THE EFFECTS OF RUBBER PLANTATION ON LAND DISPOSSESSION AMONG SMALLHOLDERS IN NORTHWEST OF VIETNAM: A CASE STUDY FROM DIEN BIEN PROVINCE



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Executive Summary

Vietnam has become the world's leading exporter of natural rubber latex. In northwest Vietnam, the expansion of rubber plantations has continued to encroach on forests which are directly managed by communities and individual households. In the process, there has been dispossession of land from smallholders.

In 2015, cultivated rubber area was 955,700 hectares nationwide. In Son La province, rubber plantations covered 50,000 hectares in 2020 from 35,000 hectares in 2015; it was 10,000 ha in Dien Bien Province in 2020 from 5000 ha in 2015. Thousands of hectares of rubber trees planted in the years 2008-2009-2010 in Northwest and Dien Bien province have now reached the age of maturity for tapping the latex.

The policy on rubber development in the Northwest in general and Dien Bien in particular was promoted by state and government leaders to local levels (provinces and districts). The question is whether or not state policy can ensure that the rubber plantation in the Northwest, including Dien Bien is appropriate to the local ecology, brings economic benefits and is suitable according to environmental impact assessments as stipulated by the Environmental Law for social development in the already poor areas predominantly settled in by ethnic minority people.

Dien Bien Rubber Company is an economic enterprise, an important local partner in rubber plantation processing and consumption. Currently, prices of latex are lower than usual, but rubber in the northwest has not been evaluated for yield, productivity, quality, etc. There is still no latex-processing plant in Dien Bien.

There is little research done on the impact of rubber plantation on forest ecosystem services and the livelihoods of smallholders, many of whom are struggling to maintain their lands and forests in the face of growing pressures from investors and government institutions to impose concession arrangements.

The study seeks to answer the following questions:

1. How has the introduction and expansion of rubber plantations in northwest Vietnam

affected the livelihoods of the people?

2. What kind of safeguards can be established in anticipating and responding to the impacts of rubber plantation expansion in northwest Vietnam?
3. What are the impacts of large-scale rubber plantations on local ecosystem services?

The research findings show that rubber trees have been planted by the Dien Bien Rubber Company in the northwest of Vietnam where the temperatures drop low in the time. As a result, the development of rubber trees as well as latex production is adversely impacted. Meanwhile, local people have been dispossessed of swidden fields and forestland for rubber plantation while receiving niether benefits nor compensation. Due to the loss of their land, local people, especially ethnic women, female-headed households and girls have been adversely affected.

Environmental impact assessment (EIA) was carried out only after rubber trees were planted. The process of evaluation did not involve the participation of the local government and the local community. The EIA report failed to anticipate the impacts the project would bring about before it was approved. Importantly, the local government as well as the local community were passive in the process of implementing the project. It is proposed that in order to minimize the impact of rubber plantations, environmental impact assessment should be carried out in a more transparent way and socio-economic development policy should be built based on the characteristics of the local ecosystem and environment and to provide local benefits.

1. INTRODUCTION

Vietnam has become the world's leading exporter of natural rubber latex. By the end of 2012, the country's rubber plantation area accounted for 910,500 ha. According to Decision No.750/QD-TTg issued on June 3, 2009 by the Prime Minister on the approval of the development planning for Rubber to 2015 with vision 2020, the current planted area already exceeds the target of 800,000 ha. Presently, more than 80% of the latex produced is processed for export. Export-oriented natural latex processing has become a key industry, contributing substantially to national revenue in recent years (See Table 1.1). The table shows that the national revenue in 2014 grew by 27.3% in compared with that of 2013. Revenues from latex export are driving fundamental changes in forest and forestland resources, and consequently affect the livelihoods of thousands of forest dependent households.

Table 1.1. National revenue from latex export (Vietnam Rubber Association, 2015)

Year	**National Revenue (Billion USD)**
2010	2.3
2011	3.2
2012	2.85
2013	2.5
2014	2.8

According to Decision 750/QD-TTg, unlike the rest of the country where rubber trees are planted, in the uplands of North Vietnam rubber farming should not be developed. This is due to the fact that the temperatures go down very low in the winter. According to the plans of MARD, the Northwest has already 50,000 hectares in 2015. However, the area planned in Son La and Dien Bien exceeds this figure. More specifically, Son La reaches 50,000 ha by 2020 and 35,000 ha 2015 (Ngo Van Huan, 2015).

The rubber tree is native to the humid tropics and has traditionally been planted in the equatorial zone between 108N and 108S (Fox and Castella, 2013). In the mainland Southeast Asia, this includes portions of southern Thailand, southeastern Vietnam, and southern

Myanmar. In the northwest of Vietnam where the temperatures go very low in winter, the development of rubber trees is stifled leading to high investment costs, standing at around USD 7,250 – 7,700/ha.

According to To and Tran (2014), expansion of the rubber plantation area has had substantial impacts on forest resources. In the Central Highlands, 79% of the new rubber plantations were established on natural forestland. In the Northwest of Vietnam, the expansion of rubber plantations has continued to encroach on forests which are directly managed by communities and individual households. In the process, there has been dispossession of land from smallholders. It should be noted that villagers have been allocated swidden fields for 50 years and therefore they have the right of use over this land. Smallholders and communities have been losing their land to rubber plantations,.

Despite this serious situation, little research has been done on the impact of rubber plantations on forest ecosystem services and the livelihoods of smallholders, many of whom are struggling to maintain their lands and forests in the face of growing pressures from investors and government institutions to impose concession arrangements.

This report is a result of an USAID-funded project that investigated the social and environmental costs as well as benefits of rubber plantations in the northwest of Vietnam. The results are based on field research conducted from June to November 2016 in Dien Bien province in northwest Vietnam.

This research will answer the following questions.

1. How has the introduction and expansion of rubber plantations in northwest Vietnam affected the livelihoods of the people?
2. What kind of safeguards can be established in anticipating and responding to the impacts of rubber plantation expansion in northwest Vietnam?
3. What are the impacts of large-scale rubber plantations on local ecosystem services?

In Section 2 the methodology employed in the research is explained. In Section 3, the background of rubber plantation in Vietnam and Dien Bien is discussed and the results of the study are presented in section 4 and the findings and proposed policy recommendations in Section 5.

2. METHODOLOGY

The purpose of this study is to provide a better understanding of the costs and benefits of rubber plantation and what has been the role of safeguards in these investments. The study was carried out in two communes in Dien Bien province, particularly Muong Pon 2, Muong Pon Commune, Dien Bien District and Pung Giat 2, Muong Muon commune, Muong Cha district. These were selected because they are representative of the province. They roughly have the same size and local communities are dependent on swidden fields as a source of supplementary income. They both have been awarded plantation "concessions". They are also close to the natural forests. The households in these communes were willing to participate in the research and this willingness was an important consideration as the research seeks to understand the power dynamics around rubber plantation.

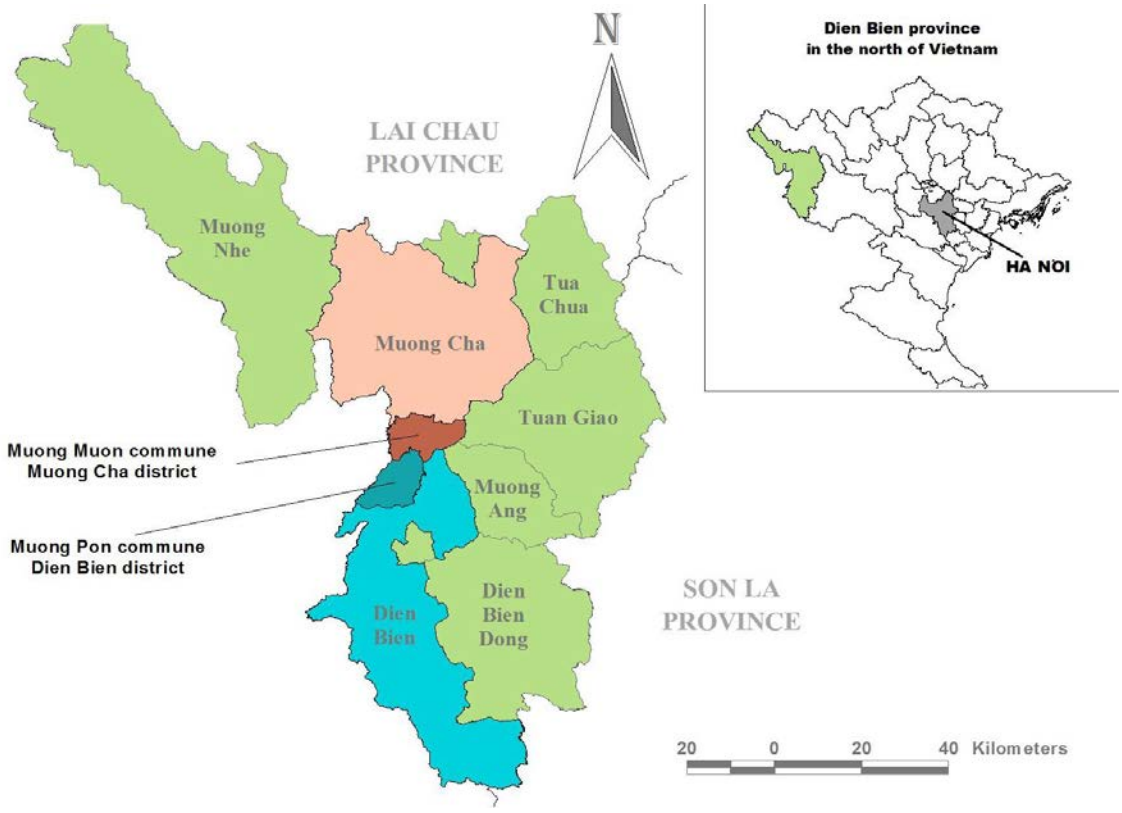


Figure 2.1. Map of the project site



Figure 2.2. Photos of focus group discussion and household interviews (Source: CECAD, 2016)

This study used both primary and secondary data sources. Given the nature of the research problem, a mixed method was employed to provide comprehensive understanding to address the research questions. It is important to note that concessions were given in 2008 in the research sites and this proposed research aimed to compare “before and after” concessions were awarded in the two communes. Questionnaires for household livelihoods, focus group discussions, village heads, provincial and district official interviews that focused on qualitative and quantitative information on local policy, forest management

mechanisms, environment and society were designed and pre-tested before they were used. The issues of gender and ethnicity were given special attention.

Key informant interviews were carried out with the cadres of Vietnam Rubber Group (VRG), the Dien Bien Provincial Department of Agriculture and Rural Development (DARD), Department of Natural Resources and Environment (DONRE), Dien Bien Rubber Company, Dien Bien and Muong Cha District DARD and DONRE, People's Committees of Muong Pon and Muong Muon communes, village heads and elderly people in the village.

In addition, in each village a sample of 50 households were randomly selected for household interviews (See Table 2.1). Field surveys and participant observations were also conducted during the field research.

Table 2.1. Sampled households in the field research

Village	**Poor**	**Near poor**	**Middle**	**Upper middle**	**No response**	**Total**
Muong Pon 2, Muong Pon Commune, Dien Bien District	26	12	10	2	0	**50**
Pung Giat 2, Muong Muon Commune, Muong Cha District	23	5	18	3	2	**51**

Source: Field survey, 2016.

3. RUBBER IN VIETNAM

According to the Vietnam Rubber Association, currently, Vietnam is the world's third largest producer of natural rubber, after Thailand and Indonesia (VRG, 2015). During 2004-2010, the export price of rubber continuously increased and reached its highest point in 1961 (VRG, 2013). As a result, areas planted to rubber in Vietnam have increased. Aside from the Southeast and Central Highlands, areas traditionally known for rubber, plantations have rapidly expanded in the north-central Coast, south-central Coast and the northern mountainous regions. This development has led to a number of concerns including the environmental and ecological impacts of converting productive, protected and natural forest lands into rubber plantations. Land conversion is especially severe when the price of natural latex is high. Although this may be good for households, they carry serious negative externalities such as deforestation and displacing one form of agriculture over another. Many researchers have already warned of the environmental costs of massive conversion from forest land into rubber plantations (Hoang et al. 2011).

Due to the intense expansion of rubber plantations (both large-scale and smallholder) across the country, in June 2009, the Prime Minister issued Decision No. 750/QD-TTg on rubber development in Vietnam to 2015 and vision to 2020. According to this plan, by 2015, the area of rubber would grow 800,000 hectares; extracting rubber area would continue to be stabilized and expanded; the productivity, quality and processing technology would be improved; and added value of Vietnam's rubber products would be promoted (See Table 3.1).

Table 3.1. *Area of rubber plantations in regions of Vietnam*

Regions	**Area (hectares)**
Southeast	350,000
Central Highlands	280,000
South Central Coast	40,000
North Central Coast	80,000
Northwest	50,000

Source: VRG, 2015.

The higher price of rubber compared with other commodities is a major factor leading to its expansion in the country. In 2004, the country had just 454,000 hectares of rubber; after 10 years, in 2013, the area of rubber doubled, reaching to 950,000 hectares, exceeding the Plan QD 750 of the Prime Minister by several folds (VRG, 2014). Some provinces are not involved in the plan such as Ha Giang, Lao Cai, Yen Bai, Phu Tho, etc., but are still growing rubber trees. Rubber trees are massively expanding in areas that need careful consideration on soil and climatic conditions, frost and steep terrain, and mountain streams in the northern mountainous area, and/or on resettlement areas where the farmland is not stable.

The northwest is a new region for expansion of rubber trees. Hence the PM's Decision clearly stated: the northwest should not be developed for rubber plantations (Hoang et al, 2011). However, in 2007, Son La province started to plant rubber trees. Since 2008, the provinces of Lai Chau and Dien Bien launched a rubber plantation program. The area devoted to rubber had continuously increased until 2012, accounting for more than 19,000 hectares of planted to rubber trees in these three provinces (TBI, 2014).

Table 3.2. Annual rubber plantation area in North-west Vietnam

Province	Annual area (hectares)						**Total (hectares)**
	2007	2008	2009	2010	2011	2012	
Son La	70	2,099	1,731	1,369	1,014	381	**6,664**
Dien Bien	0	732	1,139	820	455	322	**3,468**
Lai Chau	0	767	2,044	2,554	2,491	1,130	**8,986**
Total	**70**	**3,598**	**4,914**	**4,743**	**3,960**	**1,833**	**19,118**

Source: TBI, 2014.

Unfortunately, while the trend of rubber planting in the northwest provinces had begun to rise, the price in the world rubber market began to decline and fell to its lowest level by the end of 2014. At the beginning of 2015, the price was only $150/ton of latex. This has led to a decline in the planting of rubber in the northwest provinces and then halted in 2015 as recommended by the Ministry of Agriculture and Rural Development (VRG, 2007).

The latest data from Vietnam Rubber Group (VRG)[1] in October 2016 showed that Lai Chau province had more than 12,000 hectares of rubber trees, Son La province had more than 6,000 hectares and Dien Bien province had nearly 5,000 hectares. A total of 23,000 hectares are of 3 to 9 years old of age, of which 16,000 hectares of rubber trees are in the mature age of being tapped.

By the end of October 2016, Vietnam Rubber Group and these three provinces agreed to tap mature rubber trees, assessing rubber yield, quality, processing, costs, and economic efficiency and on profit-sharing mechanism among the provinces, where local people contributed their land for rubber cultivation for nearly ten years.

Little research has been done on the impact of rubber plantation on forest ecosystem services and the livelihoods of smallholders, many of whom are struggling to maintain their lands and forests in the face of growing pressures from investors and government institutions to impose economic concession arrangements.

In view of the lack of research to date on the impact of rubber plantation on forest ecosystem services and the livelihoods of smallholders, the purpose of this study is to fill the knowledge gap so that there is a nationally representative information on the social and environmental costs and benefits of rubber plantations in northwest Vietnam. The research findings will contribute in advancing a socially just and environmentally sustainable economic land concessions (ELCs) in Vietnam in particular, and in the Lower Mekong Subregion (LMS), in general.

[1] *Vietnam Rubber Group (VRG)* established on re-structuring of the Vietnam General Rubber Corporation which is a multi-ownership group and whose dominant capital ownership belongs to the State.

4. RUBBER DEVELOPMENT PROJECT IN DIEN BIEN PROVINCE

This section will describe rubber development in Dien Bien Province, the site of the research study. At the end of 2007, the Dien Bien Company was established in Dien Bien Province, under Vietnam Rubber Group. The company is the owner of the project "Investment in 10,000 hectares of rubber development in Dien Bien", which was approved and implemented in 2008. The project area is located in the administrative boundaries of the 16 communes in 5 Dien Bien districts and Dien Bien city. The total land area of the project is 24,400 hectares, of which 22,993 hectares of land are suitable for rubber plantation, including 12,782 hectares of cultivated land and 10,212 hectares of productive forests and protected forests (See Table 4.1 and Table 4.2).



Figure 4.1. Picture of rubber plantation in Dien Bien (Source: CECAD, 2016)

Table 4.1. Rubber forecasting area in Dien Bien

Districts, cities	**Project area (hectares)**			
	Other land	Productive and protective forest land		Total
Muong Nhe	86	2.834	6.320	9.240
Muong Cha	331	3.181	748	4,260
Muong Ang	186	2.103	929	3.218
Dien Bien	468	3.450	1.321	5.239
Tuan Giao	217	991	470	1,678
Dien Bien city	119	224	423	766
Total	1,407	**12.782**	**10.212**	**24.400**

Source: VRG, 2009.

Table 4.2. Rubber plantation area in Dien Bien province in each year (hectares)

Year	2008	2009	2010	2011	Total
Area (ha)	961	3,039	3,500	2,500	10,000

Source: VRG, 2014.

Until July 2009, Dien Bien Rubber Company had planted 1,964 hectares of rubber: Muong Nhe district had 496 hectares, Muong Cha district had 297 hectares, Muong Ang district had 621 hectares, and Dien Bien district had 961 hectares and Dien Bien city had 85 hectares. But by the end of 2014, the province had only 4,936 hectares of rubber trees and stopped planting when the planned assistance by the government did not materialize. One of the key reasons for halting operations was the low price of natural rubber latex in the world market.

4.1 Basic characteristics of the studied villages

Muong Pon

Muong Pon is a border commune, which is located in the outer area of Dien Bien district. It has a total land area of 12,518.77 hectares and shares a 15-km border with Laos. Muong Pon is the home of four ethnic groups (i.e., Thai, Kinh, Mong and Kho Mu) living in 11 villages. Three upland villages are located about eight to nine km away from the central commune. The population of Muong Pon is 4,771 with 976 households (2015). In 2015, Muong Pon had 268 (29.2%) poor households and 240 (26.2%) near-poor households. Muong Pon economy depends mainly on agriculture (Muong Pon's People's Committee, 2015).

Cultivation

The total cultivated area is 651.50 hectares. It includes 444 hectares of rice, 92.5 hectares of corn, 114.5 hectares of cassava, 8 hectares of peanut, 31.75 hectares of vegetables, 17 hectares of perennial plants, and 6.2 hectares of other crops (2015). The total grain production is 2,277.8 tons of cereal with 477.42kg/person/year of per capita (Muong Pon's People's Committee, 2015).

Animal husbandry

According to statistics of Muong Pon's People's Committee in 2015, Muong Pon had 1,172 Asian buffalo, 503 cows, 3,805 pigs and 21,759 of poultry.

Aquaculture

In 2015, the total aquaculture area of Muong Pon commune was 38.5 hectares with the output of 20.2 tons (Muong Pon's People's Committee, 2015).

Forestry

The natural forest covers 43.2% of the commune's area and the total forest area that receives payments for environmental services is 3,914.6 hectares. Total rubber area is 555.42 hectares (Muong Pon's People's Committee, 2015).

Muong Muon

Muong Muon is a poor upland commune of Muong Cha district, Dien Bien province. There are four ethnic groups, including Hmong, Kho mu, Thai and Kinh living together in Muong Muon with 717 households (3,785 people). Hmong people are the biggest group

with 325 households (2,080 people). Kho Mu people are the second with 207 households (1,022 people). The third is Thai people with 171 households (728 people). Finally, Kinh people consist of 14 households with 45 people (Muong Muon's People's Committee, 2015).

According to the chairman of the Muong Muon People's Committee, the population of the commune was 3,875 people in 2015, of whom the working-age population was 2,210 people (57.03%). The number of poor people was 2,211 people (373 households or 54.29% of population, and the number of near-poor households were 85 with 492 people (12.37%).

Poverty reduction and social welfare schemes are being implemented in the commune. According to the chairman of the commune, 42 disadvantaged households received rice subsidy totalling 3,105 kg.; 5,766 people are issued free medical insurance. The quality of health care is now improved. Muong Muon has 1 clinic with 3 beds; 11/11 villages have at least 1 nurse who serves people in the village. In 2015, 5,256 people were cared for and treated in the clinic. The commune continued to implement effectively the national target program on health: monitoring and early detection of disease, and timely disease control to prevent major epidemics (Muong Muon's People's Committee, 2015).

The rate of natural population increase is 2.46% per year. 16.5% of households have more than three children (2015). Protection and maternal health care and prevention of child malnutrition are also implemented. Poor ethnic minority people in disadvantaged areas are supported with 3,485.2 kg of seeds of different crop varieties (Muong Muon's People's Committee, 2015).

Cultivation

According to the annual report of Muong Muon's People's Committee in 2015, food crops comprised of the following: total area of grain crops was 578.2 hectares with 1,330.5 tons of cereals for grain, a decrease of 227.2 tons compared to 2014. Per capita food supply is 343.35kg/person/year. Specifically, rice area covers 384.36 hectares with 960.6 tons of output. Corn area is 193.8 hectares, a decrease in 135.3 hectares compared to 2014; productivity is 1,909 kg/hectare, with the output of 307.01 tons. Short-term cash crops including soybeans and peanuts cover 44.2 hectares with 48.31 tons of output. Perennial trees cover 546 hectares of rubber trees. Cassava area covers 90.8 hectares, with yield of 7,050kg/hectare with 640.14 tons of output (Muong Muon's People's Committee, 2015).

Animal husbandry

In 2015, as estimated, Muong Muon had 800 buffaloes, 445 cows, 2,870 pigs, and 4,556 of poultry. Livestock disease prevention is adequate. Aquaculture area covered 4.52 hectares, mining output was 5.6 tons, and aquaculture production was 7.5 tons (Muong Muon's People's Committee, 2015).

Forestry

Statistics in the annual report of Muong Muon's People's Committee in 2015 showed that Muong Muon had 5.8 hectares of production forest, 5 hectares of forest that was planted and protected by people who are also provided rice subsidy by the state, and 96.3 hectares of protective forest; the forest area covered 75% of the total land in the district.

Industrial production

Industrial production activities are mainly undertaken by individuals and family-owned small enterprises. Main products and service include corn and rice milling, mechanical repairs, etc. In 2015, a brick plant was built for brick production (Muong Muon's People's Committee, 2015).

Trade and Services

Households usually trade and serve essential commodities for local people.

Environmental resources

According to the 388 Plan of the Provincial People's Committee, 31,000 hectares of forestland has been allocated for 10 villages to manage and support for conversion into rubber trees in the commune was undertaken as a total cost of 551 million VND (Muong Muon's People's Committee, 2015).

The general socioeconomic information of two villages is summarized in Table 4.3 - Table 4.12 and Figure 4.1 and Figure 4.2 below. Table 1 and Figure 4.1 show the sources of cash income for the four income groups in Muong Pon 2 in 2015. The figures reveal some interesting facts. The four groups earned from the same sources of income, including cultivation, animal husbandry, forestry, fishery, and non-agricultural sources, such as waged labor, governmental salaries and petty trade. On average, the upper middle households

were the group that earned the most from animal husbandry at 51 million VND, accounting for 35% of the total income, while the near poor households earned 44.7 million VND making up 73% of the total income. In contrast, the upper middle households earned 20.5 million VND constituting 37% of the total income and the poor households earned almost 14 million VND accounting for 46% of the total income on average.

Table 4.3. Household size of the sampled households

	Muong Pon 2 (n=50)	Pung Giat 2 (n=51)
Mean	4.7	5.5
% HH with 5 members = < 5	68%	57%
% HH with 5 members >= 6	32%	43%
% Laborers/HH	61%	55%
Female headed households	25%	13.7%

Source: Field survey, 2016.

Table 4.4. Main sources of income for households in the last 12 months in Muong Pon 2

Source of income	**MUONG PON 2**			
	Poor (26) (VND)	Near poor (12) (VND)	Middle (10) (VND)	Upper middle (2) (VND)
Cultivation	6,323,808	4,000,000	11,225,000	31,925,000
Animal husbandry	13,933,385	44,690,000	20,524,083	50,912,000
Forestry	2,469,115	720,000	1,509,542	8,439,000
Fishery	842,115	1,620,000	2,435,833	4,995,000
Non-agriculture	6,540,769	10,360,000	19,018,750	49,960,400
Total	**30,109,192**	**61,390,000**	**54,713,208**	**146,231,400**

Source: Field survey, 2016.

On average, the upper middle households earned the most from non-agricultural sources at almost 50 million VND accounting for 34% of the total income, the middle households earned 19 million VND making up 35% of the total income; the near poor 10.4 million VND constituting 17% of the total income and the poor 6.2% accounting for 22% of the total income.

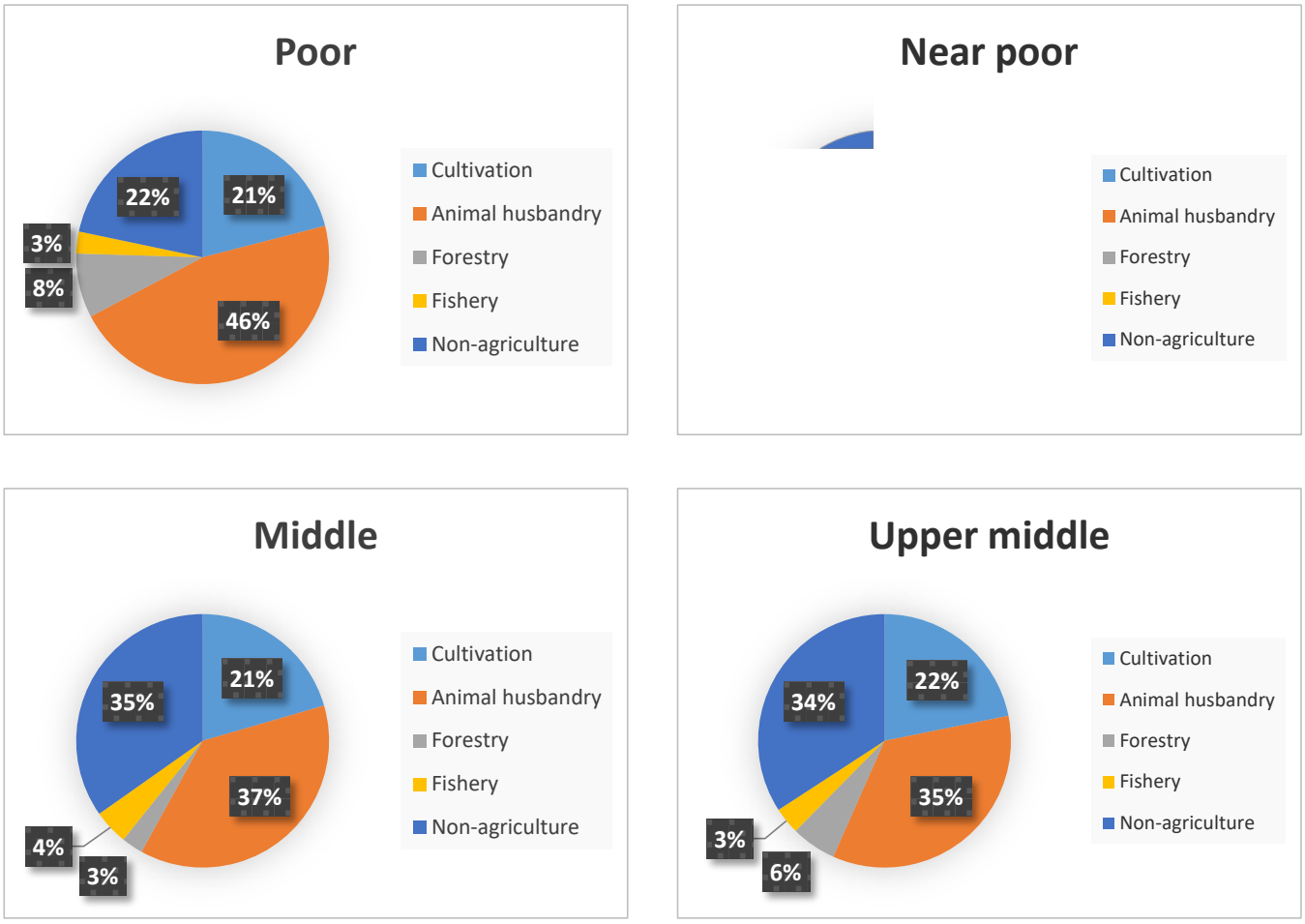


Figure 4.2. Household distribution by cash and home-consumption incomes/year in 2015 in Muong Pon 2

The upper middle households, on average, earned the most from non-agricultural sources at almost 18.8% million VND accounting for 34% of the total income, the middle households earned 8.4 million VND making up 10% of the total income; the near poor 1.2 million VND constituting 16% of the total income and the poor 4.8% accounting for 17% of the total income.

The data also show that the middle income group earned the most from cultivation at 15.7 million VND accounting for 18% of the total income, the near poor households at 11.4 million VND making up 16% of the total income on average. Meanwhile the poor households earned 7.7 million VND constituting 27% of the total income and the upper middle earned the least at 5 million VND or 2% of the total income.

The four groups of households also earned income from forestry. The near poor, middle and upper households earned almost the same at almost 4 million VND accounting for 5% of the total income for the near poor, middle and upper middle, and 2% of the total income for the upper middle. Meanwhile the poor households earned at 1.6 million VND or 5% of the total income.

The poor and the middle groups earned from fishery, but there is very little accounting for 2% and 1% of the total income accordingly. The near poor and the upper middle did not earn from fishery at all.

In summary, like their counterparts in Muong Pon 2, the rich households earned the most from all sources of income and the poor earned the least among the 4 groups of households. It is important to note that although the income from forestry is small if compared with other sources of income, it plays a very important role in the household economy. In other words, forest plays a very important role in the villagers' livelihoods.

Table 4.5. Main sources of income for households in the last 12 months in Pung Giat 2

Source of income	**PUNG GIAT 2**			
	Poor (VND)	Near poor (VND)	Middle (VND)	Upper middle (VND)
Cultivation	7,669,783	11,410,000	15,724,722	5,000,000
Animal husbandry	14,058,261	53,880,000	55,899,444	229,033,333
Forestry	1,566,957	3,644,000	3,932,222	3,866,667
Fishery	586,957	-	544,444	-

Non-agriculture	4,799,130	1,200,000	8,364,444	18,800,000
Total	**28,681,088**	**70,134,000**	**84,465,276**	**256,700,000**

Source: Field survey, 2016.

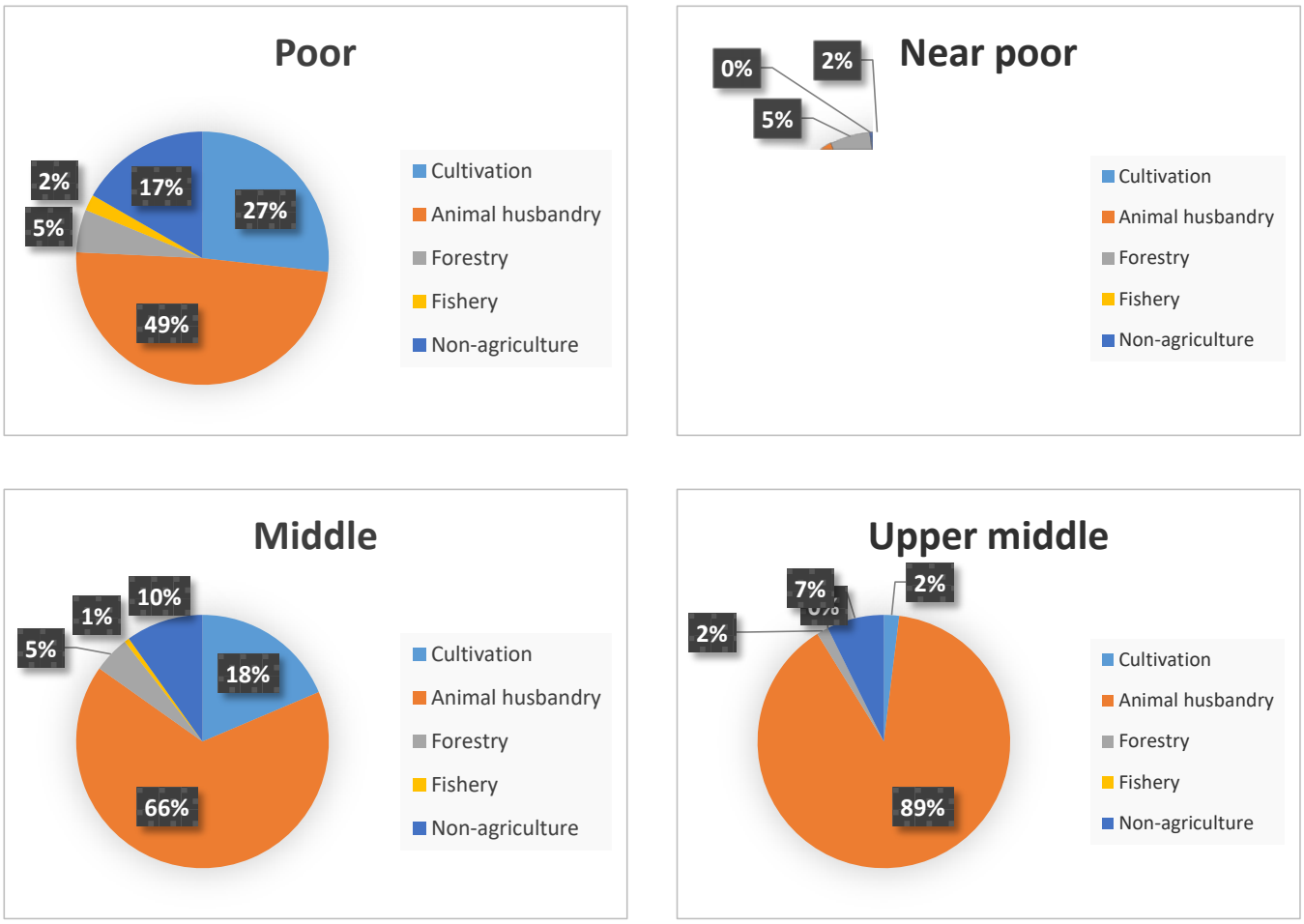
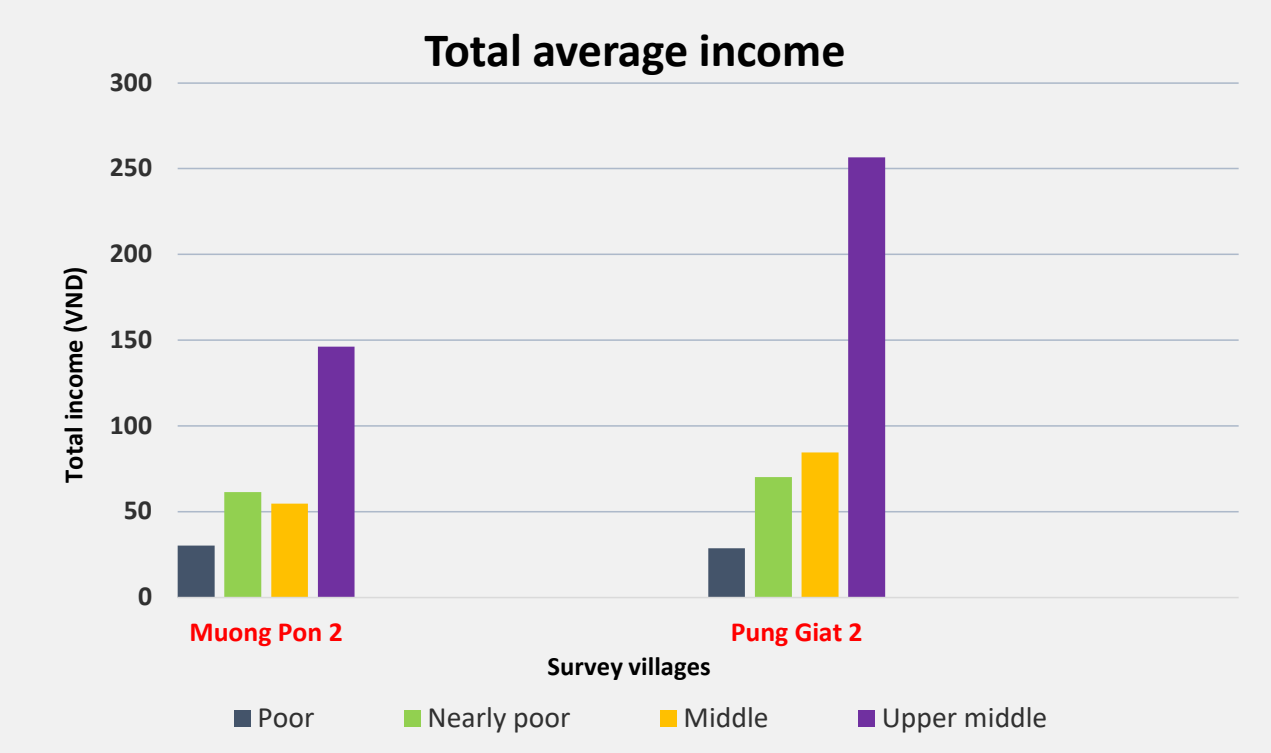


Figure 4.3. Household distribution by cash and home-consumption incomes/year in 2015 in Pung Giat 2

As shown in Table 4.6, all households in the sample in Muong Pon 2 spent between 77-86% percent of all expenses on household supplies, food, school fees, social contributions, medical bills, and paying interest/paying back loans. On average, expenses devoted to household supplies, food, school fees, social contributions, medical bills and paying interest/pay back loans … were the highest (85.6 percent) in the poor households, followed by the middle (nearly 85 percent), the middle (84 percent) and the upper middle households (77.5 percent). The upper middle households spent relatively the most income on animal husbandry and cultivation (11 and nearly 12 percent accordingly). The near poor

spent the next most on cultivation (13.5 percent), followed by the middle sample households (nearly 10 percent), and the poor 8 percent. The near poor spent the least on animal husbandry (nearly 3 percent) followed by the poor 6 percent. Meanwhile the poor households were the only one in the sample that spent money on production materials.



Source: Field survey, 2016.

Figure 4.4. Annual cash incomes of the sampled households in the two villages

Table 4.6. Average expenses per households in Muong Pon 2 in 2015

	TYPES OF HOUSEHOLDS - MUONG PON 2			
	Poor (VND)	Near poor (VND)	Middle (VND)	Upper middle (VND)
Cultivation	1,839,500 (8.33%)	3,407,500 (13.47%)	2,944,917 (9.72%)	7,202,900 (10.9%)
Animal husbandry	1,323,038 (6.0%)	620,000 (2.45%)	1,704,167 (5.63%)	7,658,800 (11.59%)

Production materials	11,731 (0.05%)	0% -	0% -	0% -
Household supplies, food, school fees, social contributions, paying interest/pay back loans …	18,896,962 (85.62%)	21,274,500 (84.08%)	25,630,417 (84.65%)	51,232,100 (77.51%)
Total	**22.071.231**	**25.302.000**	**30.279.500**	**66.093.800**

Source: Field survey, 2016.

In Pung Giat 2, all households in the sample spent between 82-98 percent on household supplies, food, school fees, social contributions, medical bills and paying interest/paying back loans (Table 4.7). The upper middle spent the most on household supplies, food, school fees, social contributions, medical bills and paying interest/paying back loans (97.5 percent), followed by the near poor (97 percent), the middle (nearly 93%) and finally the poor 82 percent. In 2015, all households in the poor and near poor groups did not spend any money on production materials, while it was a small number of middle and upper middle (less than 1%). The near poor and the upper middle did not spend any money on animal husbandry, while the poor spent (nearly 13 percent) on animal husbandry followed by the middle (nearly 3 percent). The upper middle spent the most on cultivation (2 percent), followed by the middle (more than 2 percent), the near poor (3 percent) and finally the poor (5 percent).

Table 4.7. Average expenses per households in Pung Giat 2 in 2015

	TYPES OF HOUSEHOLDS - PUNG GIAT 2			
	Poor (VND)	Near poor (VND)	Middle (VND)	Upper middle (VND)
Cultivation	1,065,652 (5.01%)	1,400,000 (3.00%)	2,368,944 (4.69%)	3,966,667 (2.17%)

Animal husbandry	2,756,522 (12.97%)	0% -	1,244,167 (2.46%)	0% -
Production materials	0% -	0% -	100,000 (0.2%	500,000 (0.28%
Household supplies, food, school fees, social contributions, paying interest/pay back loans …	17.430.761 (82.02%)	45,320,000 (97.00%)	46,798,628 (92.65%)	177,920,000 (97.55%)
Total	**21.252.935**	**46.720.000**	**50.511.739**	**182.386.667**

Source: Field survey, 2016.

Table 4.8. Wealth ranking and land ownership

Type of land (m2)	**MUONG PON 2**				**PUNG GIAT 2**			
	Poor HH	Near poor HH	Middle HH	Upper middle HH	Poor HH	Near poor HH	Middle HH	Upper middle HH
Wet rice	903	3,000	1,842	2,252	1,215	1,120	3,032	1,000
Swidden field	0	0	0	0	2,096	7,600	2,528	500
Corn	292	100	600	1,186	1,061	3,600	2,594	0
Cash crop	171	0	246	911	322	4,300	672	0
Forestland	-	-	-	-	-	-	-	-
Rubber plantation	6,994	5,000	5,309	8,200	11,448	19,061	17,777	27,500
Total	**8360**	**8100**	**8007**	**12,549**	**16,142**	**35,681**	**26,603**	**29,000**

Source: Field survey, 2016.

Table 4.8 shows that on average, in Muong Pon 2, the upper middle households have the largest area of land (12.5m2), including wet rice paddy, swidden fields, corn field, and land for growing cash crops and rubber plantation land. The poor, the near poor and middle have almost the same area of land (more than 8,000m2). Households in Muong Pon 2 do not have forestland.

Meanwhile in Pung Giat 2, households in the sample have a larger area of land. The upper middle households have the largest area of land, including rice paddy, swidden field and rubber plantation, of which the rubber plantation is the biggest piece and swidden field is the smallest. On average the poor households have the smallest area of land. It is important to note that the near poor have more land than the middle households.

Table 4.9. Wealth ranking and vehicle ownership in Muong Pon 2

Quantity of motorbikes	**TYPES OF HOUSEHOLDS - MUONG PON 2**					Total
	Poor HH	Middle HH	Upper middle HH	Near poor HH	Do not answer	
1	15	4	4	2		25
2	2	7	4			13
4			1			1

Source: Field survey, 2016.

Table 4.10. Wealth ranking and vehicle ownership in Pung Giat 2

Quantity of motorbikes	**TYPES OF HOUSEHOLDS - PUNG GIAT 2**					Total
	Poor HH	Middle HH	Upper middle HH	Near poor HH	Do not answer	
1	12	12	1	3	1	29
2	1	4	1			6
3			1			1

Source: Field survey, 2016.

Motorbike is both a means of transportation and of wealth. Table 4.9 and Table 4.10 show that the all households in the sample have motorbikes in the two villages. However, the quantity and quality of motorbikes varies between groups of households. The upper middle and middle households have more motorbikes, which are more expensive if compared with the other groups of households.

With regard to the ownership of televisions, the situation is the same as with motorbikes. Table 4.11 and Table 4.12 show that 40 out of 50 households sampled in Muong Pon 2 have TVs, and 42 out of 51 households in Pung Giat 2 have TVs. The upper middle households in Muong Pon 2 have more TVs than the other 3 groups. This is not the case in Pung Giat 2.

Table 4.11. Wealth ranking and TV ownership in Muong Pon 2

Quantity of TVs	**TYPES OF HOUSEHOLDS - MUONG PON 2**				Total
	Poor HH	Middle HH	Upper middle HH	Near poor HH	
1	18	11	7	2	38
2			2		2
3			1		1

Source: Field survey, 2016.

Table 4.12. Wealth ranking and TV ownership in Pung Giat 2

Quantity of TVs	**TYPES OF HOUSEHOLDS - PUNG GIAT 2**				Total
	Poor HH	Middle HH	Upper middle HH	Near poor HH	
1	16	18	3	5	42

Source: Field survey, 2016.

Table 4.13. Wealth ranking and rice mill ownership

Quantity	Type of Households			Total
	Poor/near poor	Middle HH	Upper middle	
Muong Pon 2	0	2	3	5
Pung Giat 2	0	1	1	2

Source: Field survey, 2016.

Table 4.13 demonstrates that in both villages, the poor and near poor households do not own rice mills. Five out of 50 households in Muong Pon 2 have rice mills; meanwhile this number is only 2 in Pung Giat 2.

The data analysis in Section 4.1 shows interesting facts. Households in the sample in Pung Giat 2, Muong Muon commune have a larger area of land if compared with their counterparts in Muong Pon 2, Muong Pon commune. There is no difference on wealth ranking and vehicle ownership in the two villages. The two villages share the same characteristics that the rich households earned the most from all sources of income and the poor earned the least among the 4 groups of households. Although the income from forestry is small when compared with other sources of income, it plays a very important role in the household economy. The following section investigates how the rubber plantation has affected the livelihoods of the local people who live close to the forest and greatly depend on forest products.

4.2. Question 1. How has the introduction and expansion of rubber plantations in northwest Vietnam affected the livelihoods of the people?

As Table 4.14 shows the majority of household in Muong Pon 2 (30 households out of 50 households) and Pung Giat 2 (27 out of 51 households) contributed their land to the Rubber Plantation Project. It should be noted that the majority of those households belonged to the poor and middle households. On average, each household contributed 6,000-7,000m^2/household in Muong Pon, while the figure is 11,000-18,000m^2/household in Pung Giat to the project on rubber plantation. As discussed earlier, forest plays a very important

role in local livelihoods so losing access to the forest is a serious livelihood impact for local people. Key informant interviews and focus group discussion results show that all the villagers were forced to give up their land to the Dien Bien Rubber Company. An ethnic Thai villager in Pung Giat 2 recalled:

> *At the beginning, we did not agree to contribute our land because planting rubber tree was not part of our culture. Many of us had not seen a rubber tree before. Later on, the provincial authorities carried out campaigns in order to convince local people to give land to the rubber development project. We were all promised that we would earn 500USD/ha/year in Year 7-8.*

By the time the field research was being carried out, the rubber trees were 8 years old already, but there was no sign that the latex would be collected soon. There was no such processing factory in the province.

Table 4.14. Household land contribution to Rubber Plantation Project

	Muong Pon 2	**Pung Giat 2**
Number of households having rubber plantation	30/50	27/51
Poor and middle HH	25/30	25/27
Average area contributed to rubber plantation/household (m^2)	6,000-7,000	11,000-18,000

Source: Field survey, 2016.

The table also shows that out of 50 sampled households, 30 households gave land to the Dien Bien Rubber Company in Muong Pon 2. On average, the poor, the middle and upper middle have given more than half of their land to the Rubber Plantation Project. Meanwhile in Pung Giat 2, out of 51, 26 households gave land to the company. According to

key informants, most of the villagers' land given to the company was their swidden fields. Giving their land to the company means they have lost their access to forest resources, such as fish, vegetables, bamboo shoots, medicinal plants, firewood, water resources and grazing land and food for them as well as for their animals. In the meantime, those who gave land to the company had two sources of income: reclamation fees which was 4.5 million VND/ha from the provincial government and waged labor from the project (normally paid at a flat rate) (see Table 4.15). In fact, only 11 households out of 30 households in Muong Pon 2 received from reclamation fees and the amount each household received ranging from 0.4–9.0 million VND. In Pung Giat 2, 22 out of 51 households received the reclamation fees ranging from 0.5 to 13.5 million VND/household. The rest of the households did not receive reclamation fees because they either lost their ID or did not have the "red book" – land-use and house ownership certificates – for the land previously. The red book is a land certificate given for private owneship of land and does not recognise communal use or access of land such as swidden fallows or secondary forest areas used especially by the ethnic communities.

Table 4.15 demonstrates some interesting facts. More specifically, in Muong Pon 2, out of 30 households given land to the company for rubber plantation, 10 households that had a member hired by the company as a worker and earned 1,350,000 VND for the whole year in 2015. Meanwhile there were 5 households in Pung Giat 2 that had members hired by the company. The amount of money earned by villagers in Pung Giat ranged between 60,000-200,000 VND per household. The data analysis also shows that nine people in Muong Pon 2 preferred wage/day at between 100,000 VND to 200,000 VND/day. Meanwhile in Pung Giat 2 the number of villagers who preferred wage/day at between 120,000 VND to 200,000 VND was 18 people.

Table 4.15. Income from Rubber Plantation Project

	Village							
	Muong Pon 2				**Pung Giat 2**			
	Valid N	Min	Max	Mean	Valid N	Min	Max	Mean
Land contributed to the	30	600	23,000	6,679	N=26	0	35,000	15,848

Project (m2)								
Money paid by the province on contributed land	11	400,000	9,000,000	4,018,182	N=22	500,000	13,500,000	5,918,182
Wage labor from the project	N=1	1,350,000	1,350,000	1,350,000	N=5	60,000	2,500,000	682,000
Preferred wage/day (VND)	N=9	100,000	200,000	143,333	N=18	120,000	200,000	150,000

Source: Field survey, 2016.

As the data shows, in Muong Pon 2, on average the rich earned the most from cultivation at 31.9 million VND accounting for 22% of the total income and the middle households at 11.2 million VND making up 21% of the total income. Meanwhile the poor households earned 6.3 million VND constituting 21% of the total income and the near poor at 4 million VND or 6% of the total income on average.

The four groups of households also earned from forestry. The upper middle households earned the most at 8.4 million VND accounting for 6% of the total income; the poor households at 2.5 million VND or 8% of the total income; the middle at 1.5 million making up 3% of the total income and the near poor earned the least of all at less than 1 million constituting 1%.

The four groups also earned from fishery. The rich earned the most at 5 million VND making up 3% of the total income; the middle households at 2.4 million VND accounting for 3% of the total income; the near poor 1.6 million VND constituting 3% of the total income and the poor households earned the least at less than 1 million VND or 3% of the total income.

As their counterparts in Muong Pon 2, the four groups in Pung Giat 2 earned from the same sources of income, including cultivation, animal husbandry, forestry, fishery and non-agricultural sources, such as waged labour, governmental salaries/support and handicraft (See Table 4. 3 and Figure 4. 2). On average the middle households were the group that

earned the most from animal husbandry at 229 million VND, accounting for 89% of the total income, while the middle households earned almost 56 million VND constituting 66% of the total income and the near poor households earned almost 54 million VND accounting for 77% of the total income and the poor households earned 14 million VND making up 49% of the total income.

In other words, the rich households earned the most from all sources of income and the poor earned the least among the 4 groups of households. Although the income from forestry is small when compared with other sources of income, it plays a very important role in the household economy, especially the poor and female-headed households. The data analysis shows that the most affected groups from rubber plantation are the poor and the female-headed households, simply because they do not have alternative sources of income and they are therefore totally dependent on forest resources for their livelihoods. A woman who lost her husband said:

> *We have to walk further and use the less fertile field that we did not use for a long time. We go to the distant field from early in the morning and come back late in the evening. We have to bring our children with us, because no one takes care of them at home. We bring lunch with us and work all day. Since we work distant from home, our heath is affected by bad hygienic conditions. Those who are lucky to have husbands and sons depend more on male members in the family, simply because men have the opportunity to work outside the village.*

During the time the field research was being carried out, many women were engaged in collecting driftwood along the river running through the village in Pung Giat 2. The head of the village stated that:

> *Collecting driftwood is very dangerous for both men and women. But it is more dangerous for women who are not physically as strong as men. And they could only do when it rains. However, they do not have any other choice. If one spends a whole day collecting driftwood, he/she could earn more than 100,000 VND. Since we lost our land to the rubber plantation, villagers have to work harder to compensate for the loss.*

In other words, women in the research site have engaged in dirty, dangerous, and difficult (3 Ds) jobs, such as collecting driftwood along the river when it rains and working on distant swidden fields all day long without rest.

Results from focus group discussions showed that all the villagers in the two communes wish to sign a contract with the Dien Bien Rubber Company. According to them, the rubber trees are 8-years old and many of them produce fruits. Therefore, villagers want the Dien Bien Rubber Company to collect the latex to discover if it is economically efficient and calculate how much percentage of the profit they would earn from the rubber plantation as land contributors. At the moment, there is no such rubber latex processing factory, which worries many local people. They compare rubber trees with traditional agricultural crops and payments for forest environmental services (PFES) and the result shows that the rubber trees have not brought any profit.

In summary, the majority of the sampled households contributed their land to the Rubber Plantation Project. In fact, many people confirmed that that were forced to give their land to the Dien Bien Rubber Company. At the time when the field research was being carried out, no contract had been signed between those who gave land to rubber plantation and the Dien Bien Rubber Company. People have to work harder to compensate for the loss. The poor and female-headed households that earned the least from all sources of income and depend the most on forest resources were the most affected by the introduction and expansion of rubber plantations in Dien Bien.

4.3. Question 2. What is the role of safeguards in anticipating and responding to the impacts of rubber plantation expansion in northwest Vietnam?

According to Decree No. 18/2015/NĐ-CP of the Vietnamese Environmental Protection Law, the development planning of Vietnam Rubber Group must implement a strategic environmental assessment (SEA) if the project goes beyond the boundary of a province, and for each project within the framework of one province or one district, they must carry out environmental impact assessment (EIA).

As specified in the Environmental Protection Law 2005, Strategic Environmental Assessment is to analyze and forecast the potential impact of strategy projects, planning, and development plans before approval to ensure sustainable development" (Paragraph 19,

Article 3). Strategic environmental assessment is conducted in parallel with the process of developing a strategy, planning socio-economic and sectoral development. According to the General Technical Guidelines on Strategic Environmental Assessment of the Ministry of Natural Resources and Environment in 2008, the purpose of the strategic environmental assessment is to integrate environmental issues into the process of developing the strategy, planning, and development plans to make sure that the decision-making process is transparent and participatory. Strategic environmental assessment is a tool to integrate sustainable development into the planning process.

Meanwhile, environmental impact assessment (EIA) is an assessment of the likely impact of a positive-negative impacts of a proposed project on the environment using natural, economic and social perspectives. The purpose of this review is to ensure that the decision makers who are interested in the impact of the project on the environment decide to carry out the project or not. Post-EIA, prevention and the polluter pay principle (also called 3P principles for the environment) are applied to prevent, minimize or require payment for liability or expenses incurred on insurance paid for the project based on the harmful effects. The provisions on environmental impact assessment before deciding to implement projects should be considered as a legal instrument to review, discuss, decide, remove or change the project design and location; as well as develop plans to mitigate impacts or enhance environmental management.

EIA legislation in Vietnam is considered as well-developed and updated, making it compatible with international requirements for practice (Claussen et al., 2011). However, there are still noticeable weaknesses in the practical implementation of the assessment, including insufficient and under-supported Government staff, the lack of innovation and independence of local Vietnamese consultants, and the dearth of strong political will to ensure the success of carrying out EIA (Claussen et al., 2011). In addition, the public engagement in the process of EIA is still limited and superficial, mainly to due to the lack of participatory culture, the cultural norms of respecting the Government amongst the rural population, and the fact that grassroots democracy is still at an embryonic stage (Hostovsky et al. 2010).

The following section discusses how EIA on rubber plantation expansion was carried out as well as its impacts on all stakeholders, including the local community, the local government and the Dien Bien Rubber Company in the context of Dien Bien.

Environmental impact assessment (EIA) of rubber development project in Dien Bien

The SEA for rubber development project in the northwest, including Dien Bien, was not conducted. Only EIA was undertaken in each province. According to the director of Dien Bien Rubber Company, if EIA of the project was not undertaken, they could not complete the investment approval procedures, so they would not be eligible for bank loans. As a matter of fact, the research finding in Dien Bien showed that EIA was carried out after the project had been implemented, and more specifically after 1900 ha of rubber trees were planted.

Dien Bien Rubber Company may have made a management plan on environmental and social impacts of the rubber development project. However, no such plan was implemented. Dien Bien Rubber Company was in charge of the EIA on the rubber development project together with the coordination of Planning Consultancy and Asian Technology Development Company. EIA report of "10,000 ha of Rubber Development in Dien Bien" project was approved in Decision No. 208 / QD-UBND by Provincial People's Committees on January 23, 2010.

Our review of Environmental Impact Assessment report found that:

- Rubber plantation project was started in 2008 ; as of July 2009, Dien Bien Rubber Company planted 1,900 hectares of rubber but EIA report was approved only in January 2010. Thus, the EIA report was prepared and approved after the project was implemented, which means Dien Bien Rubber Company did not follow the provisions of the Law on Environmental Protection. According to Circular No. 27/2015/TT-BTNMT, EIA report is considered a scientific tool for consideration before the decision on approving the project is made.
- According to the EIA report, in more than 24,000 hectares of land in planned areas, 31% of the land is not suitable for rubber plantation, 59% of land is a bit appropriate and only 9.7% of land is appropriate medium or relatively suitable for rubber trees. Evaluation of rubber cultivation is based on guidelines issued by the Vietnam Rubber

Research Institute and is based on indicators of arable soil depth, mechanical composition, degree of aggregation and stone, humus in the soil, the water table depth and slope of rubber plantations. It is important to note that in areas where only slopes of less than 20% can be considered suitable for rubber plantation. It should be noted that in the study sites, the slopes angles are more than 20%, which is not considered suitable for rubber plantation.

- The EIA report lacks detail on other aspects of environmental assessment like natural biodiversity, forest area and forest quality level, especially protection forests before converting forest land into rubber land. Even productive land and arable land on the mountain of households had not been evaluated in detail on its impact from conversion on the economy, local people's income and on other social factors.
- The EIA report only focuses on mechanics of reclamation, soil preparation, noise, dust, etc. and general effects of cultivation, such as fertilizer and soil erosion.
- Public consultation on the Environmental Impact Assessment: The public consultation is valid if it is signed and approved by the chairman of commune Fatherland Front Committee, and the Chairman of Commune People's Committees. The Commune People's Committees and the Fatherland Front Committee issued similar opinions on the EIA report. These are: "1) they agree with the environmental impact assessment of the project, 2) they agree with the mitigating measures, and 3) they offer no suggestions for the project owners. All the comments on the EIA were not identified by time and location in writing. Results from the focus group discussions and key informant interviews demonstrated that the consultations were not carried out by the project proponent during the EIA preparation. This shows negligence of both parties, the project owner and consulting firm. This demonstrates that the responsibility of the Provincial Appraisal Board and Environmental Management Agencies needs to be considered seriously.
- The preparation and approval of the EIA report after rubber plantation project had been implemented more than a year and the way of carrying out the public consultation during the preparation of the EIA report was merely a formality. It does not follow the current laws and the decision-making on rubber development in Dien

Bien is inappropriate. Moreover, there was niether a management plan nor environmental monitoring during the project implementation which is a serious shortcoming on the part of the investors and stakeholders to address environmental concerns at the local level.

- Respondents were asked, “Did you participate in the process of EIA? Have you heard about the information of EIA report?” during the household survey and focus group discussion. Almost all respondents stated that the information in the EIA report has not been widely publicized to stakeholders at the grassroots level as well as to the people where rubber trees are planted. People’s Committees leaders, administrative staff, Farmers' Associations, Women’s Union, local people, rubber plantation leaders and workers are unaware of the project's Environmental Impact Assessment report.

Socio-ecological impacts

As discussed earlier, Dien Bien Rubber Company did not comply with the provisions of Environmental Protection Law on EIA and could not identify the role of stakeholders in the economic, environmental and social impacts of the rubber development project on households, farmers, communities, and the enterprise. The following section explores the consequences caused by the inappropriate environmental impact assessment procedures on the rubber plantation project in the context of Dien Bien.

1. Households contributing land have been issued red books. However, currently, there is a difference between the land on red books and the actual land with rubber trees that the company has confirmed. The rubber areas that the company confirmed are smaller than that on the red books. As a result, the contract between local people and Dien Bien Rubber Company has not been signed.

2. Farmers have contributed their land for rubber plantation for nearly 8 years. Rubber trees have already reached the age of being tapped. However, the effectiveness of rubber tree has not been shown. Local people have not seen the economic efficiency of the project for their income. They compare income earned from rubber plantation to other crops, such as forest plantation with income from payments for forest environmental services (PFES), cassava and corn, and have discovered that the income from rubber tree is much less. (See Table 4.16).

Table 4.16. Income earned from rubber plantation in Muong Pon and Pung Giat

	Village							
	Muong Pon 2				**Pung Giat 2**			
	Valid (N)	Minimum	Maximum	Mean	Valid (N)	Minimum	Maximum	Mean
Land contributed (m2)	N=30	600	23,000	6,679	N=26	0	35,000	15,848
Money supported from Provincial People's Committee	N=11	400,000	9,000,000	4,018,182	N=22	500,000	13,500,000	5,918,182
Hired by Dien Bien Rubber Company	N=1	1,350,000	1,350,000	1,350,000	N=5	60,000	2,500,000	682,000
Appropriate salary (VND/Day)	N=9	100,000	200,000	143,333	N=18	120,000	200,000	150,000

Source: Field survey, 2016.

3. Many people are required to exploit rubber trees and receive daily wage. As Table 4.14 demonstrates, heads of households in the sample expressed their desire to be paid between 100-200,000 VND/day. According to the results from group discussions as well as key informants, local people were informed that after contributing land to the company, the local people would receive profits from the project. It was reported that the sharing ratio would be 10% of the value after subtracting production costs. In fact, up to the end of November 30, 2016 no contract was

signed between the land contributors and the company. Consequently, many people are worried about their future.

a. The slow exploitation of rubber causes psychological anxiety. Local people doubt the goals of rubber development in Dien Bien in particular and the northwest in general. That problem requires local government at the provincial, district and commune level and the company to publicly answer them. They need an effective plan on rubber exploitation and evaluation so that they know whether rubber trees can help them reduce poverty as they had been informed. Local people also want to compare the effectiveness of land use of rubber plantation to other crops such as cassava, sugar cane, corn and reforestation (*acacia*).

b. People want to know how they are involved in the process of rubber exploitation and processing to increase the added value because now they have no knowledge on exploitation technique and processing. If they can be involved in, how they will be trained in technique and what the levels of their direct involvement are. They want to know their chances and their children's opportunities of employment, too.

c. Gender - gender balance and disadvantaged groups of the communities: Students have no jobs after finishing education. If they want to find a job, they have to move to the cities. Results from women's focus group discussions show that women and girls have been affected the most by land loss. They have suffered from loss of forest products, such as mushrooms, bamboo shoots, medicinal plants, firewood, and water. Collection of non-timber products has become part of their culture. Now due to the loss of the forest, that part of their culture has been fading away. In addition, social evils, such as prostitution, drugs and gambling have reportedly been on the rise.

d. The findings from the case of Muong Muon and Muong Pon show that local people & officials at village & commune level were completely passive during project implementation and suffering from a lack of participation in the design of the project

4. Local governments

    a. The local government has considered rubber trees as a multi-purpose tree: generating income, reducing poverty, increasing forest coverage, and increasing the efficiency of land use. However, people now doubt rubber's effectiveness and therefore they need an answer from the local government. However, the government cannot make a decision on rubber exploitation and evaluation; this depends on VRG and Dien Bien Rubber Company.

    b. The province has spent money on supporting households that contributed land to the project (4.5 million VND/ha), so they expect that rubber trees are harvested, and the provincial budget is increased.

    c. The local government wants Dien Bien Rubber Company to build a processing plant and create jobs for local people. According to the Manager of Dien Bien Rubber Company, in order to build such a plant, the smallholder rubber production needs to further develop. In such a case, the rubber tree becomes a major crop and contributes to the province's GDP.

    d. Currently, the province wants to effectively use planned areas of rubber plantation which are not suitable for rubber trees - uneven, sloping land - by allowing local people to intercrop rubber trees with fruit trees or forest trees, such as *Acacia*.

5. Dien Bien Rubber Company

    a. The company worries about the price of latex. Because of the low prices, the company is hesitating to invest in exploitation, especially in processing plants in Dien Bien and the northwest region. If there is no processing plant, latex must be transported to central or south Vietnam to be processed, which is not economically efficient.

    b. If the processing plant is built in Dien Bien and the price of latex does not rise, it is impossible to expand rubber plantation areas. This is exactly the consequence of not developing the economic and technical feasibility study and carrying out EIA of the rubber plantation project before making decision

on development of rubber in the Northwest. In other words, it is the consequence of not following the correct procedures required by the law on Environmental Protection. The company wants to share risks and therefore wants Dien Bien Provincial People's Committee to support them in building rubber processing plant.

c. Rubber plantation on slopes is new to the rubber company, and it is one of the causes of rising rubber exploitation costs. Moreover, there are no pilot projects on planting rubber on the slopes, so real costs cannot be calculated. If the costs are high, the profits of both company and local people will be reduced.

d. If rubber exploitation is not carried out, Dien Bien Rubber Company cannot get bank loans for exploiting and processing rubber, and paying rubber workers.

e. According to the Manager of Dien Bien Rubber Company, the company wants VRG to support them by taking profits accumulated over a long period of time in business to support the company during difficult times.

f. The goal of the rubber campaign firstly was a political one. However, it is important to balance political and economic objectives. If economic objectives are achieved, then political objectives are achieved. Without economic gain, it is hard to achieve political objectives.

g. The company promised to tap rubber in Dien Bien and Lai Chau first, organize technical training courses for local people so that they can participate in the process of exploiting and processing rubber, and to create jobs for local communities. However, until now, the promise remains unfulfilled. When the rubber has not been exploited, and evaluation on the effectiveness of rubber trees has not been made, the expectations, concerns and hopes of local people are still on hold.

In summary, Dien Bien Rubber Company did not comply with the provisions of Environmental Protection Law on EIA. The contract between local people and Dien Bien Rubber Company has not been signed due to the fact that agreement on the land on red books and the actual land with rubber trees has not been reached between the local people

and the Dien Bien Rubber Company. As a result, local people have not received any income for the land that they gave to the project. Consequently, many people are worried about their future. The local government wants Dien Bien Rubber Company to build a processing plant and create jobs for local people so that rubber trees can help local people reduce poverty as promised by the government.

4.4. Question 3. What are the impacts of large-scale rubber plantations on the ecosystem services?

Main ecosystems of the rubber plantation areas in the northwest consist of secondary forest ecosystems after being exploited and secondary forests after cultivating and the ecosystem surrounding streams. Ecosystem services include provisioning, such as the production of food and water; regulating, such as the control of climate and disease; supporting, such as nutrient cycles and crop pollination; and cultural, such as spiritual and recreational benefits. The following section explores the impacts of the rubber development project on local ecosystem services in Dien Bien. It is important to note that the impacts on the ecosystem services mentioned here refer only to the impact of the expansion of rubber plantation on the natural resource use, the state of the environment, ecology and natural plant community.

- Providing services: The majority of households that have contributed land to rubber plantation in the survey are the poor and the middle income. In Muong Pon, 25 of 30 households contributing land were poor or middle income. 25 out of 27 households contributing land were poor and middle-income households in Pung Giat. They reported that the expansion of rubber plantation has primarily narrowed the supply of basic resources, such as their cultivated land, the forest resources including timber, firewood, and non-timber products, such as medicinal plants, wild vegetables, mushrooms and food for pigs. In addition, it has also shrunk the grazing areas for cattle and water buffalo.
- Regulating services: Natural forests are watershed forests of river/stream systems in the region. Affecting watershed forests is affecting water storage, water regulation and seasonal quantity and quality of water supply for production and local livelihoods. The degree of those effects has not yet been analyzed, and scientifically

evaluated/detailed in the EIA. However, local people reported that the company uses herbicide to remove weeds in rubber plantations, so local people's health and animals are adversely affected. More specifically, people usually have itchy skin if they swim in the streams and the pond fish died.

- Supporting services: Reclamation for rubber plantation has resulted in loss of natural vegetation, including its diversity of species that have been replaced by rubber mats from the initial period of open land to the waiting period of 4-5 years of closed rubber canopy which affects the functioning of ecosystems. This decreases the biodiversity, affecting functions of species such as pollinators like bees, roles of natural enemies, organic decomposition, especially of insects, and land and aquatic creatures.
- Cultural, tourism and spirituality services: Breaking natural landscapes, impacting sacred forests/spirit forest. Local communities should be consulted when reclaiming land for rubber plantation. The interplay between integration and conflicts involving indigenous people and workers from outside is also an aspect to be taken into consideration and compromise, not only in short-term but also for long- term goals. It is essential to respect customary laws and cultural traditions of the ethnic diversity of the Northwest.

5. CONCLUSIONS

The research aimed to investigate the social and environmental costs as well as benefits of rubber plantations in the northwest of Vietnam. The study seeks to answer the following questions:

1. How has the introduction and expansion of rubber plantations in northwest Vietnam affected the livelihoods of the people?
2. What is the role of safeguards in anticipating and responding to the impacts of rubber plantation expansion in northwest Vietnam?
3. What are the impacts of large-scale rubber plantations on the ecosystem services?

The research findings show that rubber plantation in the province has changed the land-use systems of farmers involving in the rubber project. Converting from farmland and

forestland into rubber plantation has affected the conventional use of farmland, water and forest products, thereby frustrating the traditional livelihoods and affecting farmers and communities. The women and girls are in turn the most affected. These findings are compatible to other studies by Fu et al. (2009) and Ahrends et al. (2015), affirming the severe impacts of rubber expansion on biodiversity and livelihoods of local communities.

Environmental impact assessment was carried out only after the rubber trees were planted. The EIA for Dien Bien was mainly an investment-based routine procedure under the Environmental and Investment Laws, and lacked any intention to address practical impacts of the project. Importantly, local people were not participating in the process of carrying out EIA and the local government as well as the local community were passive in the process of implementing the project.

Having contributed land to the project, local people expect economic benefits from the rubber plantation including more jobs. However, although rubber trees have reached the age of exploitation, no exploitation is organized, and the processing plant is yet to be built. Profit sharing between households that have contributed land and Dien Bien Rubber Company is not clear and no contract between the two parties has been signed. Meanwhile, the communities are affected by the appropriation of their customary properties and rights, leading to the loss of land, loss of livelihood and income, loss of employment and forest products (mushrooms, bamboo shoots, medicinal plants, firewood, and water). In addition, social evils, such as prostitution, drugs and gambling have reportedly been on the rise. People now have doubts about the project's goals of rubber plantation in Dien Bien and the northwest region.

Rubber trees have been planted in mountainous areas, adversely affecting biodiversity, soil and water of the watersheds that provide water for drinking, irrigation and hydropower purposes. The health of local people and livestock was negatively affected. People have suffered various health problems including skin rash and itching, stomach problems.

The research findings were shared with the local government in Dien Bien province in northwest Vietnam. It is hoped that in order to minimize the impact of any development project in the future, environmental impact assessment will be carried out in a more

transparent way and socio-economic development policy should be built based on the characteristics of the local ecosystem and environment. The research findings will contribute to advancing socially just and environmentally sustainable economic land concessions (ELCs) not only in Vietnam, but also in the Lower Mekong Subregion (LMS).

6. RECOMMENDATIONS

As the case of Dien Bien illustrates, the loss of land to rubber crops has had adverse impacts on local communities and women in particular. Herbicide used in the rubber plantations to remove weeds is seeping into the local streams that have reportedly changed color.

Land compensation should therefore be carried out in a fair and transparent way so that local people, especially ethnic women, female-headed households and girls can improve their livelihoods.

The Dien Bien Rubber Company should restrict or cease using herbicides and have the responsibility to clean up the streams so that local people's health and animals will be protected.

Local people's awareness on water quality and water treatment should be raised. Grassroots empowerment should be promoted to engage local communities in the decision-making and negotiating process related to water and land management.

Environmental impact assessment should be carried out in a more transparent way and socio-economic development policy should be built based on the characteristics of the local ecosystem and environment.

Social issues, such as equity, local participation, gender, ethnicity, gaps between the poor and rich should be taken into consideration while developing socio-economic policy to minimize adverse impacts on local communities.

It is hoped that the recommendations mentioned above will be implemented in a well-coordinated manner, rather than in a piecemeal and isolated instance so that socially just and environmentally sustainable economic land concessions (ELCs) in Vietnam in particular and in the Lower Mekong Subregion (LMS) in general can all take place in ways advocated in this research.

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