

Comparing the Effectiveness Between Payment for Environmental Services (PES) and a Local Compensation System on Conservation of Special-Use Forests, Son La Province, Vietnam

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Summary

Tà Xùa and Xuân Nha special-use-forests (SUF) are located in Son La, one of two provinces chosen to pilot test the PES in Vietnam. Since 2009, Tà Xùa has received PES from 119,970 to 263,785 VND/ha per year. On the other hand, Xuân Nha SUF received a 5-year-fixed payment of 100,000 VND/year per ha from the forest protection system that was launched in 2015 by the Vietnamese government. To assess the effectiveness of forest protection in Tà Xùa and Xuân Nha, 21 authorities and 190 local people were interviewed and 28 group discussions were conducted. The effect on forest protection was observed by using transect walks. In both SUFs, the Management Boards (MBs) signed contracts with local Village MBs who are responsible for managing, and enforcing forest regulations. In Tà Xùa, MBs had not developed a comprehensive forest protection plan with criteria for checks. Local people's awareness of SUF management regulations and PES requirements remained weak, illegal logging still prevailed and high-valued timber continued to dwindle. In contrast, the relative small support in Xuân Nha, a forest with less high value timber, resulted in a comprehensive plan for the SUF and local governments successfully promoting forest protection through the local communities.

Résumé

Comparaison de l'efficacité du paiement entre les services écologiques (PES) et un système de compensation locale pour la conservation des forêts spécialisés dans la province Son La au Vietnam

Les Forêts à Utilisation Spéciale (SUF) de Tà Xùa et de Xuân Nha sont localisées dans la province de Son La, une des deux provinces choisies pour étudier le système PES (Services écologiques) au Vietnam. Pour assurer la protection de ces SUF, Tà Xùa a reçu des PES variant de 119,970 à 263,785 VND/ha/an depuis 2009, tandis que Xuân Nha a reçu un montant fixe de 100,000 VND/an/ha dans le cadre d'un système de protection lancé par le gouvernement Vietnamien en 2015. Afin de comparer l'efficacité de la protection des SUF de Tà Xùa et de Xuân Nha, 21 fonctionnaires et 190 habitants ont été interviewés, et 28 interviews de groupes ont été conduits. L'effet sur la protection de la forêt a été quantifié en analysant des transects. Dans les deux SUF, les Conseils de Gestion (DGs) avaient signé des contrats avec les villages environnants. Les DGs sont responsables de la gestion de la forêt et du respect des règlements. Dans le cas de Tà Xùa, le DG n'avait pas développé un plan global de protection de la forêt avec ses critères de contrôle. La prise de conscience des habitants locaux par rapport aux règlements de gestion du SUF et aux demandes du PES est restée faible, les coupes illégales des arbres ont persisté et le nombre d'arbres de grande valeur commerciale a diminué. Par contre, avec un support financier plus faible, le DG du Xuân Nha disposant d'une forêt avec moins d'arbres de grande valeur, a établi un plan global pour le SUF et le gouvernement local a réussi à promouvoir la protection de la forêt au sein des communautés locales.

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Introduction

The Millennium Ecosystem Assessment defines “ecosystem services” as those benefits that people obtain from ecosystems (17), or more simply, “the good things nature does” for people. PES is a system that compensates or rewards local communities for maintaining and/or protecting the ecosystem. Through PES transactions, non-market values are supposed to be translated into real financial incentives that pay local actors who rely on natural resources to conserve landscapes and secure ongoing provisions of ecosystem services (14, 33, 27, 6 and 5). PES has been described as an innovative approach for improving natural resource management and offers a win-win solution for people and the environment (19, 23, 25, 30 and 31). Many scholars have promoted PES as an effective market-based mechanism to ensure efficient environmental conservation amongst local users. However, PES application has been considered incipient in some cases (30, 31, 23 and 32).

PES programs have been implemented in several countries of Latin America, Africa and in Southeast Asia. For these countries, PES plans currently rely on government or hybrid buyers.

The governments have incorporated PES as part of their natural resource management policies. These types of government-run PES programs, which in some places can be compulsory, are thus close to traditional “taxes” for environmental programs (4; 16, 18, 20, 23 and 32). For these types of PES, the payment procedure is considered not strict enough, and PES needs to be managed more effectively to contribute to better nature resources management. In implementing PES, buyers often do not want it, or in some cases, do not have rights to examine the work of the receiving parties.

Three quarters of Vietnam’s total area is hilly or mountainous and thus forest plays a very important role in its development. Before the start of PES, considerable investment was made by Vietnamese government in forest management; for example, through the 661 Program with 31,650 billion VND (following the resolution No. 08/1997 / QH10.

2007) or the Forest Protection and Development Plan 2011-2020 with 49,317 billion VND (Decision 57/QD-TTg. 2012). In Vietnam, PES has officially become operational since 2008 when its Government established the “Vietnam Forest Protection and Development Fund” by Decree 05/2008/ND-CP and approved to pilot PES in Son La and Lam Dong by Decision No. 380/ QD-TTg/2008. Following the pilot period, Decree No. 99 provided guidance on the nationwide implementation of PES from 1 January 2011. PES is considered an outstanding achievement of MARD during the period 2011-2015 (13). PES revenue is over USD 45 million per year contributing 25% of the total forestry budget. Up to June 2016, budget from PES was more than USD 261 million and Forest Protection and Development Fund was established in 41 provinces (28).

Special-use-forests (SUFs) are being protected most strictly in three types of forest in Vietnam and are defined as “SUFs, which are used mainly for conservation of nature, specimens of the national forest ecosystems and forest biological gene sources; for scientific research.... ” (Law No. 29/2004/QH11, Law No. 20/2008 / QH12, Decree 117/2010/ND-CP). Vietnam has 164 SUFs covering 2,198,744 ha. SUF MBs are assigned “to manage the SUF and they are state organizations which have the tasks and functions of forest owners and the State-assured conditions for managing, protecting and developing SUF”.

SUF management faces many difficulties, including the high pressure from local people; overexploitation of forest resources, habitat fragmentation, low public awareness of biodiversity conservation and insufficient budget. Under-funding of the SUF system constrains SUF management (11, 12, 8 and 9), particularly at the provincial level. Research on 53 SUFs indicated that they used up to 90% of the total budget for the operation of MB (7). Under this circumstance, PES may provide a sustainable budget for the conservation of SUF in Vietnam.

In the North of Vietnam, PES was piloted in Tà Xùa SUF, with PES payment covering 13,912 out of 17,650 ha. As a pilot, Tà Xùa SUF aimed to provide critical experience for PES implementation in the SUF system. Tà Xùa is a high biodiversity area of 17,650 ha with 671 flora and 282 animal species. Tà Xùa is home to the most important conifer populations of North-Vietnam.

Xuân Nha is also a high biodiversity area of 18 789 ha with 1,074 species of vascular plants and 278 species of animals. The forest protection contract (FPC) was financially supported by the KFW7 project and was officially launched in March 2015. The Xuân Nha SUF-MB established contracts with 8 villages to provide protection for a total area of 2000ha during 5 years from 2015 to 2019, against a payment of 100,000VND/per year.

After large-scale implementation of PES for 6 years, many experiences learned from PES have been documented. To contribute some lesson learned on PES for SUF management, this research (1) assessed the implementation of PES in Tà Xùa and FPC in Xuân Nha, (2) evaluated the effectiveness of PES and FPC for forest protection, and (3) proposed solutions for effectively using payment from PES or other sources for SUF.

Methodology

This research was conducted from April 2014 to June 2016. We collected initial data from April to June 2014 (in Tà Xùa) and from July to September 2014 (in Xuân Nha), and conducted complementary fieldwork in June 2016. We interviewed 211 people, held 28 group discussions and walked in total 41.5 km of forest appraisal transects (Table 1). The appraisal questionnaire had a general part and a section focusing on local people's perspective on forest protection. The transect walk followed the appraisal acceptance check standards.

Forest protection effectiveness

Forest protection effectiveness was assessed by: (1) Perspective of SUF and PES funds, represented by the forest owner, in charge of approval for payment;

(2) Perspective of villagers and VFPs, contracted parties responsible for protection; and (3) The fact-

finding field survey: (i) 24 km and 17.5 km transect walk following forest appraisal acceptance check process; (ii) in-depth interviews with four groups of villagers and 10 villagers.

Results

The Tà Xùa SUF-MB signed a contract with 8 villages to protect a total of 13, 912 ha of forest since 2009. The payment varied from 119,790 VND/ha per year (in 2009) to 263,785 VND/ha per year (in 2015). For Xuân Nha, 8 villages were paid, promised payment of 100,000 VND/ha/year for the protection of 2000 ha during 5 years from 2014 to 2019 (Table 2).

PES provided a considerable budget for forest management and a good income for local people. In 2015, Son La revenue from PES was 105 billion, almost equal to the budget of the 661 programs (110 billion) for 12 years (24). Having a three-fold larger contracted forest area than that of Xuân Nha and a higher cost norm, each village in Tà Xùa was paid fourteen times higher than that in Xuân Nha. Moreover, Tà Xùa villages have benefited from forest protection since 2009 with long-term payment, while Xuân Nha will only benefit for five years.

For forest protection, village MBs take overall responsibility and play a critical role in success of forest protection as these boards (1) collaborate with the SUF-MBs, and local communities to identify the forest areas for each village; (2) sign the contracts with the SUF-MBs and (in Xuân Nha) open bank accounts to receive payment; (3) develop forest protection plans for village such as proposing regulations on forest protection for village's members, and managing VFPs; (5) use the payments from PES and FPC (Figure 1).

Forest protection plans

In Tà Xùa, the forest protection was mainly based on VFPs and patrolling. The number of VFP members ranged from 12 to 17 and was divided into groups of 2-5 members to patrol with rangers from the SUF-MB. Normally, they spend about 3-5 days in the forest for one patrolling.

VFP members are provided with clothes and equipment and received an allowance of 80,000 VND per day in 2010 and 150,000 VND per day in 2015.

Table 1

Main methods and number of participants.

Methods	Tà Xùa SUF	Xuân Nha SUF
Interview	01 staff from Phù Yên and 01 staff from Bắc Yên PES funds 5 people from SUF-MB 01 staff from commune	01 province staff, 01 district staff 4 people from SUF-MB 03 staff from communes
Group interview	6 village management boards (VMB)	6 VMBs
24 group interviews	6 village Forest protection groups (VFPG)	6 VFPGs
Household interview 180 people	90 people in Hang Dong C, Lang Sang Hang Dong B villages	90 people in Ban Lay, Chieng Hin, Kho Hong Village

Table 2

Summary of areas and revenue from PES and FPC.

Tà Xùa SUF				Xuân Nha SUF			
Village	PES forest area (ha)	Population (persons)	PES (in million VND)	Village	FPC forest area (ha)	Population (persons)	FPC (million VND)
Làng Sáng	2,221	532	585.9	Láy	257	661	25.7
Háng Đồng B	473	239	124.8	Chiềng Hin	275	334	27.5
Háng Đồng C	2,099	592	553.7	Khò Hồng	347	630	34.7
Total	4 793	1,363	1,264.5	Total	879	1,625	87.9

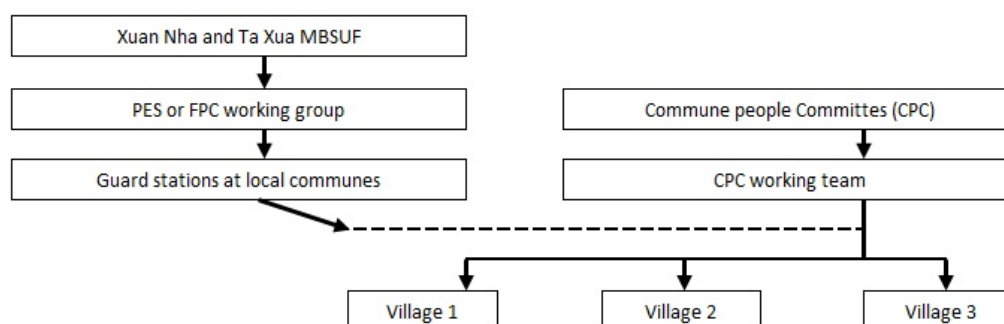
**Figure 1:** Structure of PES and FPC implementation.

Table 3

The patrolling schedule of the VFPG of Hang Dong C, Hang Dong B and Lang Sang.

Month (Lunar calendar)	Times/ month	Reasons
The first	2-3 times	Dry season; Traditional Hmong New Year, villagers are busy.
The second	3-4 times for Làng Sáng, 5 times for Háng Đồng C	Dry season; illegal logging peak because villagers are not busy with farming; destroying poppy
The third	3-5 times	Dry season, slash and burn season, high risk of forest fires. Rangers and staff from commune stationed in villages
Fourth to ninth	1-2 times	The rainy season, No risk of forest fires
Tenth to twelfth	3-4 times	Dry season, high risks of forest fire

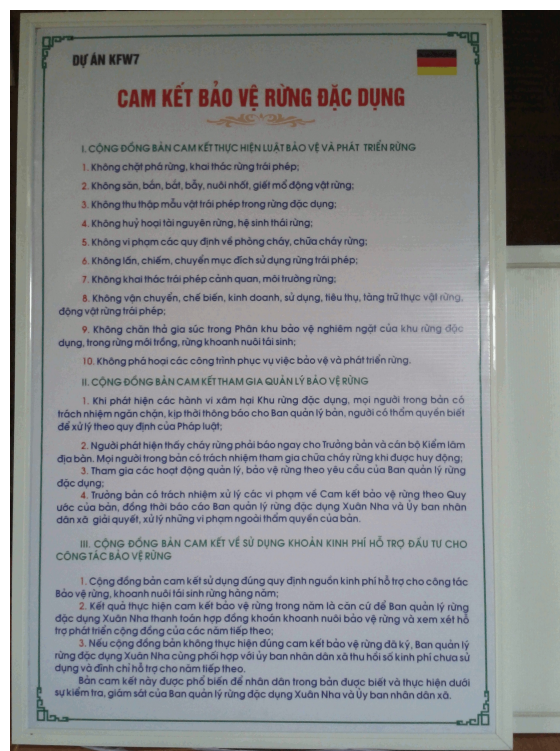


Figure 2: Forest protection regulations in Kho Hong village.



Figure 3: The village leader in Chieng Hin village announcing to villagers about their contracted forest and regulations.

The VFPGs spent more time in patrolling when forests were supposed to be under threat (Table 3). They focused on fire prevention but not on prevention of logging or poaching which cause the main conservation and biodiversity issues. After receiving PES, VFPGs patrolled more actively and more frequently, however, the amount of high value timber reduced which was widely reported in newspapers (3, 10 and 21) (Figure 2 & 3).

In Xuân Nha, VMBs worked effectively because they developed a comprehensive forest management plan for each village with strong support from the SUF-MB and local communes. They were fully involved in the whole process from identifying the contracted forest area for each village to developing the criteria for the annual forest check. All surveyed villages had very clear forest protection regulations and villagers were strongly committed. The protection in Xuân Nha was jointly worked out by both villagers and VFPGs to put more priority on community protection and on an informant network. This is a suitable strategy as they receive a very small budget only (from 25.7 to 34.7 million VND/year). Despite this limited budget, the forest resources are still well protected and VFPGs do not need to patrol often.

People's appraisal on the protection

In both Xuân Nha and Tà Xùa, the SUF-MB and WMB reported that forest areas were well protected, and that they earned the full payment. According to the reports, the forests were better protected; illegal cases, reduced; and violations, promptly reported. These acceptance checks were done by following instructions and requirements of PES and FPC. The villages providing the best forest protection were Háng Đồng A and Háng Đồng B in Tà Xùa, and Suối Quanh in Xuân Nha. According to the people, in Tà Xùa, the rate of illegal logging and wildlife hunting fell considerably, but there was no significant reduction in five other activities (Table 4).

Interviewees explained that these five activities were essential for local livelihoods and did not cause too much damage to forests. The representatives of the SUF-MB and communes also agreed that these activities should not be banned. In Xuân Nha, the FPC had positive impact on forest protection and reduced five exploitative activities, while free grazing by cattle and firewood collection by people continued. The SUF-MBs want to limit cattle grazing inside SUF so they allocated some grazing areas for local communities. However, this solution did not entirely solve the problem.

Table 4
Local people's rating (%) on forest protection.

Activities	Tà Xùa Special-Use Forest				Xuân Nha Special-Use Forest			
	Mean	Làng Sắng	Háng Đồng C	Háng Đồng B	Mean	Kho Hong	Chieng Hin	Ban Lay
Illegal logging reduced	80	60	80	100	100	100	100	100
Wild animal poaching reduced	80	70	70	100	87	90	90	80
Forest was better protected	90	100	70	100	98	90	100	100
Cattle grazing in the SUF reduced	10	0	0	30	23	30	20	20
Honey bee harvesting reduced	10	10	10	10	80	100	90	50
Shoots harvesting reduced	10	10	10	10	60	100	50	30
Firewood harvesting reduced	10	0	0	30	13	20	10	10
Mice trapping and hunting reduced	20	20	10	30	53	70	60	30
Shifting cultivation in non-permitted ares was reduced	13	20	20	0	100	100	100	100



Figure 4: Timbers gathered near Lang Sang before being floated (route No 2).



Figure 5: Remainings of *Fokienia hodginsii* logging near the road.

Effectiveness of forest protection

In Tà Xùa, the transect walk found evidences of logging, such as piles of timber ready for transport over the water stream (Figure 4) and 8 felled trunks (along a 6 km transect). In the area with high population of *Fokienia hodginsii* (Pơmu), almost all big trunks were felled (Figure 5).

In Xuân Nha, the research team walked for 17.5 km and found that the forests were well protected and no signs of forest damage were recorded. However, the forest quality in Xuân Nha is poorer than that in Tà Xùa.

Market channels for illegal logging.

The in-depth interviews with villagers in Tà Xùa revealed that commercial Pơmu logging had occurred since long time ago. Since 1990s a professional network of Pơmu traffickers and their assistants paid villagers in advance to log and transport timbers. Timbers were sawn into bars (12cm x 22cm x 220 cm) or boxes (12 cm x 80-90 cm x 260 / 280cm). Payments for logging and shipping are estimated to be approximately 200-300 thousand VND/ bar; 1000 - 1500 thousand VND / box. On average, a person can earn 500 thousand VND / day. This is a very high income as the average income of people in Hang Dong C and Lang Sang is lower than 700 thousand VND/month per person.

The timbers from the Tà Xùa SUF were transported via two main routes:

Route No.1 follows this pathway :

- (i) from SUF, 2-3 km to the A1 (near milestone 364),
- (ii) then 3-4 km to Tàng Ghênh village,
- (iii) then 6-10 km by motorcycle to Bản Mù commune and
- (iv) then to A4 where timbers are transported by trucks.

Through this route, illegal timbers are exploited from the areas close to Ban Mu Commune (in Yên Bái Province), more than 10 km away from Lang Sang and Hang Dong C villages, and about 40 km away from the Hang Dong guard station. Timbers that are exploited from Tà Xùa are transferred to Yên Bái Province, out of the SUF-MB

control area. Up till October 2016, illegal logging along this route was reported to occur widely and to have recently increased (3, 22) as well. A leader of Tram Tau district confirmed that the timbers came from Son La.

Route No.2 follows this pathway: (i) from SUF, near Lang Sang village, timbers are floated 5 km downstream; (ii) then these are taken to either Bắc Bệ A or Bắc Bệ B, or Suối Sập in Suối Tọ Commune, about 5-7km then (iii) to a gathering station in Phu Yen. Loggers mostly come from Lang Sang and Hang Dong C. Logging occurs only in the rainy season (from months 4 to 7 of the lunar calendar) when the water level is high enough for timber transport. Meanwhile the VFPs and rangers patrol little from months 4 to 9 because there is no threat of fire during rainy season and forests are not at risk. (Table 3).

About 60% of the total timber illegally exploited in the Ta Xua SUF were transported through the route 1, but this volume is expected to decrease with the recently improved law enforcement in Son La. Local people estimated that for route No.2, traffickers need 5-7 days to collect enough timber for one shipping (30-40 boxes or 100 bars). They rest and wait for about 1-3 weeks and collect another set of timber and transport these if they feel they can escape from the rangers. After PES implementation, illegal logging was reduced a little, but fell sharply in 2013 due to strong law enforcement and confiscations by new reporters and provincial rangers.

Some locals know when timbers are logged and also who are the timber traffickers. However, they do not want to report to assigned authorities because they do not feel comfortable, they lack trust, have no motivation and try to avoid conflicts. These are some of the reasons why the informant network, which had effectively contributed to a successful forest protection in Xuân Nha, is not formed yet in Ta Xua. The village leaders and the people in the commune still have low awareness on the link between forest protection and PES. Responsibility in protecting the forests by both stakeholders remains weak. This was showcased in 2010, when two illegal loggers were imprisoned for 2 years, their families continued to receive full PES money, which

contrasts with the regulations of both PES and SUF management. However village and commune leaders did not agree with this rule for violators. The PES representatives were ignored, and those of SUF-MB could not give alternative solutions. In Tà Xùa, no offences had been reported since 2009, but in Xuân Nha, several violations were reported and criticized. In April 2016 an illegal transport of 1.5m³ was reported by people in Kho Hong, and in June 2016, the SUF-MB arrested an illegal transport of 8m³ Pomu (*Fokienia hodginsii*). In 2013, at the first two village meetings on the Xuan Nha FPC, local people in Ban Lay village did not agree to report violations to responsible authorities. However, after negotiations with the SUF-MB, communes and villagers agreed that local people would report all violations to SUF-MB, but did not need to report the names of violators; all information about the informants would be kept confidential also. Although the FPC had been implemented for one year at a small scale only, the program was evaluated as a successful model to fund community-based forest management. Thus, Son La province has proposed to replicate the FPC model of Xuan Nha in other SUFs (29).

Discussion and conclusion

Next to the length of operation, Tà Xùa and Xuân Nha have at least two basic differences: rich forest versus already over-exploited forest, and not having a comprehensive plan versus having such a plan, respectively. Moreover, the Tà Xùa SUF-MB did not succeed in gaining the commitment and support of local communities, while Xuân Nha SUF-MB was able to get support and commitment to implement requirements, comply with criteria and set a clear disbursement mechanism from the start. All local communities around Tà Xùa are Hmong people and are famous for strong relationships and commitment towards their communities.

On the other hand, the Tà Xùa SUF-MB did not succeed well in promoting participatory forest protection because of the insufficient capacity of the SUF-MB staff, as well as the common interest of both communities and the SUF-MB to have access to the same sources of livelihood. The latter is supported by the non-penalization of the household when one member has been imprisoned after

committing an infraction; socially, this attitude of the SUF-MB is understandable, especially when the imprisoned person is the main income provider of the household. Not providing the household with the money might force them in (other) illegal activities. Not paying the dues, in agreement with the SUF management regulations and PES requirements, might reduce the people's commitment to forest protection. Consequently, although the VFPGs spend a lot of time in patrolling forests, illegal logging is still widely done which results in a significant reduction of high-valued timber. The case studies of Tà Xùa and Xuân Nha concur with findings of other authors (1, 26 and 2) that support of local communities plays a critical role in successful forest protection, but gaining communities' support and achieving conservation at the same time remain a challenge.

It is therefore timely for SUF-MB to elaborate the clear mechanism and requirement for forest protection. SUF-MB should also collaborate with the Hang Dong commune to elaborate requirements for forest protection for all villages.

Communities need to come to an agreement that violators should be fined or at least their families, not rewarded by PES. The informant network, a very effective tool, should be established and promoted. At the beginning, the staff should give their phone numbers or the way that the local people can contact them. To avoid conflicts and reduce the risks for informants, all information about informants are kept confidential, the informants do not need to provide the name of violators. Perhaps, it would help if informants are given incentives or rewarded for their efforts, but this contrasts with the proposed confidentiality. At the community level, SUFs should propose clear penalties in case those villages do not fulfill their duties to make examples for other villages. It is difficult and complicated to keep and return PES in case those local communities did not protect forest as requirements because of budget disbursement pressure. Similarly, shifting or canceling the contracts is also complicated. However, if the SUF-MBs are not able to apply some penalties for violations and they lose their control, they may not protect the forest properly.

PES provides a great opportunity for SUF-MB to achieve forest protection and gain commitment from local communities by compensating them for the lost livelihood options from the forest. Several authors claim that the PES has not achieved the desired outcomes regarding forest conservation because the procedures are not strict enough, and government has provided no clear directions on monitoring and evaluation (22 and 15).

These limitations can be addressed by integrating PES into SUF management regulations as these regulations were clearly defined on legal documents; this opportunity was demonstrated by the Xuân Nha SUF, although the resources of this forest were not so attractive for illegal loggers. Representing the SUF owner, assigned to manage the SUF, a SUF-MB is responsible for the strict protection of the forest, which means that when the SUF-MB fulfills its tasks properly, the SUF would be protected much better than according to the PES requirements. The PES provides them with a complementary tool to achieve these tasks to protect the forest.

PES provides a great chance for effective forest conservation. However, to achieve the expected outcomes, the capacity of SUF-MB needs to be improved. Capacity development in the areas of engaging local communities in putting up the PES, establishing rules that are acceptable for the local

communities accompanied with sufficient compensation from PES for the lost livelihood options need to be put in place.

More study, however, is needed to effectively utilize the budget from PES to improve the livelihood for local people to be compensated by PES. In addition, SUF-MBs need to also learn skills and approaches on effectively raising the awareness of people on the forest protection, and knowledge on related SUF management regulations and PES requirements. This awareness raising should also address the consumers who buy products that are made from the forest resources; the latter could be supported by Sustainable Forest Certification.

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Literature

1. Andrade G. & Rhodes J.L., 2012, Protected areas and local communities: an inevitable partnership toward successful conservation strategies? *Ecol. Soc.*, **17**, 4,14.
2. Boissiere M., Sheil D., Basuki I., Wan M. & Le, H., 2009, Can engaging local people's interests reduce forest degradation in Central Vietnam? *Biodivers. Conserv.*, **18**, 2743-2757.
3. Cao Tuấn, 2016, *Po mu forest in Yen Bai was "butchered": The truck, which carried illegal timber blatantly crossed ranger station* (in Vietnamese: Rừng pơ mu ở Yên Bái bị "xẻ thịt": Xe chở gỗ lậu ngang nhiên vượt trạm kiểm lâm). Accessed from newspaper on 27th October 2016, from: <http://giadinh.net.vn/xa-hoi/rung-po-mu-o-yen-bai-bi-xe-thit-xe-cho-go-lau-ngang-nhien-vuot-tram-kiem-lam-20161027104359653.htm>
4. Chomitz K., Brenes E. & Constantino L., 1999. Financing environmental services: the Costa Rican experience and its implications, *Sci. Total Environ.*, **240**, 157-169.
5. Corbera E. Soberanis G.C. & Brown K., 2009, Institutional dimensions of payments for ecosystem services: An analysis of Mexico's carbon forestry program, *Ecol. Econ.*, **68**, 743-61.
6. Engel S., Pagiola S. & Wunder S., 2008, Designing payments for environmental services in theory and practice: An overview of the issues, *Ecol. Econ.*, **65**, 1, 663-674.

7. Hà Thị Mừng & Tuyết Hoa Niêkdăm, 2008, *Analysis, assessment of financial resources for special-use forests in Vietnam*, (in Vietnamese: Phân tích, đánh giá nguồn tài chính cho các khu rừng đặc dụng tại Việt Nam) Accessed: 15th December 2014, from <http://www.thiennhien.net/wp-content/uploads/2012/09/Bao-cau.doc.doc>.
8. ICEM, 2003, Vietnam National Report on Protected area and development. International Centre of Environmental Management, Indooroopilly, Queensland, Australia, Hanoi, Vietnam. Accessed on 15-12-2014 at: http://www.mekong-protected-areas.org/vietnam/n_report.htm
9. ICEM, 2003, *Protected area and development: lessons from Vietnam. Review of Protected areas and development in the four countries of the Lower Mekong River Region*. International Centre of Environmental Management, Indooroopilly, Queensland, Australia, Hanoi, Vietnam. Accessed on 15-12-2014 at: http://www.mekong-protected-areas.org/vietnam/docs/vietnam_lessons.pdf
10. Mạnh Cường, 2013, *Sơn La SUF being "butchered" (in Vietnamese: Rừng đặc dụng Sơn La lại bị "xẻ thịt")*. Accessed on 27-10-2016, at <http://vtv.vn/trong-nuoc/rung-dac-dung-son-la-lai-bi-xe-thit--96187.htm>
11. MARD, 2014, *Strategic management system of special-use forests, marine protected areas, conservation areas inland Vietnam to 2020, vision 2030*. Approval by decision 218/QĐ-TTg dated 7 February 2014.
12. MARD, 2014, *Planning SUF system nationwide by 2020, with a vision to 2030*. Approval by decision 1976/QĐ-TTg dated 30 October 2014.
13. MARD, 2015, *The MARD announcement of 10 outstanding achievements of the industry in 2010-2015*. Accessed 9-1-2012, at <http://tongcuclamnghiep.gov.vn/tin-tong-cuc/chi-tra-dich-vu-moi-truong-rung-la-mot-trong-10-thanh-tuu-noi-bat-cua-nganh-nong-nghiep-giai-doan-2010-2015-a2812>
14. Mayrand K, & Paquin M., 2004, *Payments for Environmental Services: A Survey and Assessment of Current Schemes*. Montreal: Unisféra International Centre.
15. McElwee P. & Nguyen C.T., 2014, *Three years of implementing of PES in Vietnam*. (2011-2014) (In Vietnamese "Báo cáo đánh giá 3 năm chính sách chi trả dịch vụ môi trường ở Vietnam (2011-2014). Accessed on 15-12-2015 at: <http://vnff.vn/xdnld.axd?fb=tL8Kjd9I%2BsTiSafIjp1RAqBpxRMsfLXBinOh7OJFJyWgSm5Y9jf68vpz%2BLf9ws60hhIr8qXwY2YxwGgbs4ihNTqg0YLbatATYTR6kSOW62%2FMoKJoe8j3DZPQuAeQ%2Bg8iuTmkNGMUkatvU5EKvhE5aBI3JtuQ6IWEPzmySsWoGKEnPZB5z0OR7Ie9%2Bjt5xgtg>
16. McAfee K. & Shapiro E.N., 2010, Payments for ecosystem services in Mexico: nature, neoliberalism, social movements and the state, *Ann. Assoc. Am. Geogr.*, **100**, 3, 579-599.
17. MEA (Millennium Ecosystem Assessment) 2005, *Ecosystems And Human Well-Being: Wetlands And Water Synthesis*. A Report of the Millennium Ecosystem Assessment. World Resources Institute, Washington, DC
18. Munoz-Pina C., Guevara A., Torres J.M. & Brana J., 2008. Paying for the hydrological services of Mexico's forest: analysis, negotiations and results, *Ecol. Econ.*, **65**, 725-736.
19. Pagiola S., Arcenas A. & Platais G., 2005, Can payments for environmental services help reduce poverty? An exploration of the issues and the evidence to date from Latin America, *World Dev.*, **33**, 2, 237-53.
20. Pagiola S., & Platais G., 2007, *Payments for environmental services: from theory to practice*. World Bank, Washington D.C., USA.
21. Phạm Dương & Nguyễn Bắc, 2016, Illegal loggers' extract timber in Yên Bái revealed 'tricks' of illegal timber traffickers, (in Vietnamese Lâm tặc 'xẻ gỗ rừng Yên Bái tiết lộ 'mánh khéo' trùм buôn gỗ lậu). Accessed on 9-11-2016 at: <http://www.nguoiduatin.vn/lam-tac-xe-go-rung-yen-bai-tiet-lo-manh-khoe-trum-buon-go-lau-a305728.html>.
22. Phạm Thu Thủy, Bennett K., Vũ Tấn Phương, Brunner J., Lê Ngọc Dũng, Nguyễn Đình Tiến, 2013, *Payment for ecosystem services in Vietnam from policy to practice*. CIFOR Occasional Paper 93. Bogor, Indonesia.
23. Porras I., Grieg-Gran M. & Neves N., 2008, *All that glitters: A review of payments for watershed services in developing countries*. Natural Resource Issues No 11, International Institute for Environment and Development, London, UK.

24. Sơn La Protection and Development Fund, 2016, *Preliminary report 5-year implementation of Decree No. 99/2010 / ND-CP on payment for forest environmental services in the province of Son La*. Unpublished document by Son La Protection and Development Fund, MARD, Son La, Vietnam.
25. Swallow B., Dick M.R. & van Noordwijk M., 2005, *Localizing demand and supply of environmental services: interactions with property rights, collective action and the welfare of the poor*. CAPRI working paper no. 42. Washington, DC: International Food Policy Research Institute.
26. Usongo L. & Nkanje T., 2004. Participatory approaches towards forest conservation: The case of Lobeke National Park, South east Camerron, *Int. J. Sust. Dev. World Ecol.*, **11**, 119-127
27. Vatn A., 2010, An institutional analysis of payments for environmental services, *Ecol. Econ.*, **69**, 1245-1252.
28. VNFF, 2016, *Annual report on payment for forest environmental services*. Unpublished document by Vietnam Forest Protection and Development Fund (VNFF). MARD, Block A5, 10 Nguyễn Công Hoan, Ba Đình, Hà Nội, Vietnam.
29. Vũ Đức Thuận, 2016, *Personal communication, Director of Son La forest protection department*.
30. Wunder S., 2007, The efficiency of payments for environmental services in tropical conservation, *Conserv. Biol.*, **21**, 1, 48-58.
31. Wunder S., Bui Dung The & Ibarra E., 2005, *Payment is Good, Control is Better: Why Forest Environmental Services in Vietnam Have So Far Remained Incipient*, CIFOR, Bogor, Indonesia.
32. Wunder S., Engel S. & Pagiola S., 2008, Taking stock: a comparative analysis of payments for environmental services programs in developed and developing countries, *Ecol. Econ.*, **65**, 834-852.
33. Zilberman D.V., 2007, Payments for environmental services: who gains who loses? *Agric. Resour. Econ. Update*, **11**, 1, 1-3.

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