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CASE STUDY

Enhancing Impacts of Payment for Forest Environmental Services on Forest Management in Muong Gion Commune, Quynh Nhai District, Son La Province, Vietnam

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List of Abbreviations

JICA	Japan International Cooperation Agency
PFES	Payment for Forest Environmental Services
PRAP	Provincial REDD+ Action Plan
REDD+	Reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries
SNRM	Sustainable Natural Resource Management Project

Enhancing Impacts of Payment for Forest Environmental Services on Forest Management in Muong Gion Commune, Quynh Nhai District, Son La Province, Vietnam

Abstract

Payment for Forest Environmental Services (PFES) have been introduced in Vietnam since 2008 aiming to incentivize individuals and communities to sustainably manage and protect their forests by providing compensation for their efforts[1]. According to Provincial REDD+ Action Plan (PRAP) in Son La Province, PFES is the only budget of forest protection[2], suggesting the significant role of PFES in forest management. Son La PPC issued a guideline to use 40% of PFES fund for forest management. However, since PFES buyers and sellers are hardly connected, the impacts of PFES on actual forest management is unknown[3].

Sustainable Natural Resource Management (SNRM) project[1] funded by JICA supported to form a village authority to promote forest management and livelihood development, establishing village fund and demonstrating sustainable resource use models. The objective of the paper is to assess impacts of PFES on enhancement of forest management based on the experience of SNRM project in Muong Gion Commune, Son La Province.

SNRM found that a village-based authority functioned well when it is implemented with village fund, incorporating the PFES as a core fund of the operation. Although the PFES mechanism is still premature, there exists a potential of having much larger impacts of PFES on forest management.

In order to have greater impacts of PFES on forest management, enhancement of forest status assessment, regular PFES payment, intimation of PFES mechanism to villagers, and demonstration of low cost, high valued, and short rotation land use practices are recommended.

1. Introduction

[1] SNRM has four components: 1) Forest policy, 2) Sustainable Forest Management and REDD+ at four North West Provinces, 3) Biodiversity at Lang Biang Biosphere Reserve and 4) Knowledge sharing. This paper is based on the finding of Son La part of component 2 (Support for PRAP formulation/implementation and REDD+ pilot activities excluding Development of provincial forest monitoring system).

Payment for Forest Environmental Services (PFES) has been introduced in Vietnam since 2008 aiming to incentivize individuals and communities to sustainably manage and protect their forests by providing compensation for their efforts [1]. According to Provincial REDD+ Action Plan (PRAP) in Son La Province, the PFES fund accounts for 100% of the fund allocated to forest protection [2], suggesting the significant role of PFES in forest protection. Son La PPC issued a guideline to use 40% of PFES fund for forest management. However, since PFES buyers and sellers are hardly connected, intervention is required at various levels in order to remove existing barriers.

Sustainable Natural Resource Management (SNRM) project funded by JICA initiated project activities in Son La since 2016 supported forming village authorities to promote forest management and livelihood development, establishing village fund to manage the received PFES at village level.

The objective of the paper is to assess impacts of PFES on enhancement of forest management based on the experience of SNRM project in Muong Gion Commune, Son La Province.

In this paper, at first the contents and the budget of PRAP related to PFES were assessed. Then, the utilization of PFES were discussed regarding village authority with forest regulations, as well as the forest management and livelihood development practices supported by SNRM. The status and allocation of PFES qualified forests, and the revenue and expenditure of village fund incorporating PFES in SNRM target villages were analyzed.

2. Methodology and Approach

This paper draws the findings of REDD+ implementation support activities carried out by Sustainable Natural Resource Management (SNRM) project funded by JICA. The project activities at village level in Son La was initiated in September 2016 and will continue until July 2020. SNRM in Son La supported 1) PRAP formulation, and 2) REDD+ Pilot Activities composing setting up village forest management (village management board, forest management regulations, and forest patrolling team) and livelihood development (introducing improved cooking stoves, agroforestry models, enrichment of natural forests, fruit tree/vegetable cultivation, etc.). The series of village meetings, interviews with village leaders, trainings on technical supports to beneficiaries, and field surveys were carried out by the project and substantial data and collaboration have been provided by DARD, FPD, DPC and district FPD of Quynh Nhai District, and CPC of Muong Gion

Commune for the implementation of SNRM.

3. Provincial REDD+ Action Plan (PRAP) in Son La Province

Son La Provincial REDD+ Action Plan (PRAP) was formulated in 2017 with two components: 1) Forest protection and development activities and 2) six solution packages with 20 solutions (Table 1, [2])[2].

Table 1: Activities and Solutions of Son La Provincial REDD+ Action Plan: 2017-2020

Category	Activities and Solutions
Component 1: Forest Protection and Development Activities	
1. Forest Protection	- Forest protection contracting - Forest fire prevention and fighting
2. Forest development	- Afforestation/reforestation - Forest regeneration
3. Other related activities	- Scattered tree planting
Component 2: Solution packages	
1. Enhance the effectiveness of af/reforestation	- Ensure technical correctness in tree planting and tending - Ensure that the seedlings are of high quality and suitable to the site conditions - Improve management of timber logging and replanting (production forests) - Support improvement of market for plantation wood. - Support development of silviculture infrastructure
2. Promote forest protection and sustainable use of forest resources	- Promote the use of alternative materials and advanced (energy saving) technology - Develop and strengthen community forest management - Enhance law enforcement - Enhance the effectiveness of awareness raising and communication on forest benefits to local people - Enhance capacity of local people in forest maintenance - Improve forestry・agroforestry livelihoods for local people
3. Control forest fire	- Control the use of fire in upland farming. - Strengthen cooperation and coordination on fire prevention and fighting in border areas - Enhance the capacity for fire prevention and fighting

[2] MARD. 2015. DECISION Approving the guidelines on development of provincial action plan on reducing greenhouse gases emissions through efforts to reduce deforestation and forest degradation, sustainable forest management, and conservation and enhancement of forest carbon stocks (REDD+) No. 5414/QD-BNN-TCLN.

4. Control conversion of forests to upland fields	- Enhance the agricultural livelihoods for local people - Address the unpractical issues of land use planning, forests and forestry land allocation
5. Mitigate impacts of forest conversion into other land use (road /hydropower plant construction, etc.)	- Improve quality of the offset planting - Enhance protection of forests adjacent to newly converted areas
6. Province-wide Cross-cutting solution package	- Improve the provincial Forest Resource Monitoring System (FRMS) - Conduct awareness raising and capacity building on REDD+

Source: [2] Son La PPC. (2017)

PRAP Budget

According to the Son La PRAP budget, PFES account for 28% of entire budget and twice as large as entire state budget for forest protection and development (100% and 78% of forest protection and control of forest fires, respectively). PFES was planned to be spent for forest protection and forest fire control (Table 2).

Table 2: Son La PRAP budget 2017-2020 (Unit: million VND)

No.	Category	PFES	Other Funding Sources		Private Sector	Local Community	Others	Total
			State Budget	Local Budget				
Component 1		20,395	29,580	2,370	102,776	0	0	155,121
1	Forest protection	20,395	0	0	0	0	0	20,395
2	Afforestation and forest maintenance in SUF and protection forest	0	25,688	0	0	0	0	25,688
3	Afforestation and forest maintenance in Production forest	0	3,893	0	0	0	0	3,893
4	Offset plantation	0	0	0	102,776	0	0	102,776
5	Scattered tree plantation	0	0	2,370	0	0	0	2,370
Component 2		40,000	557	15,838	4,000	0	2,580	62,975
1	Enhance the effectiveness of forest plantation	0	557	2,373	4,000	0	870	7,800
2	Promote sustainable use of forest resources	0	0	749	0	0	1,470	2,219
3	Control forest fire	40,000	0	11,086	0	0	0	51,086
4	Control conversion of forests to upland fields	0	0	1,600	0	0	0	1,600
5	Cross cutting solution package	0	0	30	0	0	240	270
	Gran Total	60,395	30,137	18,208	106,776	0	2,580	218,096
	%	27.7	13.8	8.3	49.0	0.0	1.2	100.0

Remark: JICA 3 loan was removed since it was not implemented.

Source: [2] Son La PPC. (2017)

4. SNRM REDD+ Pilot Activities

SNRM REDD+ pilot activities were initiated in 13 villages in Muong Gion Commune in August 2016. 13 villages were selected as target villages due to area of forest lands without land conflicts among the villages.

Village Management Boards for Forest Management and Livelihood Development (VMBFMLD)

In each village, in order to sustainably manage the area allocated to villages and households through the promotion of forest management and livelihood development activities, Village Management Boards for Forest Management and Livelihood Development (VMBFMLD) was established through three village meetings (69 members, 36% women). VMBFMLD is being operated with their regulation approved by CPC. The tasks of VMBFMLD are:

1. Promote planning, implementation and monitoring of forest management and livelihood development in the villages
2. Develop regulations on forest use in the villages and ensure that all villagers follow the regulations
3. Promote public awareness of forest management
4. Establish village forest patrol teams (VFPT) to monitor the activities
5. Development of livelihood development activity groups by activity (for example, fruit trees cultivation, vegetables cultivation, etc.)
6. Ensure that livelihood development activities are implemented as in accordance with current plans and regulations as well as with the technical requirements.
7. Establish, manage and operate village funds for forest management
8. Coordinate with VFPTs and CPC to handle violations as in accordance with the rules and regulations on forest management or livelihood development.
9. Coordinate with forest rangers and CPC to carry out forest management and village livelihood development activities.

Village forest regulations (VFR)

Before SNRM project implementation, all the villages had VFRs and VFPTs[3] but the

[3] In order to mainstream forest fire prevention and fighting throughout the province, 1,850

conditions were varied among the villages. SNRM supported to organize the regulations with four chapters and 12 articles with the responsibilities of VMBFLD and VFPT and integrated them into the general village regulation, which are now seen on the signboard in some villages. VFRs of SNRM target villages is updated annually.

Support for sustainable resource management/land use practices

SNRM supported forest management activities (forest protection, afforestation and ANR) and nine types of livelihood development activities through VMBFLD (Table 3). Technical training and Materials were provided with obligation to contribute to village fund.

Table 3: Sustainable land use practices introduced by SNRM

Activity	Village No.	Scale	SNRM support
Forest management			
Forest protection	12	159 HH 5,027 ha	Re/setting up Patrolling Team Patrolling village forest area in cooperation with commune forest ranger(s) Forest patrol route map
Afforestation	4	165 ha Plantation Pinus masoniana	Forest plantation design Training to villagers Checking and Monitoring
Assisted Natural Regeneration	10	295.4 ha	Survey for designing regeneration Installing sign board and boundary pole along the delineated area Training to villagers Checking and Monitoring
Livelihood development			
Vegetable cultivation	12	451 HH	Training on vegetable cultivation techniques Supporting seedling for 2 seasons
Fruit tree cultivation	12 (5 grafting)	557HH (27 grafting)	Training on fruit tree planting techniques (including grafting techniques) Supporting seedlings, study trip on grafting
Compost/organic fertilizer production	10	239HH	Training on techniques including study trip equipment
Fodder grass cultivation	9	249HH	Training on cultivation techniques including study trip, Supporting cuttings/seeds and signboard
Improved stove distribution	13	579HH	Supporting design, molding of improved stove to produce at villages, Training, provision of materials
Biogas plant installation	1	2 HH	Study tour to a biogas plant model.

Village Forest Patrolling Teams had been established by 2015 (Son La PPC, 2017).

			Training on biogas installation and maintenance Supporting 50% cost of procurement and material
Contour cropping/ Agroforestry	11	72 HH	Design survey, Technical training Supporting seedling/seeds to participants after the training 15 models - Grafted docynia indica + Ghine grass + Maize, docynia indica and peach、Grafted late fruiting longan + plum + Ghine grass + Maize, Grafted late fruiting longan + pomelo + Soybean Grafted late fruiting longan + grafted Taiwan mango + Plum + Ghine grass + Cassava, Grafted black canari (Canarium tramdenum) + Grafted Taiwan mango + Ghine grass + Soybean, Grafted black canari + Ghine grass + Maize, Late fruiting longan + grafted Taiwan mango + Ghine grass + Maize, Grafted litchi + grafted late fruiting longan + Ghine grass + Cassava, Litchi + grafted Taiwan mango + grafted late fruiting longan + Ghine grass + Maize,
NTFP plantation	1	1 HH	Sa Nhan (Amomum longiligulare) plantation in forest Amomum xanthioide (Sa nhan xanh in Vietnamese) and Amomum longiligulare (Sa nhan) under natural forest canopy Technical training including study trip Supporting seedling
Mushroom production	1	7 HH	Technical training including study trip Providing material and equipment Marketing

Source: Adopted from [4] Pham, et al. (2019)

5. Payment for Forest Environmental Services in Son La Province

The total area of forest land in Son La is 1,037,454 ha (70% of total area) with forest cover 42.4% [2]. 97% of forest land is already allocated [3]. The majority of the population of Son La is ethnic minority, accounting for 75.4%, of which Thai, H'Mong and Muong account for 54.7%, 13.0%, and 8.1%, respectively [3].

Son La is one of the first two provinces of the country to pilot the implementation of PFES policy since 2008. PFES fund management was entrusted to independent department, Son La Provincial Forest Protection and Development Fund (FPDF). The jurisdiction of FPDF was shifted from DARD to PPC in 2018. In 2018, for 106 billion VND was paid to approximately 560,000 ha of forest with 43,000 forest owners as PFES payment for 2017 (FPDF, Personal communication).

Muong Gion Commune has officially received PFES since 2014. Forest owners are required to set up a forest protection team to carry out forest patrolling for forest guard and forest fire prevention[4]. According to Son La PPC guideline[5], at least 40% of the total amount of annual payment for forest environmental services is to be spent for manage, protect and develop forests, prevent and fight forest fires[6].

Forest owners are villages and hamlet communities (not organizations assigned by the State to manage forests). In particular, "Management on use of PFES by the beneficiaries[5]" refer to forest owners as village communities.

Forest status of PFES qualified forests

According to the comparison between forest status approved by FPD and PFES approved area, a large gap was found in 2015 (Figure 1, Table 4, 4% difference in total areas). However, the gap became much smaller in 2016 and 2017 (almost same in total area) because PFES in 2015 was based on forest land allocation not by forest status map[7] but PFES for 2016 and 2017 were paid based on forest status approved by FPD. It suggests the improvement of PFES qualification process through forest assessment from 2016.

[4] Decree No. 09/2006 /ND-CP of January 16, 2006 Prime Minister

[5] Guideline on the management mechanism for using payment for forest environmental services by Forest owners (Decision No. 1853 / QD-UBND, August 18, 2015)

[6] Expenses for forest management and protection teams and teams, procurement of necessary tools and equipment for forest management and protection teams and forest fire prevention and control teams, forest trees and fertilizers to plant forests and enrich forests.

[7] FPD approved Forest status map 2015 was based on SPOT 5 for 2015 and 2016 and 2017 maps were made on the 2015 map by field surveys.

Figure 1: Forest Status and PFES recognized forest maps 2015-17

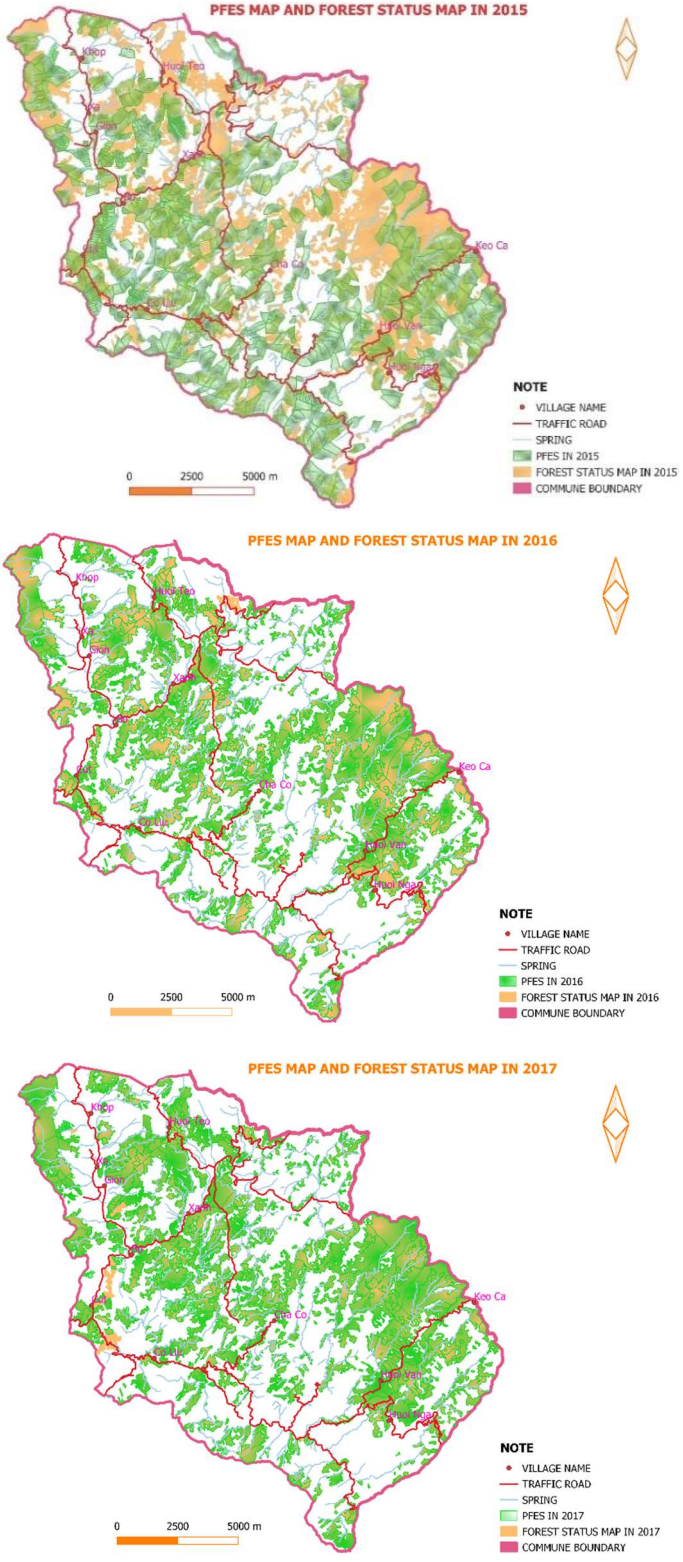

Table 4: Forest Status of PFES recognized forest 2015-17

(Unit ha)

Map type	Evergreen broadleaves (Poor)	Evergreen broadleaves (Regrowth)	Lime Stone Forests	Plantation	Total	%
2015						
Forest status 2015 (FPD approved)	444	6,170	152	237	7,004	100
PFES area	4,630	1,846	0	225	6,701	96
2016						
Forest status 2016 (FPD approved)	444	6,170	152	264	7,030	100
PFES area	444	6,170	153	237	7,005	100
2017						
Forest status 2017 (FPD approved)	445	6,224	152	264	7,084	100
PFES area	443	6,273	152	149	7,017	99

PFES payment and forest allocation status of SNRM target villages

According to the data of Son La FPDF over the 3 years (2015-2017), the PFES-qualified forest area of Muong Gion Commune has increased by 5% (315 ha, 5,085 ha in total in 2017) and 35% in amount (VND 626,277 million) due to the increased area and unit price per hectare (Table 5).

89% of PFES paid forest are allocated to communities where village control the area (Table 6). The size of PFES forest allocated to each village are varied from 1,026 ha of Keo Ca village to 106 ha of Cut village. Three H'Mong villages own 47% of PFES paid forests in 2017 (Table 6). Average size of PFES received forest allocated to households was 2.3 hectares.

Table 5: Forest area and PFES payment to SNRM target villages in Muong Gion Commune (2015 – 2017)

No.	Village	2015		2016		2017		Compared 2017 /2015
		Area (ha)	Amount (1.000 đ)	Forest (ha)	Amount (1.000 đ)	Area (ha)	Amount (1.000 đ)	Area (ha)
1	**Bo**	565.7	152,181	497.8	145,841	615.48	213,263	49.75
2	**Cha Có**	390.1	104,937	315.5	92,433	318.13	110,232	-71.97
3	**Co Líu**	120.4	32,377	253.8	74,360	110.83	38,401	-9.53
4	**Cút**	373.6	100,485	194.2	56,889	147.01	50,939	-226.54
5	**Giôn**	385.9	103,815	368.3	107,918	358.43	124,195	-27.5
6	**Huổi Ngà**	421.9	113,483	628.0	183,995	620.34	214,948	198.47
7	**Huổi Tèo**	216.2	58,152	145.1	42,514	148.48	51,448	-67.7
8	**Huổi Văn**	586.4	157,752	742.8	217,632	726.53	251,743	140.09
9	**Xanh**	398.3	107,129	363.3	106,438	440.23	152,540	41.98
10	**Kéo Ca**	719.9	193,656	1,025.9	300,574	1025.85	355,457	305.94
11	**Khóp**	224.3	60,345	309.2	90,596	331.95	115,019	107.62
12	**Xa**	97.0	26,085	248.1	72,682	241.28	83,604	144.31
Total		**4,499.6**	**1,210,398**	**5,091.7**	**1,491,871**	**5,084.5**	**1,761,789**	**584.9**

Remark: PFES payment for the Da river watershed in Son La was 269.000 VND/ha in 2015, 293.000 VND/ha in 2016 and 346.500 VND/ha in 2015, 2016, 2017, respectively.

Source: [5] based on data from Son La FPDF.

Table 6: Forest owners and PFES forest area in SNRM target villages, Muong Gion Commune, Son La

No.	Village Name	Ethnic Group	Allocation Entity			Total
			Village	Household		
			Area (ha)	No.	Area (ha)	Area (ha)
1	Bo	Thai	539.8	56	75.7	615.5
2	Cha Có	Thai	284.0	21	34.2	318.2
3	Co Líu	Kháng	107.9	3	2.9	110.8
4	Cút	Thai	105.9	20	41.1	147.0
5	Giôn	Thai	340.2	17	18.3	358.4
6	Huổi Ngà	H'Mong	520.0	29	100.4	620.3
7	Huổi Tèo	Thai	106.4	14	42.1	148.5
8	Huổi Văn	H'Mong	589.9	29	136.6	726.5
9	Xanh	Thai	359.7	27	80.5	440.2
10	Kéo Ca	H'Mong	1,025.9	0	0.0	1,025.9
11	Khóp	Thai	296.3	29	35.7	332.0
12	Xa	Thai	233.8	1	7.5	241.3
SNRM Target Villages			4,510	246	575	5,085
%			89		11	100
Entire commune			6,269	410	748	7,017

Source: [5] based on data from Son La FPDF.

PFES payment and Village Fund in SNRM Target villages

Between 2016 and 2018, PFES was paid for three years. PFES for 2015 in 2016 and PFES for 2016 and 2017 in 2018. All the PFES paid to villages are deposited in Village fund. Overall PFES accounts for 92% of village fund revenue between 2016 and 2018, suggesting a significant contribution of PFES for the village community (Table 7).

Table 7: Revenue of Village Fund by Target Villages, 2016 - 2018

(Unit: 1,000 VND)

	2016		2017		2018		Total	
Sources	Amount	%	Amount	%	Amount	%	Amount	%
PFES[1]	896,893	89.7	0	0.0	2,853,897	95.7	3,750,790	91.5
SNRM support[2]	0	0.0	132,277	62.6	0	0.0	132277	3.2
Maintaining irrigation system[3]	10,010	10.3	16,140	7.7	25,751	0.9	51,901	1.3
Village asset sale[4]	0	0	62,890	29.7	50,000	1.7	112,890	2.8
Others[5]	0	0	0	0.0	51,000	1.7	51,000	1.2
Total	906,903	100	211,307	100	2,980,648	100	4,098,858	100

Remark: 1: 2015 PFES paid in 2016. 2016 and 2017 PFES paid in 2018., 2: A part of SNRM supported material price was contributed to VF. 3: contribution to maintenance work ,5 villages, 4: pine resin and wood sales from 661 plantation, two villages, 5: Land rent, no drug addict, etc. 4 villages.

Source:[5] based on village leader interviews.

Expenditure of Village fund

Approximately one third of expenditure of village fund between 2016 and 2018 was for new rural development followed by social activities in village (28%) and distribution to villagers for livelihoods (24%) (Table 8). Spending for forest management is about 13%, 7% for Forest patrolling and 6.3% for fire control.

Table 8: Expenditure of Village Fund of SNRM Target Villages, 2016 - 2018

(Unit: 1,000 VND)

Expenditure	2016		2017		2018		Total	
	Amount	%	Amount	%	Amount	%	Amount	%
New rural development[1]	282,239	39.4	194,741	26.4	128,129	33.7	605,109	33.0
Forest patrolling[2]	50,700	7.1	41,430	5.6	36,480	9.6	128,610	7.0
Fire prevention and fighting[3]	69,650	9.7	27,966	3.8	18,660	4.9	116,276	6.3
Social activities[4]	163,949	22.9	160,197	21.7	194,820	51.2	518,966	28.3
Support for the poor[5]	0	0	12,300	1.7	0	0	12,300	0.7
Contribute to CPC[6]	0	0	7,700	1.0	0	0	7,700	0.4
Lending for the poor[7]	0	0		0.0	2500	0.7	2,500	0.1
Distribution to villagers[8]	149,823	20.9	294,680	39.9	0	0	444,503	24.2
Total	716,361	100.0	739,014	100.0	380,589	100.0	1,835,964	100.0

Remark: 1: Material purchase for construction of small infrastructure such as concrete village road, culvert, irrigation dam, etc. 2: Paid to forest patrolling team. 3: Practice of fire prevention and fighting including establishment of fire prevention contours. 4: Mainly for village festival, and Tet, Guest, meeting, etc. 5: only one village. 6: only one village. 7: only one village. 8: Distribute fund to household for livelihoods at two H'Mong villages

Source: [5] based on village leader interviews.

6. Lesson Learned

A role of PFES in forest management: a status of PRAP budget

The PRAP provides a comprehensive mechanism to promote SFM with multi-sector arrangement with participatory manners. It may have a large potential to solve complex problems in increasing/maintaining forest cover which contributes to catchment protection for hydropower dams and disaster prevention.

According to the PRAP budget in Son La, PFES accounts for 27% of PRAP implementation, 100% of forest protection and 78% of control of forest fire, suggesting a significant role of PFES in forest management (Table 2). The PFES accounts twice as high as state budget; PFES plays a role to fulfill a shortfall of public funds in forest protection. Effective use of PFES for forest management needs to more elaborated.

Status of forest land allocation and fund distribution to rural poor

In the SNRM target villages in Muong Gion commune, 89% of forest lands which receives PFES are allocated to groups of households which is treated as villages (Table 6). 11% of PFES are directly paid to individual households to which forests are allocated (2.3 ha on average). Village leaders deposit the received PFES fund to village fund and use it for public needs (e.g. new rural development, social work). At some village which received a large amount of PFES, the remaining are equally paid to villagers for livelihoods. Grouping forest owners for effective organization of PFES payment was initiated in Son La in order to reduce the work for FPDF and to encourage community-based forest management [3].

It has been a question that whether PFES reaches smallholders in rural area [6]. In the case of Son La, PFES clearly reaches smallholders in rural area through village system. It should be noted that village is not legally confirmed body since the civil law 2005 does not recognize village (or community) as a legal entity [6].

Constraints and potential of payment mechanism

Between 2016-2018 PFES was paid twice to the target villages: PFES for 2015 in 2016, PFES for 2016 in 2018. There was no payment in 2017. It is quite unpredictable when PFES fund is actually paid to villages; therefore, it was difficult for villages to plan the use of PFES fund. It is recommendable to complete the process to adjust the forest area on time and make regular payment annually, so that villagers can plan accordingly.

According to Son La FPDF, the process is speeding up by 2020; thus, it is expected that the situation would be improved soon (Personal communication, 2019).
Up to the payment in 2018 (PFES 2018 is not paid as of October 2019), PFES was paid by cash from FPDF district office to forest owners. The payment through bank accounts would ensure transparency and speed up fund distribution.
The gap between officially recognized forest and PFES qualified area found in 2015 was reduced from 2016 (Figure 1, Table 4). In order to have more updated sensitive forest status, a methodology to recognize current forest status change reflecting the amount of PFES payment (e.g. using free high-resolution satellite images in different seasons to evaluate forest status of the year) is expected to be applied.

Village authority as a catalyst to connect PFES with forest management

SNRM supported creating a mechanism of village forest management: 1) establishing a management body, VMBFMLD, 2) village forest regulations to control forests, 4) establishing village funds to support village activities (forest management, livelihood and social) incorporated from PFES and 4) village forest partolling by forming VFPT with technical guidance. PFES accounts for 92% of village fund (Table 7).

Use of PFES for forest plantation

Muong Gion Commune and 12 SNRM target villages, has a large potential for afforestation since currently it has a very large area of un-forested land (DT1).
SNRM facilitated to establish forest plantation (*Pinus masoniana* 94.6 ha in four villages, Co Lie, Huoi Teo, Khop and Xa) through providing plantation design, seedlings, technical training, without paying labor. Although this practice was not voluntarily expanded by villagers as of now probably due to the long rotation (15 years or longer), the better performance was demonstrated compared to the other program probably due to not only careful seedling selection and monitoring maintenance activities but also expectation to receive PFES in a few years since SNRM advocate the PFES mechanism to villagers[7].
According to the PPC guideline on management mechanism for PFES payment minimum of 40% is spent for 1) forest patrolling and fire prevention/fighting, 2) the procurement of necessary tools, and 3) seedlings, fertilizer, and forest enrichment. Between 2016-18, 13.3% of village fund (14% of PFES) is used for forest management (forest patrolling, 7% and fire prevention and fighting, 6.3%) but no spending for seedling and enrichment (Table 8). The SNRM model of forest plantation may enable to avoid the constraint of state budget for plantation work, and to develop more sustainable

plantations with greater ownership by villagers incorporating PFES money. Specific planning and planting plan with using PFES is needed[8].

Use of PFES for agroforestry and NTFP production

The promotion of sustainable land use practices is absolutely needed for catchment protection. SNRM supported to demonstrate 15 agroforestry models (contour fruit tree (grafted Son Tra (*docynia indica*), Grafted black canari (*Canarium tramdenum*), late fruit longan, pomelo, grafted Taiwan mango, coffee, plum) and grass planting along with crops) on agricultural lands and one NTFP production model (*Amomum xanthioide* (Sa nhan xanh in Vietnamese) and *Amomum longiligulare* (Sa nhan) planting under natural forest canopy) at ten villages. Villagers plan to expand Son Tra, Longan/mango, Coffee and Ammomum models with their own fund (Huoi Teo, Cut, Tong Bua and Huoi Nga villages) because of the successful cultivation with a potential to enhance their livelihoods in a short time [8]. Although most of PFES was paid to community not individual households, PFES payment to villages may make these expansions easier through distribution to each household (natural forest enrichment with *Amomum* at H'Mong villages with large natural forests), specific location with high value product (grafted Son Tra cultivation at high elevation at Huoi Teo village), and high value with easily marketable location (grafted mango/longan cultivation on contour at Cut village). PFES payment combined with successfully demonstrating sustainable land practices strictly with low cost, high value, competitive and short-term rotation can facilitate better land management by local villagers.

Does PFES create incentives to generate larger forest land?

Since forest types is not considered for the amount of PFES payment using K factor, equal amount for PFES is paid to all forest types. Regrowth non forest area can be eligible to receive PFES faster by weeding and planting small number of trees (Assisted Natural Regeneration work). SNRM supported to organize ANR by villagers' voluntary work. At Huoi Nga village, villagers worked 1,520 man-days for weeding to generate forest. As a result, 124.8 hectares of forest lands (67 ha in Huoi Nga village) became newly a PFES qualified forest. It showed that the PFES mechanism may encourage villagers to work to develop newly qualified forest.

[8] Pine plantation established by the 661 program were resin tapped and harvested at 10 and 12 years old, respectively in some villages, resulting in low profit for forest owners.

7. Conclusions

PFES was initiated in Vietnam as a market-based mechanism in order to incentivize forest protection for catchment of hydro-power dams. The paper showed that the PFES plays an important role in forest protection and control of forest fires as well as livelihood and social support to rural villagers.

The experience of SNRM found that a village-based authority for forest management functions well when it is implemented with forest regulations combined with livelihood support and village fund, incorporating the PFES as a core source of development and forest protection fund. Although the PFES mechanism is still premature and the SNRM is only a pilot base, there exists a potential of having much larger impacts of PFES on forest management at village level which is the closest body to publicly manage land use on the ground.

In order to have greater impacts of PFES on forest management, enhancement of forest status assessment, regular PFES payment, intimation of PFES mechanism to villagers, and demonstration of low cost, high valued, and short rotation land use practices under various conditions acceptable by villagers are recommended.

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