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REGULAR RESEARCH ARTICLE

Impacts of Payment for Forest Ecosystem Services on Local livelihoods in A Luoi District, Thua Thien Hue Province, Viet Nam

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ABSTRACT

This paper analyses the impacts of the national Payment for Forest Environmental Services (PFES) policy in A Luoi district, Thua Thien Hue province, Viet Nam. There are mixed impacts of PFES in A Luoi district. While some surveyed households have experienced increases in income since PFES, for many other incomes have fallen. Our findings show PFES impacts on local communities and individuals are limited because most forest areas are managed by state agencies, leaving only 17.9% of PFES payments being channeled to these groups, while the rest goes to state government agencies and commune people's committees. This disparity in PFES payments has further widened the income gap between state agencies and local households. PFES payments currently contribute little to household incomes, averaging only 2.64% of total earnings. PFES has little impact and additionality in advancing land tenure security and reducing natural forest product exploitation for generating income as impacts are similar to those found in non-PFES villages. PFES poverty reduction impacts vary from village to village, but in general, percentages of poor households receiving PFES payments range from 1% to 59%.

KEYWORDS

Payment for Forest Ecosystem Services; Vietnam; livelihoods; additionality; poverty reduction; sustainable forest management

1. INTRODUCTION

Since the 1990s, the global community has hoped Payment for Environmental Services (PES) can promote better forest protection and development and improve local livelihoods (Pagiola et al., 2005; Börner et al., 2013; Tacconi et al., 2013; Kwayu et al., 2017; Roe et al., 2020). However, assessing the social and economic impacts of PES is challenging due to the long-term nature of its effects and the lack of proper monitoring and evaluation to track these impacts in most countries (Hegde & Bull, 2011; Ezzine-de-Blas et al., 2016). Numerous studies, such as Pagiola et al. (2005), Tallis et al. (2008), Wunder et al. (2008), Tacconi et al. (2013), Börner et al. (2013), Kwayu et al. (2017) and Roe et al. (2020) have tried to document and analyze the impacts of PES on local livelihoods in different countries and political contexts. However, Blundo-Canto et al. (2018) found that despite the large number of global studies examining PES impacts on local livelihoods, these studies often focus on income-related and social and cultural impacts as well as trade-offs between multiple livelihood dimensions, while effects on inequality are less studied. Meanwhile, in debates on PES and environmental governance, social impacts are often unclear (Haas et al., 2019). More knowledge is needed on how PES impacts changes in household expenditure and choices, and on trade-offs between household income and inequality in ecosystem service provider communities (Blundo-Canto et al., 2018). An understanding of the extent to which – and under what conditions – PES schemes have successfully improved livelihoods is essential for enhancing PES's synergistic environmental and livelihood goals (Blundo-

Canto et al., 2018).

Following international lessons on developing financial incentives for local people to protect forests, Vietnam developed its own national Payment for Forest Ecosystem Services (PFES) scheme in 2008. As the Government of Vietnam is promoting forestry-based livelihoods as one of many strategies for combatting environmental degradation and rural poverty (Pietrzak, 2010), contributing to local livelihoods is a key objective of PFES, which falls under a national monitoring and evaluation system where provinces are required to report on PFES contributions to overall household incomes. Due to the lack of rigorous impact assessments and government funding for proper monitoring and evaluation activities since the launch of PFES in 2008, interest in determining its impacts has been increasing in both government and academic circles.

Using A Luoi district, Thua Thien Hue province as a case study, this paper aims to provide empirical evidence on PFES impacts in Vietnam. Thua Thien Hue province started implementing PFES in 2011, and while payments had been collected from service users since the beginning of 2012, it took the province a further two years to identify service providers and pay them for their environmental services provision. A Luoi district has a large area of natural forest – approximately 91,877 hectares (ha) in 2019 – accounting for 31.86% of natural forest in the province, but it is also one of the province's poorest districts. For many years, the district was reported as a hotspot for forest loss. PFES was launched in the district in 2014 with revenues generated from the public's payment of electricity and water bills paid to the Provincial Forest Protection and Development Fund. The Fund then distributes payments to environmental service providers, including communities and individual households, state government agencies and commune people's committees. In 2019, PFES payments to environmental service providers in A Luoi averaged VND 600,000/ha (approximately USD 26/ha). This was the highest rate of payment among all catchments in Thua Thien Hue province. Although numerous attempts have been made to analyze the impacts of PFES in Thua Thien Hue, including Pham et al. (2018), Dang & NaRanong (2019), Haas et al. (2019) and Mai (2020), rigorous impact assessments have been limited (Mai, 2020), particularly in highlighting additionality by comparing pre- and post-PFES situations in both PFES and non-PFES sites. Additionality is critically important for Payment for Environmental Services as environmental services buyers should only pay for services if they would otherwise not have been available in the absence of payments provided by the PES system (Bennett, 2010; Alarcon et al., 2017; Lichtenberg, 2018).

2. METHODS

This paper adopts a framework developed by Jagger et al. (2010), Sunderlin et al. (2018), Duchelle et al. (2017), Wunder et al. (2020), and Pham et al. (2020) in assessing PFES additionality by comparing its impacts in control (non-PFES) and intervention (PFES) sites and comparing situations before and after its implementation. Based on literature reviews and consultations with local authorities, we identified a pool of fifteen villages with and fifteen villages without PFES that have similar environmental and socio-economic conditions. We then conducted a scoping study by visiting these villages, verifying matches, and selecting four pairs of villages with as many similarities as possible, whose inhabitants agreed to take part in the study, and are located in areas where the research team could obtain permission to conduct studies (Figure 1). The matching criteria include environmental conditions such as forest cover, social and economic context such as ethnicity and income status. Culture and ethnicity shape the way individuals and communities manage natural resources including forests but are often overlooked (Weber et al., 2007; Fischer & Charnley, 2010; Schelhas, 2002). Ethnic minority groups in Vietnam not only depend on forest resources their livelihoods, but

also for their cultural identities (Anh & Ubukata, 2016; Vien & Thanh, 2017). Therefore, the different forest management approaches taken by different ethnic groups need to be taken into account in any forestry policies or impact assessment studies, including this research. Although the research team tried to match villages as much as possible, finding identical characteristics was an impossibility (see Table 1).

The research team also applied a wide range of research methods. The authors reviewed all legal documents regulating PFES implementation in the province, as well as annual reports from the Thua Thien Hue Provincial Forest Protection and Development Fund. Key informant interviews were conducted with heads of six commune people's committees, seven government staff members from the A Luoi District Forest Protection Department, Thua Thien Hue Sub-Department of Forest Protection, and Provincial Forest Protection and Development Fund, as well as eighteen village heads in the four PFES villages. During these interviews, people were asked to assess the results of PFES and its impacts on local livelihoods. In addition, household surveys and focus group discussions (FGDs) were also carried out in the selected villages. In total, 243 people took part in household surveys. FGDs in the study sites involved a total of 348 people and aimed to understand the strengths and weaknesses of PFES as well any impacts since its implementation. FGD participants included those involved in and not involved in PFES, representing study village demographics in terms of gender, age, wealth, and ethnicity. The FGDs and household surveys both aimed to understand perceptions of how PFES impacts upon local livelihoods, and of opportunities and challenges for PFES implementation.

A national workshop, involving thirty-eight participants representing government, local communities, the private sector, CSOs, international NGOs and academia, was organized to discuss feedback on research findings.

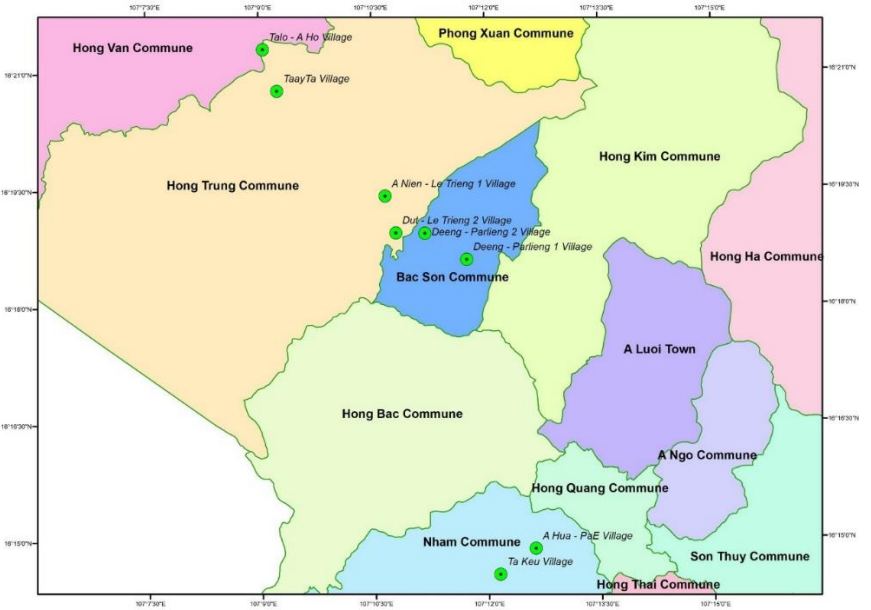

Figure 1. Locations of study villages.
[Source: Thua Thien Hue Provincial Forest Protection and Development Fund 2021]

Table 1. Characteristics of study villages

Criteria	Study villages							
	Control sites (Without PFES)				Intervention sites (with PFES)			
	Talo-A Ho village - Hong Van commune (Pair 1)	A Nien - Le Trieng 1 village - Hong Trung commune (Pair 2)	TaayTa village - Hong Trung commune (Pair 3)	Ta Keu village - Nham commune (Pair 4)	A Deeng - Parlieng 1 village - Bac Son commune (Pair 1)	Dụt -Le Trieng 2 village - Hong Trung commune (Pair 2)	A Deeng - Parlieng 2 village - Bac Son commune (Pair 3)	A Hua - PaE village - Nham commune (Pair 4)
Total number of households	170	200	200	78	140	165	160	67
Total forest area (ha)	310	1,460	1,200	100	800	1,300	650	59
Number of poor households *	39	89	87	30	39	72	58	20
Ethnicity	Paco	Paco	Paco	Ta oi	Paco	Paco	Paco	Ta oi
Main income sources	Rice, cassava, acacia, hired workers	Livestock, acacia, hired workers	Acacia, cassava, hired workers	Rice, cassava, acacia, hired workers	Livestock, acacia, hired workers	Livestock, acacia, cassava, hired workers	Livestock, acacia, hired workers	Acacia, agriculture
Number of people involved in focus group discussions	31	30	27	33	36	31	32	30
Number of people involved in household surveys	30	31	31	30	30	31	30	30

(*): Poor households were defined as those that had received poor household certificates issued by local government and met the criteria for poor households stipulated in Vietnamese Government Decision No.1614/QDTTg, dated 15 September 2015. According to the Decision, a household is considered "poor" if it meets one of two criteria: has a monthly income below VND 700,000 for a household in a rural area, or VND 700,000 to VND 1,000,000 per month in an urban area and falls short in three or more of 10 indicators of basic services (healthcare, education, housing, water and sanitation, and access to information).

3. RESULTS

3.1 Who benefits?

Among the different service providers, in 2019, communities, households and household groups accounted for the highest number of payees (98%) at 576 PFES recipients compared to nine state forest owners (the national park, watershed forest management boards, and state-owned forest enterprises) and four commune people's committee forest ranger units. Yet, having higher numbers of payees does not necessarily equate to communities benefitting most from the program. Despite 97.79% of PFES recipients being local communities and households, the payments they received accounted for only 17.61% of all PFES disbursements to forest owners. Over the years, there have been slight increases in PFES payment amounts to communities, but state agencies have continued to receive a larger share of PFES revenues.

Household interviews showed that after 2014, average land area per household was only 1.19 ha in intervention sites and 1.73 ha in control sites. People have planted more than 70% of these small plots with forest trees like acacia and NTFPs and around 16-24% with crops like cassava, maize, and used the remainder for building houses or for other purposes. In terms of land tenure, more than 75% of household land belonging to households already has land-use certificates.

According to outcomes of key informant interviews, PFES was expected to increase payments to local communities for protecting forests and, therefore, bring positive impacts on local livelihoods. However, as shown by Table 2, average areas of household-managed land for all land uses including forestry increased in both control

and intervention sites, and those increases were higher in control than intervention sites. This suggests that in terms of forest area managed by households there is limited additionality, which is a criterion for payment. At the same time, the average area of agricultural land has fallen in both control and intervention sites. According to some interviewed households, access for swidden farming has fallen since PFES implementation due to stricter law enforcement.

Several key informants at the provincial level pointed out that forest demarcation and forest land allocation processes have been completed thanks to PFES, and this has increased management security for individual households managing forest land. However, as Table 2 shows, despite the area of land with land-use rights certificates increasing in intervention sites following PFES, the increase was lower than in control sites. Again, this illustrates limited additionality with PFES because numbers of land-use rights certificates have still increased even in places where PFES is absent.

Table 2. Land use survey sites

Description	Villages with PFES			Villages without PFES		
	Average			Average		
	Before PFES	After PFES	Difference	Before PFES	After PFES	Difference
Average land area (ha/household)	1.13	1.19	0.06	1.59	1.73	0.14
By land use						
Agricultural land (%)	24.90	23.99	-0.91	17.11	16.52	-0.59
Forestry land (%)	68.93	69.90	0.97	74.67	75.90	1.23
Husbandry (%)	0.65	0.50	-0.15	0.00	0.00	0.00
Aquaculture (%)	0.32	0.25	-0.07	2.80	2.35	-0.45
By land tenure						
With land use certificates (%)	74.61	74.98	0.37	77.55	79.31	1.76
Without land use certificates (%)	25.39	25.02	-0.37	22.45	20.69	-1.76

[Source: Household interview results (2020)]

3.2 Impacts of PFES on household incomes

In 2019, the average annual income of VND 24.28 million or USD 1,055 per person (DT, 2019) in study villages was much lower than per capita GDP in Thua Thien Hue province at USD 2,007 (PPC, 2019) and nationwide at USD 2,715 (World Bank, 2019).

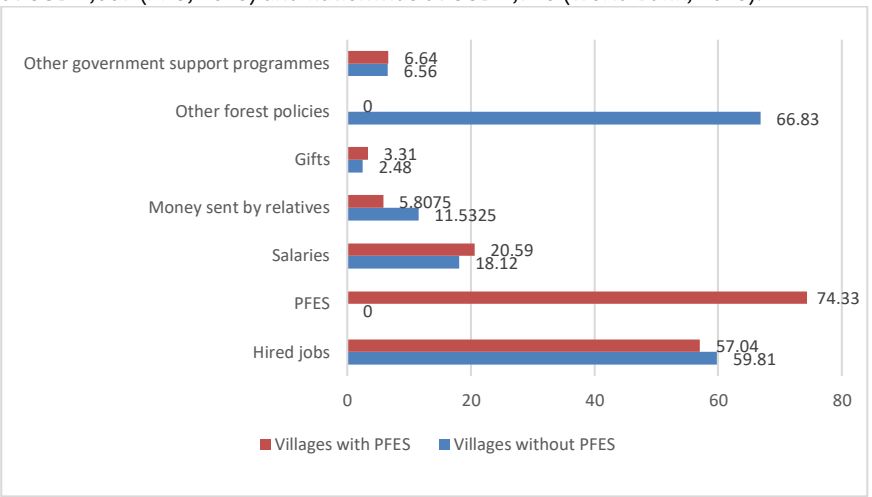

Figure 2. Percentages of households by income source.
[Source: Household interviews (2020)]

Figure 2 shows that aside from PFES, control and intervention villages both had similar income sources. Although control villages earned nothing from PFES, 66.83% have incomes from another forestry policy through Decree 75/2015 on forest development associated with sustainable and rapid poverty reduction and assistance to ethnic minorities in the 2015-2020 period. This decree provides rice subsidies, cash support and loans to encourage poor households to invest in forest protection and planting. Participants in the consultation workshop comparing PFES to Decree 75/2015 said that while decrees do provide government subsidies in the short term, PFES provides more sustainable incomes.

For households in PFES intervention sites with multiple income sources, salaries, hired day labor and livestock generally contributed most to overall household earnings, while PFES contributed little at only 1.90-4.06%. Due to differences in payments and total numbers of payees, the payments received by each household varied between villages. Households in Dut Le Trieng 2 received the highest payments at around VND 2.64 million (USD 114) per household, while payments in A Hua Pa E were only VND 1.05 million (USD 45) per household. Not only do PFES payments contribute very small percentages of overall household incomes, not all households in the intervention sites could access such payments. Among the households interviewed in the four intervention villages, ninety (74.38%) were indirectly receiving PFES payments, mainly through the community forestry mechanism. Very few households or groups of households with forest allocated to them were contracted to protect the forest directly as individuals (Table 3).

Table 3. PFES payments to survey villages

Village	Households		Community		Household groups	
	Forest area (ha)	Payment received (VND)	Forest area (ha)	Payment received (VND)	Forest area (ha)	Payment received (VND)
A Deeng Par Lieng 1		0	158.11	78,564,000		0
A Deeng Par Lieng 2	0.75	366,000	163.97	83,418,000		0
Dụt Le Trieng 2	6.18	1,860,000	166.78	85,452,000	61.79	30,510,000
A Hua Pa E	1.18	576,000	59.16	29,880,000		0
Total	**8**	**2,802,000**	**548**	**277,314,000**	**62**	**30,510,000**

Source: Thua Thien Hue Forest Protection and Development Fund, 2019

Comparing household incomes before and after PFES, incomes of 32% of households in intervention sites had increased, while 53% saw no change and the incomes of 15% had fallen. Meanwhile, in control sites 25% experienced increases in income, 51% had no change and 24% had lower incomes than before PFES. Household surveys showed changes in all income sources after 2014 when PFES payments commenced.

3.2.1 Incomes from forest products

The logging ban and restrictions on harvesting non-timber forest products (NTFPs) in natural forest together with natural resources depletion have resulted in modest earnings from forest products for local households. None of the interviewed households in either control or intervention sites had incomes from natural forest timber following PFES. However, three households, including one in an intervention village, said they had previously been involved in some form of logging. Only NTFPs like fuelwood, bamboo, rattan, medicinal plants and animals, honey, mountain frogs and snails provide earnings for local people. However, most of these are collected for household

use, with only 7.5% of households in intervention villages and 5.73% in control sites selling NTFPs. Quantities of almost all NTFPs collected, sold, and consumed have fallen since the implementation of PFES. Table 4 shows that while the average percentage of households selling natural forest products has increased slightly, numbers of households in control sites saying they sell natural forest products have decreased. This means PFES has had little impact in reducing the numbers of households engaged in harvesting and selling forest products. Earnings from selling natural forest products fell 50% for households in both control and intervention sites indicating little PFES additionality or impact. When asked why forest product use and sales have fallen, households gave reasons of reduced market demand when most people now use electric or gas stoves instead of fuelwood; natural resources depletion and the fact that people rarely encroach on forests following stronger law enforcement including with PFES, and they can collect fuelwood from their plantation forests. All of these factors have contributed to reducing average annual household earnings from natural forest in intervention villages from VND 440,000 (USD 19.1) before PFES to VND 290,000 (USD 12.6) after PFES (Table 4).

3.2.2 Incomes from crops

More than 80% of interviewed households have incomes from growing crops, such as cassava, coffee, and fruits. People also plant acacia, mainly for wood chips and acacia planted area has expanded over time. Crops yields have increased after PFES, resulting in higher earnings from agriculture. Table 5 shows average incomes from crops of around VND 4.95 million (USD 214) per household in intervention sites and VND 3.61 million (USD 156) in control sites. Households in villages with PFES had higher incomes from agriculture than their neighbors, both before and after PFES (see Table 5). Labor, seedlings, and pesticides are major expenses for local farms. After PFES, agriculture investment costs in both control and intervention sites increased nearly twofold from VND 0.71 million to 1.38 million per household in villages with PFES, and to around VND 1.52 million in villages without PFES. After deducting costs, income from agriculture still increased in all the surveyed villages. With higher revenues and similar costs, farmers in intervention sites have higher incomes from crops than those in control sites, both before and after PFES. Before PFES, crops brought an average income of VND 2.38 million (USD 103) per household in intervention sites, nearly 2.5 times higher than in control sites. After PFES, this rose to VND 3.58 million (USD 155) per household in villages with PFES, 1.5 times higher than before PFES, and 1.7 times higher than the average income of around VND 2.10 million (USD 91) in villages without PFES. However, over the years, some 40% of surveyed households have stopped planting cassava, coffee and rainfed and upland rice, with reasons for doing so including low productivity, low profits, lack of water for cultivation, changes in market demand, land erosion and crop disease.

3.2.3 Incomes from livestock

Following PFES, the percentage of households investing in livestock has increased significantly from 29.65% to 62.02% in intervention sites and from 43.39% to 66.29% in control sites. Despite the small scale of husbandry, numbers of cattle and goats have risen in all surveyed villages compared to before PFES. However, higher livestock numbers do not necessarily equate to farmers earning more from livestock. In fact, due to market price fluctuations, earnings from livestock fell dramatically from VND 10.15 million to only 6.94 million per household in villages with PFES and from VND 14.11 million to 6.38 million in control villages. Farmers generally rear ducks and chickens for household consumption rather than sale, so earnings from these animals are limited. Average livestock investment costs fell over time from VND 9.86 million to 5.72

million per household in intervention sites and from VND 13.52 million to 6.95 million in control villages. This was partly due to reproduction and government support programs providing free cows for poor households. Costs were higher in control villages as they owned more cows, buffaloes, and pigs than intervention villages, both before and after PFES. After deducting costs, average income from livestock was very modest after 2014, at around VND 1.22 million (USD 53) per household in villages with PFES. In almost all control and intervention sites, incomes were much lower after than before PFES. In villages without PFES, earnings were insufficient to cover costs, causing an average loss of around VND 570,000 per household (see Table 6).

3.2.4 Other income sources

In addition to forestry, agriculture and livestock, local people also earn money from other sources, the most significant being paid salaries and wages. Household earnings averaged around VND 24-28 million, with little difference between control and intervention sites. PFES provides income in intervention sites, while people in control sites received government support through Decree 75/2015, which integrated forest protection, poverty reduction and assistance to ethnic minorities.

Focus group discussions and household surveys revealed that stakeholders in study villages perceive income from PFES to be more stable and longer term than from normal projects. Participants also said most donor projects require counterpart funds, and PFES can be used for this purpose. Fifty percent of interviewees confirmed improved livelihoods since PFES, while 30% said their income had increased and 7% decreased since PFES. However, all the village heads interviewed referred to unexpected and incurred costs, saying they do not receive full amounts of PFES, but have to pay 5% to 20% to government officials for helping them complete the paperwork necessary for PFES payments, due to literacy issues and a lack of legal understanding of PFES protocols. Rates paid are determined through agreements between government officials and local people. In the consultation workshop, participants from government agencies said that despite numerous capacity building efforts, villagers remain unable to complete the paperwork. Villagers, meanwhile, voice fear of not receiving PFES payments if they do not pay to get the paperwork done.

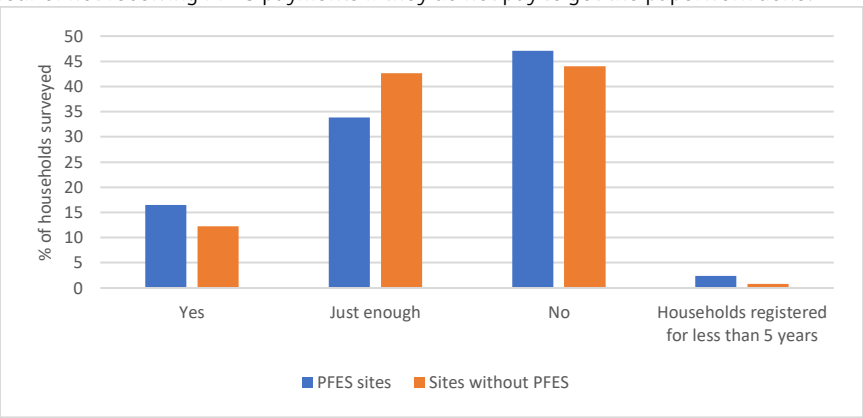

Figure 3. Extent to which income meets household needs.
[Source: Household interviews (2020)]

During household interviews, when people were asked how they spend PFES money, 80% said they used it to buy basic necessities such as rice. Payments are made close to Lunar New Year celebrations when there is a high demand for goods, so were greatly appreciated by some farmers. Other mentioned purposes included debt

repayments, seedling, and fertilizer purchases, and paying children's education costs. People were also asked to self-assess whether their incomes meet their needs. Results show that large numbers of interviewees said their current earnings are insufficient to cover all expected expenses including medical fees, children's education costs, and other expenses. There were no significant differences between control and intervention sites (see Figure 3).

Table 4. Household incomes from natural forest

Description	Villages with PFES										Villages without PFES									
	A Hua Pa E		Dut - Le Trieng 2		A Deeng Parlieng 1		A Deeng Parlieng 2		Average		Ta Keu Nham		Anien-Le Trieng 1		TaAy Ta		Ta Lo A Ho		Average	
	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES
Households selling natural forest products (%)	3.33	6.67	3.23	0.00	6.67	6.67	16.67	16.67	**7.48**	**7.50**	0.00	0.00	3.23	0.00	12.90	12.90	13.33	10.00	**7.37**	**5.73**
Income from selling natural forest products (VND x million /household)	0.03	0.02	1.00	0.00	0.01	0.08	0.73	1.06	**0.44**	**0.29**	0.00	0.00	2.00	0.00	0.13	0.21	0.10	0.78	**0.56**	**0.25**

Source: Household interview results (2020)

Table 5. Household incomes from crops

Description	Villages with PFES										Villages without PFES									
	A Hua Pa E		Dut - Le Trieng 2		A Deeng Parlieng 1		A Deeng Parlieng 2		Average		Ta Keu Nham		Anien-Le Trieng 1		TaAy Ta		Ta Lo A Ho		Average	
	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES
Households having incomes from crops (%)	70.00	93.33	80.65	77.42	93.33	96.67	76.67	93.33	80.16	90.19	76.67	90.00	90.32	93.55	64.52	77.42	80.00	86.67	77.88	86.91
Total revenue from crops per household with income from crops (VND x million /household)	5.23	7.98	2.67	3.85	2.36	4.77	2.07	3.21	3.08	4.95	2.72	3.61	0.61	1.77	0.59	2.41	2.87	6.66	1.70	3.61
Cost/household with income from crops (VND	0.31	0.52	1.23	2.31	0.59	1.62	0.70	1.06	0.71	1.38	0.39	1.69	1.41	2.18	0.80	1.46	0.31	0.74	0.73	1.52

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Description	Villages with PFES										Villages without PFES									
	A Hua Pa E		Dut - Le Trieng 2		A Deeng Parlieng 1		A Deeng Parlieng 2		Average		Ta Keu Nham		Anien-Le Trieng 1		TaAy Ta		Ta Lo A Ho		Average	
	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES
x million /household)																				
Income from crops/household (VND x million /household)	4.92	7.46	1.44	1.54	1.77	3.15	1.37	2.15	2.38	3.58	2.33	1.92	-0.80	-0.41	-0.21	0.95	2.56	5.92	0.97	2.10

Source: Household interview results (2020)

Table 6. Household incomes from livestock

Description	Villages with PFES										Villages without PFES									
	A Hua Pa E		Dut - Le Trieng 2		A Deeng Parlieng 1		A Deeng Parlieng 2		Average		Ta Keu Nham		Anien-Le Trieng 1		TaAy Ta		Ta Lo A Ho		Average	
	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES	Before PFES	After PFES
Households with livestock (%)	10.00	46.67	41.94	58.06	40.00	70.00	30.00	70.00	30.49	61.18	20.00	50.00	48.39	77.42	45.16	74.19	53.33	73.33	41.72	68.74
Value of livestock/ household with income from livestock (VND x million)	11.77	13.91	27.65	21.01	21.06	18.01	17.56	14.04	19.51	16.74	13.05	16.89	36.71	19.19	50.76	38.59	14.22	20.81	28.69	23.87
Revenue/household with income from livestock (VND x million)	3.47	3.86	12.19	11.06	21.10	7.15	3.83	5.67	10.15	6.94	3.67	4.53	20.37	5.69	26.69	13.17	5.69	2.11	14.11	6.38
Cost/household with income from livestock (VND x million)	22.67	6.21	8.85	9.21	5.69	4.01	2.23	3.45	9.86	5.72	5.43	6.32	12.84	3.58	28.63	11.93	7.17	5.95	13.52	6.95
Income/household having income (VND x million /household)	-19.20	-2.35	3.34	1.85	15.41	3.14	1.60	2.22	0.29	1.22	-1.76	-1.79	7.53	2.11	-1.94	1.24	-1.48	-3.84	0.59	-0.57

Source: Household interview results (2020)

3.3 PFES impacts on poverty reduction

Poverty rates are high at around 30% of households in all the study communes (Figure 4). Of 433 households receiving PFES payments, 100 were poor (23% of all PFES recipients and 36% of all poor households in intervention sites). In some communes, like Hong Trung and Nham, as many as 40% of households live below the poverty line. Numbers of poor households were slightly higher in control than intervention sites, with surveys showing 51.26% of interviewed households in intervention sites and 54.92% in control sites being poor and near poor households. One matched pair of villages in Nham commune showed a significant difference, with 33.33% of households in Ta Keu village (control) being poor or near poor, while the figure in A Hua Pa E village (intervention) was only 10%.

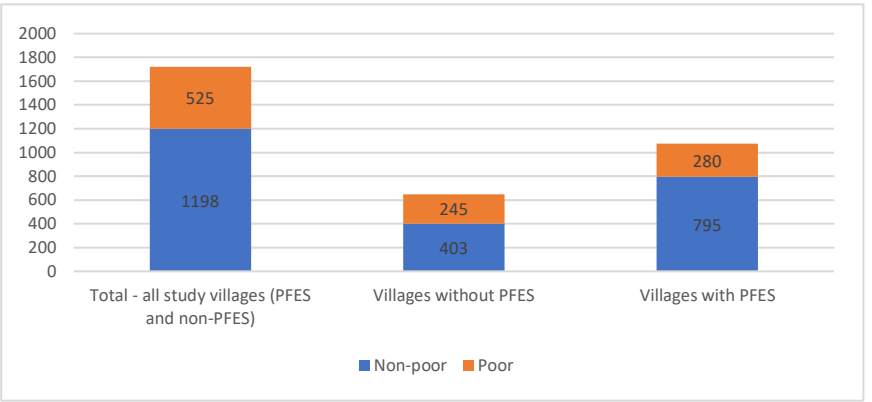

Figure 4. Numbers of poor households in the study villages.
[Source: Household interviews (2020)]

A Luoi district is one of the poorest districts in Thua Thien Hue province. In addition to PFES, the district has other state programs, such as Government Program No. 135 on Poverty Reduction, the National Target Program on Sustainable Poverty Eradication and the New Rural Program helping people escape poverty. These programs have improved public infrastructure considerably. Now, for example, all of the district's communes have road access for four-wheeled vehicles and 100% electrification, while 65% of households have access to clean water (Linh & Dinh, 2015). Thus, PFES additionality remains questionable in this regard.

Table 7 shows villagers' perceptions from FGDs on a roadmap and strategies for poor households to escape poverty. The roadmap shows a poor household at step 1, strategies to escape poverty from step 5, and possible pathways to become a wealthy household from step 8.

Figure 5 below shows how households have spent PFES money. The figure also shows households using PFES payments to cover activities in steps 2, 3, 5, 6 and 10 in the roadmap to escape poverty. According to FGD participants, welfare, consumption, healthcare, education, and debt repayment are all urgent needs households feel they cannot afford on their current incomes. With the additional income from PFES payments these unresolved needs have been partially met. Our analysis shows 58% of PFES recipient households in Thua Thien Hue province being poor, but only 3.93% of these poor households have escaped poverty thanks to PFES.

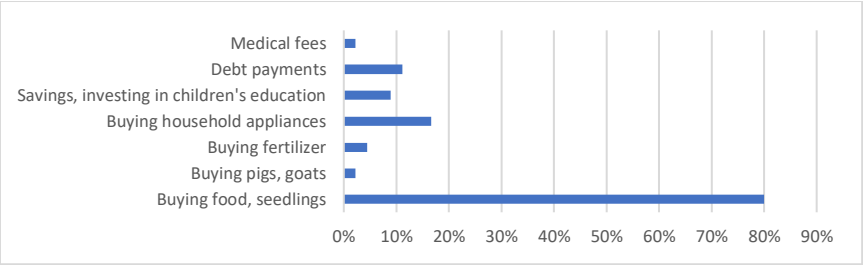

Figure 5. PFES used for well-being purposes. Source: Household interviews (2020)

Table 7. Villagers' perceptions on their roadmap and strategies to escape poverty

Step	Strategy
10	Open bank saving accounts and invest in children's education
9	Buy more land for production
From moderate to well-off	
8	Buy ploughs, tractors, water pumps
7	Continue to buy more breeds of chickens, pigs, and cows
6	Build or repair a house, buy household appliances
Escape poverty	
5	Buy buffalo breeds, cows, fertilizers, animal feed
4	Repair or renew pig pens
3	Buy pig and goat breeding stock
2	Buy food, chicken, and duck breeding stock
1	Lack of productive land, no labor force, no capital, temporary housing situations

Source: Focus group discussion results (2020)

The results from households surveys in PFES sites also show that only 33% of surveyed households surveyed in PFES sites saying their incomes have risen since PFES, with 7% saying that their incomes have fallen. In terms of negative impacts, 24 households (13%) said they are no longer allowed to harvest timber or clear forest to plant crops and have to submit many documents if they want to cut trees for timber to build houses. These cause additional costs and have adverse effects on local livelihoods.

Although PFES payments are paid mainly to communities rather than individual households and each household receives a limited amount of money, villagers expressed their appreciation of having government support to improve their livelihoods and invest in infrastructure for people to get water. PFES payments are also used for community work to improve infrastructure and support forest protection teams, with 21% of interviewees saying PFES money is used for fixing village electricity systems, meeting halls and welcome gates, for welfare funds and even for women's and farmers' unions so they have more funds to deliver activities.

4. DISCUSSION

This paper highlights the mixed impacts of PFES in A Luoi district. While some surveyed households have experienced increases in income since PFES, for many other incomes have fallen. The increased income might not mean people are better off as many surveyed households said that they still cannot afford to cover all their basic needs such as education and medical expenses. Moreover, the additional incomes come with costs, such as loss of access to forest resources, and additional working days indicating that the costs and benefits for PFES implementation have not yet to be fully analyzed and recognized.

While another study in A Luoi, Thua Thien Hue argues that the payments households receive from the PFES program are adequate compensation for their conservation efforts (Nguyen et al., 2018), our paper challenges this assertion and shows that study's analysis overlooks total costs, which include not only working days, but other associated informal costs such as indirect payment to government agencies to access PFES payment as well. Moreover, previous studies have also shown that when people no longer have access to forest areas and derive incomes from activities such as logging (Hoang et al., 2017), they have to switch to intensive farming for their livelihoods. Although households receive compensation payments, these are too low to cover the investment costs necessary for more intensive agriculture and for buying food and construction materials, all of which could previously be obtained for free from the forest (Artati, 2011). Any impacts of the PFES scheme need to be examined in terms of both costs and benefits relating to PFES implementation (Wong et al., 2019). While the costs of implementing PFES are not always well recorded or analyzed and require further study in the future, the fact that local people frequently referred to informal costs – including paying government officers to help them complete the necessary paperwork to receive PFES payments – raises issues of system accountability and the risk that local people, particularly vulnerable ones, cannot access PFES payments in full. These issues are not new and were highlighted in a previous study (Pham et al., 2014). Forest resources have previously functioned as an important buffer for mountain households when coping with crises like serious floods, so any impacts on forest incomes might reduce and affect adaptive capacity, which is a critical issue for equity and social sustainability in adaptation (Beckman, 2011).

Moreover, PFES is being implemented in Vietnam with high hopes surrounding its ability to contribute to poverty reduction in the way many other forest protection programs do (Völker & Waibel, 2010). However, the impacts of PES on household well-being are related to the magnitude of the payments provided (Clements & Milner-Gulland, 2015). While another study in Lam Dong province shows positive impacts of PFES on local livelihoods (Phan et al., 2018), our paper shares similar results to a study conducted in Son La province showing limited impacts of PFES on social outcomes (Pham et al., 2020). As our paper shows, despite PFES helping to cover some expenditures aligned with locally determined strategies for households to escape poverty, few have managed to do so through PFES. Our study shows that despite payment amounts increasing over time and some households saying their incomes have increased since PFES, the benefits obtained are limited and do not contribute significantly to household incomes. A previous study conducted in A Luoi in 2005 showed the average monthly income for households under Program 661 forest protection contracts was VND 300,000 (around USD 20), which was a significant amount compared to the per-capita monthly average for ethnic minority households at VND 80,000 (equivalent to USD 5) (Wunder et al., 2005). Current PFES payments are four times higher than those under Program 661. However, the fact that PFES at most contributes 4.06% of earnings for households in our study sites means there is little incentive for local people to protect forests. Our findings are similar to previous studies conducted in Phu Loc district by Artati (2011) and Mai (2020), which also show PFES contributing little to overall household earnings. However, the fact that local people see PFES as a more regular and sustainable source of income compared to other financial sources and that it contributes to pathways to escape the poverty for some households, show PFES still plays an important role in daily livelihoods and poverty reduction strategies.

Our paper also highlights consistent power and economic gaps between state agencies and local people. Before PFES, Wunder (2005) had already found that due to

budgetary restrictions, opportunities for households to secure forest protection contracts with management boards in Thua Thien Hue province were limited, meaning few could benefit. As our study shows, this situation persists as not all households in intervention sites receive PFES payments and numbers of individual households benefitting from PFES are limited. The power imbalance rooted in inequitable land use distribution and state control over forest resources affords limited opportunities for individual households to benefit from PFES. Our paper also echoes previous studies on the gap between participating in and benefitting from forestry policies. Therefore, to achieve a sustainable community forest management model, an integrated approach is needed that considers whether a community forest reflects community values and produces benefits (Ngo et al., 2012). Pre-existing political, economic, and social conditions influence impacts on payment distribution, and environmental policies can reinforce existing asymmetries in power and wealth if they do not consider the socio-political context they operate in (Haas et al., 2019). Considering the dynamic nature of resource dependency over time, it is necessary for programs to consider and embrace the local context to ensure better forest protection and management and satisfaction among local people in managing forest resources (Thang et al., 2010). Design of PES designs that target livelihood improvement should address disaggregation, equity, and ecosystem services (ES) and livelihood trade-offs (Blundo-Canto et al., 2018). Finally, if PES schemes are implemented to sustainably improve livelihoods, targeting disaggregated populations, understanding equity and social power relations within and between ES providers and users, and better monitoring and evaluation systems that consider locally relevant livelihood dimensions are needed (Blundo-Canto et al., 2018).

5. CONCLUSION

Our findings show the impacts of PFES on local communities and individuals are limited because most forest areas, the management of which is the main criterion for PFES payments, are managed by state agencies. This leaves only 17.9% of PFES payments being channeled to these groups, while most go to state government agencies and commune people's committees. The fact that PFES payments to state agencies have increased sharply over time, while increases in payments to households have been minor by comparison further widens the income gap between the state agencies and local households. Our paper also represents the stark inequality between local households who are assumed to have less power than more powerful actors and the state agencies in accessing benefits from PFES. Furthermore, our paper reflects the complexity of financial disbursement to local communities and sends a signal of the possible ineffectiveness of financing environmental protection on the ground.

Our research highlights the need for policy on PFES to address a few key areas to increase its impacts. First, PFES alone cannot provide strong incentives for local people to take part in forest protection. As PFES currently contributes little to household incomes, embedding PFES in a larger policy landscape where multiple policies and project initiatives can provide complementary support such as diversification of local livelihoods, providing technical training for local people, and improving access to the market might create stronger incentives for locals to take part in PFES. Second, as benefits derived from PFES depends on the area of forest local people manage - which is currently limited - promoting a co-management approach or forest land allocation for local people that empowers their ownership, strengthens their tenure security, and increases their earnings could provide stronger incentives for local people to engage in PFES. Increasing the PFES payment without addressing the conditions for local people to receive the payments will not lead to a better off situation for local people. Third, as the power imbalance leaves households unable to gain benefits from PFES, capacity

building and promoting participatory decision-making process are both essential. Conservation in Vietnam has much to gain from local participation. However, suitable safeguards and incentives need to be in place to insure sustainable use of its forest resources.

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REFERENCES

Alarcon, G. G., Fantini, A. C., Salvador, C. H., & Farley, J. (2017). Additionality is in detail: Farmers' choices regarding payment for ecosystem services programs in the Atlantic forest, Brazil. *Journal of Rural Studies, 54,* 177-186. https://doi.org/10.1016/j.jrurstud.2017.06.008

Anh, T. N., Kim, D. C., & Ubukata, F. (2016). Negotiating the State-making in Vietnam borderland–Case study of an ethnic minority group in Central Vietnam. Belgeo. *Revue belge de géographie,* (4). https://doi.org/10.4000/belgeo.19409

Artati, Y. (2011). *Water-induced displacement in Thua Thien Hue province: the impacts of hydropower dams on livelihood of forest dependent people.* Utrecht University Repository.

Beckman, M. (2011). Converging and conflicting interests in adaptation to environmental change in central Vietnam. *Climate and Development, 3*(1), 32-41. https://doi.org/10.3763/cdev.2010.0065

Bennett, K. (2010). Additionality: the next step for ecosystem service markets. *The Duke Environmental Law & Policy Forum, 20*(2), 417-438. Retrieved from https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1047&context=delpf

Blundo-Canto, G., Bax, V., Quintero, M., Cruz-Garcia, G. S., Groeneveld, R. A., & Perez-Marulanda, L. (2018). The different dimensions of livelihood impacts of payments for environmental services (PES) schemes: A systematic review. *Ecological Economics, 149,* 160-183. https://doi.org/10.1016/j.ecolecon.2018.03.011

Börner, J., Wunder, S., Reimer, F., Bakkegaard, R. K., Viana, V., Tezza, J., ... & Marostica, S. (2013). *Promoting forest stewardship in the Bolsa Floresta Programme: local livelihood strategies and preliminary impacts.* Center for International Forestry Research (CIFOR).

Clements, T., & Milner-Gulland, E. J. (2015). Impact of payments for environmental services and protected areas on local livelihoods and forest conservation in northern Cambodia. *Conservation Biology, 29*(1), 78-87. https://doi.org/10.1111/cobi.12423

Dang, D. T., and NaRanong, A. (2019). Livelihood and Environmental Impacts of Payments for Forest Environmental Services: A Case Study in Vietnam. *Sustainability, 11*(15), 4165. https://doi.org/10.3390/su11154165

DT. (2019, 12 6). Social - Economic Report. Retrieved from A Luoi District Portal: https://aluoi.thuathienhue.gov.vn/?gd=21andcn=254andtc=16341

Duchelle, A. E., de Sassi, C., Jagger, P., Cromberg, M., Larson, A. M., Sunderlin, W. D., ... & Pratama, C. D. (2017). Balancing carrots and sticks in REDD+ implications for social safeguards. *Ecology and Society, 22*(3), 1-13. https://doi.org/10.5751/ES-09334-220302

Ezzine-de-Blas, D., Wunder, S., Ruiz-Pérez, M., & Moreno-Sanchez, R. D. P. (2016). Global patterns in the implementation of payments for environmental services. *PloS one, 11*(3), e0149847. https://doi.org/10.1371/journal.pone.0149847

Fischer, A. P., & Charnley, S. (2010). Social and Cultural Influences on Management for Carbon Sequestration on US Family Forestlands: A Literature Synthesis. *International Journal of Forestry Research.* https://doi.org/10.1155/2010/960912

Haas, J. C., Loft, L., & Pham, T. T. (2019). How fair can incentive-based conservation get? The interdependence of distributional and contextual equity in Vietnam's payments for Forest Environmental Services Program. *Ecological Economics, 160,* 205-214. https://doi.org/10.1016/j.ecolecon.2019.02.021

Hegde, R., & Bull, G. Q. (2011). Performance of an agro-forestry based Payments-for-Environmental-Services project in Mozambique: A household level analysis. *Ecological Economics, 71,* 122-130. https://doi.org/10.1016/j.ecolecon.2011.08.014

Hoang, H. T., Tran, T. T., and Le, Q. V. (2017). Performance of rights over natural forest and its impact on local people livelihood in Vietnam's upland: A case study in Huong Lam Commune, A Luoi District, Thua Thien Hue Province. *Hue University Journal of Science: Agriculture and Rural Development, 126*(3E), 75–88. https://doi.org/10.26459/hueuni-jard.v126i3E.4242

Jagger, P., Sills, E. O., Lawlor, K., and Sunderlin, W. D. (2010). *A guide to learning about livelihood impacts of REDD+ projects.* CIFOR.

Kwayu, E., Paavola, J., and Sallu, S. (2017). The livelihood impacts of the Equitable Payments for Watershed Services (EPWS) Program in Morogoro, Tanzania. *Environment and Development Economics, 22*(3), 328-349. https://doi.org/10.1017/S1355770X17000067

Linh, N., and Dinh, V. C. (2015, November 13). Environment. Retrieved from A Luoi District Portal: https://aluoi.thuathienhue.gov.vn/?gd=21andcn=112andtc=2990

Lichtenberg, E. (2018). Additionality in Payment for Ecosystem Services Programs: Agricultural Conservation Subsidies in Maryland. SSRN. http://dx.doi.org/10.2139/ssrn.3290775

Mai, T. K. (2020). Payments for Forest Environmental Services in Vietnam with The Different Mechanisms. *12th NEU-KKU International Conference on Social - Economic and Environmental Issues in Development.* National Economics University.

Ngo, D. T., Sakai, T., Moriya, K., & Mizuno, K. (2012). Participation in and Benefits of Community Forest Management: Learning from Cases in Thua Thien Hue Province, Vietnam. *Geographical review of Japan series B, 85*(1), 39-55. https://doi.org/10.4157/geogrevjapanb.85.39

Nguyen, Q. K., Janekarnkij, P., and Vijitsrikamol, K. (2018). Household Conservation Efforts and Perception towards Payment for Forest Environmental Services: Thua Thien Hue Province, Vietnam. *Proceedings of 56th Kasetsart University Conference: Education, Economics and Business Administration, Humanities and Social Sciences.* Kasetsart University.

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 Development, 33*(2), 237-253. https://doi.org/

10.1016/j.worlddev.2004.07.011

Pham, T. T., Dao, T. L., Nguyen, D. T., Haas, J. C., and Hoang, T. L. (2018). *Local perspectives on drivers of deforestation and degradation and effectiveness of financial incentive mechanisms in Bach Ma National Park.* CIFOR.

Pham, T. T., Ngo, H. C., Dao, T. L., Hoang, T. L., & Fisher, M. R. (2020). The politics of numbers and additionality governing the national Payment for Forest Environmental Services scheme in Vietnam: A case study from Son La province. *Forest and Society, 4*(2), 379-404. https://doi.org/10.24259/fs.v4i2.10891

Pham, T., Moeliono, M., Brockhaus, M., Le, D., Wong, G., & Le, T. (2014). Local preferences and strategies for effective, efficient, and equitable distribution of PES revenues in Vietnam: Lessons for REDD+. *Human Ecology, 42*(6), 885-899. https://doi.org/10.1007/s10745-014-9703-3

Phan, T. H. D., Brouwer, R., Hoang, L. P., & Davidson, M. D. (2018). Do payments for forest ecosystem services generate double dividends? An integrated impact assessment of Vietnam's PES program. *PloS one, 13*(8), e0200881. https://doi.org/10.1371/journal.pone.0200881

Pietrzak, R. (2010). *Forestry-Based Livelihoods in Central Vietnam: An Examination of the Acacia Commodity Chain: A Case from Thua Thien Hue Province, Vietnam.* Retrieved from Wilfrid Laurier University: https://scholars.wlu.ca/etd/963/

PPC, T. T. (2019, December 6). *Report No. 330/BC-UBND.* Retrieved from Thua Thien Hue Portal: https://thuathienhue.gov.vn/vi-vn/Thong-tin-kinh-te-xa-hoi/cid/2051D38F-87F0-4D2A-B1DB-A9AE008FA85F

Schelhas, J. (2002). Race, Ethnicity, and Natural Resources in the United States. *A Natural Resources Journal, 42*(4), 723-763. https://www.jstor.org/stable/24888656

Sunderlin, W. D., de Sassi, C., Sills, E. O., Duchelle, A. E., Larson, A. M., Resosudarmo, I. A. P., ... & Huynh, T. B. (2018). Creating an appropriate tenure foundation for REDD+: The record to date and prospects for the future. *World Development, 106,* 376-392. https://doi.org/10.1016/j.worlddev.2018.01.010

Roe, D., Booker, F., Wilson-Holt, O., & Cooney, R. (2020). *Diversifying local livelihoods while sustaining wildlife: Exploring incentives for community-based conservation*. Luc Hoffmann Institute.

Tacconi, L., Mahanty, S., & Suich, H. (2013). The Livelihood Impacts of Payments for Environmental Services and Implications for REDD+. *Society and Natural Resources, 26*(6), 733-744. https://doi.org/10.1080/08941920.2012.724151

Tallis, H., Kareiva, P., Marvier, M., & Chang, A. (2008). An Ecosystem Services Framework to Support Both Practical Conservation and Economic Development. *Proceedings of the National Academy of Sciences of the United States of America, 105*, 9457-64. https://doi.org/10.1073/pnas.0705797105

Thang, T. N., Shivakoti, G. P., & Inoue, M. (2010). Changes in Property Rights, Forest Use and Forest Dependency of Katu Communities in Nam Dong District, Thua Thien Hue Province, Vietnam. *International Forestry Review, 12*(4), 307-319. https://doi.org/10.1505/ifor.12.4.307

Vien, T., & Thanh, M. (2017). Decentralization in Forest Management in Vietnam's Uplands: Case Studies of the Kho Mu and Thai Ethnic Community. In M. V. Thanh, T. D. Vien, S. J. Leisz, & G. P. Shivakoti (Eds.), *Redefining Diversity & Dynamics of Natural Resources Management in Asia* (Vol. 2, pp. 195-206). Elsevier. https://doi.org/10.1016/B978-0-12-805453-6.00012-7

Völker, M., & Waibel, H. (2010). Do rural households extract more forest products in times of crisis? Evidence from the mountainous uplands of Vietnam. *Forest Policy and Economics, 12*(6), 407-414. https://doi.org/10.1016/j.forpol.2010.03.001

Weber, R., Faust, H., Schippers, B., Mamar, S., & Kreisel, E. S. (2007). Migration and ethnicity as cultural impact factors on land use change in the rainforest margins of Central Sulawesi, Indonesia. In T. Tscharntke, C. Leuschner, M. Zeller, E. Guhardja, & A. Bidin (Eds.), *Stability of Tropical Rainforest Margins Linking Ecological, Economic and Social Constraints of Land Use and Conservation* (pp. 415–434). Springer. https://doi.org/10.1007/978-3-540-30290-2_20

Wong, G. Y., Luttrell, C., Loft, L., Yang, A., Pham, T. T., Naito, D., . . . Brockhaus, M. (2019). Narratives in REDD+ benefit sharing: Examining evidence within and beyond the forest sector. Climate Policy, 19(8), 1038-1051. https://doi.org/10.1080/14693062.2019.1618786

World Bank. (2019). *GDP per capita (current US$) - Vietnam*. Retrieved from World Bank Group IBRD-IDA: https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=VN

Wunder, S., Börner, J., Ezzine-de-Blas, D., Feder, S., & Pagiola, S. (2020). Payments for Environmental Services: Past Performance and Pending Potentials. *Annual Review of Resource Economics, 12,* 209-234. https://doi.org/10.1146/annurev-resource-100518-094206

Wunder, S., Dung, B. T., & Ibarra, E. (2005). *Payment is good, control is better: Why payment for forest ecosystem services remained incipient.* CIFOR.

Wunder, S., Engel, S., and Pagiola, S. (2008). Taking Stock: A Comparative Analysis of Payments for Environmental Services Programs in Developed and Developing Countries. *Ecological Economics, 65*(4), 834–52. https://doi.org/10.1016/j.ecolecon.2008.03.010