many areas. However, as of mid-2013, only two provinces (Lao Cai and Lam Dong) had introduced payments for this type of environmental service under Decree 99, with 21 contracts signed with tourism companies (4 in Lao Cai and 17 in Lam Dong) and about USD 26,000 in revenue collected (Central Forest Protection and Development Fund 2012). The main reason the tourism industry has so few PFES contracts is the lack of detailed guidelines on the collection and disbursement of payments. To resolve this, MARD plans to prioritize the collection of payments for tourism in 2013 and provide the support and guidance requested by provincial FPDFs. Other provinces are testing tourism-related PFES schemes under Decree 99 (Table 10).

In Decree 99, PFES for tourism is envisaged as generating payments through two main channels: commercial tourism companies (accommodation, transportation, tours) and national parks and protected areas (Figure 7).

Challenges in collecting PFES money from commercial tourism companies

Commercial tourism companies appear to be a potential source of substantial revenue, but collecting PFES fees from them is often difficult because they wield strong political power, and so can lobby local authorities to avoid paying the fees (Pham *et al.* 2009). In addition, their accounting systems tend to lack transparency (e.g., unclear bookkeeping, no public disclosure of revenues of large companies, no bookkeeping by smaller enterprises such as homestay accommodations) (Hoang and Do 2011).

Decree 99 requires tourism companies to pay 1–2% of their revenue to the provincial FPDF. However, in practice, as found in Lam Dong Province, tourism companies have successfully lobbied the PPC to be allowed to pay 1–2% of their total entrance fees rather than of their total revenue.

Table 10. Pilot PES schemes for landscape beauty in Vietnam.

Province	Donor (purpose)	Mechanism	Buyers	Suppliers	Year
Lam Dong	Winrock International (support PES pilots)	All tourism companies pay 1% of their entrance fees to the FPDF.	Large-scale tourism businesses (eco-parks, accommodation)	Households and communities	Since 2008
Quang Binh	German Agency for International Cooperation (GIZ) (support implementation of Decree 99)	PFES fees are passed on to tourists through the entrance fee.	Tourism companies (accommodation, tours), excluding small businesses such as boat operators and souvenir vendors	Phong Nha Ke Bang National Park	2012
Bac Kan	World Agroforestry Centre and GIZ (support implementation of Decree 99)	Boat cooperatives and accommodation and tour companies pay the Ba Be trust fund.	Tourism companies (accommodation, tours), excluding small businesses such as boat operators and souvenir vendors	Ba Be National Park and local communities	2010

Source: O'Callaghan (2008), Dang *et al.* (2011), Patterson and Burns (2011).

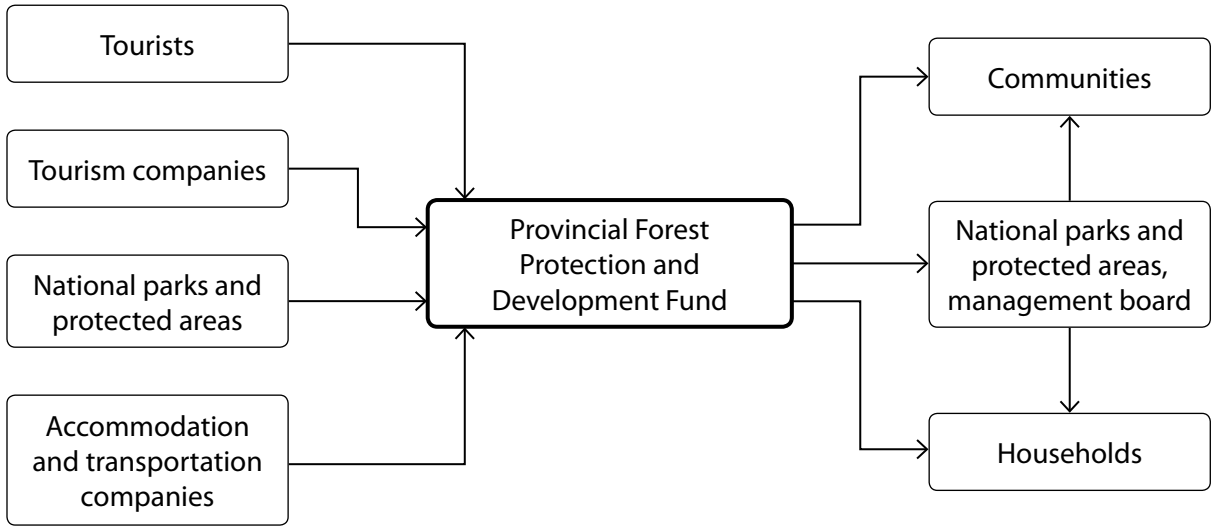


Figure 7. Institutional design for payments for landscape beauty services.

According to interviewees from the Lam Dong government, this amount does not reflect the value of the environmental services used. For example, in Lam Dong, an interviewee from a commercial tourism company revealed that the company was earning USD 500,000 a year thanks to forest environmental services; that revenue had come from entrance fees, accommodation, restaurants, rentals and other activities such as the game center and horse riding (Box 2). However, as the PPC had required the company to pay only 1% of revenue from entrance fees, their payment was only VND 600,000/year (USD 28.57/year; in total, VND 60 million or approximately USD 2900 in

Box 2. Examples of charges by tourism companies in Da Lat, Lam Dong Province.

- Entrance ticket: 20,000 VND (USD 0.95)
- Horse riding: 150,000 VND/hour (USD 7)
- Boat tour around the lake: 200,000 VND/hour (USD 9.50)
- Photograph wearing indigenous traditional dress: 30,000 VND (USD 1.50)
- Car rental (to the top of the mountain): 500,000 VND (USD 24)

entrance fees had been collected in 2010) or 0.6% of what should have been collected.

Although some tourism companies in Lam Dong had persuaded the PPC to charge PFES fees based only on revenue from entrance fees, many tourism companies in other provinces (e.g., in Nha Trang) opposed this approach. In Lam Dong, entrance fees are low and tourists pay extra for other activities, such as horse riding. However, in Nha Trang, the entrance fee is relatively high, at around VND 400,000 per person (for example, at Vinpearl) and includes all activities. These companies oppose the requirements in Decree 99 and delay making payments (personal communication from Pham Van An 2012).

As seen, willingness to pay differs between groups, often according to the amount of revenue generated (the higher the revenue, the higher the willingness to pay), the basis of payment (e.g., whether payments are based on revenue from entrance fees or from overall profits), the buyer's awareness and understanding of the value of environmental services (large companies with dedicated public relations campaigns are more willing to pay) and the quality of the working relationship between the company and the fund. It may also be influenced by how the fund can support buyers and reinvest the money to help their businesses. In the absence of clear rules for law enforcement, the effectiveness of PFES for tourism depends on buyers' willingness to pay, and its efficiency depends on the scale of the businesses. Many small businesses are not registered and the tax office and local authorities do not know their revenue (GIZ 2012), which makes it difficult to quantify the profit earned from the exploitation of landscape beauty and biodiversity.

Challenges in demonstrating the contribution of environmental services to tourism

Another difficulty is that companies are often not fully aware of how the landscape beauty contributes to their business. Tourism PFES is very difficult to apply and controversial because of the wide range of stakeholders, the types of operation and the complicated supplier–broker–buyer relationship. The end effect is that stakeholders do not trust the concept of PFES. For example, an interviewee from a tourism company in Lam Dong denied that PFES has any additionality, stating that as the forest does not itself attract tourists, it is not clear how forest environmental services contribute to the sector. Training staff of provincial FPDFs so they can articulate the value of environmental services is necessary if tourism PFES is to progress.

Who are the buyers?

Decree 99 lists a diverse range of buyers of landscape beauty services. GIZ (2012) warned that the scale of business should be taken into account when defining potential buyers. The involvement of small businesses means that the cost of identifying buyers and enforcing their compliance with PFES might exceed the actual payment received, particularly in the case of local souvenir vendors and boat operators. From a cost-efficiency perspective, it might be more reasonable to take an alternative approach for small businesses, such as family-run homestays.

Although both commercial tourism companies and national park and protected area authorities are running tourism enterprises, the debate on tourism PFES at the central level is limited to national park and protected area authorities, which play an important role in the scheme. GIZ (2012) and tourism companies in Lam Dong pointed out that the role of national park and protected area authorities in the payment process is unclear and may vary depending on how the PFES scheme is set up. National park and protected area authorities and forest organizations are established in law as forest managers; as such, they are seen as suppliers of environmental services and are thus entitled to receive PFES payments. However, at the same time, they generate revenue through tourism, which makes them also buyers

of environmental services. In addition, as they often contract households to protect forests, they can also be considered intermediaries or brokers channeling PFES payments to forest managers, in which role they are entitled to keep 10% of each PFES payment to cover their management costs. It is therefore important to balance the benefits that national parks gain for the services they sell with the payments they should be entitled to receive as suppliers of an environmental service.

In Vietnam, profits from tourism in national parks and protected areas are often low. Their lack of funding for marketing and for facilities such as accommodation and restaurants makes it harder for them to attract tourists (Pham *et al.* 2009). In addition, tourism differs from one province to another, which makes it difficult to apply a uniform rule. Whereas tourism is booming in some locations, such as Nha Trang and Lam Dong, where it is year-round, the industry remains underdeveloped in others, such as Bach Ma and Ba Be National Parks, where tourism is more seasonal (mainly summer only). Given the low willingness to pay among tourism operators and the absence of uniform rules for PFES, it might be more effective if each province designs its own approach to PFES for tourism.

According to Butler's (1980) theory, over time, landscapes become less attractive and less able to compete with other areas, as visitor numbers increase and carrying capacity is exceeded. Each tourist area passes through a number of stages (Figure 8), and understanding which stage a site is at will be useful for designing effective PFES schemes that can support both the tourism industry and environmental protection (Table 11). Depending on their institutional setting and stage of tourism development, national park and protected area authorities can consider various options, as summarized in Box 3.

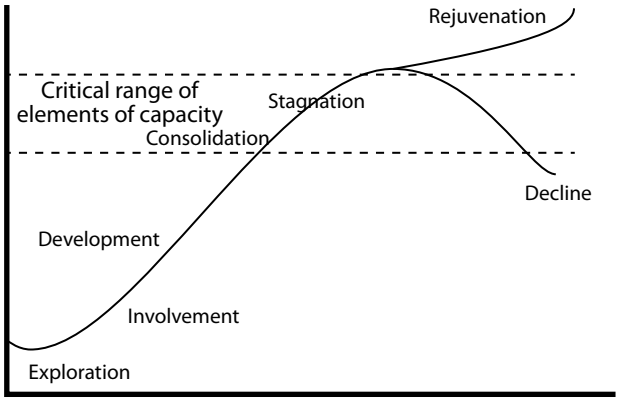


Figure 8. Theory of evolution of tourist areas.
Source: Butler (1980)

Table 11. Implications of the tourism cycle for PFES.

Stage (examples)	Nature of development	Implications for PFES
Exploration (Nui Chua National Park in Ninh Thuan Province, Co To Island)	The site is mostly unknown or not considered attractive and has little or no development; only a few businesses exist. Landscape beauty is appreciated only by local people, and tourism services and facilities are used and owned by locals.	Tourism has little impact on environmental services, and direct payment based on negotiation between buyers and suppliers should be promoted; indirect payment using the FPDF would be inefficient and ineffective.
Involvement (Ba Na Hills in Da Nang, Ba Be National Park, Bach Ma National Park)	A tourist season is emerging, requiring at least those local residents involved in tourism to adjust their social pattern. Local entrepreneurs are coming to appreciate the economic value of tourism and are beginning to provide tourist facilities and services; tourist numbers are increasing; jobs are being created for local people; production of local handicrafts and art objects for sale to tourists is increasing. Pressure may be placed on the public sector to provide infrastructure, and a seasonal pattern is emerging. The community is beginning to adapt to the tourist trade, and advertising to attract tourists can be anticipated.	Direct negotiations for PFES could be easier to establish at this stage, as the state and companies require people and national parks to carry out sustainable planning and management for the landscape, and in return, the government and companies could invest in infrastructure and job training for local people. The national park entrance fee could be increased slightly.

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Table 11. continued

Stage (examples)	Nature of development	Implications for PFES
Development (Phong Nha Ke Bang National Park, Trang An in Ninh Binh)	A tourist market area is well defined; local involvement in and control of development is declining rapidly. Some locally provided facilities disappear, superseded by larger, more elaborate and sophisticated facilities provided by external organizations, particularly for visitor accommodation. Natural and cultural attractions are developed and marketed, and the original attractions are supplemented by imported facilities. Changes in the physical appearance of the area are noticeable, and it can be expected that not all of them will be welcomed or approved by all of the local population.	As the sites have been developed with a large number of tourism enterprises, additional charges can be imposed on tourists. At the same time, tourism services suppliers can be required to pay 1–2% of their profits for environmental services. Direct payment should also be promoted as part of companies' social responsibilities.
Consolidation (Ha Long, Cat Ba)	A major part of the area's economy is tied to tourism. Marketing and advertising are far-reaching, and efforts are made to extend the visitor season and market area. Major tourism franchises and chains are represented, but few if any additions are made. The large numbers of visitors and the accommodations and other businesses catering to them can be expected to arouse some opposition and discontent among permanent residents, particularly those not involved in the tourist industry, and to result in some deprivation and restrictions on their activities. The rate of increase in the number of visitors declines, although total numbers are still on the rise and exceed the number of permanent residents.	Additional charges can be applied to tourists, and tourism services can be required to pay 1–2% of their profits for environmental services. Direct payment should be promoted as part of companies' social responsibilities.
Stagnation (Sa Pa)	The peak number of visitors has been reached. Capacity levels for many variables have been reached or exceeded, with attendant environmental, social and economic problems. The area has a well-established image but is no longer in fashion. Tourism relies heavily on repeat visits, conventions and similar forms of traffic. Natural and genuine cultural attractions have probably been superseded by imported artificial facilities. Ecosystem services are in decline, resulting in diminished ability to support the local community.	Additional charges can be applied to tourists, and tourism services can be required to pay 1–2% of their profits for environmental services. Direct payment should be promoted as part of companies' social responsibilities.
Decline (Tam Dao National Park, Cuc Phuong National Park)	The area is unable to compete with newer attractions and the market is declining, both spatially and numerically. It no longer appeals to vacationers but is used increasingly for weekend or day trips, if it is accessible to large numbers of people. Property turnover is high, and tourist facilities are often replaced by non-tourism-related structures as the area moves out of tourism. This has a cumulative effect: as tourist facilities disappear, the viability of remaining facilities becomes more questionable.	Transaction costs to collect payments could increase in relation to payments collected. Direct negotiations could be undertaken with lower transaction costs to encourage local people to improve environmental services.

Adapted from Patterson and Burns (2011) and Butler (1980).

Box 3. Fee options for national parks and protected areas.

- Entrance fee: A one-time fee upon entry to the park (with higher rates for foreigners than nationals) is current policy in many national parks, including Ba Vi, Cuc Phuong, Ba Be, Cat Ba, Bach Ma and Cat Tien. Fees can also be charged for admission to specific sites, trails and visitor centers.
- Use fee: This can be charged for renting equipment, such as ropes, helmets, tents and anti-leech socks.
- Guide license: Private guides pay to bring clients into the park. Licenses are often also contingent upon completion of a training course provided by the park.
- Service fee: This can be charged for use of park-employed guides or vehicles. Visitors are often more willing to pay for greater expertise, so it can be helpful to use a junior/senior/expert guide ranking system.
- Fishing or hunting license: This is usually issued on a per-day basis for fishing and a per-animal basis for hunting.
- Parking fee: This is most suitable for parks that have public roads passing through them.
- Sales tax: This can be levied on souvenirs, lodging, and food and drink purchased within the park.
- Offset fee: Tourists calculate their carbon footprint based on their travel itinerary at the park, and contribute to a fund to reforest an area of the park to offset emissions. Additionality and the opportunity for tourists to see the place where their offset is having an impact are advantages. Online calculators can be used to estimate the carbon footprint.
- Property license: This can be applied to souvenir products with a logo or trademark that incorporates the park name.

Source: Patterson and Burns (2011), adapted from Butler (1980).

4.2.2 Benefit sharing

As the concept of tourism PFES is relatively new in Vietnam and elsewhere (Hoang and Do 2011), the best design for a benefit-sharing system is yet to be determined. Empirical evidence demonstrating the success of benefit-distribution systems in tourism PFES pilot projects is lacking. Of the four environmental services listed in Decree 99, tourism has the highest level of financial leakage, because tourism investors often export their profits outside the protected area, province, region or even nation, providing little return to local communities (Patterson and Burns 2011). However, PFES programs are intended to boost the incomes of households in and around the park and thereby replace activities that would otherwise degrade the park landscape, natural assets and biodiversity, such as clearing forest for agriculture, excessive commercial exploitation of non-timber forest products, poaching and grazing. Therefore, a principal determinant of the effectiveness of a tourism PFES program is the extent to which revenue generated from tourism remains inside the local economy (Patterson and Burns 2011).

Pham *et al.* (2009) found that in Nha Trang and Hue, transaction costs were higher because of conflicts between stakeholders; for example, the provincial departments and the marine protection area management board did not work well together because of competing roles and functions. Buyers are particularly concerned about the role of government in collecting and disbursing the PFES money, especially about transparency and accountability (Padilla *et al.* 2005).

The tourism industry offers much potential for increasing economic activity, and it is often expected that members of households in and around protected areas will benefit from both direct employment and indirect employment, such as providing the food, souvenirs, furniture or other materials that are used in tourism. Therefore, PFES payments should take the form not only of cash but also of relevant in-kind benefits. For example, in Bac Kan Province, where monetary incentives are too small to support forest protection and development, the use of non-cash incentives should be given more attention, especially considering local budget constraints (Hoang and Do 2011). However, the choice of

cash or in-kind rewards should be based on local determinants and sensitivity to the specific poverty context; understanding how local communities use their financial assets can inform this decision (de Groot 2011).

Tourism operators and other intermediaries normally capture the bulk of the payments from their customers, with little going to the land stewards (Padilla *et al.* 2005). An appropriate benefit-sharing mechanism needs to be established to ensure equity for service suppliers. Furthermore, some businesses, such as vendors and boat operators, begin their tourism operations as an alternative to exploiting natural resources for income and charging them a fee may create unnecessary conflict. The scale of each business should be taken into account when defining potential buyers.

4.2.3 Monitoring and evaluation

No monitoring and evaluation system for PFES for landscape beauty and biodiversity is in place. It remains unclear under what conditions service suppliers are eligible to receive PFES payments. For PFES, it is important to measure "additionality", which is the extent to which environmental services have been improved compared with business as usual. It is, therefore, critical to set the baseline, trajectory and definition of success to be used to measure the effectiveness and efficiency of the program (Patterson and Burns 2011). For tourism PFES, this baseline could include estimates of acreage, landscape condition (photos or quantification), species and land cover assessments, water quality assessments, and other types of information that can help to establish the baseline and expected trajectory for biological diversity and ecological health (Patterson and Burns 2011).

Households under contract with the protected area management board are also entitled to benefit from PFES, under Decree 99. To ensure equity for these stakeholders, forest inventory and contract development should be conducted in full and according to set procedures. Attention should also be paid to ensuring that individuals and organizations that contributed to forest protection receive payments for their services. In addition, income from forest protection activities needs to be high enough to encourage households to participate.

4.3 Spawning, feeding and natural breeding resources

Highlights:

- Six policy options for methods and levels of payments for mangrove and inland forests have been proposed: revenue, cost–benefit ratio (total present value of benefits to total current costs), fixed payments, forest area-based payment, volume of water used and certification.
- The first five options involve a top-down approach in which the level of payment is set administratively. In these approaches, the state functions as fee collector and law enforcer, which will entail major investment in the operation of government organizations.
- In the sixth option, certification, buyers and suppliers directly negotiate the terms of the contract and the level and methods of payment. The state mainly serves as facilitator and referee, so operating and transaction costs can be minimized.
- The monitoring and evaluation systems that have been proposed are problematic. First, the large number of indicators to be assessed makes it difficult and costly for local authorities to carry out monitoring and evaluation. Second, some criteria are not relevant to the performance of environmental services.
- Quality data collected on a regular and timely basis are essential not only to enable accurate evidence-based analysis and policy recommendations but also to monitor compliance. The availability and accuracy of data remain major challenges for monitoring environmental services related to mangrove and inland forests because of the number of actors involved and the large number of aquaculture species.

4.3.1 Institutional setting

According to Decree 99, "provision of spawning grounds, sources of feeds, and natural seeds [and] use of water from forest for aquaculture" is an environmental service that is eligible for payment under the national PFES scheme. Mangrove and inland forests are therefore eligible for PFES

schemes. Approaches for the two aquaculture subsectors associated with these forest types need to reflect the differences between them: mangrove-based aquaculture is mostly large scale and is concentrated in the Mekong and Red River Deltas, whereas inland aquaculture is small scale and is concentrated in the north and central highlands regions.

Although Decree 99 implies a general political commitment to implementing PFES for mangrove and inland forests, detailed guidelines on institutional and organizational arrangements are lacking. To address this gap, MARD, with financial and technical support from the IUCN, GIZ and CIFOR, has conducted numerous feasibility studies and consultations, from which six policy options for payment methods and level of payments have been proposed (Table 12).

This section highlights opportunities and constraints for the implementation of each option, trade-offs (both positive and negative) that these policy options would entail and the urgent need for a policy shift from traditional command and control to more participatory decision making for long-term economic and sectoral sustainability. It takes into account the governance of the forestry and aquaculture sectors (rules and the financial and human resources to enforce them) and public readiness to implement such policy options (understanding of PFES, willingness of buyers to pay and willingness of suppliers to provide).

Each policy option has pros and cons in terms of its practicality and its implications for achieving effectiveness, efficiency and equity in PFES; each also requires its own institutional and organizational setting. MARD plans to launch PFES pilot projects in mangrove areas in the next 5 years to determine the optimum policy components.

The first five of the six options involve a top-down approach in which the level of payment is set administratively. In the sixth option, certification, buyers and suppliers directly negotiate the terms of the contract and the level and methods of payment. In the first five options, payments are calculated using a simple formula, but numerous challenges remain with data collection (Tables 13 and 14).

Although there is no available study on buyers' willingness to pay in the context of aquaculture in Vietnam, experiences from the implementation of Decision 380 and Decree 99 indicate that the public has little understanding of PFES and buyers have low willingness to pay. As a result, people will be reluctant to participate and unlikely to comply with PFES policy. Convincing buyers to pay an additional charge will require strong evidence on the causal relationship between the protection of mangrove and inland forests and the productivity and revenues of aquaculture enterprises. Additional charges imposed need to reflect the scale and profit of the business. Implementation of PFES in the aquaculture sector will require regular and transparent financial management by households and enterprises, as well as strong collaboration between the tax department and MARD, which is not currently in place.

Although the role of inland and mangrove forests in aquaculture is widely recognized by the public and by decision makers globally (Hawkins *et al.* 2010; Bui 2012; Pham 2012), drawing up a contract between buyers and suppliers requires detailed information on the economic value of mangrove and inland forests for the specific aquaculture sector. This information is available for mangrove forests (Table 14) but is limited in the case of inland forests.

The value of environmental services provided by mangrove forests has been assessed in various areas throughout South and Southeast Asia. In establishing payment rates, how mangrove forests are used should be taken into account, as should the condition of the area (i.e., whether it is completely or partially deforested or remains as intact mangrove forests). The high range of values assigned to mangrove forests suggests that PFES payments will only cover a portion of the actual value of mangrove forests (IUCN 2007; Nguyen *et al.* 2010; DebRoy and Jayaraman 2012; Sathya and Sekar 2012). The PFES program then should incorporate not only economic incentives but also social motivations of local people. Lack of information on inland forests poses a great challenge to the establishment of a fair PFES payment level for suppliers and users of the aquaculture services of inland forests.

Table 12. Policy options for PFES in aquaculture.

Basis for payment	Mangrove forests	Inland forests	Buyers	Sellers
Revenue	For aquaculture and mollusk farming, 0.5–2% of total revenue For shrimp farming, 1–2% of total revenue		Aquaculture farmers, processors and exporters Suppliers of food and medicine to aquaculture People who exploit aquaculture resources	Organizations (government agencies or private sector) to which the government allocates or leases forests that provide water for aquaculture activities Forest management board; CPC Marine protected areas and national parks Individuals and households to which the government allocates or leases forests Communities
Cost–benefit ratio (total present value of benefits to total current costs)	For ratios from 1.1 to 1.5, 0.5% of profit For ratios from 1.6 to 2.0, 1.0% of profit For ratios of 2.0 or more, 1.5% of profit	Payments are 0.5–2% (L%-coefficient, a factor used to determine the amount of payment) of benefits in business period of aquaculture. Payment levels are regulated by the PPC	Mangrove forests: Those who carry out extensive farming, advanced extensive farming, intensive farming and semi-intensive farming Inland forests: Individuals, households and businesses that undertake aquaculture adjacent to forests, rivers, streams or lakes and use water from forests	Organizations (government agencies or private sector) to which the government allocates or leases forests that provide water for aquaculture activities Forest management board; CPC Marine protected areas and national parks Individuals and households to which the government allocates or leases forests Communities
Fixed payments	For aquaculture and mollusk farming, 1,500,000–7,000,000 VND/ha/year For people who exploit aquaculture resources (the poor or forest dependent), 100,000–200,000 VND/ha/year For shrimp farming, 250,000–1,500,000 VND/ha/year		People who exploit aquaculture resources Mollusk farmers Those who undertake extensive and advanced extensive farming, especially of shrimp	Organizations (government agencies or private sector) to which the government allocates or leases forests that provide water for aquaculture activities Forest management board; CPC Marine protected areas and national parks Individuals and households to which the government allocates or leases forests Communities
Forest area-based payment	This method is based on area of farming activities and exploitation. Equation: G = S×T G = payment S = area T = average payment level	Payments are 0.5–1% of land-use tax for forest area	Mangrove forests: People who exploit aquaculture resources and aquaculture households Inland forests: Individuals, households and businesses that carry out aquatic farming adjacent to a forest, river, stream or lake and use water from natural forests	Organizations (government agencies or private sector) to which the government allocates or leases forests that provide water for aquaculture activities Forest management board; CPC Marine protected areas and national parks Individuals and households to which the government allocates or leases forests Communities

Basis for payment	Mangrove forests	Inland forests	Buyers	Sellers
Volume of water used		Payments are 40 VND/m^3 water used	Aquaculture businesses, including farmers and processors, that are located far from natural forests but still use water from them	Organizations (government agencies or private sector) to which the government allocates or leases forests that provide water for aquaculture activities Forest management board; CPC Marine protected areas and national parks Individuals and households to which the government allocates or leases forests Communities
Certification	Decision should explicitly encourage certification as a mechanism to deliver PFES, allow for pilot projects to test the implementation of the decision, and avoid setting cost norms that pre-empt the results of the pilot projects.	Payments are negotiated and could be in kind or cash or a combination of the two.	Large-scale aquaculture processors and exporters, and consumers in environmentally sensitive markets	Organizations (government agencies or private sector) to which the government allocates or leases forests that provide water for aquaculture activities Forest management board; CPC Marine protected areas and national parks Individuals and households to which the government allocates or leases forests Communities

Table 13. Evaluation of PFES policy options for mangrove and inland forests.

Payment approaches	Mangrove forest	Inland forest	Pros	Cons
Revenue	For aquaculture and mollusk farming, 0.5–2% of total revenue For shrimp farming, 1–2% of total revenue		Ease of calculation as long as information about product price and area is available	Difficulty obtaining accurate data on revenue Difficulty quantifying revenue from forest environmental services because of complexity of businesses
Cost–benefit ratio	For ratios from 1.1 to 1.5, 0.5% of profit For ratios from 1.6 to 2.0, 1.0% of profit For ratios of 2.0 or more, 1.5% of profit	Payments are 0.5–2% (L%-coefficient, a factor used to determine the amount of payment) of revenues in business period of aquaculture. Payment levels are regulated by the PPC.	Ease of calculation as long as information about costs and revenues is available	Need for detailed bookkeeping records, which are often not available

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Table 13. continued

Payment approaches	Mangrove forest	Inland forest	Pros	Cons
Certification	Decision should explicitly encourage certification as a mechanism to deliver PFES, allow for pilot projects to test the implementation of the decision, and avoid setting cost norms that pre-empt the results of the pilot projects	Payments are negotiated and could be in kind or cash or a combination of the two	Market access becomes more reliable Experience with certification in clam cooperatives in Ben Tre Growing consumer demand for certified aquaculture products Alignment with current legal framework, vision and strategy in the sector Good documentation of rules and methods Alignment with strategic development of the sector	Lack of cooperation between households and private sector; fragmented supply chain
Forest area	This method is based on area of farming activities and exploitation. Equation: G = S×T G = payment S = area T = average payment level	Payments are 0.5–1% of land-use tax for forest area	Ease of calculation (only information on area is required)	Investment costs and business scale of buyers are ignored, leading to lack of protection for buyers
Volume of water used		Payments are 40 VND/m^3 water used	Appropriateness for buyers far from the forest Ease of calculation	Difficulty determining exactly how much water is used
Fixed payments	For aquaculture and mollusk farming, 1,500,000–7,000,000 VND/ha/year For people who exploit aquaculture resources (the poor or forest dependent), 100,000–200,000 VND/ha/year For shrimp farming, 250,000–1,500,000 VND/ha/year		Ease of implementation (no requirement for measurement or monitoring)	Unclear criteria for payments

Source: Brunner (2012); Bui (2012); Pham (2012)

Table 14. Effectiveness, efficiency and equity of proposed policy options for mangrove and inland forests.

Basis for payment	Mangrove forest	Inland forest	Effectiveness	Efficiency	Equity
Revenue	For aquaculture and mollusk farming, 0.5–2% of total revenue For shrimp farming, 1–2% of total revenue		Does not address the drivers of deforestation and forest degradation or change household and enterprise practices	Requires substantial time to collect information about revenue Has high transaction costs because of the large number of poor and small households and intermediaries	Investment costs, business scale and business risks of buyers are ignored; those who may incur losses still have to pay Could be perceived as unfair and generate resistance, given many households' financial constraints Marine fisheries supply chain is highly unbalanced with benefits captured mostly by processors and intermediaries; fishers' slim benefits leave them vulnerable to increased costs
Cost–benefit ratio	For ratios from 1.1 to 1.5, 0.5% of profit For ratios from 1.6 to 2.0, 1.0% of profit For ratios of 2.0 or more, 1.5% of profit	Payments are 0.5–2% (L%-coefficient, a factor used to determine the amount of payment) of profits in business period of aquaculture. Payment levels are regulated by the PPC	Does not address the drivers of deforestation and forest degradation or change household and enterprise practices	Has high transaction and transportation costs because of the large number of actors and intermediaries involved	Takes business risks into account Could be perceived as unfair and generate resistance, given many households' financial constraints Processing companies capture almost three quarters of the total net value-added in the chain
Certification	Decision should explicitly encourage certification as a mechanism to deliver PFES, allow for pilot projects to test the implementation of the decision, and avoid setting cost norms that pre-empt the results of the pilot projects	Payments are negotiated and could be in kind or cash or a combination of the two	Results in improved water and waste management and lower risk of disease and catastrophic crop loss Requires regular third-party monitoring for permanent improvements Strong incentive for compliance Easier and more effective to enforce with a small number of large companies[a]	Offers producers a price premium High transaction costs of working with thousands of small and scattered households High cost of complying with standards and paying for audits Demonstrated willingness to pay in international markets As a voluntary system based on market prices, less vulnerable to nonmarket influences Cost efficient as monitoring and evaluation are based on existing regulations and international requirements instead of requiring a new system	Accrual of a direct in-kind benefit (certification) and indirect cash benefit (higher prices) to the whole community or members of the cooperative Potential to be perceived as unfair and generate resistance, given many households' financial constraints Capture of most sector profits by processors and exporters (in the south) and intermediaries (in the north) Possibility that only landowners will be included, landless people (and presumably the poorest) will be excluded and farmers will be left landless

continue to next page

Table 14. continued

Basis for payment	Mangrove forest	Inland forest	Effectiveness	Efficiency	Equity
Area	This method is based on area of farming activities and exploitation. Equation: G = S×T G = payment S = area T = average payment level	Payments are 0.5–1% of land-use tax for forest area.	Does not address the drivers of deforestation and forest degradation or change household and enterprise practices	Limited number of large farm ponds (>2000 m^2) concentrated in the Mekong Delta; large number of small ponds (<5000 m^2) in the north and central highlands, incurring a high transaction cost for collecting fees; costs may outweigh benefits	Investment costs, business scale and business risks of buyers are ignored; those who may experience loss still have to pay Could be perceived as unfair and generate resistance, given many households' financial constraints
Volume of water used		Payments are 40 VND/m^3 water used	Does not address the drivers of deforestation and forest degradation or change household and enterprise practices	Technical requirement for water measurement can increase transaction costs	Investment costs and business scale of buyers are ignored, leading to lack of protection for buyers Could be perceived as unfair and generate resistance, given many households' financial constraints
Fixed payment	For aquaculture and mollusk farming, 1,500,000–7,000,000 VND/ha/year For people who exploit aquaculture resources (the poor or forest dependent), 100,000–200,000 VND/ha/year For shrimp farming, 250,000–1,500,000 VND/ha/year		Does not address the drivers of deforestation and forest degradation or change household and enterprise practices	Most efficient method as it does not require ongoing efforts to determine fees	Does not protect buyers in the case of disaster or disease

a By 2008, there were 544 industrial-scale processing enterprises, of which 414 had already applied GMP (Good Manufacturing Practices) and ISO (International Organization for Standardization) 14001. There are now 269 processing enterprises that have permits to export to the European Union, compared with 18 in 1999. Besides the state-owned enterprises, private export processing enterprises have developed rapidly in recent years; several have ranked first in export value and some have an export turnover of approximately USD 100 million per year. There are more than 300 companies in Vietnam related to the shrimp trade, among which 60 large companies cover more than 80% of export value and 120 companies reached export sales of USD 1 million for shrimp.

Source: Brunner (2012); Bui (2012); CIEM and University of Copenhagen (2010); Pham (2012); authors' observations.

The six policy options can be grouped into two PES approaches, user-led (certification) and government-led (the other five options), each of which has specific institutional and organizational implications. The selection of an option should depend on public preference expressed through participatory and transparent consultations, as well as on the objective underlying the option and its intended impact on the economy and sector development.

Prior to introducing a new government program, it is important to conduct regulatory impact analysis to provide a detailed and systematic appraisal of the potential impacts of the regulation, whether it is likely to achieve the desired objectives and whether regulatory costs may exceed the benefits. No such analysis of PFES policy on aquaculture in general or of the six PFES policy options being proposed has yet been undertaken. This paper does not intend to fill in this gap, for which more in-depth studies are needed, but rather aims to provide a general assessment of the possible impact of the six policy options on different actors and on sectoral development, using a "3E" framework (Table 15):

- *Effectiveness:* Will this policy help to sustain, protect and improve the quality and quantity of inland and mangrove forests and address the causes of the destruction and degradation of mangrove and inland forests?
- *Efficiency:* Will this policy be implemented in a cost-efficient manner?
- *Equity:* Will this policy have equitable impacts and involve equitable benefit sharing?

One important question concerns the expected outcomes of PFES for aquaculture. If the main objective of the policy is to generate additional funding to cover MARD's operating costs for the protection and management of mangrove and inland forests, then the five top-down options would be the most effective. If the main objective is sustainability and inducement of behavioral change, the market-based certification approach would be the most appropriate.

In certification, transactions are voluntary and the added value of the end product is conditional on maintaining strict standards of production (which means it is closer to the principles of PES than the other options). Furthermore, certification schemes do not depend heavily on valuation studies. Implementation of certification schemes is impeded by the following factors:

- Vietnam has no national certification body to coordinate efforts.
- Authorities in charge of issuing mandatory certificates of aquatic products have weak competency (CIEM and University of Copenhagen 2010).
- The chain of custody standards in Vietnam are weak, although improvements are beginning to be seen (CIEM and University of Copenhagen 2010).
- At least 10 certification schemes are applicable to Vietnamese aquaculture farmers, but fewer than 20 farmers or farmer organizations (out of 1 million aquaculture farmers) have been certified (CIEM and University of Copenhagen 2010). This small number is mainly due to the high cost of applying for certification and farmers' limited understanding of certification requirements and market trends (CIEM and University of Copenhagen 2010). MARD's own GAP (Good Agriculture Practices) program is still in its infancy and cannot cope with the increasing number of producers wanting certification so they can comply with standards under an ever-growing number of voluntary schemes (CIEM and University of Copenhagen 2010).

The other five policy options follow the conventional Vietnamese top-down approach in which fees are administratively set and collected without voluntary participation by buyers or suppliers. In these first five approaches, the state functions as fee collector and law enforcer, thus necessitating major investment in the operation of government organizations; the last approach focuses on improving the quality of environmental services, where the state serves mainly as facilitator and referee, which makes it possible to minimize operating and transaction costs.

From a national policy-making perspective, aquaculture should be seen in the context of the economy as a whole, in which case certification is the optimum option for several reasons. Since 2001, Vietnam has been one of the top 10 seafood exporters in the world, with an average growth rate of 10% per year (Directorate of Fisheries 2012). Despite this impressive growth, the industry has been hampered by persistent obstacles such as limited breeds, poor water quality and pollution in breeding nurseries, and overfishing. In addition, the increasingly strict social and environmental standards applied in major markets such as the European Union and United States are causing

the export value of Vietnamese products to decrease (CIEM and University of Copenhagen 2010). Vietnamese aquaculture products tend to target the lower end of the market and compete more on price than on quality, which not only generates only small profits for producers but also makes the industry vulnerable to oversupply, as in the case of *Pangasius* (CIEM and University of Copenhagen 2010). Vietnamese producers need to develop more sophisticated (value-added) aquaculture practices in order to access the international market, and investments are needed to fulfil the relevant (mandatory and voluntary) certification requirements (CIEM and University of Copenhagen 2010). To address these issues, the Prime Minister approved the Strategy for Aquaculture Development in Vietnam to 2020, which aims to turn the fishery sector into a commodity producer with prestigious brand names and high competitiveness by ensuring high environmental and social standards. The Overall Development Plan for Vietnam's Fishery Sector until 2020 with a Vision to 2030 focuses on stable and sustainable development and anticipates that the country's onshore and offshore aquaculture and seafood processing will be industrialized by 2020 and modernized by 2030 (Prime Ministerial Decision 332/QD-TTg, dated 3 March 2011, on Approval of the Aquatic Farming Development Plan to 2020). With this strategy in place, certification of Vietnamese aquaculture can become a reality.

Certification, with its aim of obtaining higher prices for products produced in an environmentally sound and socially sustainable way, creates a strong incentive for behavioral change in a way that law enforcement alone cannot achieve. A well-designed PFES strategy can influence sustainable development of the aquaculture sector by creating an additional economic incentive for local people to protect forest and meet international environmental standards. The PFES program cannot be viewed as just an additional tax or charge for the use of mangrove forests and water from inland forests.

Two remaining questions for implementation in Vietnam, then, are how certification can be scaled-up and whether the government is ready to shift from a command-and-control approach to a more market-based approach.

Some stakeholders have suggested that certification could be limited to the Mekong Delta given that aquaculture production is concentrated there. However, we argue that it should be applied across the country, because the only differences between the north and the south are the incentives provided and the scale required to embed PFES.

The main incentive for certification and PFES in the Mekong Delta is likely to remain the possibility of entering the international export market, which is not a competitive advantage for cold-water aquaculture. Nevertheless, the domestic market for feed and freshwater fish could also motivate PFES certification in the inland aquaculture sector. Feed is the main cost component of aquaculture production, but traditional homemade feeds made from caught inland and marine "trash" fish, which were formerly widely used by fish farms in Vietnam, have been replaced by imported manufactured feeds because of increased availability and growing concerns about quality and efficiency (CIEM and University of Copenhagen 2010). Currently, more than 70% of manufactured feed is imported. This reliance on the international market is risky, and increasing domestic inland capture for feed is likely to be a sustainable and long-term development for the sector. In addition, the domestic market for freshwater fish is expected to increase steadily (CIEM and University of Copenhagen 2010) because of growing public awareness of the health benefits of fish consumption, the increasing importance of fish as a source of nutrition, increasing income and population growth.

Although certification has the potential to ensure sustainable and stable growth in the sector, it involves a long-term process; in the short term, other policies can help to generate funding and raise awareness among policy makers and local people. Researchers have predicted (CIEM and University of Copenhagen 2010) that not all producers will comply with certification in the near future, as the number of certification schemes and the breadth of markets and market demands will still allow for the marketing of conventional products. The other five policy options could provide a short-term solution and a transition to certification as they generate findings to inform the implementation of PFES and build capacity and awareness among government officials and service buyers and suppliers.

4.3.2 Benefit sharing

In aquaculture-related PFES, Pham (2012) identified one case in which a system of direct payments was set up between a forestry company and shrimp farmers. However, Pham (2012) recommended a system of indirect payments instead, where intermediaries collect the payments from buyers and then distribute them to environmental service suppliers, because of the large number of buyers (such as small-scale aquatic farmers) and the diversity of forest owners.

Under the five conventional policy options proposed, the provincial FPDF would act as intermediary to collect and distribute payments received from users. In the case of aquaculture, the provincial FPDF is the environmental service supplier and could reinvest a large amount of PFES revenue in improving the protection of mangrove and inland forests. Strategic reinvestment targeting improved forest condition that in turn boosts revenues from aquaculture might motivate buyers to pay PFES fees. Policy makers may consider applying lessons learned from the experience with Xuan Thuy National Park (Box 4).

In a bid to improve benefit sharing in this context, the UN Development Programme is supporting a 2-year project designed to generate revenue from clam farming in an area of 1000 ha in Xuan Thuy National Park. This project aims to remove legal barriers for benefit sharing and generate policy recommendations for PFES in mangrove areas. In addition, MARD issued Decision 1010/QD-BNN-TCLN, which sets up a 1-year trial for sharing revenues generated from the harvest of fish, clam seed, and medicinal plants and clam farming in mangrove and mudflat areas. The decision allows for local communities and the national park management board to negotiate the details of the benefit-sharing mechanism.

Box 4. Xuan Thuy National Park: Example of an early PFES program in mangrove forests.

The Vietnam Conservation Fund supported a small project on benefit sharing from natural clam seed and fishery resources in the mudflat areas managed by Xuan Thuy National Park. The park initially had problems with local people entering the core zone to collect clams, clam seed and fish. To solve this problem and to enhance management of the wetland ecosystem, a benefit-sharing project was piloted in the communes of Giao An and Giao Thien from 2007 to 2010.

Using a participatory approach, in which both local authorities and local people were involved, the following rights and obligations were established:

- Mudflats can be leased for clam farming at a cost of 25 USD/ha/year.
- Aquatic resources can be manually collected in accordance with the guidelines provided.
- No natural habitat may be converted and no destructive fishing practices may be used.

After 4 years, total revenue had reached USD 47,841 for Giao Thien commune and USD 110,358 for Giao An commune. Nam Dinh Provincial People's Committee oversaw the distribution of this revenue, which was allocated as follows: 80% to a local welfare fund, 15% to an environmental protection fund and 5% to the park to cover the operating expenses of the clam management board. However, because revenue is low and alternative funding is available, the park returned its share of the revenue to the communes.

On the one hand, results from this model are quite promising. It demonstrated that there is high potential to generate funds that can be used to enhance the management of the wetland ecosystem and conserve biodiversity. In addition, the contribution to the local welfare fund helps increase the income of the poorest residents and improve the livelihoods of all. This project demonstrated that local people were willing to pay for the sustainable use of local resources. On the other hand, however, Xuan Thuy National Park authorities did not agree with the share of revenue allocated to them. The park authorities had expected to receive 30–40% of the total revenue, which they had intended to use to manage the wetland ecosystem and conserve biodiversity. They also wanted to expand the use of this PFES mechanism to other areas of the park.

As the PFES program is scaled up, clear guidelines on benefit sharing will be needed to ensure equity among stakeholders. In addition, PFES payments collected from buyers could be used to support producers across the country in attaining certification. This could include providing technical assistance on mangrove conservation and development for small-scale producers so that they meet international standards, or creating a financial mechanism (such as low-interest microcredit) to help households and small enterprises cover the costs of applying for certification, complying with standards (both the initial investment and recurring costs) and carrying out auditing.

4.3.3 Monitoring and evaluation

It remains unclear what specific environmental conditions are actually targeted by developing a PFES scheme for the environmental service of spawning grounds and sources of feeds and natural seeds. A strong link between the environmental conditions being monitored and aquaculture production must be established. For example, poor water quality is said to be a major cause of mangrove degradation and the poor performance of the aquaculture sector (CIEM and University of Copenhagen 2010; Hawkins *et al.* 2010). Blocking of tidal fluctuations and changes to water chemistry and sediment regimes have been tied to reduced productivity of mangrove systems. For inland fisheries, linking upland forest condition to water quality, water regulation and sediment reduction, as in the case of watershed services, would be appropriate. In both cases, a clear practical monitoring scheme needs to be developed.

The choice of policy option also has implications for the monitoring and evaluation system and the costs involved. If the government adopts the certification approach, the monitoring and evaluation system would be based on existing certification criteria and indicators; this could potentially reduce the transaction costs. However, if policy is made based on any of the other five proposed options, the government would need to establish a new monitoring and evaluation system, which would entail relatively high transaction and operating costs.

Monitoring of environmental services related to aquaculture should be done jointly by the fishery and forestry departments. However, MARD interviewees claimed that weak coordination and competition between the two sectors are serious obstacles to joint initiatives.

The following monitoring and evaluation criteria have been proposed (Bui 2012; Pham 2012) and are currently being considered by MARD:
For mangrove forest protection and development:

- area (ha) of protection forest, special-use forest and production forest
- forest quality (growth rate of the trees)
- forest tree distribution
- generation of seedlings
- compliance with state regulations on logging and exploitation of protection and production forests
- number of people participating in forest protection meetings
- number of violations of regulations on forest protection and sustainable resource use
- farming status in the pond or status of wastewater drainage from animal pens to the pond
- number of poultry and livestock on the farm
- presence of a toilet by the river and shrimp farming area
- status of waste treatment
- use of chemical fertilizer for trees and crops
- presence of a coal cellar
- quality of record keeping.

For aquaculture:

- aquaculture area, production, productivity in the form of intensive, semi-intensive or advanced extensive farming, mollusks, eco-farming, and other forms
- cost–benefit ratio of each type of farming
- the amount of seed, feed and environmental treatment products used in each type of farming
- the percentage of the aquaculture area damaged by disease, storms, floods, storm surges, climate change or other factors
- time required to recover from damage
- support from the state or other organizations and individuals in case of damage.

Socioeconomic criteria:

- number of households, number of people providing the environmental services of spawning grounds, feeds and natural seeds from mangrove forest for aquaculture
- annual income from these environmental services

- number of households moving out of poverty thanks to the PFES policy.

These criteria are problematic for several reasons. First, the large number of indicators will make monitoring and evaluation difficult and costly for local authorities. Second, some criteria are not effective or are irrelevant to the performance of environmental services. For example, the number of people participating in forest protection meetings and the number of poultry and livestock on a farm are poorly defined indicators that have no link to improvements in the quality and quantity of mangrove and inland forests. Third, some indicators are impossible to determine, such as the number of households moving out of poverty as a result of the PFES policy.

Good-quality data collected on a regular and timely basis are essential not only to enable accurate evidence-based analysis and policy recommendations but also to monitor compliance. The availability and accuracy of data remain major challenges for monitoring environmental services provided by mangrove and inland forests because of the large number of actors involved and the large number of aquaculture species. This is further complicated by the fact that two incompatible data-collection systems are running in parallel: one conducted by the sector (now Fisheries Information Centre) and the other managed and controlled by the General Statistics Office in Vietnam. The sector data are more detailed and most fishery specialists view them as more accurate, but resources dedicated to data collection in the sector are far inferior to those of the General Statistics Office in Vietnam and, as a result, data are not always consistent or systematically collected (CIEM and University of Copenhagen 2010). Moreover, diversity in the sector is such that case studies offer the only way to accurately collect some types of fisheries data. Every year, multiple surveys and studies are conducted that are specific to one region, species or issue. Although these generate pockets of good-quality and detailed data, this information rarely finds its way to a central repository. Thus, it is strongly recommended that efforts be made to create one central clearing house for this information (CIEM and University of Copenhagen 2010).

Difficulties with contract monitoring and enforcement arise not only in drawing up contracts between service suppliers and fishery users but also in ensuring compliance with contracts, given people's low education levels and limited experience in cooperative management (CIEM and University of Copenhagen 2010). The lack of any enforcement or guidance and authority to levy fines for failure to comply further hampers PFES implementation. In most cases, monitoring and inventory of inputs and farming practices are not taking place in a systematic way (CIEM and University of Copenhagen 2010).

5 Discussion: From myth to reality

Highlights:

- PFES schemes in Vietnam do not meet all the conditions of a true PES scheme in that the design lacks a market-based payment system and payments lack strong conditionality criteria. However, the discussion should focus not on whether Vietnam's PFES policies are truly "PES" in Vietnam but rather on whether the PFES policies have a clear and coherent legal framework that can ensure good governance in public PFES schemes
- PFES per-hectare payment rates are calculated as the total PFES fee paid by buyers divided by the total area of forest protected. Using this method of calculation, watersheds with a higher percentage of forest area receive a smaller PFES payment/hectare, and watersheds with a lower percentage of forest area receive a larger PFES payment/hectare. Although the larger payments create a greater incentive for forest protection in areas with less forest, the lower payments stimulate land conversion in areas with more forest. Either way, buyers of environmental services gain little value from PFES because they pay the same rate regardless of the condition of the watershed. This finding suggests that PFES could be combined with other conservation programs to enhance overall watershed protection.
- "Bundling" environmental services would diversify funding streams, but the central government has shown little awareness of this or interest in doing so. Bundling environmental services would require mapping specific areas and collaboration among multiple government and NGO entities. The efforts would increase payments to suppliers of environmental services and reduce individual transaction costs.
- The PFES scheme does not clearly define buyers, sellers and intermediaries, and there is no accountable information exchange among these key actor groups.
- The absence of clear evidence that PFES is indeed helping to maintain and improve the environment raises questions about the effectiveness of the scheme and the level of equity between buyers and sellers.
- PFES contracts in Vietnam are difficult to enforce because all parties — buyers, sellers and intermediaries alike — have little understanding of the requirements and contracts, and the country has no accurate and consistent database on land use and forests.
- Social impacts of PFES appear to be mixed; credible data showing that PFES has a positive impact on local incomes are lacking.
- Mechanisms for financial flows and benefit-sharing mechanisms are in place, but the monitoring and evaluation system contains no clear grievance mechanism that guarantees grievances are handled in a timely manner without reprisals.
- An alternative FPDF board structure that includes not only designated government agencies but also NGOs, CSOs and local community representatives may improve PFES program delivery by increasing transparency.

5.1 PES or PES-like

Wunder (2005), having defined PES as consisting of voluntary, conditional transactions, observed that, in Vietnam, neither buyers nor suppliers voluntarily enter into PES contracts and nor are payments truly conditional (Wunder *et al.* 2005); rather, PES payments in Vietnam can be seen either as "performance-based forest-ranger salaries" or "unconditional minor welfare subsidies". Another observation is that those who plant and protect the forests are compensated for the opportunity costs of labor, not of land (Wunder *et al.* 2005).

However, an approach that combines PES and more traditional command-and-control tools (Wunder *et al.* 2005) might be the most suitable for Vietnam's PFES programs. Therefore, the discussion should focus not on whether PFES policies in Vietnam are truly "PES" but rather on whether PFES policies have a clear and coherent

legal framework that can ensure good governance in public PFES schemes.

The government of Vietnam, as the owner of the country's utility companies, was able to rapidly dictate the payment rate and the expectation that companies would pay, and it did not assess companies' willingness to pay or negotiate rates with them; this rather expedited Vietnam's introduction of PFES. Many countries, especially those where utilities are owned by private corporations, would not be able to do the same. However, the effectiveness of the existing PFES program is undermined by the lack of conditionality (i.e., where payments are made only when the service is delivered) — the feature that separates PES from tax and spending programs. Our analysis has revealed several places where the system needs improvement. Should such improvements be made, the system could certainly serve as a model for PES.

5.2 Institutional gaps

There can be no template for institutional arrangements, because each institution must reflect national and local realities, including political and geographic factors, and be integrated into existing legal and institutional frameworks, particularly those that govern ecosystems. PES arrangements also have to be compatible with related laws to avoid obstacles.

At the center of the institutional design for PFES in Vietnam are the national and provincial FPDFs. The FPDFs were created not simply to establish new institutions but rather to align the roles and responsibilities of existing institutions, both horizontally (between different environment-related sectors of government) and vertically (from national to local level). However, the advantages of separating functions and powers are that PFES specialists can be involved and that checks and balances are in place to prevent arbitrary decision making.

The complexity of the administrative arrangements is a major impediment to the efficient implementation of PFES in Vietnam. It was found that political interference had discouraged buyers of environmental services, especially tourism enterprises. In addition, PFES projects employ a top-down approach that disenfranchises the poor; it is difficult for local authorities and other local organizations to involve the poor in the design of PFES when buyers of environmental services and those designing PFES mechanisms are working to predetermined selection criteria and suppliers of environmental services have limited access to information. PFES case studies in Son La, Hoa Binh and Khanh Hoa Provinces reveal that both the distribution of payments or other benefits and project monitoring and reporting lack transparency (Pham *et al.* 2009). Finally, the high transaction costs of PFES programs reduce their efficiency.

Although Decree 99 contains guidelines for addressing these issues, putting them into practice is highly complicated. Two key institutional issues limit PES. The first is the strong risk aversion demonstrated by local officials who wait for guidelines from central government to protect themselves in case they make the "wrong" decision. This characteristic persists despite high levels of administrative decentralization. Second is the low accountability embedded in the system. For example, if an FPDF holds farmers accountable for maintaining forests, the farmers may in turn demand better performance from the FPDF. In these circumstances, PFES accountability runs counter to traditional systems. Based on this observation in PFES pilot projects, it is suggested that FPDF board membership be expanded to include not only the designated government agencies, as at present, but also NGOs, CSOs and local community representatives as an alternative model for PFES management.

Another shortcoming of PFES is the method of calculating PFES payments at a rate per hectare: PFES payment rates are calculated as the total PFES fees paid by buyers divided by the total area of forest protected. Using this method of calculation, watersheds with a higher percentage of forest area receive a smaller PFES payment per hectare, and watersheds with a lower percentage of forest area receive a larger PFES payment per hectare. Although the larger payments create a greater incentive for forest protection in areas with less forest, the smaller payments stimulate land conversion in areas with more forest. Either way, buyers of environmental services gain little value from PFES because they pay the same rate regardless of the condition of the watershed. This finding suggests that PFES could be combined with other conservation programs to enhance overall watershed protection. Some of the policy options worth considering are as follows:

- Evaluate the basis of payment rates for buyers, and compare the current fixed rate with an alternative adjustable rate based on a percentage of the revenue generated from the supply of electricity or water, similar to the approach of charging tourism companies.
- Determine whether payment rates should be based on the percentage of the watershed that is forested.
- Direct PFES funding to key areas that supply specific environmental services. For example, forests adjacent to streams could receive a higher level of payment for watershed protection than forests far from stream, or forests with high biodiversity value could receive a higher level of payment for landscape beauty and biodiversity services than forest areas that do not supply these services.
- Use some of the fees collected, or pair PFES with other government programs, to improve the overall health of watersheds, for example, by restoring forests or following soil and water best management practices in other land uses to reduce erosion and sedimentation.

5.3 Bundling payments for environmental services?

The current structure of the FPDFs allows for environmental services to be "bundled"; that is, complementary environmental services (e.g., carbon and watershed protection or biodiversity and carbon) can be purchased from suppliers at the same time and the FPDF serves as the focal point for PFES. At this time, environmental services are not being bundled, and each supplier is being paid at a single rate for forest protection. As payments for individual environmental services are usually low (Hawkins *et al.* 2010), bundling services could increase funds and may also motivate land managers to adopt new land-management strategies. Through bundling, the FPDF could diversify its revenue streams, support the resilience of the funding system and boost supplier engagement. Bundling environmental services would require strong collaboration among government agencies, NGOs, and local and international buyers of environmental services, but would lead to higher payments to suppliers and lower transaction costs compared with paying for each environmental service separately.

Land-management practices that aim to optimize one type of service may cause a reduction in another service. By developing a holistic strategy for land management, environmental services could be bundled for the greatest effect. For example, in the case of forest conservation, it may be appropriate to bundle watershed protection and carbon sequestration, and, depending on the forest location and condition, biodiversity payments may also be suitable. Fast-growing plantations in areas with little biodiversity value may receive payments for watershed protection and carbon sequestration services. In some cases, a shift in land-use practices could lead to the provision of new environmental services. For example, dams and reservoirs created alongside hydropower plants, such as in Dak Nong, have engendered aquaculture and irrigation farming.

Although lessons drawn from the case study can be generalized to all types of PFES schemes, the working details of each scheme are specific to an individual site and stakeholder group. However, the very immaturity of PFES in Vietnam, if subjected to timely analyses of its pitfalls, presents a great opportunity for shaping future schemes that will be able to provide the poor with long-term benefits from the market-based provision of environmental services, while also enhancing environmental quality.

5.4 Buyers and suppliers: Characteristics, relationships and definitions

As discussed in Section 4, hydropower plants, water supply companies and tourism operators function simply as fee collectors — intermediaries that pass the fees from one party to the next, with little to no effect on their financial bottom line. However, by then passing the fees on to the end users, these companies are neglecting their responsibility to maintain and improve the resources upon which their businesses depend. For example, representatives of hydropower plants interviewed in Son La claimed that all reservoirs and channels in Son La Province have to be cleaned out three times a year because the high volume of sedimentation greatly reduces their storage capacity. They could avoid this business expense if soil erosion were kept at natural rates through the application of best-practice land-management techniques. At the same time, although they claim not to have time to be actively engaged in monitoring of forest protection, they are interested in hearing the results at least

annually. From this a question arises: should the companies that rely on clean water for their business be sharing the costs of maintaining that clean water resource? No legal instrument allows them to share the costs and benefits derived from the delivery of environmental services. A policy change may be needed in this area to require companies to pay PFES fees upfront from their own revenues.

Another important consideration, as discussed in Section 4.1, is that the private sector in Vietnam is not homogeneous and private companies are often disadvantaged compared with state-owned companies when it comes to complying with PFES requirements. Therefore, a different approach to compliance should be taken for these companies.

It is worth noting that although many studies have analyzed the nature and characteristics of suppliers of forest environmental services in Vietnam, understanding of how buyers and end users perceive PFES remains limited. A company's business model (state owned, joint stock, private, cooperative), size, main sector and target market all have different implications for PFES design and implementation. In addition, recent fieldwork conducted by CIFOR in Dak Nong shows that buyers are likely to comply with PFES policies when FPDF staff have both good technical capacity and accountability.

Moreover, as Pattanayak *et al.* (2010) and van Noordwijk *et al.* (2012) argued, PFES must reflect longer-term societal values, rather than the economic mood of the day. Although PES schemes rely on financial incentives to induce behavioral change (Jack *et al.* 2007), the role of social motivation and persuasion and the interface of social motivation and the monetization of environmental services are important considerations (van Noordwijk *et al.* 2012).

Understanding the role of neighborhood networks, which are common in most rural areas in Vietnam, in encouraging farmers to participate in PFES would also be very useful, as this information could be used to stimulate local patterns of high and coordinated uptake of PFES, which could in turn boost ecosystem protection at a wider, landscape level. The way ecological concerns and market strategies are framed can influence how people perceive and relate to nature. Moreover, where collective action is initially driven by social, nonfinancial rewards, introducing monetary incentives can actually serve to weaken social norms and thus undermine collective action. There is a need, therefore, to understand how monetary and other types of incentives interact with pro-social motivation and collective action (van Noordwijk *et al.* 2012). Different groups and individuals will respond differently to price changes and exhibit different forms of market behavior, with behaviors shaped by whether decision making takes place under uncertainty, perceived risk, loss aversion or bounded rationality (Anderson 2006). Therefore, it is also important to understand how individuals make decisions under uncertainty, the importance of fairness and how individuals behave as part of the collective (Anderson 2006).

When designing a PFES scheme, it is important to understand what motivates each party; even more important when implementing the scheme is understanding how parties interact with each other. At their core, markets require exchange of information about willingness to pay and willingness to accept, and so the market mechanism necessitates that each side reveal information to the other. Salzman (2009) argued that landowners know best the opportunity cost of a specific land-use change and the price they are willing to accept to implement this change, buyers know how much they are willing to pay and government agencies know which land-use changes would be most beneficial for service provision. The design challenge is how to most efficiently transfer both types of information — willingness to pay or accept, and service provision resulting from a land-use change — from one party to another in a mutually reinforcing fashion (Salzman 2009). It is problematic that most end users (the public) in Vietnam are not aware that they are the true buyers under PFES. However, in Vietnam, information exchange between end users and suppliers is limited and needs improvement.

5.5 Are the benefits of environmental services obvious?

PFES monitoring should include monitoring of environmental services, contracts, financial flows and the socioeconomic impacts of the program, all of which are challenging in Vietnam.

Effective monitoring of environmental services requires knowledge of the biophysical pathway

of service provision, identification of the metrics that must be monitored to assess the quality of service provision, establishment of a baseline, and a method for analyzing the data to assess compliance and quality of service provision once the scheme is operating. None of these elements appears in Vietnam's PFES policies.

Key factors hampering efforts to monitor the provision of environmental services in Vietnam include lack of data (in the case of spawning, feeding and breeding resources, and landscape beauty), inconsistencies in data and unreliability of data (in the case of forest cover, forest condition, carbon sequestration and watershed protection), and poor capacity of government agencies to undertake monitoring, particularly at the local level. As a result, and given the high cost or even impossibility of measuring the environmental effects of a policy (Jack *et al.* 2007), the government selected forest cover as the proxy for most environmental services. However, this approach makes it difficult to identify clear links between actions and the environmental services provided (e.g., whether improving forest cover leads to improved water quality).

Even when PFES does result in the conservation of a greater area of forest, that additional forested area may not yield additional environmental services because ecosystem function is not the same as the provision of environmental services, even though the scientific literature and the general public often equate them (Sills *et al.* 2006). It remains unclear, for example, whether an increase in forest cover will cause an increase in the provision of water (as might happen, for example, with native forest conservation) or a decrease (as might happen with reforestation).

Watershed protection is often based on the assumption that reforestation of areas upstream of dams has the hydrological benefit of protecting hydroelectric dams from siltation; however, further research is needed to determine when or if such reforestation is the optimal land-use strategy (Wunder *et al.* 2005). Evidence on the alleged watershed benefits of forests in Vietnam runs contrary to common belief (e.g., the "forests increase runoff" myth) or is indeterminate ("forests increase dry-season flow") or, in the case of the belief that forests reduce erosion and flooding, the environmental service actually depends much more on general vegetation cover and its management than on forest cover (FSIV and IIED 2002).

Regardless of the exact extent to which forest conservation affects water yields in watersheds, in most provinces in Vietnam, the proportion of forest cover is low (averaging about 40%) and soil hydrological properties such as water infiltration, storage and release have been altered. The relatively small forest area may be particularly relevant when considering the role of forests in capturing moisture from clouds. For example, in areas of Southeast Asia, fog capture by forests accounts for 5% of the annual rainfall and 86% of the dry season (November–April) precipitation (Liu *et al.* 2004), making it an important ecological function of forests.

It may be more relevant to talk about changes in runoff and erosion that have resulted from land-use change rather than to try to interpret stream flows and sediment at the base of a watershed. It is well documented in the scientific literature that forest cover improves infiltration and that water storage and movement into and through soils is higher in areas with forest cover than with other land uses (Ziegler *et al.* 2006). Compared with other land uses, such as roads, agriculture or built-up areas, runoff of precipitation is much lower in forested lands and the high infiltration capacity can help to attenuate flooding up to the point that soil storage capacity is overwhelmed by storm size. These conditions could be mimicked through the application of proper conservation measures that retain soil organic matter and soil surface cover even with non-forest land uses. Forest cover itself has a multitude of values but should not be considered the only land-use option for providing the desired environmental services.

For most services, provision is heterogeneous. Certain landscapes provide greater levels of services than others because of the intrinsic environmental characteristics of each portion of the landscape. Factoring this into PFES requires a clear understanding of the biophysical pathway between landscape, land use, service provision and service delivery. Although monitoring that is based on inputs rather than outcomes could be easier to implement, devising appropriate proxies requires an understanding of the relationships between activities and ecosystem functions. Depending on the type of environmental service, proxies may

be relatively easy or difficult to use. For example, forest cover would be a good proxy to measure the impact of PFES on landscape beauty, but it is a weak indicator of improvements in water quantity and quality. The long-term viability of PFES may depend in part on advances in techniques for estimating the value, delivery and quality of environmental services using easily observable ecosystem properties. Whatever the method used, it must be able to take into account spatial variation and the landscape context, reflecting the fact that some sites are more important to water quality than others, but not be so expensive that transaction costs exceed the efficiency benefits of markets. This is important because PES schemes work best when the rules are simple and compliance-monitoring mechanisms are inexpensive, even though this approach may yield less information than buyers may demand or need.

Currently, PFES payments rely on reports by individuals, households, communities or organizations of their own success in protecting the forest. Forest protection officers check forest boundaries for compliance only if there is a dispute. The requirement of checking 10% of the contracted forest area for compliance, as stated in Circular 20, is not being fulfilled consistently. Forest conversion is the main trigger for nonpayment of a contract, although it has occurred only occasionally. No methodology has been established to determine activities that cause forest degradation and that would result in nonpayment. Forest patrols, paid for through PFES payments to forest management boards, look for evidence of tree harvest but it is unclear how, or whether, their findings are tied to payments.

PFES payments need to be tied to delivery of environmental services, but are currently linked to forest cover only. Yet, as discussed in Section 4, difficulties in determining forest baselines forest and ownership of forest are resulting in nontransparent and potentially unjustified payments. The minimum requirements to deal with this problem are clear delineation of forest areas, establishment of who is responsible for protection, and guarantees that that protection has occurred before any payments are released.

One of the premises of establishing PFES and requiring payments from water users downstream was that water quality would be enhanced and sedimentation of reservoirs and stress on turbines would be reduced. Specifically, Decree 99 lists soil protection, water regulation, and disaster prevention and mitigation in both headwaters and coastal areas as forest environmental values. We know that quantification of sediment from multiple sources in a watershed is extremely difficult. Delivery of erosion products to a stream system at the watershed scale is difficult to quantify because erosion can move from one place on a hill-slope and be stored in another place and never actually reach the stream system. We also know that much of the sediment moved in a stream is capture of sediment stored in the channel itself or from stream bank erosion (Hamilton 1987). We know that forests prevent accelerated runoff and sediment production from occurring, especially when compared with other land uses (Ziegler *et al.* 2006), and that cutting of forest can accelerate landslides in prone areas. Much of Vietnam's original forest has already been converted to other land uses. It is not the purview of Decree 99 to address soil erosion from non-forest areas, particularly agricultural lands in watersheds. Demonstrating that forests protected under PFES are indeed providing the environmental services encompassed by the program, namely those of reducing erosion and improving water quality, should entail local monitoring of hill-slope runoff and erosion under various ecological conditions, instead of relying on attempts to make estimates based on the stream channel or reservoir below. An appropriate methodology for the Vietnam context remains to be developed.

Another premise of establishing PFES, as defined by Decree 99, is to conserve biodiversity and carbon sequestration to support habitat and spawning grounds for various organisms and forest products. Although a map of forest areas that marks different types of forest could serve as a very coarse measurement of these values, there is no quantification of the services associated with each type of forest. Many provinces in Vietnam have Biodiversity Action Plans, yet it is unclear whether PFES is being used to implement any of those plans; the two programs need to be linked. Several groups (supported by the Asian Development Bank, Japan International Cooperation Agency or the Netherlands Development Organization) are developing field and GIS-based assessments of biodiversity and carbon storage; results from these studies should be evaluated for efficacy and incorporated into PFES monitoring.

Establishing forest and ownership boundaries is difficult, yet it is critical task and a first step to creating contracts. National forest inventory data do not have sufficient detail to be used at the local level. Provincial Forest Management Boards hire outside consultants at great cost to proof and update the forest inventory information that is received from the state, for which extra funding has been allocated. Acquisition of high-quality forest data is a critical step for establishing baseline information for many of the programs (e.g., REDD+ and SilvaCarbon) being established in Vietnam. It is imperative that practitioners work together to collect and continually update these data over time.

5.6 Is it easy to draw up, fulfil and monitor compliance with PFES contracts?

The large number of actors in PFES makes it difficult to keep lines of communication open and to determine who is responsible for which components of contract development.

Although contracts are based on land allocation, it is extremely difficult to know on the ground where one person's property stops and another's begins. Farmers may have documents saying they have been allocated land but they often do not know where the boundaries are, what the condition of their land is or where they should be patrolling or protecting. They therefore report the number of hectares they were allocated with no clear understanding of what is being accounted for. FPDF officials and forest protection officials whose responsibility it is to verify forest protection have little more information. This inability to define the forest boundary, determine land ownership and allocate certificates has caused delays in signing of PFES contracts and large amounts of the available funding have not been allocated. Given the lack of guidance on managing payments in this situation, the rate of disbursement of funds to landowners is low and slow, engendering mistrust of government officials among landowners. Contracts currently run for 1 year, whereas long-term contracts would be of benefit to all parties.

Monitoring compliance with environmental services contracts is another challenge because of poor understanding of PFES among both government staff and service suppliers and buyers, the limited number and capacity of government staff, and the large number of service suppliers. In addition, at the national level, as shown in Section 4 and as Pham *et al.* (2009) highlighted, efforts to enforce and monitor contracts are impeded by lack of clear guidelines on how to deal with noncompliance and by political factors, such as the need to support private sector investment in poor areas and the fact that violations by minority groups do not result in contract cancellation or reduced payments because of political sensitivity. In principle, PFES-related provisions should also establish a framework for compliance and enforcement. Regulations can introduce awareness-raising activities, which are not only important for the development of new PFES schemes, but also encourage compliance with existing schemes (Greiber 2009).

The absence of regulations for dealing with noncompliance is problematic. In principle, it is important for a contract to establish the consequences of noncompliance or a procedure for determining those consequences. Without an adequate deterrent, the likelihood of noncompliance may be high.

Establishing a monitoring process in the contract can help prevent future disagreements. Greiber (2009) described the following monitoring models:

- periodic reporting and evaluation by multiple public entities
- prior determination of a baseline
- combination of satellite surveillance and field checks
- creation of a monitoring team with representatives of suppliers and buyers
- periodic auditing
- determination of noncompliance criteria.

The first option seems to be used the most; introduction of other methods could help enhance the provision of environmental services. To deter noncompliance and support enforcement, regulations could also define violations, create dispute settlement mechanisms and introduce remedies and sanctions. Dispute settlement mechanisms might include administrative, judicial or alternative dispute-resolution systems, such as arbitration, mediation and special water-related tribunals. Sanctions need to be flexible enough

to respond to different situations and degrees of noncompliance (Greiber 2009).

Wunder *et al.* (2005) compared three contract models at the local level in Vietnam, namely individual, group and village, and concluded that household contracts produce little additionality and village contracts are the weakest. This suggests that group contracts may be the most appropriate for Vietnam. The Asian Development Bank is applying this approach in Quang Nam Province. However, the theoretical literature on PES cited in this review tends to ignore the challenges of mobilizing collective action in a group contract; there is an assumption that collective action will take care of itself if the payment is well calibrated (van Noordwijk *et al.* 2012). Further research is needed to verify such findings.

At the village level, conflicts should, in principle, be mediated by the mass organization and the village management board before they are brought to court. According to a central government interviewee, the law allows for the injured party to request the intervention of the relevant authorities in the case of a conflict between buyers and suppliers, depending on the nature of the conflict. However, in Lam Dong and Son La, not only was conflict not resolved, but it was exacerbated by the weak capacity of village heads and by corruption, elite capture of financial flows and intervention by powerful groups. Local people often take their questions to the village head, and said that they only talk to the CPC when the village head cannot provide answers. Only a few said that they had sought help from the media (Pham *et al.* forthcoming).

Local organizations can become trusted representatives of the poor and, in some cases, can represent the suppliers of environmental services. However, they often have limited power and understanding of PFES and lack the skills to negotiate, manage and monitor environmental services and PFES contracts. Training should be provided to these groups to improve their ability to develop, implement and monitor PFES schemes.

Genuine, meaningful involvement of communities and their representatives early in a project, with the aim of better understanding their needs, will help to improve the delivery of PFES programs. Involvement of the poor in the early planning stages of PFES schemes will also improve their understanding of the benefits they may derive, facilitate improvements in program design and monitoring, and put in place procedures to ensure transparency and equitable distribution of benefits.

It is problematic that PFES contracts are available only in Kinh but not in local languages, as many members of ethnic minority groups cannot understand the contract requirements. Local languages should therefore be used in future PFES contracts. Using a photo-based map of the forest to be protected in each contract would help clarify expectations of the contract for those that cannot read.

5.7 Are the social impacts of PFES obvious?

Few studies have looked at the medium- and long-term impacts of PFES on local people and communities, their social systems and environmental services. Although case studies illustrate many promising aspects of PES (e.g., Tran 2010; Winrock International 2011), we do not yet fully understand either the conditions under which PES has positive environmental and socioeconomic impacts or its cost-effectiveness. In addition, we lack understanding of the social impacts of alternative conservation policies, including Integrated Conservation Development Programs, protected areas and environmental education, for comparison with PES schemes. The dearth of evidence on PES stems partly from the newness of the concept itself (Pattanayak *et al.* 2010).

Assessments of the impact of PFES on local livelihoods are mixed and often not comprehensive. Pham *et al.* (forthcoming) and Wunder *et al.* (2005) found that PFES has limited impact when households have little or no leverage over land use and when lands that are considered critical for the protection of environmental services are managed by the state. In addition, local people usually receive few meaningful benefits from ecotourism PFES schemes, as discussed in Section 4.2. No studies have assessed the impacts on those who are not involved in PFES.

A recent study of the effectiveness of PFES in Son La Province (Pham *et al.* forthcoming) found

that whether the money is spent effectively, efficiently and equitably depends on the capacity and accountability of village management boards, mass organizations, self-formed groups and local villagers, but that accountability and capacity of villagers are insufficient, and monitoring and law enforcement require strengthening. Auditing is also needed to ensure transparency.

However, PFES does appear to have had an impact through awareness raising. Results from surveys in Lieng Bong village (Lam Dong) and Khua village (Son La) and discussions with stakeholders showed that PFES had greatly increased people's awareness of forests and forest environmental services. PFES brought a new source of income (an alternative to the state budget) for forest development (Hoang and Do 2011).

A common challenge with implementing pro-poor PFES is the capacity of government to develop, implement and maintain plans that reflect the needs of the marginalized and poor, rather than merely considering broader government objectives. In Vietnam, this will require a paradigm shift within government organizations toward greater flexibility and adaptability. Interviews conducted with government officials revealed that the government has not given enough attention to the cost-efficiency of PFES, which is a widespread problem.

5.8 Are financial management regimes and benefit-sharing mechanisms in place, with a clear monitoring and evaluation system that features grievance handling?

In the name of equity, payments are typically distributed to a large number of rural households, but the per-household amounts are so small that they are insignificant for most recipients' livelihoods. Although applying a flat per-hectare rate may seem equitable, it is not necessarily fair: depending on the distance and accessibility of the contracted forest area, the time and labor required to patrol it can vary substantially. It would likely be more efficient to reduce the number of contracts and instead pay a higher rate when patrolling costs are high and the degradation risks and benefits are highest — in other words, to favor the most strategic forest areas (Wunder *et al.* 2005; Pham *et al.* forthcoming).

In structuring payments for environmental services, an important question concerns the timing of payments: Should they be spaced evenly, back loaded or front loaded? Although in principle PES should be back loaded, in practice PFES schemes favor the interests of the suppliers and tend to be based on inputs, particularly on specific land-use activities. Viewed broadly, however, this arrangement really is about risk allocation: the buyer is accepting the risk that requiring inputs (information on land-management activities) is a sufficiently close proxy to service provision that the payments are justified.

Another question in the design of payment mechanisms is whether to pay for the service itself or for some proxy for the service. If environmental services could be measured easily, and if cause-and-effect linkages were straightforward, payments would be most effective if made directly for output of the services delivered. In other cases, payments may be linked to observable land-use changes that correlate with provision of the desired environmental service.

The payment mechanism also needs to balance effectiveness and equity. In the case of Son La, moral questions have emerged: if we say that people are being paid to provide a service, how can PFES schemes ignore those who already provide that service? Doesn't that essentially reward bad actors and thereby encourage undesirable behavior? How do PFES schemes equitably account for the existing forest quality baseline? Farmers who have already made the investments and managed their land responsibly and have high-quality forests receive the same payments as farmers who have been less responsible and have forests of poor quality. This creates a disincentive for land stewardship.

Donors and international NGOs have encouraged allocation of payments through the Social Policy Bank, but this option is not favored at the provincial level. This bank only opens once a month and has many activities. By contrast, if a project arranges its own payments, they can be completed within a month. Most interviewees from provincial government departments preferred that provincial and district staff, the village head

and the party first secretary in the village form a group for organizing payments. The head of the village can propose the payment method and schedule, the group can make payments for 4–10 villages a day, and people can come in to receive and sign for their payments. A good village-level benefit-distribution system needs good leadership, for example by the head of the village. However, village heads have many responsibilities and receive little compensation for their time and expenses.

6 Policy recommendations

Highlights:

- As PFES payments are based on formal documentation of land allocation/contracts, suppliers of environmental services must hold some form of land tenure instrument to be entitled to benefits. The government should prioritize the equitable expedition of land certificates.
- Combining direct cash payments with indirect benefits that have potent enduring effects (such as education and skills development) on poverty should be an integral part of PFES.
- Equity should be a key feature of program delivery, regardless of existing power structures.
- Trust and accountability can be built through participatory development of a transparent monitoring and evaluation program that is integrated into PFES.
- To address areas of environmental degradation, policy makers should consider alternatives to PFES and look at expanding the program or pairing it with other soil and water conservation efforts in non-forest areas.
- The monitoring and evaluation system could be simple or sophisticated, depending on the financial and technical capacity of the provincial FPDF. A simple approach that concentrates on inputs and self-reporting might be better initially, to help get PFES underway; however, by the fifth year of a project, monitoring efforts should be well documented and sufficient to clearly demonstrate if progress is being made toward achieving socioeconomic and environmental targets.
- A key component of any monitoring and evaluation system is to use information obtained through open dialogue and feedback from stakeholders and constituents to continually refine the process and improve both PFES policy and delivery to achieve the desired outcomes.

6.1 Multisectoral and multidisciplinary approaches to closing institutional gaps

Ensure secure tenure. As PFES payments are based on formal documentation of land allocation/contracts, suppliers of environmental services must hold some form of land tenure instrument to be entitled to benefits. However, insecure land tenure is a problem for PFES implementation in Vietnam (Wunder *et al.* 2005; Pham *et al.* 2008). Many residents of forest areas in Vietnam are poor, and engaging poor people in PFES is particularly important in cases where they are harming the forests in an effort to earn income. Securing households' and communities' use rights to state forest lands is therefore critical if the poor are to participate in PFES, which will require changing the land-use system by granting land-use rights to poor groups and accelerating the land-allocation process. This does not necessarily mean that land needs to be privatized. Rather, the goal is to give low-income suppliers of environmental services the capacity to manage land, which will be feasible only if they are granted use rights. Land-use planning and land allocation need to be carried out carefully and according to local conditions to avoid unexpected negative impacts on the poor such as the capture of land by elite groups and consequent landlessness. However, it should also be noted that a pro-poor approach (e.g., in land allocation) may compromise the environmental and social performance of PFES in some cases.

Enhance the capacity of government officials, local organizations and the poor. Limited capacity among government officials and local people is a major constraint for PFES implementation. Adequate funding should be devoted to providing training, and the potential contribution of intermediaries such as donors and international NGOs in building capacity should be assessed. Poor households' limited understanding of PFES and limited ability to monitor environmental

services make it difficult for them to provide those services. Empowering the poor by giving them the necessary information and skills is critical for pro-poor PFES implementation. Participatory methods for assessing and monitoring environmental services should be developed so that the poor can participate more fully.

Encourage the involvement of the private sector in PFES, but with caution. The private sector is potentially the primary buyer of environmental services. Policies that encourage the involvement of these powerful actors can help the environmental services market develop. However, the private sector often has considerable power to influence decision makers, which, if abused, can result in conflicts and inequity between poor suppliers and private buyers (Pham *et al.* 2009). For example, large tourism companies may petition the PPC to waive their PFES payment requirements whereas low-income tourist businesses (e.g., handicraft sellers or homestay businesses) may still be expected to pay. PFES designers should anticipate this risk and develop policies that reduce power imbalances.

Combine direct payments and indirect benefits. The government in Vietnam is effectively using taxes and fees as the main economic instruments for implementing PFES. Although this approach can bridge the gap between private and public costs or benefits, it often does not reflect the market price of environmental services. Our case studies show that nonmonetary rewards may better motivate the poor to participate in PFES. Therefore, appropriate incentives could be a combination of direct cash payments and indirect benefits such as improved education or skills training. Direct payments supplement income, but indirect benefits provide the poor with tools and resources, which can have a more potent and enduring effect on poverty (Kiss 2004).

Understand the social and behavioral factors that influence the willingness of suppliers and buyers to participate in PFES. Regulation is the government's primary approach to controlling pollution and maintaining environmental values. However, incentives and payments offer considerable scope for improving environmental outcomes. Generally, PES participation is only voluntary until an agreement or contract is signed, at which point the arrangement becomes conditional upon the contractual obligations being met. It would be helpful to explore the terms and conditions of PFES contracts and the link between volunteerism and conditionality, from the perspectives of both buyers and suppliers. Our analysis suggests that the current approach to conditionality favors buyers but not suppliers. Furthermore, there is room to examine the enabling mechanism(s) for contracts to be entered into and the criteria used in assessing whether conditions are met. It is also important to design payment schemes that are relevant to local needs, as this will encourage poor households to participate in the scheme and fulfil their contractual obligations. Consultation with and engagement of the poor in all project stages would help ensure effective implementation of PFES. Furthermore, as poor management and corruption tend to diminish trust, an accountability mechanism such as multiparty monitoring can help to build local people's trust and commitment.

Combine PFES with complementary programs. Although PFES is expected to address issues surrounding both poverty and environmental protection, our analysis indicates that PFES may not offer a solution to all problems, particularly when schemes are funded on a temporary or trial basis and where political and social problems are entrenched. In such circumstances, it may be more prudent to apply alternative strategies to improve poverty and environmental problems, such as employment programs to reduce pressure on forests or regulatory measures. Further research is needed to better evaluate the transaction costs and to establish PFES as a market-based instrument, particularly with the aim of achieving less government intervention and greater use of market forces to resolve poverty and environmental issues.

6.2 Options for establishing effective monitoring and evaluation

This section provides a conceptual framework for the development of a monitoring and evaluation system for PFES in Vietnam, which should be integrated into the overall PFES program (Figure 9). The collaboration of FPDF staff, other government agencies, buyers and sellers of environmental services and NGOs throughout all phases of designing and implementing the monitoring and evaluation system will create a shared learning environment that invites questions, seeks answers and uses the knowledge obtained

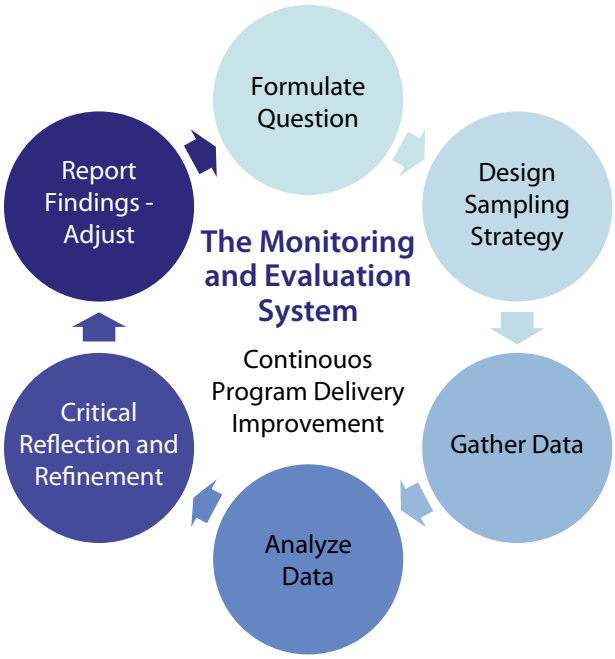

Figure 9. Overall scheme for incorporating monitoring and evaluation into PFES.

to improve the overall delivery and effectiveness of PFES.

The purpose of monitoring and evaluation should be formulated by local constituents and clearly articulated by all interested parties to ensure common understanding and active engagement of relevant stakeholders. A sample purpose statement might be: "To understand baseline forest and socioeconomic conditions and how implementation of PFES will affect those conditions over time."

The monitoring and evaluation system could be simple or sophisticated, depending on the financial and technical capacity of the provincial FPDF. A simple approach that concentrates on inputs and self-reporting might be better initially, to help get PFES underway; however, by the fifth year of a project, monitoring efforts should be well documented and sufficient to clearly demonstrate if progress is being made toward achieving both socioeconomic and environmental targets. Local entities should define the scope of monitoring and evaluation by discussing and agreeing on the level of funding available for the system, the engagement of local constituents, the level of detail in the field data collected and whether it is quantitative or qualitative, and the capacity of stakeholders and partner organizations to achieve the desired level of sophistication in the system (Guijt and Woodhill 2002).

A key component of any monitoring and evaluation system is to use open dialogue and feedback from internal staff and constituents to continually refine the process and improve both the policy and delivery system to achieve the desired outcomes. Informal discussions, in addition to analysis of quantitative data, will reveal many of the areas that need changes. The key is to act on the information, adapt the process in a timely manner and communicate the results to constituents.

The organizational arrangements and benefit-sharing mechanisms established by the government of Vietnam in Decree 99 and supplemental policy documents (see Section 3) reveal the main actions required of monitoring and evaluation. These actions are depicted in Figure 10 as components of an integrated system. The actions have been separated into "Inputs" (actions needed to implement PFES to achieve the desired results) and "Outcomes" (actions needed to document whether the PFES program is trending toward achieving the goals of improved social well-being and environmental condition).

A monitoring and environmental system helps an organization to determine whether or not its actions are moving it toward the desired outcomes. Annex 3 shows a draft example of a framework for a monitoring and evaluation system, which features the following activities: establishing a baseline; monitoring PFES program inputs including identification of stakeholders, development of contracts, acquisition and disbursement of funds; and assessment of the social and environmental impacts of the program. The framework presented in Annex 3 is intended not to be a final product but to inspire provincial FPDF directors, staff and other agencies and constituents to develop their own, more detailed, plans.

A comprehensive monitoring and evaluation system, as demonstrated in Annex 3, would include the following activities:

- developing key performance questions (see Table 15)
- determining what information is needed to answer each question and defining the protocol to be used to acquire that information

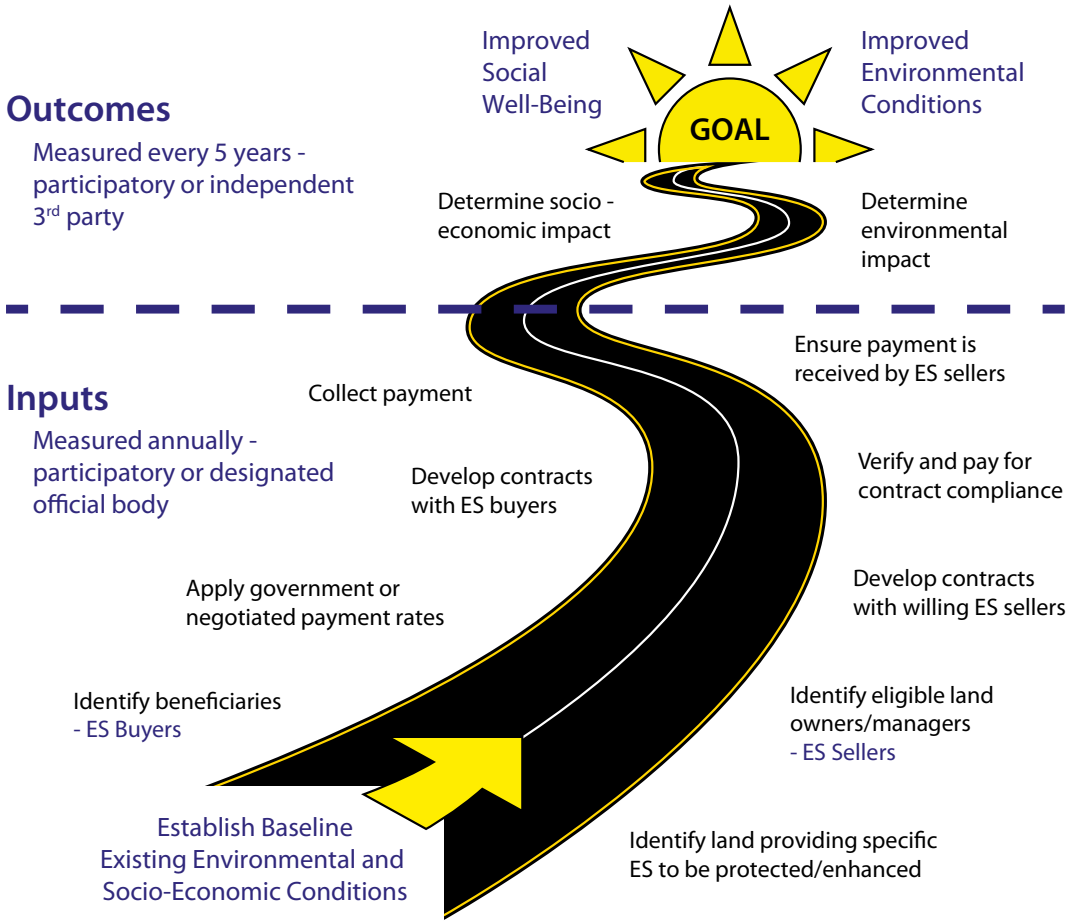

Figure 10. Main PFES actions to be included in the monitoring and evaluation system.

- determining the relevance of a protocol to the overall PFES strategy and how the information will be used to help evaluate the program outcomes, adapt policy or improve program delivery
- determining exactly who is responsible for each action as some tasks should be done at the local level, some more complex tasks are appropriate for the provincial level and the most scientifically rigorous tasks should be completed, less frequently, at the central government level or at the request of donor agencies
- deciding how often each task should be completed
- producing outputs, that is, discrete products generated through answering the key questions (e.g., a map, report or spreadsheet)
- establishing the minimum acceptable level of compliance at every level, to ensure transparency and accountability in PFES and to function as a trigger point; the minimum threshold is the point at which the program cannot move forward if this step is not completed, and where the minimum threshold is not met, corrective action must be taken at a higher organizational level
- setting reporting requirements that itemize the exact products that need to be delivered at specified time frames
- clearly establishing the consequences of failing to complete the required reporting in a satisfactory manner.

A participatory process should be used to develop the monitoring and evaluation system and results should be regularly reported, both internally and to constituents, as this establishes strong relationships and builds trust among constituents; it also allows for critical reflection on how PFES is being received in the community, the efficiency and effectiveness of program delivery, and its ability to achieve the desired outcomes. Both formal and informal feedback on PFES can then be used to strengthen program delivery through adjusting either policy or program delivery as needed.

Identifying performance questions is the first and perhaps most important step in guiding the entire monitoring and evaluation effort. These questions, developed through a participatory process, should be relevant to the management of the PFES program, designed to improve program delivery and used to document program outcomes. Examples of key performance questions for different stages of the process are listed in Table 15 (taken from Annex 3). Knowledgeable participants in the PFES process need to further refine these questions for each specific context. The aims are to create transparency for all involved, ensure conditionality and generate sufficient baseline and monitoring information.

Although protocols appropriate for answering the proposed performance questions may already exist, determining the exact methodologies to use is outside of the scope of this PFES review and protocols are not suggested in Annex 3. Selecting appropriate protocols will require a review of the literature on existing protocols and a group of informed stakeholders to select and test the desired protocol to determine its ability to answer key questions. The group should also determine the practicality of implementing a particular protocol before recommending it for use nationally. It is important that PFES program information be collected using consistent protocols across the country so that the results can be aggregated, from the household to village to commune to district to provincial and finally to the national level.

Acquiring the information to monitor the efficiency, effectiveness and equity of PFES will necessarily require the engagement of multiple ministries. For example, the Ministry of Natural

Table 15. Sample key performance questions for use during PFES monitoring and evaluation.

Stage/topics	Sample key performance questions
Determine baseline conditions	Where is the forested land? What condition is the forest currently in?
Environmental (forest) condition	What physical assets support people's daily needs?
Socioeconomic condition	What is the current income of the local community (poverty rate)? Describe existing cohesion and community spirit, networking capacity. Are people aware of the connections between their livelihood and the environmental services provided by forests?
Monitor PFES program inputs Monitored annually	Who are the buyers of environmental services, as defined in Decree 99? Are there other service buyers that should be engaged? Are contracts with all potential service buyers in place? Have all service buyers complied with contracts (e.g., made agreed-upon or legally required payments)? What forest areas contribute environmental services to those buyers? Who owns/manages those forest areas? Are contracts with all potential service suppliers in place? Have all service suppliers complied with contracts to protect forest and received appropriate payment?
Determine PFES program outcomes	To what extent has the forest area changed over time? To what extent has forest quality changed over time? Are there areas inside forests that are actively eroding?
Environmental (forest) impact Socioeconomic impact	Have PFES payments led to any improvement in physical assets (houses, physical needs) to support local people's daily needs? Has PFES led to any gain or loss in local income? How does PFES affect social cohesion, community spirit, established networks within and between villages? Does PFES provide any capacity building for local people (e.g., whether people have improved access to technology transfer or understand best management practices related to timber harvesting, road construction, or agricultural practices)? Has there been a change in people's awareness of the value of forests to their livelihood?

Resources and Environment has the strong technical capacity, appropriate tools and equipment, and laboratories needed to monitor many of the environmental variables, for which MARD may not be equipped. Other ministries, including the Ministry of Labor and the Ministry of Culture, may be better equipped to evaluate the social outcomes in collaboration with MARD. The Department of Culture, Sport and Tourism should be engaged in developing the protocols and monitoring PFES program outcomes for tourism. Sharing agency expertise can create an environment of shared learning that supports the effective and efficient delivery of programs. Shared monitoring efforts also help highlight areas where local staff and community members require more training in monitoring.

Although many program inputs will remain unchanged regardless of the service being evaluated, establishing baselines and evaluating PFES program outcomes will demand that monitoring protocols be tailored to each of the environmental services being evaluated. For example, the monitoring components for assessing watershed protection will differ from the indicators of biodiversity, landscape beauty or carbon sequestration. Similarly, the types of forest environmental services supplied by upland forests to prevent sedimentation will differ from the types of environmental services needed from mangrove forests to produce a healthy fishery. Each protocol should be designed to capture sufficient information to determine if PFES is indeed likely to achieve the goals associated with each environmental service.

Finally, all parties must appreciate that monitoring and evaluation is an integral part of PFES. The aim is not to simply accumulate data and report them at the end of the year but to critically analyze those data, including through informal feedback and discussions, and communicate the findings. Open communication of findings empowers all groups engaged in PFES (e.g., communities, government staff, buyers of environmental services, NGOs, the provincial FPDF board of directors) to critically reflect on how the information learned through monitoring can help to improve both program delivery and outcomes and to adjust policy, procedures and the engagement of constituents as needed.

6.3 Expanding the PFES concept

Early discussions on the value and benefits of introducing PFES in Vietnam not only examined the scheme's potential to boost funding for forest management throughout the country but also recognized the value of the services that forests provide, including soil protection, water regulation, headwater protection, coastal protection, disaster prevention and mitigation, biodiversity conservation, carbon sequestration and retention, landscape beauty for tourism, habitat and spawning ground of organisms, and timber and other forest products.

According to MARD (2012), 39.7% of the national area was covered by forest in 2011 and the government had a goal of increasing that proportion to 47% by 2020 — a goal that requires strategic investment. Decree 99 allows for individuals, groups or organizations to use their own funds to reforest areas, and an area can be eligible for PFES payments when it meets the criteria for forest as defined by Circular No. 34/2009/TT-BNNPTNT (i.e., height greater than 1.5 and 3 m for slow- and fast-growing trees, respectively, with 1000 trees per hectare and 5 live trees in each 20-m plot). However, the cost of reforestation is so high that it does not motivate people to take this PFES option. In addition, given that PFES payments are very low compared with the opportunity costs of agricultural conversion, clearing a forest is a more economically tempting prospect for farmers than participating in PFES. It is critical, therefore, to find a way to engage local communities in protecting and enhancing existing forests, and in either restoring sensitive areas to a forested condition or employing soil and water conservation techniques on agricultural and developed landscapes that provide functions similar to forested landscapes. PFES also needs to work alongside other livelihoods programs.

During the course of this PFES review, it became increasingly apparent that despite a massive reforestation effort during the 1990s, the area of forest in Vietnam remains relatively small. Many steep lands (>60% slope) are tilled each year for maize production without any use of soil and water conservation practices, and forest is being cleared to make way for coffee plantations. Population pressures and relocation of farmers due to the construction of hydropower dams and associated

reservoirs continue to intensify the pressure for conversion of upland forests. In addition, the potentially high revenue from growing coffee and maize entices poor indigenous farmers to convert forest to agriculture in an effort to improve their incomes and well-being. Demanding that these people revert their agricultural lands to forests is not an option because the compensation rates from PFES are so low. The introduction of additional incentives that make conserving forest as profitable as growing crops could foster a new dynamic.

If the full value of forests is to be realized, the concept of eligible PFES lands will need to be expanded or PFES will need to be paired with other conservation programs. Existing forests alone cannot provide all of the projected environmental services. Biodiversity conservation is perhaps the service with the most direct link to forests: the survival of certain species depends on specific forest species composition, structures and spatial arrangements in the landscape and biodiversity conservation requires intact forest core areas and corridors to allow species to migrate so that they can complete certain life functions. Climate regulation too is tied directly to forests, especially for capturing precipitation from fog, provision of shade and subsequent cooling effects, and carbon sequestration in above-ground vegetation and soils.

Although soil erosion control and water regulation benefit greatly from forest cover, forests are not the only land use that can provide these environmental services. The key functional requirements to produce these services are soil surface cover and features that encourage water infiltration, storage and slow delivery over time. With the use of soil and water conservation practices described as "best management practices", whether applied to agricultural lands or developed sites or during road construction, other land uses can perform similar functions to forested landscapes in terms of soil erosion control, decreased sedimentation, improved water quality and water regulation. If PFES is not expanded or paired with soil and water conservation efforts on agricultural and developed lands, soil erosion, sedimentation and, ultimately, water quality conditions will not be improved, as buyers of these environmental services have been promised.

Local communities living in or near forests are in an ideal position to apply proper land-conservation practices. Without their commitment, not only will conditions not change but they will continue to degrade over time. We propose the introduction of participatory land-use planning, to be trialed in mountainous watersheds in a few ecoregions of Vietnam. As part of this activity, an interdisciplinary team of natural resource specialists (e.g., experts in physical sciences (soil and hydrology), wildlife ecology, forestry/vegetation ecology, social sciences) would run workshops with community members to investigate the landscape and its capacities. For example, biodiversity core areas and corridors are best located along specific environmental gradients, certain parts of the landscape are more or less prone to erosion, certain parts of the landscape inherently shed water rapidly, and water is stored in other areas, which are important for the regulation of storm flows. The community, too, needs to be involved in mapping and understanding the role that each part of the landscape plays. Once all participants understand the ecological and social baselines, the group can then map existing land uses. Together, the group can discuss needs and desires for specific outcomes from the landscape (environmental services, crops, housing, community center, etc.) and design a land-use plan that is mostly likely to achieve all the stated objectives. Included in the plan should be a locally agreed list of "best management practices" that farmers, developers and construction contractors must follow to support the accomplishment of social and economic goals while simultaneously providing the environmental services needed.

A process such as this would active engage communities in designing their own futures. They become both the implementers and the monitoring body, and they are given the power to change practices that will ultimately deliver outcomes that they themselves have planned.

7 Conclusions

The type, quality and quantity of services provided by an ecosystem are affected by the resource-use decisions made by individuals, communities and the private sector. The environmental, socioeconomic, political and dynamic context of a PFES policy is likely to interact with political realities to influence policy outcomes, including environmental effectiveness, cost-efficiency and poverty alleviation. Environmental services policies work by changing behaviors rather than by imposing rules or directives.

PFES policies demonstrate the government's commitment to forest protection and development. The context in which a PFES initiative is implemented has a strong impact on the effectiveness of the policy design and on whether the stated goals are ultimately achieved. Given the powerful influence of context on the success of policies, it must be emphasized that no single policy is right for every scenario. As experience in most provinces has shown, it is unlikely that a PFES approach will always be able to simultaneously improve livelihoods, increase environmental services and reduce costs. Potential trade-offs among these goals can be assessed reasonably well by considering the correlation between characteristics of poor landholders and their land, characteristics of the costs and benefits of providing environmental services, and the political feasibility of each policy option.

For PFES to work well, the following are required:
- a reduction in transaction costs, which could be achieved by strengthening coordination between central organizations and local line agencies, ensuring that each body has the necessary capacity and clarifying roles, rights and responsibilities
- effective sharing of information on forest land, forest land allocation and forest owners
- a reduction in the cost of making contracts with households
- a combination of different monitoring techniques
- adaptation of payment schemes to each local context
- bundling of payments for environmental services (e.g., bundling carbon, landscape beauty and water services), as the amount paid for a single environmental service is not economically attractive
- capacity building, awareness raising and the mainstreaming of PFES into existing programs (such as forest land allocation, sustainable land-use management and extension services)
- involvement of all social groups.

Using pilot studies, eliciting and applying lessons learned from past experiences, and scaling-up the program will help to create a nationwide vision for PFES, and establishing common criteria for performance, monitoring and evaluation, and eligibility for payments will contribute to legal clarity and certainty. However, a risk of such unification is the application of a simple top-down approach, in which the national legislature steers PFES without taking the differences between local contexts into consideration. National PFES legislation should regulate both as much as necessary and as little as possible. Regulation of further details can be left to implementing legislation at the provincial and local levels. Such decentralization can be a useful means of adjusting policy to local circumstances and closing the policy–practice loop (Greiber 2009).

PFES is a major breakthrough for Vietnam's forestry sector and it underwent numerous refinements and improvements during the pilot phase. In particular, major achievements have been made in establishing legal frameworks and institutional arrangements, generating substantial revenue and gaining political commitment and interest in supporting PFES at both central and provincial government levels and among local people, all of which suggest a bright future for the scheme.

For PFES to have outcomes that are effective, efficient and equitable, however, policy makers need to work toward developing a functional monitoring and evaluation system with an accessible grievance mechanism, to ensure

transparency and accountability in the distribution of PFES revenues from central to local levels. PFES could also benefit from being part of a more holistic program, working with complementary conservation and socioeconomic development programs. PFES program delivery would be further supported by long-term capacity building for government staff and households, communities and their representatives.

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Annexes

Annex 1. List of legal instruments issued in support of PFES

#	Year	Name of legal instrument	Issuing authority
1	2008	Decree 05/2008/ND-CP, dated 14 January 2008, on Forest Protection and Development Funds	Government/ Prime Minister
2	2008	Decision 380/QĐ-TTg, dated 10 April 2008, on payments for forest environmental services (now defunct)	Government
3	2008	Decision 111/2008/QĐ-BNN, dated 18 November 2008, on regulations on the organization and operation of Forest Protection and Development Funds at the provincial level	MARD
4	2008	Decision 114/2008/QĐ-BNN, dated 28 November 2008, on setting up the Vietnam Forest Protection and Development Fund	MARD
5	2008	Decision 128/2008/QĐ-BNN, dated 31 December 2008, on regulations on the organization and operation of the Vietnam Forest Protection and Development Fund	MARD
6	2009	Decision 378/QĐ-BNN-PC, dated 17 February 2009, on issuing templates for implementing PFES	MARD
7	2010	Decree 99/2010/NĐ-CP, dated 24 September 2010, on policies for payments for forest environmental services	Government
8	2010	Decision 2284/QĐ-TTg, dated 13 December 2010, on approving the proposal to implement Decree 99/2010/NĐ-CP of the Government, dated 24 September 2010, on payments for forest environmental services	Government
9	2011	Decision 135/QĐ-BNN-TCLN, dated 25 January 2011, on approving the implementation plan for the proposal to implement Decree 99/2010/NĐ-CP on PFES	MARD
10	2011	Circular 80/2011/TT-BNNPTNT, dated 23 November 2011, on guiding methods to determine payments for forest environmental services	MARD
11	2012	Circular 85/2012/TT-BTC, dated 25 May 2012, on guidance for financial management of the Forest Protection and Development Fund	Ministry of Finance
12	2012	Decision 119/QĐ-TCLN-KHTC, dated 21 March 2012, on provisional regulations on procedures for establishing contracts on payments for forest environmental services	VNFOREST
13	2012	Circular 20/2012/TT-BNNPTNT, dated 7 May 2012, on guiding orders and procedures for validation of forest protection performance and making payments for forest environmental services	MARD
14	2012	Decision 779/QĐ-TTg, dated 27 June 2012, on national action plan for REDD+, 2011–2020.	Prime Minister
15	2012	Circular 60/2012/TT-BNNPTNT, dated 9 November 2012, on regulating principles and methods to determine forest area in the watershed for payments for forest environmental services	MARD
16	2012	Circular 62/2012/TTLT-BNNPTN-BTC, dated 16 November 2012, on guiding management and use of funds collected from payments for forest environmental services	MARD and Ministry of Finance
17	2012	Decision 779/QĐ-TTg, dated 27 June 2012, on national action plan for REDD+, 2011–2020.	Prime Minister
18	2012	Decision No. 3003/QĐ-BNN-TCLN, dated 29 November 2012, on promulgating forest areas in the watersheds covering territory in two or more provinces as the basis for policy on payments for forest environmental services	MARD

Source: Adapted from VNFF (2013); personal communications from Pham (2013) and Dam (2013)

Annex 2. Lessons learned from PES pilot projects in Vietnam

Highlights:

- Transaction costs for PFES tend to be high because of the complexity of administrative structures, limited capacity of public servants, conflicts of interest, and weak coordination and information sharing between and within government agencies.
- Communities have little interest in forest protection and development because they do not have the legal status to enter into PFES agreements under the 2005 Civil Code.
- A model of a multi-stakeholder trust fund with representatives of buyers, suppliers, NGOs, academia and government agencies (trialed in Hoa Binh) and a cooperative model (trialed in Thai Nguyen) built trust among both buyers and suppliers of forest environmental services.
- Suppliers of environmental services are interested in not only receiving cash payments but also payments in kind.
- PFES contracts setting out the conditions for payment tend to be driven by buyers and intermediaries, with little input from local people (suppliers).
- PFES schemes have no comprehensive monitoring and evaluation because of the lack of consistent data on land use, certified forest ownership, and assessments of forest condition, soil erosion, water quality and biodiversity. Although poverty reduction is a stated objective of PFES, proponents have failed to measure its impact on local livelihoods and poverty reduction because they lack appropriate methods.
- Monitoring is often based on individual landowner reports, which tend to be biased and inaccurate. Delays in verification and distribution of payments engender mistrust among the project participants, which undermines the functioning of PFES contracts.

Most PFES projects were developed to test the feasibility of adopting market-based instruments in Vietnam and to trial various benefit-sharing mechanisms and monitoring, reporting and verification systems. The experiences provide numerous lessons learned on institutional settings, benefit sharing, and monitoring and evaluation.

Institutional setting

PFES projects in Vietnam were driven by donors and were designed only as pilot schemes. Intermediaries, including government agencies, NGOs, international agencies, local organizations and professional consulting firms, initiated PES projects based on local problems. Payment levels were set by central government and Provincial People's Committees (e.g., in Nha Trang) or according to the budget made available by buyers (e.g., Hoa Binh). Payments were allocated to national park and marine protected areas boards (e.g., Thua Thien Hue, Bac Kan, Dong Nai), provincial treasuries (e.g., Nha Trang) and a multi-stakeholder trust fund (e.g., Thai Nguyen and Hoa Binh). The model with the multi-stakeholder trust fund, with representatives of buyers, suppliers, NGOs, academia and government agencies (trialed in Hoa Binh) and a cooperative model (trialed in Thai Nguyen) earned the trust of both buyers and suppliers of environmental services.

The transaction costs for PFES are high because of the complexity of administrative structures, limited capacity of public servants, conflicts of interest, and weak coordination and information sharing between and within government agencies (Pham *et al.* 2009). For example, in Hoa Binh, the AR-CDM (Clean Development Mechanism Afforestation and Reforestation) project team spent 2 months negotiating with buyers and 4 months to complete the project proposal; it took them a whole year to fulfil all the requirements of the different government agencies, and 2 years to deliver contracts to local people. Similarly, it took the board of the nonprofit organization 1 month to establish the fund but 1 year to get the province's final approval of its operational guidelines.

Benefit-sharing mechanisms

For PES schemes to be effective, payments must be channeled toward those that actually provide the services (Tomich *et al.* 2004) and thought must be given to the best way to pay them (Garnett *et al.* 2007). In Hue and Nha Trang Provinces, revenue from payments was retained by provincial authorities and not passed on to the suppliers of the environmental services (Pham *et al.* 2009). For example, in Nha Trang, all the payments were given to the Nha Trang Bay Marine Protected Area Authority and the provincial treasury, in a system that ignored the role of local people and communities. A similar approach was observed in Bach Ma, where payments were received and managed by the national park authority (Hoang *et al.* 2008). Circular 126/2012/TT-BTC states that the park management board can keep 80% of all entrance fees, with the remaining 20% to be allocated to the national budget. This raises questions about how to involve local suppliers of environmental services in the payment process and whether the incentives are sufficient to motivate them to continue providing environmental services.

The form of payments influences the sustainability of PFES schemes. For example, in Bac Kan, local communities preferred payments in kind, such as support for building community halls and small-scale hydropower plants, because cash payments were so small. In the AR-CDM project in Hoa Binh, the PES contract involved both upfront payments for farmers' labor and the initial funding needed to help farmers change their land-use practices (Vu 2008; Pham *et al.* 2009). Both buyers and suppliers in Hoa Binh saw these as the key determining features for successful benefit sharing because they address local people's pressing needs. The lesson from this is that PFES payments must be tailored to local desires and interests, which can be accomplished through direct negotiation between parties or through a participatory and consultative process at the time of program development. In reality, however, these benefit-sharing mechanisms were often designed by external project designers with little discussion with local people. As these intermediaries were often under pressure from donors to deliver results, they did not undertake participatory consultation and their proposals were not neutral (Pham *et al.* 2010).

In most cases studied, suppliers of environmental services had little opportunity to negotiate because the service buyers set the proportions for allocating revenue and the contract terms. As a result, local people got much less than they expected from the project, and the buyer dictated how much was spent and how, and held a more powerful position (Pham *et al.* 2009). Although both buyers and suppliers expressed a preference for the model of a multi-stakeholder trust fund, households were not represented on the fund management boards. For example, in the case of Hoa Binh, most board members came from the university, the head of the village and local government. Members of the management board were also members of the project's supervision and inspection teams, which created a conflict of interest with respect to monitoring. In many cases, it was not the low level of payment but the lack of a transparent benefit-sharing mechanism that reduced people's interest in PFES (Pham *et al.* 2009).

Monitoring and evaluation

Environmental service suppliers and government agencies had difficulties in demonstrating that both the costs of and benefits from watershed protection had been delivered to buyers. At the same time, buyers of environmental services point out that obtaining proof of the benefits is the key to incentivizing them to become and stay involved in PES. In the cases studied, difficulties arose for drawing up contracts and instituting comprehensive monitoring and evaluation because of the lack of consistent data on land use, certified forest ownership, and assessments of forest condition, soil erosion, water quality and biodiversity (Pham *et al.* 2009). As budgets for monitoring and evaluation in these schemes were small, monitoring was often based on individual landowner reports, which tend to be biased and inaccurate (Pham *et al.* 2009). Delays in verifying and distributing payments engendered local people's mistrust of the project, which eventually undermined the efficacy of the contracts (Pham *et al.* 2009).

Targeting buyers of environmental services to establish and monitor compliance with contracts requires innovative approaches, continuous follow-up and careful assessment of buyers' capacity and willingness to pay, as well as attention to the

specific concerns of buyers and suppliers (Pham *et al.* 2009). In addition to voluntary contracts between buyers and suppliers, government enforcement of contracts is needed (Hoang *et al.* 2008). Coalitions between state agencies and the private sector can weaken law enforcement and undermine the conditionality of PES contracts (as seen in, e.g., Bac Kan) (Pham *et al.* 2009). Resistance to paying PES fees is widespread in the domestic private sector; international buyers are more willing to pay because they see the advantages of putting their participation in PES in their public relations campaigns (Pham *et al.* 2009). Hoang *et al.* (2008) suggested four key elements that need to be explored in future studies if delivery of environmental services and PES contract monitoring are to be strengthened: (1) conditionality of payments and service delivery, with conditionality expressed in the level of the service, the condition of the land, the activities of the seller or the community-level management of the resources; (2) duration and contractual form of the relationship; (3) the degree to which agreements refer to specific causal relationships between the continuity of the service(s), such as avoided degradation or restoration, and the form of payment, such as freely usable financial capital, investment in public services, or trust funds for specified activities; and (4) the level of payment in relation to the opportunity costs for the seller and the costs of alternative provision of the service to the buyer.

Developers of early pilot projects paid no attention to monitoring of financial flows, despite strong interest from international buyers and brokers in participating in monitoring environmental services, PES contracts and financial flows, given their skepticism concerning governments' ability to deliver accountable and transparent benefit-sharing mechanisms (Pham *et al.* 2009). Although poverty reduction is a goal of all projects, there has been no monitoring to determine whether it has been achieved. Furthermore, no case in Vietnam has demonstrated the degree to which underprivileged (in terms of wealth or gender) stakeholders are affected and included in PES, that is, the degree to which the mechanism can be considered pro-poor.

Annex 3. Conceptual PFES monitoring and evaluation system for Vietnam

A. Determine baseline conditions

Key performance question	Information need and monitoring protocol	Relevance and end use	Responsible actor	Minimum frequency	Product	Minimum compliance threshold	Reporting requirement	Required action if not achieved
Where is the forested land?	Forest Inventory (FIPI) and satellite imagery (Ministry of Natural Resources and Environment (MoNRE)) processed to delineate forest type and area boundaries Refine at local level as needed Protocol TBD	Core information needed to develop contracts with ES suppliers and to track changes over time to understand impact of PFES on protection of forested area	FIPI and MoNRE for initial nationwide maps FPDF for local refinement Coordinate this effort with other entities (e.g., REDD+, SilvaCarbon, etc.) that also need this information; use one data source	Year 1 establishes initial baseline	Satellite image and Forest Inventory Database, processed to produce a provincial map of forested lands with accompanying GIS database	Map of forested lands in a GIS database	Map and area (ha) of forested land within each province	VNFOREST ensures maps and GIS data delineating forested lands are available and refined as needed at local level Project cannot proceed without this information
What condition is the forest in?	Forest species and structural class data Forest biomass algorithms =Processed nationwide using satellite signatures Protocol TBD	Needed to determine if condition of forest is maintained, enhanced or degraded and to classify biodiversity components present in forest Biomass data needed for carbon calculations	FIPI and MoNRE for initial nationwide maps FPDF for local refinement Coordinate this effort with other entities (e.g., REDD+, SilvaCarbon, etc.) that also need this information; use one data source	Year 1 establishes initial baseline	Satellite image and Forest Inventory Database, processed to produce a provincial map of forest species and structural components with accompanying GIS database Initial estimates of above-ground carbon	Classification into native, non-native and plantation forest plus initial carbon estimates for each forest type and condition	Area (ha) of forest in condition suitable for PFES payments Biodiversity score and carbon estimate for each forest area Specific protocols and suitability criteria would need to be determined	VNFOREST ensures maps classifying condition of forest are available at national level Governed by donor's compliance requirements
What is the income of households?	Statistics on income and poverty rates for each community Number of jobs created by PFES	Contribution of PFES payments to household income Number of jobs created by PFES	Relevant ministries	Year 1 establishes initial baseline	Government report on personal income and poverty rate for each community	Government report on personal income and poverty rate for each community	Document current income and poverty rate	Chair of provincial FPDF to add information to report

Key performance question	Information need and monitoring protocol	Relevance and end use	Responsible actor	Minimum frequency	Product	Minimum compliance threshold	Reporting requirement	Required action if not achieved
Are people aware of the connections between their livelihood and the environmental services provided by forests?	Survey to determine knowledge held by service suppliers and buyers Protocol TBD	To understand change in perceptions over time To understand willingness to engage in PFES	Provincial FPDF	Year 1 establishes initial baseline	Survey results on levels of knowledge	Notes from informal discussions	Report documenting interviews and levels of knowledge	Chair of provincial FPDF to interview buyers and sellers selected at random

B. Determine PFES program inputs

Key performance question	Information need and monitoring protocol	Relevance and end use	Responsible actor	Minimum frequency	Product	Minimum compliance threshold	Reporting requirement	Required action if not achieved
Who are the ES buyers, as identified in Decree 99?	Knowledge of all ES buyers as identified in Decree 99	Use information to develop contracts and collect payments	Provincial FPDF and PPC	Annually	Identification (map?) of all hydropower, water supply and tourism companies with facilities in the province	List of all known ES buyers as identified in Decree 99	List of all known ES buyers as identified in Decree 99	Chair of provincial FPDF to identify buyers
Are there other ES buyers that should be engaged?	Other potential ES buyer types not specified in Decree 99 but known beneficiaries of ES provision (e.g., industrial water users, hotels, etc.)	Information needed to expand ES buyer base and increase payments to forest owners	Provincial FPDF and PPC	Annually	Strategy to identify and negotiate ES payment rates with potential ES buyers	Identify and negotiate ES payments with a minimum of one new ES buyer group per year	List of potential buyers, methods used to negotiate payment	Provincial FPDF to work with PPC to identify additional potential buyers
Are contracts with all potential ES buyers in place?	Signed contracts specifying basis for payment, payment schedule, penalty for noncompliance	Needed to document engagement and ensure payment	Provincial FPDF	Contract renewed every 5 years	Signed contracts with all potential ES buyers in province	Signed contracts with all ES buyers identified in Decree 99	List of ES buyers with signed contracts	Provincial FPDF to solicit contracts not already in place Project cannot proceed without this step

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B. Determine PFES program inputs... continued

Key performance question	Information need and monitoring protocol	Relevance and end use	Responsible actor	Minimum frequency	Product	Minimum compliance threshold	Reporting requirement	Required action if not achieved
Have all ES buyers complied with contracts (e.g., made agreed-upon or legally required payments)?	Financial tracking of ES payments from all contracted buyers	Use to determine payment rate to ES suppliers	Provincial FPDF	Annually	Excel spreadsheet, database or hardcopy ledger of payments with signed receipts	Hardcopy ledger of payments with signed receipts	Level of ES used (e.g., kWh produced) Anticipated payment based on negotiated rates, actual payment received	Chair of provincial FPDF to solicit payments Project cannot proceed without this information
What forest areas contribute ESs to those buyers?	Watershed area contributing watershed protection services to downstream ES buyers Specific forest area contributing ESs to buyers Other areas identified depending on specific ES buyer	Use to document who is eligible for payments from specific ES buyer according to rules established in Decree 99	Provincial FPDF, VNFOREST for buyers where more than two provinces are involved	Annually with information updated on a 5-year cycle unless annual monitoring eliminates payments on some lands due to forest degradation	Map (photo-based) of eligible forest lands for each buyer	Map (topographic) of eligible forest lands for each buyer	Map and area (ha) of forest land potentially funded by each ES buyer	Chair of Provincial FPDF to determine appropriate area for payment Project cannot proceed without this information
Who owns/ manages those forest areas?	Identification of forest owners Requires user right certificate	Use to determine eligible ES suppliers Confirm with ES suppliers the exact boundary of the land they are responsible for protecting to receive PFES payments To understand engagement of the poor in PFES	Provincial FPDF	Annually with information updated on a 5-year cycle unless annual monitoring eliminates payments on some lands due to forest degradation	Map (photo-based) of land ownership boundaries and owner names laid over forest cover Maps posted in public space for community review	Map (topographic) of land ownership boundaries and identified owner names on forest cover	Map and area (ha) of forest land by owner that is eligible to receive PFES payments Number of poor or landless people with land titles Document grievances received and solutions	Chair of provincial FPDF to determine appropriate area for payment Project cannot proceed without this information

Key performance question	Information need and monitoring protocol	Relevance and end use	Responsible actor	Minimum frequency	Product	Minimum compliance threshold	Reporting requirement	Required action if not achieved
Are contracts with all potential ES suppliers in place?	Signed contracts specifying forest land to be protected, current condition (if known), expected protective activities, payment schedule and basis for payment calculations	Needed to document expectations and engagement of landowners, and to determine payment levels after funds are collected from buyers	Provincial FPDF	Annually with information updated on a 5-year cycle unless annual monitoring eliminates payments on some lands due to forest degradation	Signed contracts with all identified ES suppliers or authorized representative in province	Signed contracts with all ES suppliers or authorized representative in province	List of ES suppliers with signed contracts Percentage of eligible forest lands with signed contracts	Provincial FPDF to solicit contracts not already in place Project cannot proceed without this step
Have all ES suppliers complied with contracts to protect forest and received appropriate payment?	Verification of forest protection as agreed to in contract Financial tracking of ES payments to all contracted suppliers	Use to determine efficacy of PFES program and for information on environmental and socioeconomic impacts Use to identify and track grievances	Verification by owners, village committee, Forest Management Unit, provincial FPDF Payments by provincial FPDF or authorized local government entity	Annually	Minutes of meetings and discussions on contract verification Excel spreadsheet or hardcopy ledger of payments with signed receipts Tracking of resolution of grievances	Minutes of meetings and discussions on contract verification Hardcopy ledger of payments with signed receipts Tracking of resolution of grievances	List of contracts complied with and receiving payments Document grievances and solutions	Chair of provincial FPDF to verify contract compliance and payments Project cannot proceed without this information

C. Determine PFES program outcomes

Key performance question	Information need and monitoring protocol	Relevance and end use	Responsible actor	Minimum frequency	Product	Minimum compliance threshold	Reporting requirement	Required action if not achieved
To what extent has the land area under forest changed over time?	Forest Inventory (FIPI) and satellite imagery (MoNRE) processed to delineate forest type and area boundaries Refine at local level as needed Protocol TBD	Core information needed to track changes over time to understand impact of PFES on protection of forested area	FIPI and MoNRE data for revised nationwide maps FPDF for local refinement Requires third-party or participatory verification of results	Every 5 years to monitor changes over time May detect change more frequently with use of high-resolution images (see Global Forest Watch 2.0)	Satellite image and Forest Inventory Database, processed to produce a provincial map of forested lands with accompanying GIS database	Map of forested lands in a GIS database Comparison with baseline data	Map and area (ha) of forested land within each province showing changes from baseline Discussion of why change is happening; if negative, how further protection can be enforced; if positive, how to replicate successes	VNFOREST ensures maps and GIS data delineating forested lands are available and refined as needed at local level Project cannot proceed without this information
To what extent has forest quality changed over time?	Forest species and structural class and forest carbon data Processed nationwide using satellite signatures Field sampling to verify satellite interpretation Protocol TBD; will be specific to each ES provided	Needed to determine if condition of forest is maintained, enhanced or degraded and to classify biodiversity components present in forest Biomass needed for carbon calculations Other as needed for each ES provided	FIPI and MoNRE for initial nationwide maps FPDF for local refinement Requires third-party or participatory verification of results	Every 5 years to monitor changes over time	Satellite image and Forest Inventory Database, processed to produce a provincial map of forest species and structural components with accompanying GIS database Carbon calculations based on above	Classification into native, non-native and plantation forest plus carbon estimates for each forest type and condition	Area (ha) of forest in condition suitable for PFES payments Biodiversity score and carbon estimate for each forest area This information used for contract renegotiation with ES buyers and suppliers	VNFOREST ensures maps classifying condition of forest are available at national level Governed by both government and donor compliance requirements

Key performance question	Information need and monitoring protocol	Relevance and end use	Responsible actor	Minimum frequency	Product	Minimum compliance threshold	Reporting requirement	Required action if not achieved
Are there areas inside the forests that are actively eroding?	Sites of active erosion Protocol TBD	Active erosion highlights areas of inherent instability or areas where some land use is causing erosion Information to be used to determine the efficacy of forest cover to produce watershed protection services	Landowners, forest patrols, village committee, Forest Management Unit, FPDF Requires third-party or participatory verification o f results	Annually	Map of eroding areas, dimensions of eroded area size Determination and implementation of corrective action	List of number and size of eroding areas within forest boundaries	Documentation of whether erosion is or is not occurring in forested areas Discussion of how to correct the situation if it is occurring Documentation of corrective action taken	Buyers of watershed protection services allowed to renegotiate contracts if this information is not supplied
Do PFES payments lead to any improvements in physical assets (houses, physical needs) to support local people's daily lives ?	Characterization of physical assets in each community or shared between communities Protocol TBD	Needed to understand factors constraining efforts for poverty reduction	Provincial FPDF, village leaders, District People's Committee Requires third-party or participatory verification of results	Every 5 years to monitor improvements over time	List of current physical assets	List of current physical assets	List of assets and description of value of those assets in providing community enhancement	VNFOREST to determine and document reason for noncompliance and take corrective action
Is PFES leading to any gain in or loss of local income?	Statistics on income and poverty rates for each community	Needed to understand PFES contribution to individual or village income	Relevant ministries Requires third-party or participatory verification of results	Every 5 years to monitor changes in poverty rate over time	Government report on personal income and poverty rate for each community	Government report on personal income and poverty rate for each community	Document current income and poverty rate	Chair of provincial FPDF to add information to report

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C. Determine PFES program outcomes... continued

Key performance question	Information need and monitoring protocol	Relevance and end use	Responsible actor	Minimum frequency	Product	Minimum compliance threshold	Reporting requirement	Required action if not achieved
Does PFES provide any capacity building for local people (e.g., whether people have improved access to technology transfer or understand best management practices for timber harvesting, road construction or agriculture)?	Observations of improved management practices applied in communities based on those demonstrated through PFES-associated training Protocol TBD	Used to determine nonmonetary (in-kind) benefits of PFES program	FPDF Requires third-party or participatory verification of results	Every 5 years to monitor changes and efficacy of PFES program	Documentation of improved forest management practices	List of training opportunities List of landowners engaging in improved land-management practices and discussion of the impact of those practices	Number of training sessions conducted Number of people attending Number of farmers employing new practices with specific practices documented	FPDF board to require FPDF director to solicit this information
Has people's awareness of the value of forests for their livelihood changed?	Survey to determine knowledge held by ES providers and buyers Protocol TBD	To understand change in perceptions and willingness to engage in PFES	Provincial FPDF Requires third-party or participatory verification of results	Every 5 years to monitor changes in perceptions over time	Survey results of levels of knowledge Documentation of survey or informal discussions indicating changed attitudes and increased awareness of the role of forests in providing ES	Notes from informal discussions and documentation of results	Report on interviews and levels of knowledge	Chair of provincial FPDF to interview buyers and sellers selected at random

CIFOR Occasional Papers contain research results that are significant to tropical forest issues.
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This CIFOR Occasional Paper assesses the government of Vietnam's program of Payments for Forest Environmental Services (PFES), with the aim of providing policy makers with practical policy recommendations for achieving effective, efficient and equitable outcomes. The authors focus on three aspects of PFES: (1) institutional setting; (2) benefit-sharing mechanisms; and (3) monitoring and evaluation.

Vietnam's PFES policies demonstrate the government's commitment to forest protection and development. The scheme, which is a major breakthrough for Vietnam's forestry sector, underwent numerous refinements during the pilot phase. In particular, major achievements have been made in establishing institutional arrangements, generating substantial revenue and gaining political commitment and support for PFES at all government levels and among local people, all of which suggest a bright future for the scheme.

By examining case studies and PFES pilot projects, the authors draw numerous lessons. In particular, they note that the context in which a PFES initiative is implemented heavily influences the effectiveness of the policy design and the likelihood of the stated goals being achieved. Potential trade-offs between environmental and social goals can be assessed reasonably well by considering the correlation between the characteristics of poor landholders and their land, the costs and benefits of providing environmental services, and the political feasibility of each policy option. For PFES to be more effective and efficient, transaction costs need to be reduced, which could be achieved by strengthening coordination between central organizations and local line agencies, ensuring that each body has the necessary capacity, clarifying roles, rights and responsibilities, and sharing information on forest areas, land allocation and forest owners. A combination of monitoring techniques and bundling of environmental services could also enhance the efficiency and effectiveness of PFES.

Policy makers must also work toward developing a functional monitoring and evaluation system with an accessible grievance mechanism, to ensure transparency and accountability in the distribution of PFES revenues from central to local levels. PFES could also benefit from being part of a more holistic program, working with complementary conservation and socioeconomic development programs. PFES program delivery would be further supported by long-term capacity building for government staff and households, communities and their representatives.

CGIAR RESEARCH PROGRAM ON Forests, Trees and Agroforestry

This research was carried out by CIFOR as part of the CGIAR Research Program on Forests, Trees and Agroforestry (CRP-FTA). This collaborative program aims to enhance the management and use of forests, agroforestry and tree genetic resources across the landscape from forests to farms. CIFOR leads CRP-FTA in partnership with Bioversity International, CIRAD, the International Center for Tropical Agriculture and the World Agroforestry Centre.

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