Payment for Forest Environmental Services:

A Case Study on Pilot Implementation in Lam Dong Province, Vietnam 2006-2010

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ACKNOWLEDGMENTS

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Front cover photo: Waterfall in Bi Duop-Nui Ba National Park

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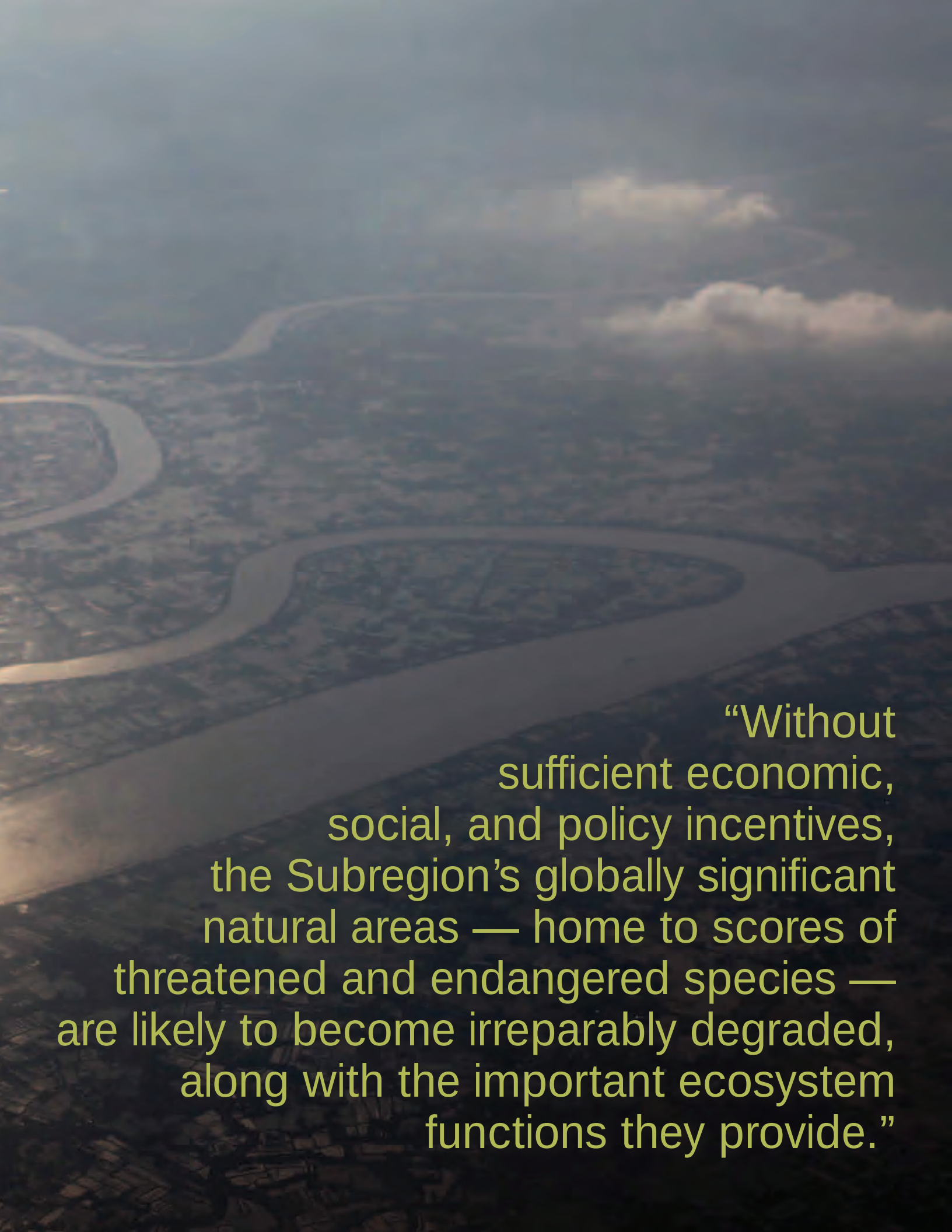


"Without sufficient economic, social, and policy incentives, the Subregion's globally significant natural areas — home to scores of threatened and endangered species — are likely to become irreparably degraded, along with the important ecosystem functions they provide."

INTRODUCTION AND SUMMARY

With support from USAID/RDMA (Regional Development Mission for Asia), Winrock International's Asia Regional Biodiversity Conservation Program (ARBCP) has supported the Government of Vietnam since 2006 in implementing a successful pilot program of Payment for Forest Environmental Services (PFES), which has improved livelihoods of over 40,000 rural poor while promoting biodiversity conservation in Lam Dong Province and across Vietnam. The pilot policy also helped to inform the design and subsequent signing of a national PFES Decree, a regionally significant milestone.

Vietnam, like many countries in Southeast Asia, has suffered the loss of critical forestlands and other environmental degradation from the expansion of agriculture and unbridled economic development. Conservation of vital habitats is more likely if forest owners and forest-dwelling communities can be compensated for the true economic value of the services intact ecosystems provide, including protection of water quality, prevention of soil runoff that increases siltation of hydroelectric reservoirs, harvest of natural forest products, and the aesthetic appeal of natural landscapes important to tourism.

Vietnam's national PFES pilot policy, the first of its kind in Southeast Asia, created the legal framework necessary to collect and distribute a portion of the economic value of ecological services provided by forests in two pilot areas (Lam Dong province in the south and Son La province in the north). The policy facilitated payments ensuring continuous forest protection and management services, while improving the economic condition of local communities providing those services. The program also created a transparent process, based on scientific research that increased market confidence by requiring PFES payments from public utilities based on a reduction in their operating costs.

This case study examines the establishment of the scientific basis and justification for, and valuation of, forest environmental services in Lam Dong Province; recounts the capacity building and public awareness efforts necessary to implement the pilot policy; details the key activities undertaken during the two-year implementation phase (2009-10); summarizes ongoing monitoring and evaluation efforts; and provides an overview of the policy's achievements, challenges, and lessons learned.

By December 2010, PFES payments totaling 87,067,200,000 Vietnam Dong (VND; US $4.46 million) were made to 22 Forest Management Boards (FMBs) and forestry businesses, as well as to 9,870 households, 6,858 of which are ethnic minorities. PFES activities have resulted in enhanced protection of 209,705 hectares of threatened forest land. In 2010, the average annual payment per household was 10.5-12 million VND (US $540-615), representing an almost 400 percent increase over previous forest protection payments by the Government of Vietnam. Based on information in logbooks maintained by patrol teams, forest protection patrols supported by PFES payments have resulted in a 50 percent decrease in the number of reported cases of illegal logging and wildlife poaching in the Da Nhim watershed area.

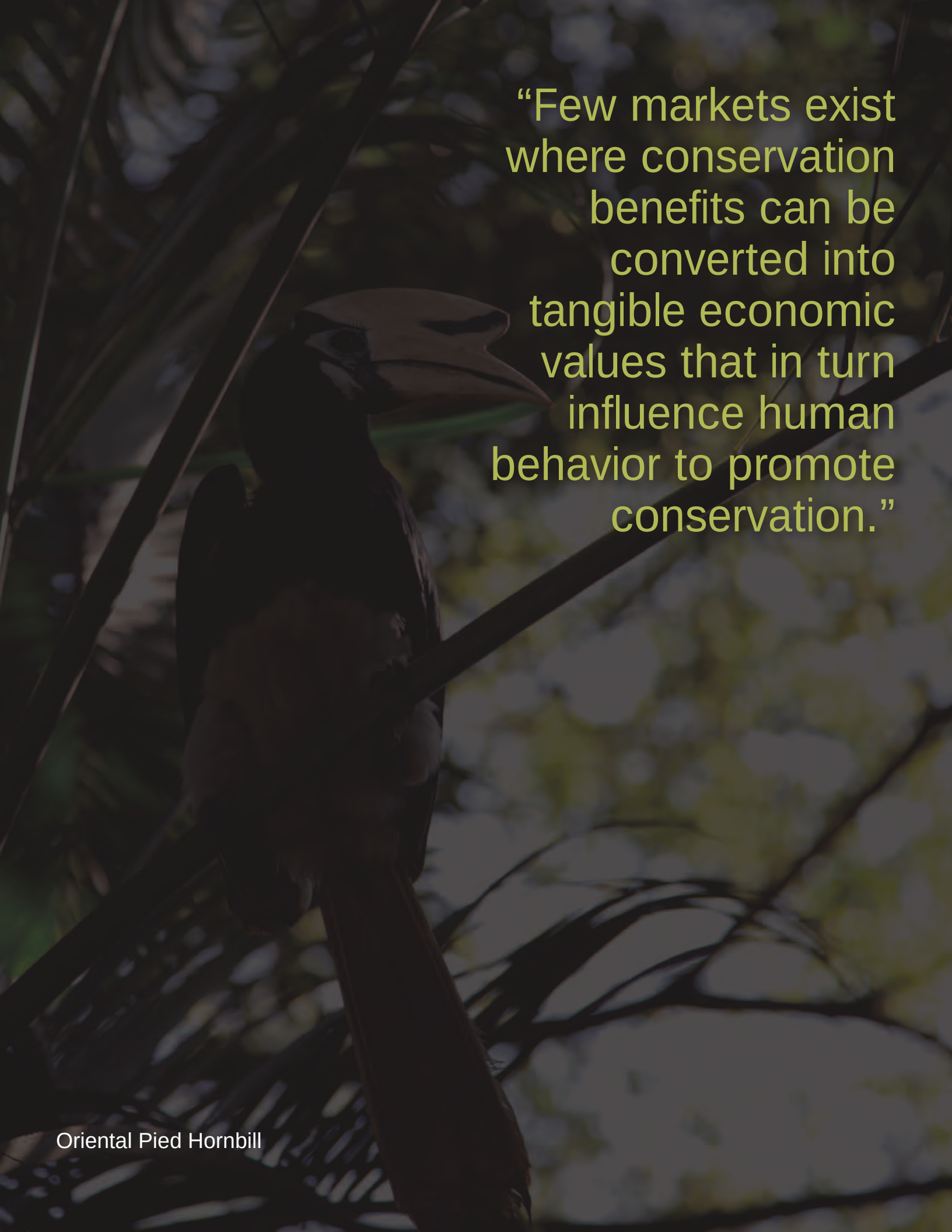
On September 24, 2010, the successful implementation of the pilot PFES policy in Lam Dong Province during its two-year trial culminated in an announcement from the Prime Minister of Vietnam that a National PFES Decree had been approved. The PFES Decree transforms the way forests are viewed and managed in Vietnam, providing a measure of assurance that critical forests, and the ecosystems services they provide, will be protected into the future through the scale up of PFES nationwide. This regionally and globally significant achievement serves as a model for other countries in Southeast Asia struggling to find economically viable approaches to support biodiversity conservation.

ACRONYMS

ADB	Asian Development Bank
ARBCP	Asia Regional Biodiversity Conservation Program
C	Carbon
CO_2	Carbon Dioxide
CERs	Certified Emission Reductions
CTNP	Cat Tien National Park
DARD	Department of Agriculture and Rural Development
DONRE	Department of Natural Resources and Environment
DPI	Department of Planning and Investment
EVN	Electricity of Vietnam
FMB	Forest Management Board
FPD	Forest Protection Department
FPDF	Forest Protection and Development Fund
GCC	Global Climate Change
GoV	Government of Vietnam
GMS	Greater Mekong Subregion
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
ha	Hectare
HCMC	Ho Chi Minh City
MARD	Ministry of Agriculture and Rural Development
MF	Ministry of Finance
MONRE	Ministry of Natural Resources and the Environment
NTFP	Non-timber Forest Product
PA	Protected Area
PES	Payment for Ecosystem Services
PFES	Payment for Forest Environmental Services
PPC	Provincial Peoples' Committee
PPP	Public Private Partnership
RCSP	Regional Cooperation Strategy and Program
RDMA	Regional Development Mission for Asia
REDD	Reducing Emissions from Deforestation and Forest Degradation
SAWACO	Sai Gon Water Company
SFE	State Forest Enterprise
t	Ton
USAID	United States Agency for International Development
USFS	United States Forest Service
VCS	Voluntary Carbon Standard

MAP OF PFES PILOT AREAS IN LAM DONG PROVINCE

PFES pilot implementation areas relative to the Dong Nai River Basin Conservation Landscape.



“Few markets exist where conservation benefits can be converted into tangible economic values that in turn influence human behavior to promote conservation.”

Oriental Pied Hornbill

Section 1: Background and Context

Since October 2005, Winrock International's Asia Regional Biodiversity Conservation Program has been supporting initiatives to encourage conservation and sustainable natural-resources management in Southeast Asia and the Greater Mekong Subregion[1] (GMS), a globally important hotspot of biodiversity. The overarching goal of the USAID/RDMA-funded ARBCP is to help partner countries develop the capacity to improve landscape-level ecosystem connectivity and biodiversity habitat function in multiple-use forests.

Threats to biodiversity in the GMS are largely driven by the need for economic development. One of the most pressing issues for conservation involves offsetting the 'opportunity' costs to rural communities of protecting natural habitats rather than converting them to agriculture or other uses providing immediate income generation. Biodiversity and watershed conservation services provided by special-use forests, protected forests, and commercial forests are often undervalued. Few markets exist where conservation benefits can be converted into tangible economic values that in turn influence human behavior to promote conservation. As a result, in many cases economic returns from the protection of planted and natural forests are not high enough to prevent their conversion to other uses. Without sufficient economic, social, and policy incentives, the Subregion's globally significant natural areas — home to scores of threatened and endangered species — are likely to become irreparably degraded, along with the important ecosystem functions they provide.

Payment for Ecosystem Services

Payments for ecosystem services (PES) mechanisms compensate individuals or communities for undertaking actions that increase the provision of ecosystem services such as water regulation, flood mitigation, or carbon sequestration. PES programs induce behavioral change by providing an economic incentive, and as such are considered part of the broader class of incentive- or market-based mechanisms for environmental policy.

In Vietnam, as elsewhere, insufficient funding for conservation serves as another major constraint to achieving biodiversity conservation goals. Costs of managing protected areas are high, particularly those related to biological and enforcement monitoring. Management boards for protected areas rely on funding provided by Vietnam's central government. Few funding sources are available for conservation initiatives located outside protected areas, and reforestation programs have not received enough funding to meet and maintain required results.

In 2006-2007, ARBCP supported Lam Dong Province in developing its first Biodiversity Conservation Action Plan (BCAP), establishing clearly defined landscape-level management objectives to be reached, and potential strategic biodiversity corridor targets to be met by 2020. The plan provides the framework for using funds generated by Payments for Ecosystem Services (PES) mechanisms to support and sustain the province's priority conservation targets. The BCAP was the first in Vietnam to be fully coordinated with a province's socioeconomic development plan.

Together with national and provincial partners, ARBCP developed a sustainable PES-based financing mechanism (coined Payment for Forest Environmental Services–PFES – in Vietnam) explicitly designed to preserve biodiversity at the landscape level. The pilot approach supported natural resource management and conservation in ways that provide real economic opportunities to rural communities, using sustainable financing pinpointed at reducing poverty. PFES has provided local stakeholders with a significant role in managing the forest resources that contribute to their livelihoods, helping ensure continuing local support for conservation.

1.1 DECISION 380 – PFES PILOT POLICY

In 2007, significant efforts by key decision-makers within the Ministry of Agriculture and Rural Development (MARD)

1. Greater Mekong Subregion (GMS) comprises Cambodia, the People's Republic of China, Lao People's Democratic Republic, Myanmar, Thailand, and Vietnam.

led to a request for ARBCP to help develop a pilot policy for Payment for Forest Environmental Services in Vietnam. The result was a globally and regionally significant policy approved under Prime Minister's Decision No. 380/QĐ-TTg[2], dated April 10, 2008, with activities undertaken through December 2010. MARD led implementation of the pilot policy in cooperation with Lam Dong Province in the south and Son La Province in the north. ARBCP was selected to undertake implementation in Lam Dong Province, while German development agency (GTZ) supports activities in Son La Province.

Upland communities, in search of firewood and increasing production from agricultural land, illegally cut trees in the Da Nhim watershed. In Vietnam, as elsewhere, insufficient funding for conservation serves as another major constraint to achieving biodiversity conservation goals.

The PFES pilot policy, the first of its kind in Southeast Asia, created the legal framework necessary to collect a portion of the true economic value of ecological services provided by forests in the two pilot areas. The policy facilitates disbursement of payments from service buyers like hydropower facilities to ensure continuous forest protection and management services, while improving the livelihood of the participating communities safeguarding these services. The pilot policy also increased market confidence by requiring PFES payments as a means to reduce public utility operating costs. Specifically, the policy:

- Established a pilot phase for testing PFES in Lam Dong and Son La Provinces from January 2009 through December 2010;
- Stipulated three types of forest environmental services for piloting: water regulation, soil conservation, and landscape aesthetics;
- Identified the 'service buyers', directing publicly-owned electric and water utilities, including Electricity of Vietnam (EVN) and the Sai Gon Water Company (SAWACO), to pay for water regulation and soil conservation services, and directing tourism operators in Lam Dong and Son La Provinces to pay for the landscape aesthetics service;
- Based on studies conducted by Winrock, set the payment levels at 20 VND per kilowatt-hour from commercial hydropower production businesses, 40 VND per cubic meter from clean-water production businesses, and 0.5-2 percent of annual revenue from tourism businesses; and
- Identified the 'service providers', stipulating that local farmers, local farming households, and local farmer communities who had already been allocated forest land would be the primary beneficiaries from the PFES policy.

1.2 PILOT SITE SELECTION IN LAM DONG PROVINCE

The Dong Nai watershed, including its surrounding areas located in Dong Nai, Binh Phuoc, and Lam Dong Provinces, was selected as ARBCP's pilot site area. The site possessed the necessary conditions (see Section 2.1) to directly support conservation and development objectives set forth by the Government of Vietnam (GoV) in the BCAP. In addition, the high demand for watershed services from Ho Chi Minh City and surrounding urban industrial parks gave PFES mechanisms in the Dong Nai watershed area the best chance for success. Finally, the site area's proximity to major tourism markets offered opportunities to turn demand for biodiversity conservation services into tangible economic incentives.

ARBCP reviewed the Government of Vietnam's Program 135[3] priority areas in the Dong Nai River basin, and completed assessments of communities located around the priority conservation areas of Cat Tien National Park (par-

2. Decision No. 380/QĐ-TTg is the official title of Vietnam's Payment for Forest Environmental Services Pilot Policy.

3. Government of Vietnam Program 135, Phase II (2006 – 2010) is a poverty reduction plan targeting poor, rural, ethnic minority communities.

ticularly Da Teh district) and Bi Doup-Nui Ba National Park (particularly the watershed catchment areas of the Da Nhim dam in Lac Duong district). The study identified two initial pilot areas in Lam Dong Province that possessed the range of conditions and incentives (see Section 2.1) needed to achieve PFES development, habitat connectivity, and enhanced livelihoods. These districts (*see Figure 1.2: Program 135 communes vs. Conservation Focal Areas*) have populations comprising significantly poor ethnic minority households that rely primarily on forest products for their livelihoods. The two national parks, in turn, represent important conservation anchors for the Dong Nai River Basin Conservation Landscape.

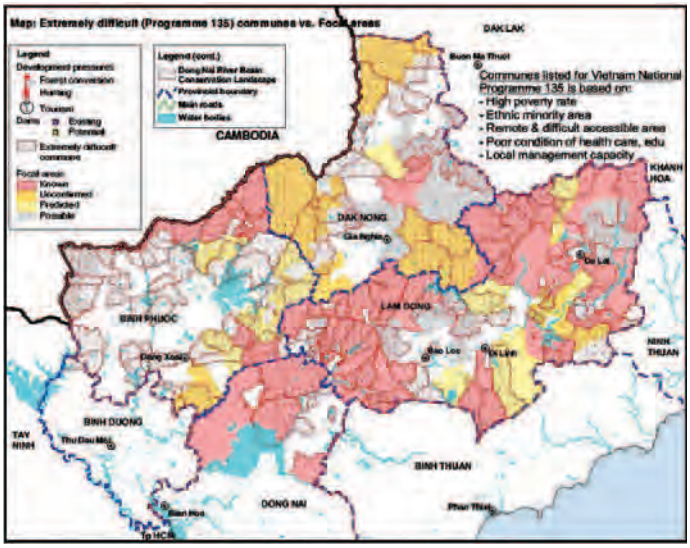


Figure 1.2 The mapping of poor communes outlined under Program 135 and conservation focal areas delineated under the biodiversity assessments helped identify the two initial pilot PFES areas.

1.3 IMPLEMENTING THE PFES PILOT POLICY IN LAM DONG PROVINCE

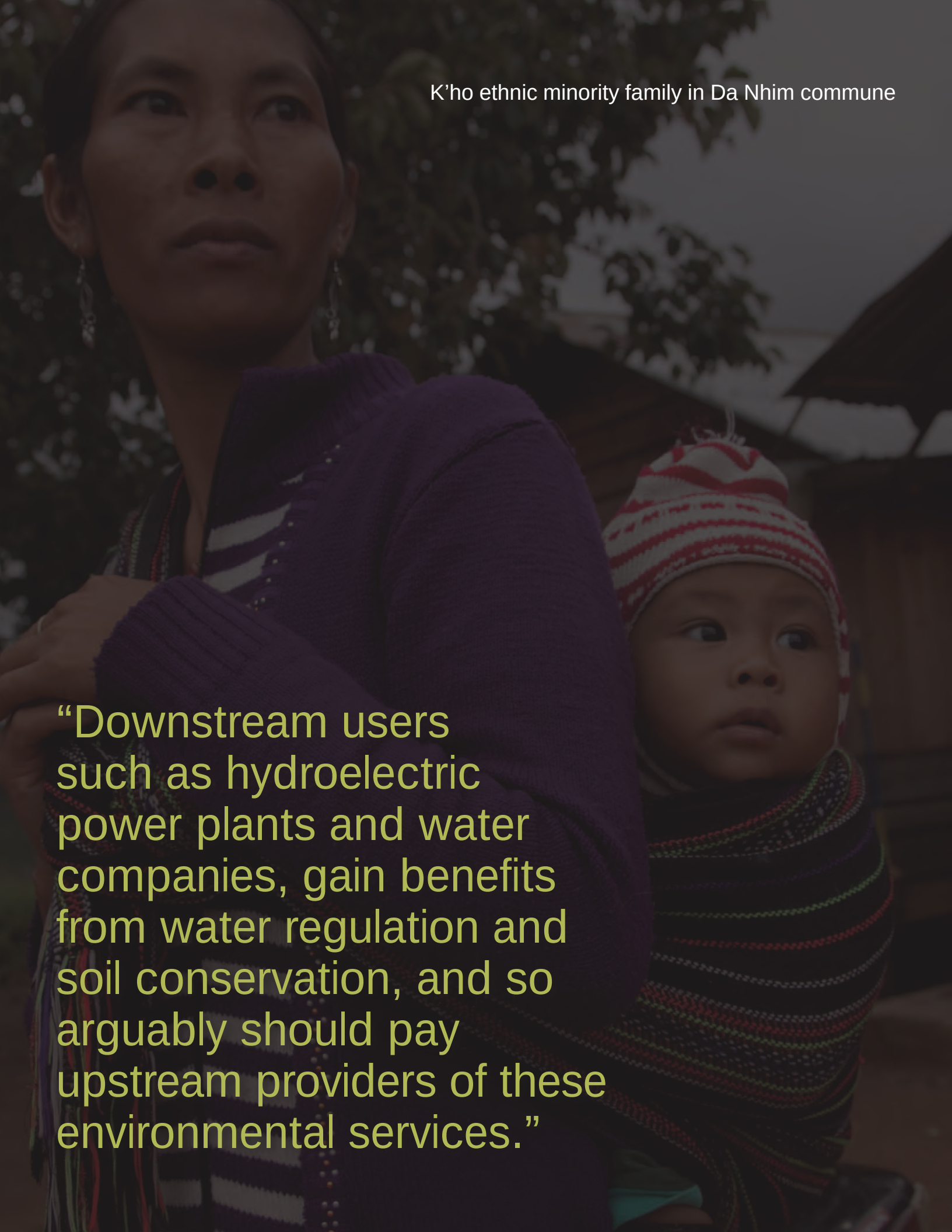
To implement the pilot policy, ARBCP worked with the Lam Dong Provincial Peoples' Committee (PPC), Department of Agriculture and Rural Development (DARD), and MARD's Forest Protection Department (FPD) to design and develop a PFES program that (1) promotes financial sustainability; (2) minimizes transaction costs; (3) encourages transparent flow of funds and information; (4) targets agroforestry smallholders as the service providers; (5) provides ethnic minorities, women, and other disadvantaged groups with opportunities to participate as service providers as a means of poverty reduction; (6) fosters locally defined best management practices for PFES implementation and monitoring; and (7) strengthens environmental governance mechanisms and increases institutional capacity of relevant national and provincial implementing agencies.

The following case study examines the establishment of the scientific basis and justification for forest environmental services in Lam Dong Province, recounts the capacity building and public awareness efforts necessary to implement the pilot policy; details the key activities undertaken during the two-year implementation phase; summarizes the ongoing monitoring and evaluation efforts; and provides an overview of the pilot's achievements, challenges and lessons learned.

1.4 TIMELINE OF PFES PILOT POLICY IMPLEMENTATION

This time line provides a schematic representation of the main activities undertaken to prepare for and ultimately implement the PFES pilot policy effectively in Lam Dong Province. Its successful implementation led to the disbursement of US $4.46 million to, amongst others, 9,870 primarily ethnic minority and relatively poor households. It also led to the signing of a national PFES Decree into law on September 24, 2010.

Biological & Macroeconomic Assessments	**2006 - 2007**	Biological Assessment of the Dong Nai River Basin Conservation Landscape undertaken. Vietnamese government officials go on study tour to PES watershed management projects in the USA. Spatial threats assessment completed for DNRBCL, together with macroeconomic assessment and cost-benefit analysis for major land use types of Lam Dong Province Biodiversity Conservation Action Plan drafted, providing rationale and basis for piloting sustainable conservation finance mechanism in Lam Dong Province.
	April 2008	Valuation study in Da Nhim watershed completed, providing baseline estimates of economic value of ecosystems services in the watershed.
Policy Issued		Pilot PFES policy approved under Prime Minister's Decision No. 380/QĐ-TTg, establishing pilot phase for Lam Dong and Son La Provinces from January 2009 through December 2010.
Capacity Building & Awareness Raising	**2008 - 2009**	Awareness raising campaigns on importance of biodiversity conservation and other environmental services values undertaken at commune, district, provincial and national level. Training and capacity building on various disciplines including forest valuation, environmental monitoring, field surveying, and spatial modeling.
Pilot Implementation	**2009**	EVN, SAWACO, Bien Hoa Water Company, and 59 tourism concessions sign initial MOUs committing payments totaling US $3.4 million to protect more than 220,000 hectares of forests. PFES payments set and first payments are received by the newly established Forest Protection and Development Fund (FPDF). Da Nhim identified as first PFES pilot commune to enter into forest protection contracts under PFES pilot policy and first payments disbursed to households.
Monitoring, Evaluation & Adjustments		Assessment of PFES policy implementation undertaken by MARD and payment levels increased.
	2010	Gaging Stations to monitor water and sediment flows installed at four sites in Da Nhim watershed. Preliminary data supports the fact more sediment originates from agricultural land use versus forest land. Socioeconomic study carried out to evaluate the impact of payments on households. Showed pilot PFES policy plays an important role in family cash income, reducing poverty and forest degradation.
Results	**September 2010**	Prime Minister of Vietnam signs the National PFES Decree into Law.
	December 2010	PFES payments totaling US $4.46 million have been made to 22 Forest Management Boards and forestry businesses, as well as to 9,870 households, 6,858 of which are ethnic minorities.



K’ho ethnic minority family in Da Nhim commune

“Downstream users such as hydroelectric power plants and water companies, gain benefits from water regulation and soil conservation, and so arguably should pay upstream providers of these environmental services.”

Section 2: Initial Studies and Consultations

ARBCP undertook a series of studies and consultations with regional and international experts, with the aim of informing the policy development process, providing a scientific and socioeconomic basis for the pilot site selection, and determining the market value for water, soil, and aesthetic environmental services in the Dong Nai River basin. Major studies and significant results and findings are detailed below.

2.1 BIOLOGICAL ASSESSMENT AND CONSERVATION ACTION PLAN

In 2006-2007, ARBCP supported the completion of a study entitled *Biological Assessment of the Dong Nai River Basin Conservation Landscape* (Pilgrim et al, 2007), which examined the four provinces of Binh Phuoc, Dak Nong, Dong Nai, and Lam Dong in southern Vietnam. The principal result of the assessment was an ambitious biological vision for strategic conservation action. The vision comprised a set of "conservation foci" (global biodiversity elements that were deemed conservation priorities); a map of "focal areas," which provided a set of priority geographic options for the conservation foci; and a series of "conservation targets" that needed to be met for the biodiversity elements to be conserved.

The conservation foci included two ecological processes (habitat manipulation by very large herbivores and predation by large carnivores); three focal communities (upland evergreen forest, non- or slow-flowing wetlands, and fast-flowing rivers and streams); and 36 focal taxa (five mammals, seven birds, one reptile, one amphibian, and 22 plants). The focal areas were mainly distributed within the conservation landscape's major forested corridors, including the corridor from Vinh Cuu Nature Reserve to Bi Doup-Nui Ba National Park along the Dong Nai River and a cluster of areas around Cat Tien National Park and between Ta Dung Nature Reserve and Bi Doup-Nui Ba National Park.

A spatial assessment (Thai, 2009) was conducted to determine the level of economic threats in the priority conservation focal areas. Two provincial-level macroeconomic assessments were conducted in Lam Dong (Thanh, 2009) and Binh Phuoc Provinces to further understand the rate and direction of change that could be expected under future development plans and to help the program and its partners further prioritize areas for implementing pilot activities. This process considered conservation priorities, as well as imminent conservation threats derived from the socioeconomic status of the local communities. Two focal areas — Da Teh and Da Nhim in Lam Dong Province, lying at the two extremes of the Vinh Cuu Nature Reserve and Bi Doup-Nui Ba National Park corridor, respectively — were identified as appropriate pilot sites.

The biological assessment was considered along with three other studies: *Lam Dong Province Macroeconomic Assessment* (Thanh, 2009), *Lam Dong Spatial Threats Analysis* (Thai, 2009) and the *Cost-Benefits Analysis for Selected Crops and Trees—Lam Dong Province* (THanh, 2007). The result was the Lam Dong Biodiversity Conservation Action Plan (BCAP) (Lam Dong PPC, 2008), developed by ARBCP, Lam Dong DARD and Forest Protection Department (FPD) with cooperation of other relevant provincial departments.

The BCAP provides a framework to maintain and strengthen landscape connectivity and functions of ecosystems, particularly between Cat Tien National Park and Bi Doup-Nui Ba National Park; maintain and develop focal populations, species, and genetic diversity; and mobilize resources from the government, nongovernment organizations, and economic sectors to make contributions to, and share the benefits from, conservation and biodiversity in the province. The Lam Dong Province BCAP was completed and approved by the Lam Dong PPC in 2007, providing the rationale and basis for piloting a sustainable conservation finance mechanism in Lam Dong. The plan also presented recommended assessments and conservation measures for conservation foci, particularly focusing on endangered and endemic species that have received less attention in the past.

2.2 BIODIVERSITY MONITORING

A baseline assessment of biodiversity in Da Teh's forests was undertaken as part of the BCAP for Lam Dong. Da Teh was chosen for its importance as a buffer zone for Cat Tien National Park, as well as its location in the forest corridor connecting Cat Tien to the natural forests of the Langbian Plateau around Da Lat City. Beginning in 2007, community-led teams monitored the populations of target species in Da Teh district over the course of three years. Existing target species and populations of global and national conservation significance include the yellow-cheeked crested gibbon (*Nomascus gabriellae*), black-shanked douc langur (*Pygathrix nigripes*), orange-necked partridge (*Arborophila davidi*), green peafowl (*Pavo muticus*), Germain's peacock pheasant (*Polyplectron germaini*), and great Indian hornbill (*Buceros bicornis*) [4].

The most recent survey in Da Teh district, conducted in December 2009, revealed a viable population of yellow-cheeked crested gibbon, a high encounter rate of great Indian hornbill, and potentially the highest known density of orange-necked partridge in its range, a species endemic to the Dong Nai Conservation Landscape (including Cambodia). Because gibbon and hornbill species are considered indicators of good forest quality, Da Teh forests can be judged to still provide suitable wildlife habitat and to serve as a buffer zone for Cat Tien National Park as well as a key habitat corridor in the Dong Nai River Basin Conservation Landscape.

Counterbalancing this good news were findings by the community-based monitoring program emphasizing the potential negative impact of the increasing number of commercial tree plantations (including rubber and acacia) on the biodiversity value and ecological function of Da Teh's forests. Monitoring results showed a substantial reduction in gibbon activity in 2008 related to a sudden increase in forest disturbance by new private forest companies and local residents. A rebound in the number of gibbon groups in 2009 implies that gibbon populations can adapt to a higher disturbance level as long as large contiguous forest cover with a high density of tall broadleaf trees remains intact.

Community-based biodiversity monitoring had a dual benefit: Not only did it create the conservation monitoring baseline for Da Teh, it also built the capacity and awareness of five communes that received PFES payments while improving their knowledge about the environmental services that their forest provides and the requirements to sustain these services for the future.

Furthermore, ARBCP investments in the Da Teh district pilot site serve to provide a continuing laboratory for the assessment of biodiversity-friendly development alternatives that can help meet Lam Dong Province BCAP targets for conservation and socioeconomic development.

Pinus krempfii—An Endemic Species

The conifer species *Pinus krempfii* ranks as one of the most important endemic tree species in the tropical mountainous monsoon area within Lam Dong Province. In recognition of its intrinsic value[5], a study was undertaken to provide a scientific baseline for its conservation in the PFES pilot areas, encompassing its natural distribution and plans for future conservation and monitoring.

Using five standard permanent sampling plots workers studied the forestry characteristics, species ecology, and population ecology of *Pinus krempfii*. Two hectares of *P. krempfii* were planted within the natural range of the species, with plantations monitored to assess mortality and determine ideal conditions for future conservation planting. The study showed that illegal logging and conversion of forest to agriculture are restricting the species' range. These factors, coupled with poor natural regeneration of *P. krempfii* compared to other species in the ecosystem, could mean eventual extinction for this important endemic tree. *P. krempfii* is listed as "Vulnerable" in the Vietnam Red Book and as "Endangered" in the Red Book of the International Union for the Conservation of Nature.

The study provided recommendations for mitigating negative impacts on the conifer's range, demonstrated the environmental values of PFES pilot areas, and showed the importance of conveying this information to the households contracted under the PFES pilot mechanism.

4. Yellow-cheeked crested gibbon is listed as "endangered" in the Vietnam Red Book 2007 and as "vulnerable" in the IUCN Red List 2006; the black-shanked douc langur and orange-necked partridge are listed as "endangered" in the IUCN Red List and Vietnam Red Book; and the green peafowl, Germain's peacock pheasant and great Indian hornbill are listed as "vulnerable" in the Vietnam Red Book and "near threatened" in the IUCN Red List (Lam Dong PPC, 2008)

5. *Pinus krempfii* is not only endemic to Lam Dong Province, but is considered to be a rare conifer species due to its flat needles. As a result it is classified in its own subsection.: Krempfianae (Wang, *et al*, 1999)

2.3 VALUATION OF FOREST ENVIRONMENTAL SERVICES

An integral part of the program involved an initial watershed valuation model, undertaken to support the main thrust of the PFES pilot policy and to provide baseline estimates for the economic value of the Da Nhim watershed catchment. The program also worked with Lam Dong Province to develop forest cover baseline assessments, which formed the basis for estimating carbon offset values that will enable Lam Dong Province to generate additional revenues from standing forests or forest restoration activities in the future.

Water Regulation and Soil Conservation

ARBCP's initial forest valuation study for the Da Nhim watershed provided baseline estimates of the tangible economic value of two vital environmental services provided by intact forests (Thanh, 2008). Downstream users such as hydroelectric power plants and water companies, gain benefits from water regulation and soil conservation, and so arguably should pay upstream providers of these environmental services. The valuation study (see Figure 2.3 below) was also instrumental in raising the confidence level of policymakers regarding setting payment levels.

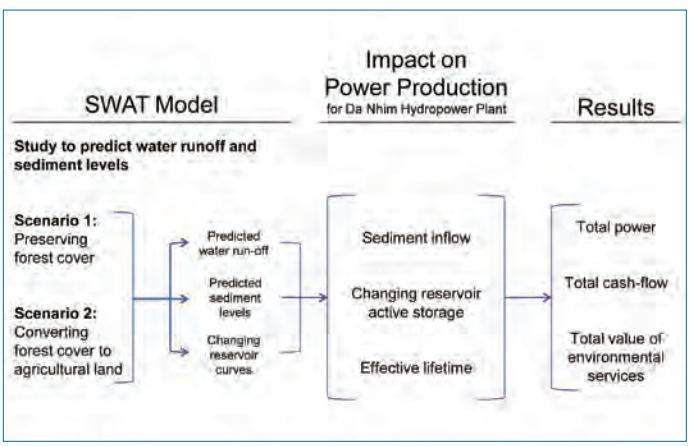


Figure 2.3 Two divergent land use scenarios were run through a Soil & Water Assessment Tool (SWAT) model to demonstrate the impact on hydropower production and generate tangible economic values for water regulation and soil conservation ecosystem services.

The program, in collaboration with local authorities, identified hydropower and water-supply companies as potential payers of forest environment services, and forest-dependent rural households as payees.

More sediment is carried into a stream running through agriculture land than a similar stream running through intact forest. Storage capacity of a downstream reservoir decreases as a result of sedimentation, shortening the reservoir's useful lifespan and creating a significant and quantifiable financial loss. Equally, an intact forest regulates the flow of water ultimately reaching a reservoir, minimizing flash floods.

The study used the Soil and Water Assessment Tool (SWAT) model on two different scenarios: preserving existing forest cover and converting 45,000 hectares of pine forest to agriculture. SWAT was used to predict water runoff and suspended sediment levels entering the Da Nhim Reservoir. The varying water inflows generated by the SWAT model were entered into a Power Generation Production model of the Da Nhim Hydropower Plant to estimate the daily power production outputs. The production value and net benefit under the two scenarios were estimated, as well as the Net Present Value (NPV) of the forest in dollars per hectare per year.

A model was established that took into consideration the sediment deposited in the reservoir for the two scenarios. The total power generation forgone due to the shift between the two scenarios was estimated, followed by the cash-flow from the power generation during the lifetime of the reservoir. The change in the NPVs between the two scenarios was estimated, as well as the NPV of the losses. Finally, the value of the environmental service that forests provide in reducing sedimentation in the reservoir was estimated.

Results indicated that one hectare of forest was valued at US$69 per year to the Da Nhim hydropower project, of which US$14.60 was attributed to the benefits accrued from water regulation and US$54.40 for reduction of sediment into the reservoir. Translated into production cost, water regulation and soil conservation was priced at 64.55 VND per kilowatt-hour of electricity produced—14.9 VND for cost of water regulation and 49.6 VND for reduction of sediment into the reservoir.

These initial estimates formed the basis for policymakers to consider and ultimately decide upon the payment levels stipulated in the pilot PFES policy: 20 VND per kilowatt-hour for power generation and 40 VND per cubic meter for water provision. The study has also therefore been instrumental in informing the development of the national PFES decree.

Landscape Aesthetics

Sustainable and effective conservation in Lam Dong depends in part on the development of ways for forest residents to reap measurable financial rewards from the province's inherent beauty and scenic (aesthetic) values. ARBCP completed several studies providing a basis for medium- and long-term sustainable tourism planning, including a draft plan to fund conservation of Lam Dong's natural and cultural assets. Studies included *Lam Dong Provincial Tourism Master Plan: Options for Tourism and Biodiversity Funding Mechanisms* (Rogers, 2008), the associated *Cost-Benefit Analysis of Sustainable Tourism in Lam Dong Province* (Rogers, 2008), and *Linking Tourism and Payment for Ecosystem Services in Bidoup Nui Ba National Park Lam Dong Province, Vietnam* (Patterson and Burns, 2009).

As a first step, potential payers in the pilot areas were identified and awareness raising programs implemented within the tourism sector. Later, ARBCP formulated a plan through which tourism companies in the pilot area could pay for forest environmental services. Deliberations at the provincial level, taking into consideration the ARBCP studies, resulted in the decision to set the payment level of 0.5-2 percent of annual gross revenues for tourism companies.

The Da Nhim reservoir is laden with silt after recent storms. The conversion of forest to agriculture (as seen in the foreground) is known to increase runoff rates and soil erosion causing greater sediment yields in streams, rivers and ultimately the reservoir.

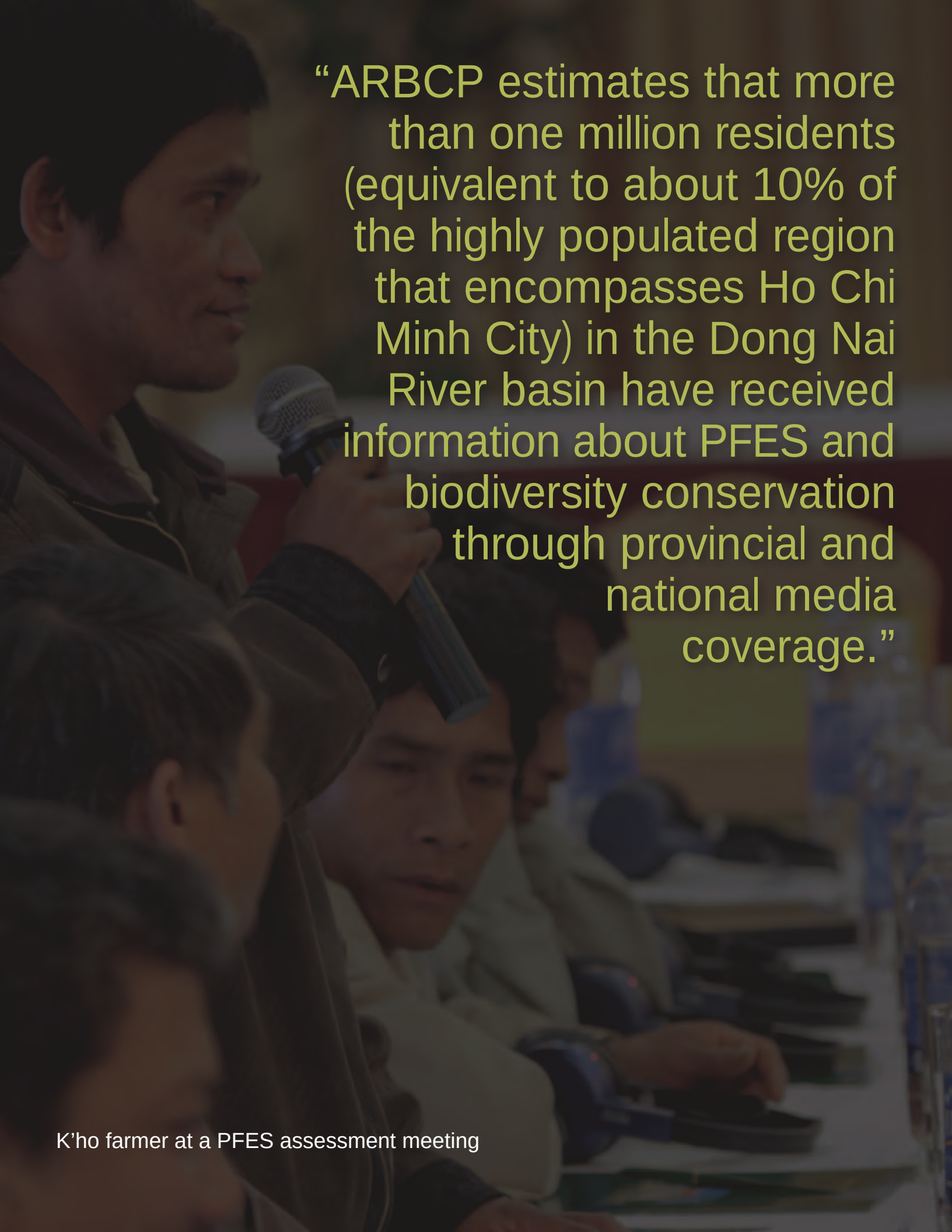
Carbon Sequestration

The growing economic opportunities associated with carbon credits offer additional ways for communities to generate income while protecting forests. An important part of PFES, carbon credits reward forest stewards for preserving trees that not only sequester CO_2 from the atmosphere, but would have been a source of CO_2 emissions had they been cut down. These credits are the result of a relatively new and evolving global framework called Reducing Emissions from Deforestation and Forest Degradation (REDD). The framework represents a potentially important means by which rural communities can benefit financially from forest protection.

ARBCP helped Lam Dong Province establish a forest cover baseline for the pilot PFES project area using Quickbird, one form of high-resolution satellite imagery. This work also provided the opportunity to estimate the carbon stocks in the pilot area. Ultimately, the value of the carbon sequestration service could be added to revenue from water regulation, soil conservation, and landscape aesthetics, providing households with greater compensation for protecting forests rather than, for example, clearing them to plant monoculture crops.

Using GEOMOD, a computer program which simulates land use change using geographic modeling, the deforestation in a "business-as-usual" scenario was estimated. Carbon dioxide emissions associated with unplanned deforestation (assuming a deforestation rate of 0.59 percent per year) were also predicted. The simulation indicated that between 2007 and 2037, a total of 2.19 million tons of carbon would be at risk of being lost across the whole Da Nhim watershed (representing 14,000 hectares of forest loss), equivalent to 8.02 million tons of CO_2 emissions.

ARBCP provided continuing support to Lam Dong Province in designing a REDD pilot project that would generate carbon credits to be sold in the voluntary carbon market. To provide a greater measure of confidence in the outcome, ARBCP helped the province estimate carbon emissions from an existing provincial plan to convert nearly 3,448 hectares of forest to development and agriculture (see Section 4.2 for more details).



“ARBCP estimates that more than one million residents (equivalent to about 10% of the highly populated region that encompasses Ho Chi Minh City) in the Dong Nai River basin have received information about PFES and biodiversity conservation through provincial and national media coverage.”

K’ho farmer at a PFES assessment meeting

Section 3: Public Awareness, Capacity Building, and Training

The concept of Payment for Ecosystem Services is gaining recognition worldwide, but is still a relatively new concept in the Southeast Asia region, Vietnam notwithstanding. ARBCP recognized the need for national and local awareness raising activities, as well as provincial-level capacity building and training to ensure that the ambitious objectives outlined for the pilot PFES mechanism could be realized within the two-year pilot implementation phase.

AWARENESS RAISING

PES Study Tour to US

During the months leading up to the pilot PFES policy development phase, in 2007 ARBCP and the U.S. Forest Service (USFS) supported a study tour to the United States for participants from Vietnam, Cambodia, and Thailand. The tour visited successful PES watershed-management projects in which upstream forest and ecosystem service providers receive financial incentives from downstream beneficiaries. Participants also learned how PES programs in Hawaii, Oregon, and New York calculated economic demand for watershed services and garnered support for the services through tangible economic incentives.

Through presentations, site visits, and discussions with local officials, participants learned about interagency cooperation, innovative public-private partnerships, and legislative and legal support mechanisms designed to encourage private-sector involvement in service delivery. The tour provided excellent real-life concepts and models for application and replication in the design and the implementation of the ARBCP pilot PFES policy development activities in Vietnam. ARBCP worked with the Vietnamese participants in considering the best practices presented in the study tour when evaluating private sector demand for environmental services in Vietnam and when designing the PFES mechanism with Vietnamese water utilities, hydropower companies, and tourism operators. The tour also exposed the participants to the range of scientific, legal, political, and administrative procedures required to facilitate PES projects in the United States and their relevance for Vietnam.

Community-Level Public Awareness Campaigns

In 2008, ARBCP began conducting awareness raising campaigns on the importance of biodiversity and other environmental services values, both at the commune and district level and the Dong Nai River basin and nationally. Campaigns were launched with support from district officials and local communities in Quoc Oai, An Nhon, Da Lay, Da Kho, and Huong Lam communes of Da Teh District, as well as the Da Nhim, Da Sar, and Da Chais communes of Lac Duong District in Lam Dong Province. The campaigns featured contests, performances, and competitive role-playing skits. Village teams were judged on their conservation knowledge and ability to link general environmental messages to attitude and behavioral change. Several of the skits were televised across Lam Dong Province. ARBCP estimates that more than one million residents (equivalent to about 10% of the highly populated region that encompasses Ho Chi Minh City) in the Dong Nai River basin have received information about PFES and biodiversity conservation through provincial and national media coverage. Local news agencies aired these and other PFES stories during their weekend programming to ensure a wide viewership among local farming communities.

"Town hall" meetings on PFES in the Da Nhim commune provided a forum to raise the awareness of local households on forest environmental services, answer questions and elicit ideas for appropriate implementation.

Figure 3.1 Forty-one roadside PFES billboards were installed in districts within the Da Nhim watershed to further raise awareness of the benefits of ecosystem services and the need to keep forests intact.

Once the PFES pilot communities were identified in early 2009 (see Section 1.2), the project translated the PFES Pilot Policy (Decision 380; see Section 1.1) into local languages and held informal commune and hamlet "town hall" meetings to introduce PFES concepts, outline the benefits of providing environmental services, and discuss how forest protection might be conducted at the commune level. ARBCP also coordinated with the Lam Dong Forest Protection and Development Fund (FPDF) – the independent entity created to manage the disbursement of the PFES payments – and the Forestry Department to work with Lam Dong television to broadcast brief messages about PFES in local languages to better inform minority communities about its benefits to participating households.

In 2009, an Al Jazeera Asia news crew visited Lam Dong Province to shoot a two-minute news piece on the province's groundbreaking PFES activities. The visit and short video served to demonstrate to local stakeholders the increasing level of interest in the pilot PFES activities—not only in Vietnam but throughout Asia.

PFES Information Campaign by the Government of Vietnam

Throughout the two-year pilot phase, ARBCP has supported provincial authorities and the FPDF in a major PFES public information campaign, which included installing 24 poster panels in Lac Duong, Don Duong, Duc Trong, and Da Lat districts, displaying more than 200 small billboards at major tourist sites, installing 41 large roadside billboards (see Figure 3.1), and distributing 14,200 brochures, as well as organizing meetings and workshops for local stakeholders.

The FPDF also launched a VND 438 million (US$ 22,000) multimedia publicity program in September 2009, which disseminated information on PFES through television and radio programs aired in Lam Dong Province.

ARBCP helped MARD develop a 30-minute video on PFES implementation that has been aired nationally on television and widely featured at various inter-ministerial and national meetings. The video includes interviews and discussions with national, provincial, and local PFES implementers, and closes with remarks on the success of PFES in Lam Dong Province by Deputy Prime Minister Hoang Trung Hai.

3.1 CAPACITY BUILDING AND TRAINING

Provincial-Level Capacity Building and Training

To prepare Lam Dong Province to undertake the PFES pilot, ARBCP worked with provincial officials to appoint a ten-member Lam Dong PFES Technical Working Group made up of forestry and environment experts from the province, as well as key technicians and civil servants from DARD, DONRE, the Department of Culture, Tourism and Sport, and the FPDF.

ARBCP organized a series of workshops and discussion groups with experienced international PES experts, including experts from the New York City Water Supply-Catskill Watershed Corporation and the Heredia Public Utilities Company of Costa Rica. Provincial technicians were also

supported in attending overseas courses and undertaking study tours to build their capacity and improve their knowledge in tourism (Australia), watershed management (United States), and SWAT modeling (Thailand). ARBCP has also facilitated more than 50 technical training sessions for officials and technicians from more than 15 provincial agencies.

Key training and capacity building exercises undertaken in collaboration with the PFES Technical Working Group are summarized below. ARBCP:

- Provided training on environmental monitoring and forest valuation, including watershed management, field surveying, and REDD-related courses (carbon stock measurement, spatial modeling, Voluntary Carbon Standard) (see Figure 3.2 below);
- Provided advice and training on data collection required to develop baselines for conservation of endemic species;

Figure 3.2 Training on carbon stock measurements in Da Nhim watershed ensures buy-in from provincial counterparts and stakeholders and sustainability of the monitoring process.

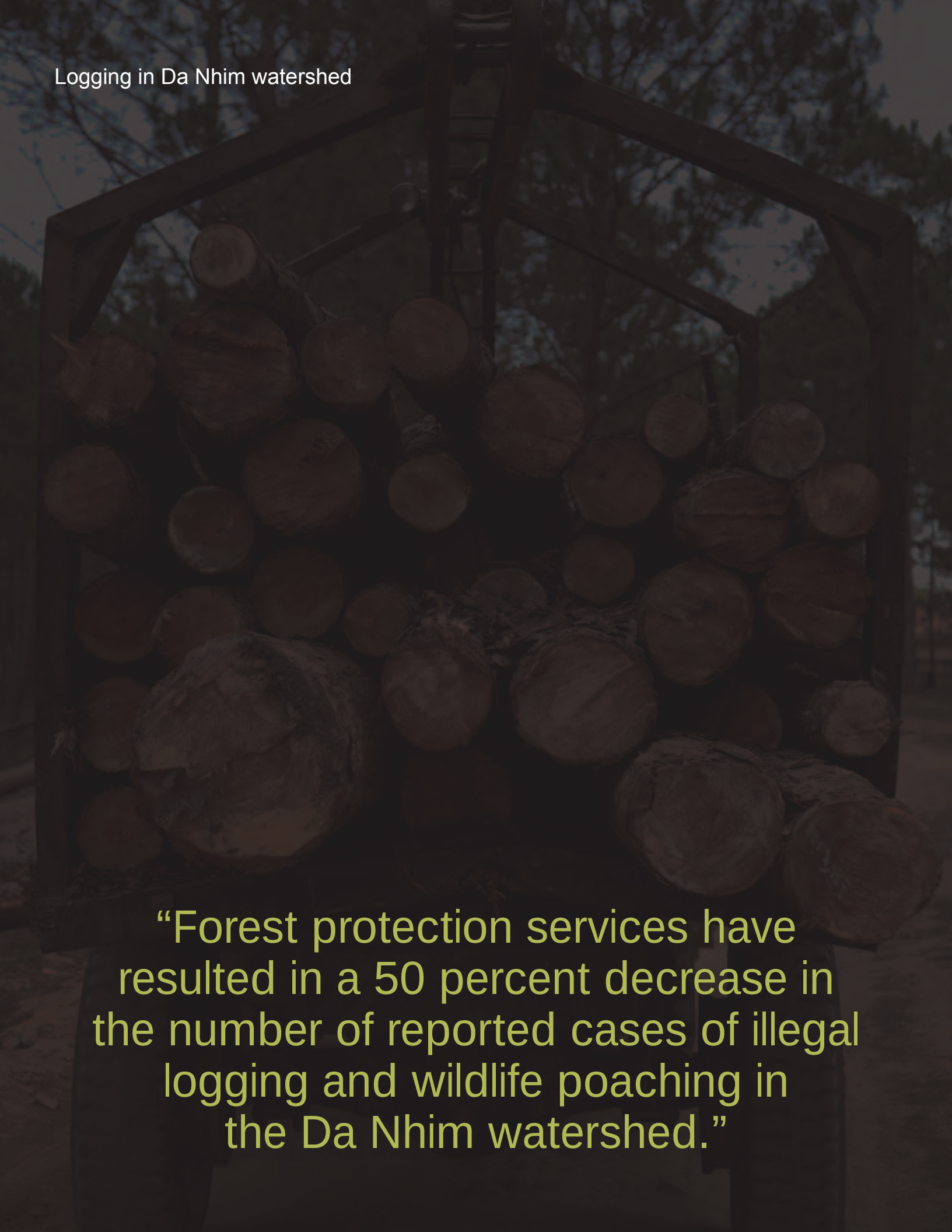
- Conducted training sessions for the PFES Technical Working Group and the local Environmental Impact Assessment committee on environmental assessments of roads in partnership with the U.S. Forest Service;
- Worked with DONRE to install and collect data from four gauging stations with training support from the U.S. Geological Survey;
- Trained provincial officials to conduct a socioeconomic survey on PFES and analyze and report results; and
- Supported training on land use classification from remote sensing images in partnership with Chiang Mai University, Thailand.

Testing Forest-Friendly Livelihood-Improvement Models in Da Teh

To further inform the pilot PFES activities in Lam Dong Province, ARBCP tested models for livelihood improvement focused on increasing household incomes while aiding biodiversity conservation. The project has worked to bolster enterprise development and production of non-timber forest products, particularly in bamboo handicraft production and planting and processing of cacao and essential oils. Within these sectors, the project linked forest-dependent communities with “downstream” firms and markets in Ho Chi Minh City, leveraging project support to communities and enterprises to develop profitable commercial-based relationships that ensure communities’ long-term access to technology and financing.

The project facilitated the signing of ten commercial contracts between private enterprises and farmers who supply raw materials and end products such as handicrafts and essential oils. ARBCP continues to strengthen these public-private partnerships and build the capacity of new enterprises by providing market knowledge, production training, and management advice to farmers, community leaders, and local authorities through study tours and monthly cooperative meetings. To date, ARBCP has trained more than 1,400 farmers through improved rural livelihood and agroforestry activities.

As a result, low quality forests have been enriched, improving the wildlife habitat and maintaining an important buffer zone to the Cat Tien National Park.



Logging in Da Nhim watershed

“Forest protection services have resulted in a 50 percent decrease in the number of reported cases of illegal logging and wildlife poaching in the Da Nhim watershed.”

Section 4: Implementing the Pilot PFES Policy in Lam Dong Province

As described in previous sections, the preparations and process for implementing the pilot PFES policy in Lam Dong Province included scientific studies, national and local awareness raising efforts, and provincial capacity building and training activities. The Lam Dong pilot implementation plan was developed in consultation with national, provincial, and local stakeholders to ensure immediate buy-in and commitment from the province, the payers, and the services providers.

4.1 IMPLEMENTATION APPROACH

Da Nhim Commune PFES Pilot

- 5 hamlets
- 220 farmers
- 90% K'ho ethnic minority
- 4,800 ha contracted to protect
- Average income from forest protection activities under government sponsored 661program in 2008 was $417/household/yr

In 2009, Lam Dong DARD, with assistance from ARBCP and the legal authority from MARD and the Lam Dong PPC, finalized the work plan for a two-year pilot PFES implementation phase scheduled to end in December 2010. A national PFES Steering Committee was established with representatives from MARD, DARD, PPC, Office of the Government, Ministry of Planning and Investment, Ministry of Finance, and ARBCP. The committee's primary function is to review, lead, and monitor the PFES implementation plan. In April 2009, the steering committee, in concert with the Lam Dong PPC, determined that one PFES pilot commune (Da Nhim) would be the first to enter into forest-protection contracts.

Identifying the Payers

ARBCP worked with national and provincial stakeholders to identify a range of potential payers for environmental services. In particular, the project worked with the Lam Dong provincial government to identify payment mechanisms and beneficiaries from improved watershed management, including hydropower facilities and large tourism concessions in Lam Dong Province. ARBCP conducted a series of valuation studies (see Section 2) to estimate revenues, potential payments, and the potential impact of focusing on, and putting a value on, forest environmental services as part of improving watershed management.

Two hydropower companies, Da Nhim and Dai Ninh, as well as Sai Gon Water Company (SAWACO) were identified by the PFES Steering Committee as the pilot's first payers. Tourism operators in Lam Dong Province and the Dong Nai Water Company were added later.

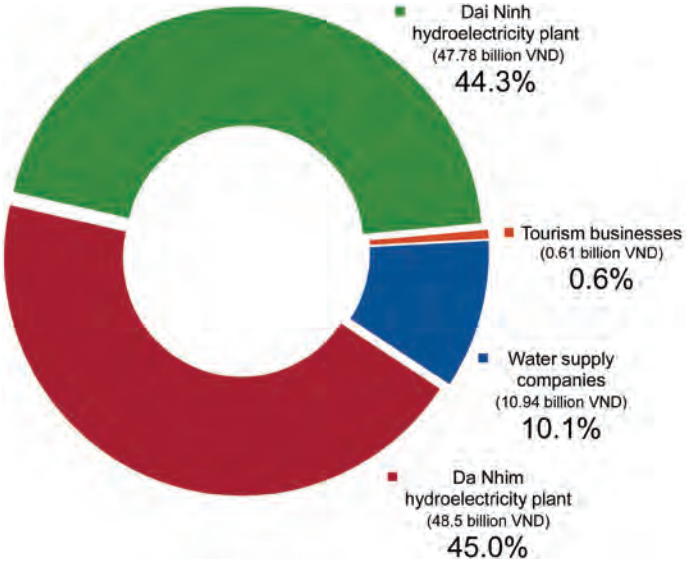


Figure 4.1 The Lam Dong FPDF has received 107.81 billion VND (US $5.53 million) from payers – primarily from the Da Nhim and Dai Ninh hydropower plants – who are benefiting from the forest environmental services the intact forests provide in the form of regular water flow and reduced sedimentation in rivers and aesthetically-pleasing landscapes.

As dictated by the GoV to Electricity of Vietnam (EVN), under the PFES pilot policy the participating hydropower

companies were instructed to pay 20 VND per kilowatt-hour into the Lam Dong Forest Protection and Development Fund (FPDF). The Dong Nai and Sai Gon water supply companies were instructed to pay 40 VND per cubic meter, while tourism companies operating in and around Da Lat City were to contribute 1 percent of their total annual gross revenue into the fund. Figure 4.1 shows the breakdown of total payments made into the FPDF: 107.81 billion VND (US$5.53 million) from January 2009 to December 2010.

Establishing the Forest Protection and Development Fund

With ARBCP technical support, Lam Dong Province established Vietnam's first provincial Forest Protection and Development Fund. Lam Dong's FPDF serves as a key financial component of Vietnam's first decentralized budget-transfer mechanism. The fund is overseen by an independent governing board consisting of representatives from DARD, Department of Finance, DONRE, Department of Planning and Investment, Department of Taxation, Department of Industry and Trade, and the State Treasury, who together appointed the fund's manager. The fund is monitored by independent auditors to ensure transparent and proper use of the monies received and paid out for the forest protection services.

In early 2009, EVN, SAWACO, Bien Hoa Water Company, and 59 tourism concessions signed initial Memorandums of Understanding (MOUs) committing payments totaling US $3.4 million to protect more than 220,000 hectares of forests and the services they provide. The provincial FPDF was set up to receive these payments, transfer them to service providers (forest owners), and ensure that the services are properly delivered. Figure 4.1b depicts the payment process and associated management fees currently being employed under the Lam Dong pilot PFES mechanism.

Contracting Forest Protection and Management Services

As part of the pilot PFES implementation, the FPDF and Lam Dong Province initiated forest protection contracts

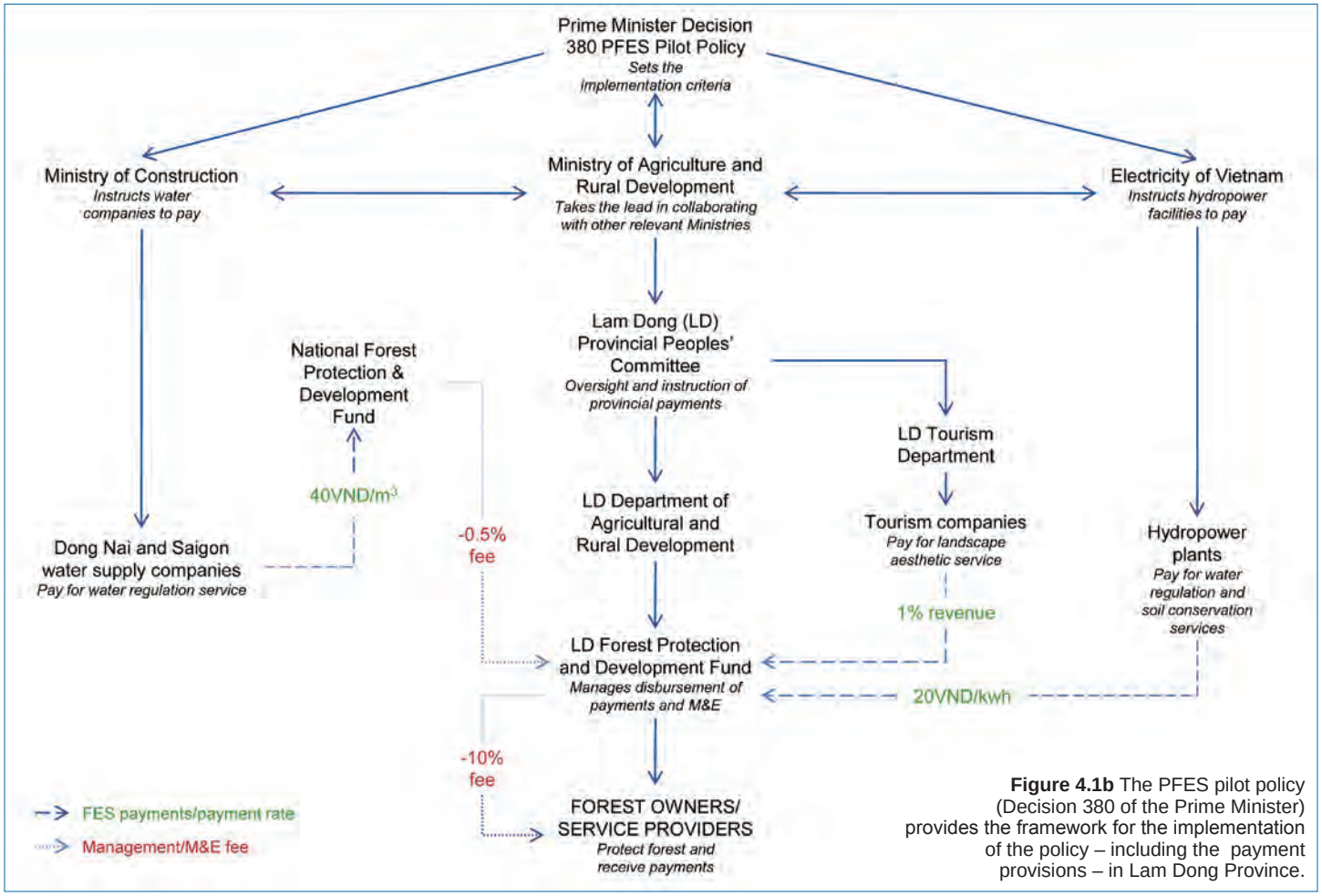


Figure 4.1b The PFES pilot policy (Decision 380 of the Prime Minister) provides the framework for the implementation of the policy – including the payment provisions – in Lam Dong Province.

in five hamlets, involving 218 contracted households, for patrolling 4,795 hectares of forest in and around the Da Nhim commune for a three-month pilot phase. Farmers and forest management boards (FMBs) were allowed to enter into the pilot program on a voluntary basis. Commune leaders met with the FPDF managers, DARD, and FMBs to discuss contract terms and payment levels. After several meetings, the parties agreed that the services would include:

- Maintaining and improving the forest and soil by patrolling regularly according to a fixed schedule;
- Patrolling and guarding the forest to promptly detect and stop any illegal encroachment activities or any activity that could harm the forest;
- Installing signage provided by the province for demarcating the boundaries of the contracted area; and
- During the dry season, clearing and treating combustible materials, establishing fire breaks, constructing makeshift fire sentry towers, and supporting firefighting efforts when needed.

In addition, the farmers are not allowed to negatively impact the forest, hunt forest animals, raise animals in the forest, import exotic or invasive species to raise in the forest, change the natural landscape of the forest, or cause environmental pollution to the contracted protection area.

Daily patrolling entries in the Forest Environmental Services Protection Contracting Logbook provide the basis for the quarterly payments.

Establishing Payment Levels

Extensive studies were undertaken to assess how to set PFES payments based on forest quality and threat levels, ultimately employing the concept of a "K coefficient."[6] However, pilot communities in Lam Dong Province elected to keep the payments consistent for forest environmental services to assure equitable payments and thereby avoid conflicts. In 2009, the province decided on payments of 290,000 VND/ha/yr for the Da Nhim watershed and 270,000 VND/ha/year for the Dai Ninh watershed. In 2010, the province increased payment levels through two legal decisions[7] to 400,000 VND/ha/year in the Dai Ninh watershed, to 350,000 VND/ha/year in the Da Nhim watershed. This was a corrective administrative step to accelerate disbursement of funds that had accrued during the delayed allocation of land and contracting of farmers to provide forest protection services.

Farmers from Da Teh District plant bamboo seedlings under ARBCP-supported public-private partnerships to enrich natural forests (thereby improving habitat for wildlife) and provide a sustainable resource for bamboo handicraft production.

Expanding PFES in Lam Dong Province

According to the FPDF's report from January 2011, PFES payments have been made to 22 Forest Management Boards and forestry businesses, as well as to 9,870 households (6,858 of which are ethnic minorities; and includes over 13,000 women), for the protection of 209,705 hectares of threatened forest land. The average household payment in 2009 was 8.1-8.7 million VND (US $438-470) per year, with each household protecting approximately 30 hectares. In 2010, the average payment per household was increased to 10.5-12 million VND (US $540-615) annually. These payments represent an almost 400 percent increase over previous forest protection income received from national GOV policies. Based on information in the patrolling logbooks, forest protection services have resulted in a 50 percent decrease in the number of reported cases of illegal logging and wildlife poaching in the Da Nhim watershed.

6. Article 13 in Decision 380/TTg provided guidance for applying a coefficient (the K-coefficient) to different forest areas to determine their relative value based on an average of four factors: forest type, K_{LR} (protection/special use/production); quality of forest, K_{CLR} (rich/moderate/poor/secondary); origin of forest, K_{NGR} (natural forest/planted forest); and human impact, K_{TD} (near road or residential areas, remote forest area) i.e. $K= (K_{LR}+K_{CLR}+K_{NGR}+K_{TD})/4$.

7. Decision 415/QĐ-UBND, dated February 14, and Decision 1363/QĐ-UBND, dated June 25, 2010.

4.2 EXPLORING OTHER PES OPPORTUNITIES IN LAM DONG PROVINCE

Avoidance of Carbon Emissions

Carbon sequestration is one of the most important environmental services provided by forests, reducing greenhouse gases that contribute to climate change. The Government of Vietnam acknowledges this by including references to carbon sequestration in the national PFES decree. However, given the extended time for any payments to originate from the sale of Certified Emission Reductions (CERs) or carbon credits and the fact there was still uncertainty surrounding the mechanism within the Province and Vietnam in general, carbon offsets were not included in the pilot phase of PFES. Nevertheless, payments from future REDD or voluntary offset projects, when bundled with the payments for water regulation, soil conservation and landscape aesthetics, would be better able to offset the cost of coffee plantations and other high-income activities farmers would forgo.

As such, ARBCP has built the capacity of the Lam Dong Technical Working Group to benefit from future REDD activities including forest carbon inventorying and spatial modeling. An iterative learning-by-doing approach has been employed to guarantee sustainability. With support from Winrock International's Ecosystem Team, different approaches were considered to generate CERs from the project area, such as avoidance of unplanned deforestation and/or planned deforestation. The program focused its efforts primarily on the avoidance of deforestation of 3,448 hectares scheduled by the province for conversion to agriculture and urban development. Taking into consideration the calculated biomass of 60 tons of carbon per hectare (tC/ha), and the proposed logging of the entire area by 2020, it is estimated that 265,191 tC would be saved, equivalent to 973,252 tCO_2 of emissions avoided, amounting to US $4.7 million in revenues (assuming no leakage and a price of US $5 per tCO_2 emissions avoided).

Biodiversity Conservation through Agroforestry

The program's successful establishment of biodiversity-friendly microenterprise models has supported the development of incentive-based, biodiversity-friendly natural resource management approaches that can be applied under PES projects to improve the incomes of poor households while improving habitat connectivity and ecosystem function targets.

Earlier this year, ARBCP facilitated a public-private partnership with Ho Chi Minh City-based essential oil company, Saroma, and six farmers in a pilot program to cultivate ten hectares of lemongrass. Planting and processing strictly followed the GLOBALG.A.P (Good Agricultural Practices) guidelines. To this end, ARBCP and Saroma worked closely with the farmers to provide necessary technical and financial support, including training, regular inspections, and on-site advice to ensure that the production process observed the GLOBALG.A.P standards. Saroma and the cooperative were awarded GLOBALG.A.P certification in May 2010. As a result, the company will be able to access niche markets resulting in higher prices for the products, and higher revenues for the farmers in principle.

Private sector investments in the program's biodiversity-friendly bamboo agroforestry model support conservation targets in two biodiversity corridors: Da Teh in Lam Dong Province and Vinh An in Dong Nai Province. Initial monitoring results in the Da Teh biodiversity corridor document that populations of six target wildlife species migrated to areas where the program's bamboo planting and agroforestry models avoided clearing of natural forest.

ARBCP supported the sustainable production of bamboo handicrafts by public-private partnerships, providing employment and supplemental income to poor rural households in Da Teh District.

Training on water monitoring in Da Nhim watershed

“Vietnam is now developing as a center of excellence, from which other countries in the region could learn about implementing PES mechanisms.”

Section 5: Monitoring and Evaluation

The pilot PFES implementation phase incorporated a series of monitoring and evaluation activities designed to both assess the progress of the pilot policy implementation and inform the development of Vietnam's national PFES decree.

ARBCP engaged in a series of stakeholder consultations to discuss the pilot implementation. It supported a comprehensive socioeconomic survey to review the impact of the policy and, in particular the PFES payments, on participating households and communes as well as the impact on the payers and related forest owners designated by the Government to manage forests, such as the Forest Management Boards and the National Parks.

ARBCP helped Lam Dong Province establish a watershed monitoring system in sub-catchments of the Da Nhim watershed. This action supports the scientific premise that effectively maintaining and managing forest cover will reduce soil erosion and enhance water regulation, and in turn reduce future production costs for hydropower and water supply companies.

5.1 MID-TERM EVALUATION

ARBCP supported MARD in completing a mid-term evaluation report for the pilot PFES policy. This report was submitted to the Prime Minister and the findings were presented by Mr. Hua Duc Nhi, Vice-Minister of MARD, at a national meeting in Hanoi hosted by MARD and chaired by Mr. Nguyen Sinh Hung, Standing Deputy Prime Minister, on March 9, 2010.

Experiences in piloting the policy were presented by representatives from the main stakeholders involved in the pilot PFES implementation in Lam Dong Province (and Son La Province), including the Lam Dong Province Peoples' Committee, the Da Nhim Hydropower Plant, the People's Committee of Da Nhim Commune, Sai Gon Water Supply Company, and Lam Dong Department of Agriculture and Rural Development.

In general, it was noted that the pilot policy was being implemented successfully, with payments made by the payers and received by the communities providing the forest protection service. The income of households involved in the implementation of the policy was shown to have increased significantly. PFES payments were becoming an important source of income for poor households, especially those of ethnic minorities. As a result, forests in the pilot areas were acknowledged to be better protected, with the incidence of violations and encroachment reduced significantly. According to the report, businesses benefitting from forest environmental services understood that PFES was an input investment that fosters sustainability of their own business operations.

Vietnam is now developing as a center of excellence, from which other countries in the region could learn about implementing PES mechanisms.

Deputy Prime Minister Nguyen Sinh Hung affirmed that Vietnam was committed to continuing the pilot PFES implementation by supporting the development of a national PFES Decree that would effectively expand the pilot activities to 15 provinces.

PFES–contracted farmers patrol forests in Da Chais commune in the Da Nhim watershed, deterring illegal logging and encroachment of agricultural plots in return for payments of up to 350,000 VND/ha/year.

5.2 ASSESSMENT OF PROGRESS AND LOCAL MONITORING

In August 2009, an assessment mission including MARD, the Office of the Government, Ministry of Planning and Investment, and MONRE, and headed by MARD's Vice Minister Hua Duc Nhi, met with provincial implementing partners, Da Nhim Commune leaders, and local farmers to assess the initial pilot PFES efforts in the field and discuss the challenges and next steps for PFES implementation in Lam Dong. The outcome of the mid-term assessment determined that:

- Payment levels (initially set at 200,000 VN/ha/yr) were too low for the forest protection services outlined in the contract; payments were increased to 270,000 VND/ha/year and 290,000 VND/ha/year in the Dai Ninh and Da Nhim watersheds respectively;
- Households participating in the PFES pilot would no longer receive forest protection payments from the GoV Decision 661[8];
- Households of the K'ho ethnic groups preferred to work in teams of six to ten in larger areas, rather than on smaller, individually patrolled plots; and
- FPDF and FMBs required funding to perform monitoring services and disburse payments. A ten percent management fee was agreed to by the FMBs and the payers.

These recommendations were reviewed and incorporated into the PFES implementation process as the pilot was expanded to 3,500 households at the end of 2009 and to over 9,000 in 2010.

Lam Dong Province established a monitoring system involving the participating communes, wards, and districts in the pilot area to help forest owner organizations encourage the contracted households to fulfill their obligations, as well as to monitor contracting and payment procedures. These responsibilities and obligations include:

- Forest owner organizations must assign forest protection staff to record time spent by participating households and community groups on forest patrolling and management twice per week; promptly coordinate with community groups and teams contracted for forest protection to write minutes of the violation cases and to notify the local FPD for the assessment of fines; and, together with the local FPD staff, review the forest protection activities with households and community groups at least once per month. They are also tasked with recording the minutes and maintaining them in the forest protection and management dossiers, which serve as evidence of performance and the basis for making quarterly payments, and verifying the results of the forest protection activities undertaken by the patrol groups.
- The Forest Protection and Development Fund is responsible for monitoring contracting procedures; advancing quarterly payments to the forest owners; reporting on the status of forest management and protection in the pilot area and reviewing the financial documents; and delivering a quarterly progress report on the PFES implementation in the pilot areas to the Control Board of the Lam Dong FPDF.

Regular monitoring at the local level, along with formal and informal stakeholder consultations, has helped identify problems with the pilot implementation and provided for quick adaptation and conflict resolution when required.

5.3 SOCIOECONOMIC SURVEY

A socioeconomic survey was carried out in March 2010 in the Da Nhim watershed of the pilot PFES area in order to evaluate the impact of payments on households (Thanh, 2010). The survey covered 291 households in nine communes, 11 forest environmental services (FES) payers in the hydropower, water supply, and tourism sectors, and seven forest owners (including forest and tourism management boards, Bi Doup-Nui Ba National Park, and a seedling company). Secondary data and information was also collected during the survey through field reports, annual statistics, and community focus group discussions.

Since 1992, households in Da Nhim watershed have been receiving a nominal annual payment to protect forests in the area: 50,000-100,000 VND/ha/yr under the national 661 Program, as well as under several other national and provincial social assistance programs. During the period reviewed by the survey (March 6 –March 19, 2010), PFES pilot households had received forest protection payments of 290,000 VND/ha/yr, a significant increase.

The survey showed that the pilot PFES policy plays an important role in family cash income, with seventy-two percent of the surveyed households indicating that PFES was "very important". An additional 23 percent said it was "important"; 5 percent said it was "moderately important"; and 1 percent said it was "not important." Ultimately, it was acknowledged that PFES payments have been important in poverty reduction in the pilot areas. According

8. Decision 661 put in motion the 5 Million Hectare Reforestation Program to be undertaken between 1998 and 2010 to increase nation-wide forest coverage up to 43% of the total land cover.

to the survey, on average, there was a 15 percent reduction in incidence of poverty in the pilot area compared to the national standard of similar low-income households (see Figure 5.3).

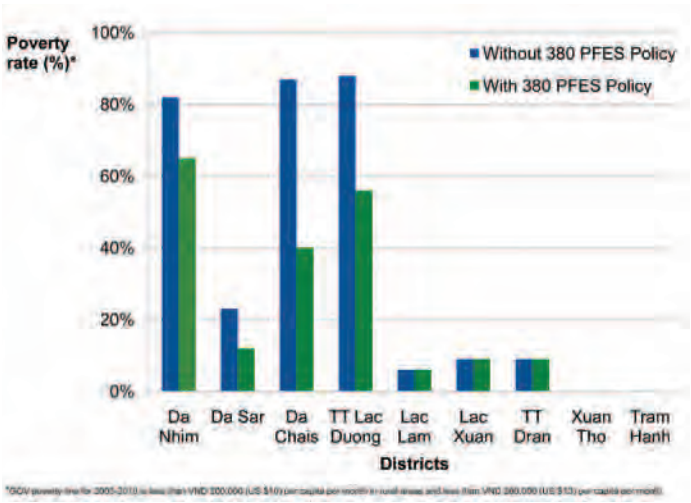


Figure 5.3 The impact of the PFES pilot policy on poverty reduction has been substantial in some districts within the Da Nhim watershed, with an average reduction of 15% across the whole watershed.

Consultations with communities, forest departments and forest owners showed that the PFES pilot policy has had a positive impact on the forest in 2009, as evidenced by a reduction of cases of illegal logging, a reduction of forest area lost, and an improvement in forest quality. However, there was no official historic data or figures to support these assertions. As reported through community focus group discussions, forest area lost was reduced overall during implementation of the pilot policy but still occurred in some communes because of road development (for example, Provincial Road 723), limited capacity or incentive to undertake forest protection services, and low penalties for illegal activities.

According to the survey, the participating hydropower companies considered the PFES rate to be relatively high compared to the cost of power production. However, the results of forest valuation studies undertaken by ARBCP showed that there are financial gains to be realized by protecting forests in the catchments of the hydropower companies, though those gains will be realized in the mid- to long-term. The latter point, and the possibility that in the future any additional cost associated with production and distribution could be gradually transferred to their consumers, helped to assuage the companies' present worries.

5.4 GAUGING STATIONS

As the valuation studies showed, the provision for water regulation and soil conservation services will over time improve the return on investment in hydropower development. In particular, increased dry-season flows and reduced erosion through forest conservation land use management practices can increase power production in extended periods of lower rainfall and can reduce maintenance and plant costs of hydropower production through avoided soil erosion and siltation.

The pilot PFES policy plays an important role in family cash income, with seventy-two percent of the surveyed households indicating that PFES was "very important".

The aforementioned valuation study estimated that the value of conserving 45,000 hectares of pine forest in the Da Nhim watershed, rather than converting the area to

agriculture, was as high as US $3.75 million a year, with avoided erosion accounting for more than 80 percent of the projected values. This estimate was based on the SWAT modeling exercise, which, while technically sound, relied on a dataset that was partially imported from an earlier study completed in an area of similar biophysical and socioeconomic conditions in northern Thailand.

ARBCP needed to establish a more complete and relevant dataset upon which water regulation and soil conservation services values could be more reliably established in the Da Nhim watershed. Very little data on how land use affects runoff and erosion in Vietnam was available, requiring further work to measure the quantity of each kind of service coming from different land use and vegetation types. This would improve the scientific basis upon which the amount and value of service levels could be quantified, performance could be measured, and newly established markets could be institutionalized.

Consequently, the ARBCP, with technical assistance from the U.S. Geological Survey (USGS) and the Thai Research Fund, supported Lam Dong Province in establishing four gauging stations on four sub-catchments in the Da Nhim watershed in early 2010. These stations monitor water discharge and sediment yields coming from four different land use and cover types, including broadleaf evergreen forest, pine forest, mixed agriculture systems, and intensive agricultural systems, considered to be broadly representative of the overall landscape. Data on sediment and water yields coming from the gauging stations serves to continually improve the scientific basis for establishing values in the pilot area and potentially developing guidelines for building similar modeling systems throughout the country. These models will support the implementation of new PFES agreements under Vietnam's new PFES decree and its implementation in 15 Vietnam provinces, as well as other GMS countries.

The data collected from the four gaging stations between April-November 2010 show an increase in sediment loads as the proportion of forest declines and the proportion of agriculture increases (see Figure 5.4). Streamflow from the broadleaf watershed with nearly 100% forest cover is exceptionally pure as indicated by the low turbidity (cloudiness) of the water, while the turbidities are much higher from the pine watershed where agriculture comprises almost 6% of the area, and higher still from the watershed with 88% pine forest and 12% urban and agricultural land use. In the predominantly agricultural watershed the very high sediment loads regularly buried the turbidity sensor and prevented the collection of reliable data. The latter demonstrates that sediment loads from areas devoted heavily to agriculture can be alarmingly high, and conversely, keeping forest cover intact in watersheds can reduce sedimentation considerably (see Figure 5.4 below).

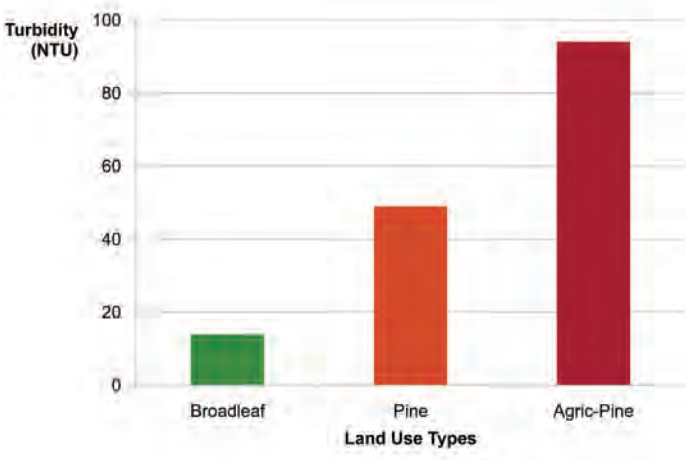
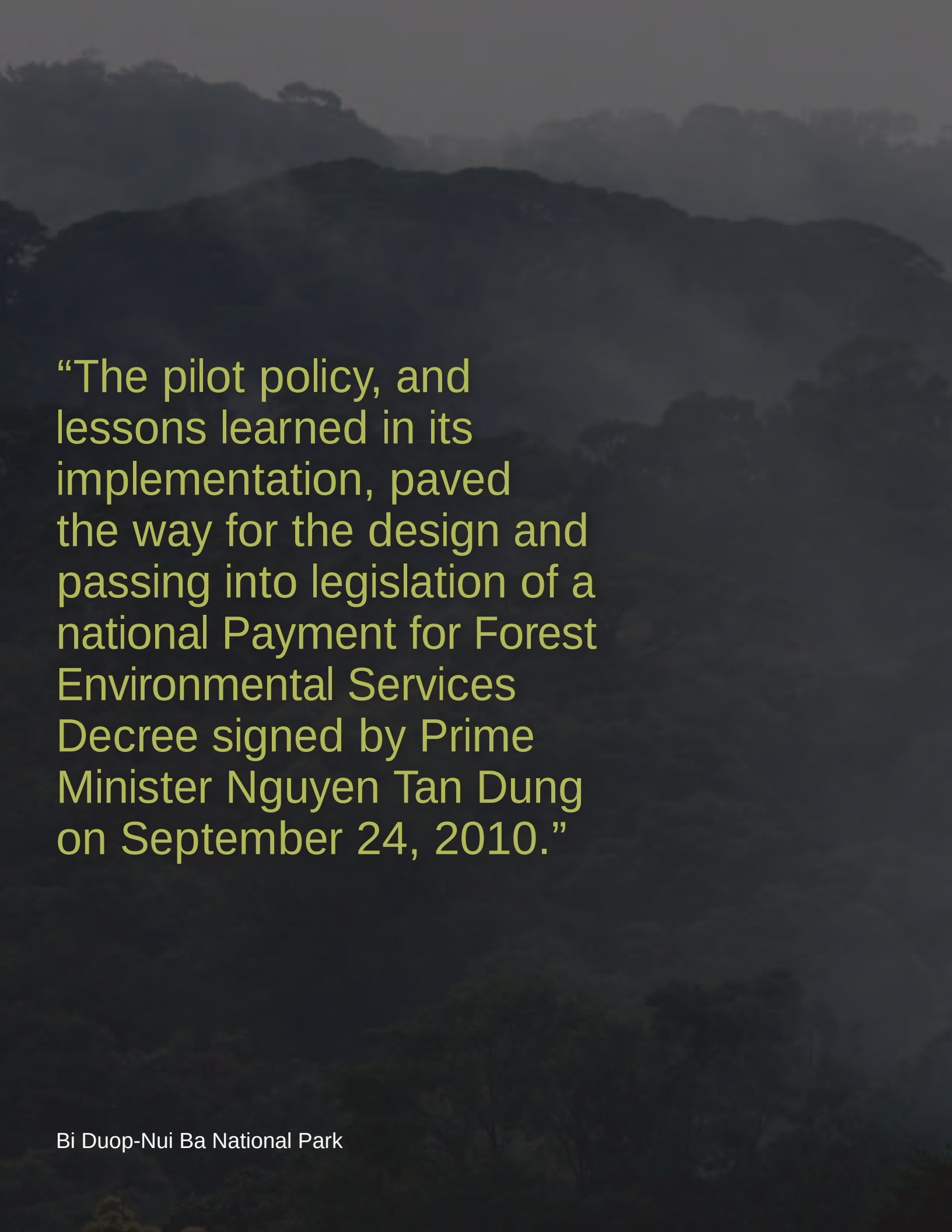


Figure 5.4 Results from the gauging stations demonstrate that streams originating in forested sub-catchments transport much less sediment than streams from agricultural areas devoid of forest cover in the Da Nhim watershed.



“The pilot policy, and lessons learned in its implementation, paved the way for the design and passing into legislation of a national Payment for Forest Environmental Services Decree signed by Prime Minister Nguyen Tan Dung on September 24, 2010.”

Bi Duop-Nui Ba National Park

Section 6: Accomplishments, Challenges and Lessons Learned

ARBCP, together with the Ministry of Agriculture and Rural Development and Lam Dong Province, was successful in designing and implementing the PFES pilot policy. The national policy, the first in Southeast Asia, creates the legal conditions necessary to collect a portion of the true economic value of ecological services provided by forests, using this payment to ensure continuation of such services and promote the welfare of forest stewards. The pilot policy, and lessons learned in its implementation, paved the way for the design and passing into legislation of a national Payment for Forest Environmental Services Decree signed by Prime Minister Nguyen Tan Dung on September 24, 2010. The following section outlines milestones reached during the implementation of the PFES pilot policy in Lam Dong Province, challenges faced and overcome and the lessons learned in the process of implementation.

6.1 ACCOMPLISHMENTS

- Vietnam's first provincial Forest Protection and Development Fund (FPDF) was established. Lam Dong's FPDF serves as a key financial mechanism for Vietnam's first decentralized budget-transfer mechanism.
- By December 2010, PFES payments totaling 87,067,200,000 Vietnam Dong (VND; US $4.46 million) were made to 22 Forest Management Boards and forestry businesses, as well as to 9,870 households, 6,858 of which are ethnic minorities; payments facilitated the protection of 209,705 hectares of threatened forest land. The current payment rate in 2010 was set at 10.5–12 million VND (US $540-615) per year. These payments represent an almost 400 percent increase over previous forest-protection services.
- More than 100 participants from ASEAN member countries and China attended the Southeast Asia Regional PES Policy Enabling Conditions Workshop in Da Lat City and participated in site visits showcasing the lessons learned from Lam Dong Province's pilot PFES efforts.
- Government delegations from Lao PDR and Cambodia, as well as other Vietnamese provinces, undertook study tours to Lam Dong Province to learn about implementing a PES mechanism.
- Four state-of-the-art gauging and weather stations were installed in Lam Dong Province, including equipment to facilitate continuous measurements of water levels, suspended-sediment concentrations (using automated pumping samplers), and turbidity. The Lam Dong Technical Working Group and DONRE staff was trained on sample collection from the stations.
- Gaging station data was analyzed and supports the hypothesis that more sediment originates from predominantly agricultural land, while higher-quality water flow originates from forested sub-catchments.
- With the approval of the Lam Dong Biodiversity Conservation Action Plan, 479,825 hectares of forest land in the Province now fall under a comprehensive management plan with specific priorities, categories, and targets for conservation and development. The BCAP for Lam Dong serves as a model for integrated planning that can be applied across the Dong Nai River Basin Conservation Landscape to recognize and prioritize sustainable financing opportunities supporting conservation at the landscape level.
- Eleven successful public-private partnerships were created in the Da Teh district pilot area for production of essential oils and bamboo handicrafts, providing sustainable livelihoods for low-income farming communities. Conservation-friendly development under these public-private partnerships has increased incomes for more than 1,400 households.
- GLOBALG.A.P certification under an ARBCP-facilitated public-private partnership resulted in improved production procedures with a 300 percent increase in annual yield of lemongrass oil.
- ARBCP's bamboo model has had a significant impact on local livelihoods in and around the Cat Tien National Park buffer zone in Da Teh district. Local authorities, farmers from Lam Dong Province, and bamboo enterprises signed an MOU to undertake a pilot bamboo development project. Local authorities designated 1,000 hectares of production forest in Da Teh to be used for

planting, managing, and protecting two commercially-valuable, native bamboo species (Tam Vong and Manh Tong). The pilot is expected to help the development of a high-yielding bamboo industry, generating more jobs, improving the livelihoods of the rural poor and improving habitat connectivity for wildlife. It is estimated that the average income from planting the bamboo will range from US $1,500 to US $2,000/ha/yr.

- Through these agroforestry models, ARBCP improved the management of more than 650,000 hectares of biologically significant forest lands. The most significant achievements include the addition of 5,600 hectares of key elephant (*Elephas maximus*) and gaur (*Bos gaur*) habitat to improve ecosystem connectivity and function in 109,000 hectares of protected forest land in the Vinh Cuu Nature Reserve and Cat Tien National Park.
- ARBCP, at the request of the MARD, supported the GoV to draft a National Bamboo and Rattan Development Policy. At the time of printing, the policy was approved by the MARD and submitted to the Government Office for final approval by the Prime Minister.

6.2 CHALLENGES AND LESSONS LEARNED

Lessons learned during implementation of the pilot PFES policy were manifold. They not only informed the shape and direction of the Program but will also assist the Government of Vietnam in effectively implementing the PFES decree nationwide. Implementing such an innovative mechanism also involved many challenges. This section provides an outline of these, as well as lessons learned in overcoming the challenges.

- The identification and emergence of champions at all levels of the implementation process (national, provincial, district, and commune) was a key factor in the success of the pilot policy.
- The limited number of environmental services implemented under the pilot policy (water regulation, soil conservation, and landscape aesthetics) reduced the risk of implementation failure and made the pilot policy easier to approve. The policy also concentrated the learning effort entirely on two pilot areas.
- While studies were undertaken to determine the K coefficient for PFES payments, Lam Dong Province elected to keep the PFES payments consistent across all areas on a per-hectare basis, regardless of forest quality and degree of threat. This occurred because the primarily K'ho communities wanted an equal distribution of payment, and saw the K coefficient as a source of potential social discontent. Nevertheless, if these payments are to be effective in encouraging communities not only to keep forests intact but to improve their quality through sustainable land management practices, the K coefficient will have to be employed in due course.
- Despite the fact extensive studies were done to value the ecosystem services (as well as arrive upon the K coefficient), the final payment structure also took into consideration the socioeconomic and socio-political factors of the communities in question. Strictly adhering to the valuation studies, while scientifically robust, would not guarantee the uptake of the project and the backing of the community and payers.
- Lam Dong Province implemented a number of measures to raise public awareness on forest values and impart information on the PFES pilot policy to related departments, authorities, companies, and communities. The most effective way to raise the awareness of the community and households was deemed to be through village and/or commune meetings and information from the FMB during preparation of the forest protection contracts. For the paying companies and institutions, the flow of data and information through formal channels between the Government, Province/Ministry, Department and Company was the most effective way to raise awareness.
- The development of the management mechanism was greatly assisted by local household participation in its design, implementation, and evaluation. Local stakeholders suggested that payments through the FMBs would be most effective because they could track the payments and have a forum to resolve disputes.

Farmers from K'ho ethnic minority communities chose to form patrol units in the Da Nhim watershed to better patrol the forest under the PFES pilot policy.

- The proper and equitable distribution of payments is contingent on the equitable and precise allocation of forest parcels to households. However, lacking a private land tenure system and integrated land use plan-

ning, the process of forest demarcation, allocation, filing, and approval in Lam Dong Province required significant time and money, at times impeding the proper and timely disbursement of payments to households.

- There was an issue of whether payments under PFES should be considered state budget or whether they replaced the water-resource tax that hydropower plants had to pay. These and many other issues, connected to the innovative concept of PES, took time to resolve among various stakeholders. (During the pilot implementation companies paid both the water resource tax and PFES monies.)
- Establishing automated gauging stations in a relatively remote provincial river basin was a great challenge. The choice of either relying on manual measurements of water flow, discharge, and sediment or fully automated systems (or something in between) needs to be made after taking full consideration of the institutional and technical capacities of all the actors that will be involved in monitoring.
- To increase the robustness of the existing monitoring approach, including the four gauging stations, a comprehensive monitoring system based on a watershed analysis, a system of sediment fences to measure sediment yields at the sub-catchment level, and depth surveys in the reservoir could be employed.
- To support monitoring of PFES mechanisms nationwide under the new PFES decree, it will be essential for MONRE and MARD to collaborate more effectively, harmonize efforts, and clarify roles.
- Setting up the PFES pilot policy and implementing it appropriately required the collaboration of many disparate stakeholders, from the national level (for example, MARD and other relevant ministries and agencies) to the provincial level (PPCs of the two provinces). As such, subordinate technical agencies did not always work closely and in a timely fashion, resulting in slower implementation, especially in allocation of the budget to the province.
- Key to the success of the valuation studies was the involvement of the Da Nhim Hydropower Station technical staff. Their involvement in the design and implementation of the valuation studies assured that relevant research questions were being asked; as a result, they were better able to articulate the results to policy decision-makers.
- Although increased patrolling increased the likelihood of detection of illegal logging, the entire enforcement system should be evaluated to determine the likelihood of arrest, successful prosecution, judgments, and penalties paid in cases where illegal activity can be proved.
- To implement the recently-passed national PFES decree, it is important to promote the Lam Dong Province PFES pilot area as a center for learning, sharing, and improving the PFES mechanism for the whole country.

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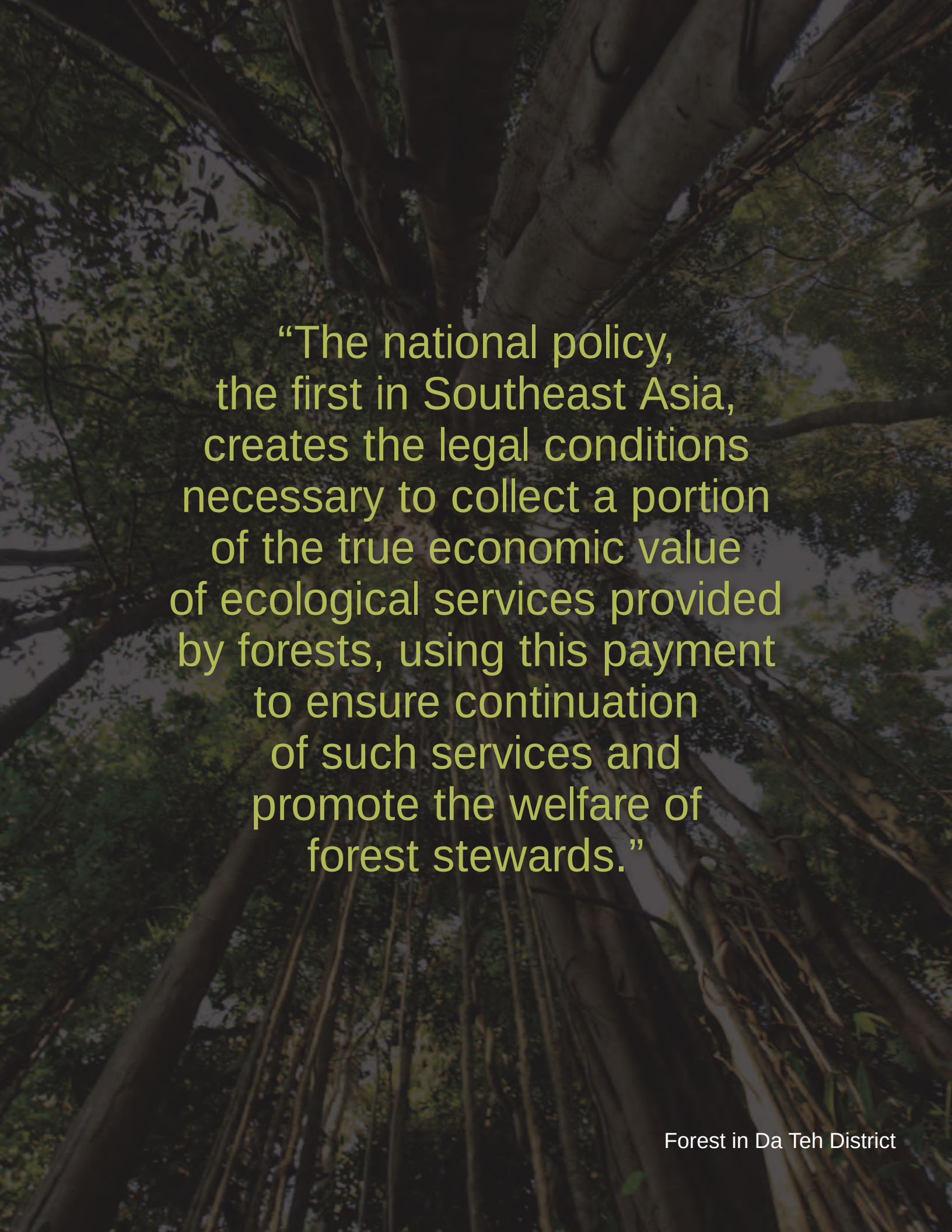

“The national policy, the first in Southeast Asia, creates the legal conditions necessary to collect a portion of the true economic value of ecological services provided by forests, using this payment to ensure continuation of such services and promote the welfare of forest stewards.”

Forest in Da Teh District