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The Supported Policies in the Afforestation and Perennial Crops Project and its Effects on the Local Peoples' Livelihoods in Dien Bien Province of Vietnam

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Abstract

The Afforestation and Perennial Tree Plantation Project were implemented in several mountainous areas in Dien Bien province, Vietnam, for many purposes such as providing agricultural products, increasing incomes for the people in the projected areas, and reducing shifting cultivation. Based on these reasons, the central and local governments implemented several policies and subsidies for the growers, including rice subsidies for ethnic minorities who planted forests to replace shifting cultivation; investment support for planting protective forests and special-use forests; and providing seedlings. This article aimed to provide a clear view of the supporting policies in the Afforestation and Perennial Crops Project and its effects on the local people's livelihoods in Dien Bien province of Vietnam. By analyzing the types of the capital of the livelihood assets (human capital, natural capital, financial capital, physical capital, and social capital), indicators of each capital type were chosen and scored in the context of achieving sustainable livelihoods. The results identified that the government has issued several policies to help the investors and farmers involved in this project. However, there were some concerns about the policies in practice, for example, the low percentage of dividend sharing for farmers, unclear land use rights, and inadequate applications of the policies in reality. In evaluating the livelihood assets, significant differences were found in the sustainable livelihood index gained between the rubber-based and non-rubber-based groups.

Keywords

Policy, subsidy, afforestation, livelihood, Northwest Vietnam

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Introduction

Over the last 50 years, reforesting the so-called ''barren land'' has become a growing concern among policy-makers in many areas of the

world (Quang *et al*., 2015; Trædal, 2018). In Asia, the governments of Thailand, Laos, Cambodia, Indonesia, China, and Vietnam have projected and carried out similar forestland policies, including settlement programs, land classification, devolution of forest management, and reforestation schemes (rubber and acacia) (Simelton *et al*., 2017). Ziegler *et al*. (2009) and Clement (2008) reported that more than 500,000ha of rubber may have been planted in the uplands of Thailand, China, Vietnam, Laos, Cambodia, and Myanmar. Recently, many farmers in the region have realized opportunities to convert their land to commercial crops, such as rubber. As a result, rubber is now one of the foremost plants in the whole region, however, global expansion of commercial agricultural products is leading to the conversion of traditional subsistence agricultural and occupied non-agricultural lands to commercial-agricultural purposes. This trend in mainland Southeast Asia shows that rubber plantations are expanding rapidly in China, Laos, Thailand, Vietnam, Indonesia, and Myanmar, where rubber trees are not historically found (Li & Fox, 2012). Together with the expansion of rubber and acacia in Vietnam, many of the policies affecting land uses/land cover changes have been implemented in the upland regions over the last five decades (Clement, 2007; Simelton *et al*., 2017) (**Figure 1**).

The mountainous regions of Vietnam, which were described as being in "a state of deepening environmental and social crisis", are home to one-third of the nation's citizens. The characteristics of these places are high rates of rural poverty, rapid population growth, the shortening of fallow periods through the traditional slash and burn cultivation system, and forest degradation (Jamieson *et al.*, 1998). In the context of declining agricultural productivity, food shortages, and environmental degradation, the Vietnamese government has run several programs for upland development. These programs aimed to conserve the environment and ensure the sustainable livelihoods of the local ethnic minority people (Jamieson *et al*., 1998; Castella, 2006). With the same circumstances, Dien Bien, a mountainous Northwest province of Vietnam, has been facing serious cases of forest degradation and soil erosion due to the over-harvesting of fuel-wood, shifting cultivation, and conversion to farmland, caused by a high poverty rate (Kazuhiro, 2011). The guidelines in Decision No. 1151/2007, which approved the plans for the Vietnam-China border region in 2020, indicated that Dien Bien lies in the Secondary Economic Zone II, a zone for the development of the hydroelectric industry, processing and mining industries, urban and rural services, and forestry. For future development, as a distinctive feature from the perspective of watershed management, Dien Bien province is highly focused on afforestation. Hence, the dominant parts of the forests in the province have been classified as protected areas. Also, many policies and programs have been put into place to develop productive forests and perennial crops on the mountainous and hilly areas for several purposes, including land conservation, environmental protection, and raising the standards of people's livelihoods.

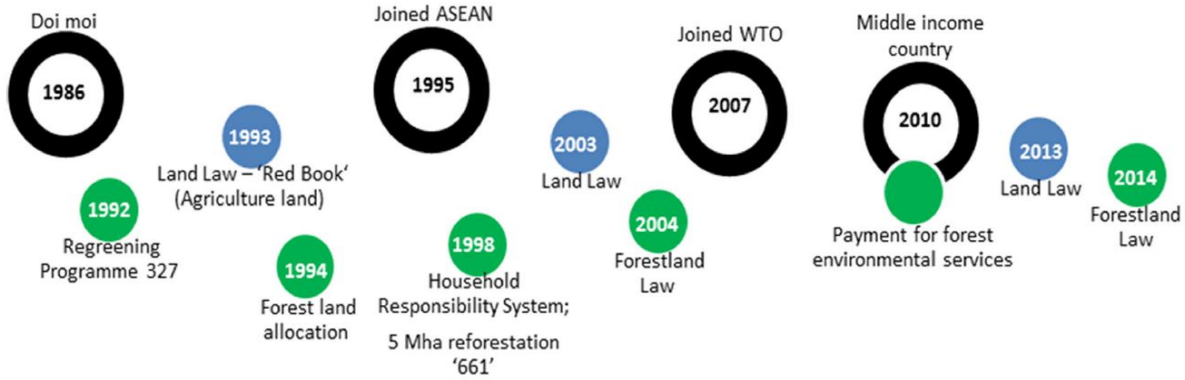

Figure 1. Major policy milestones in Vietnam since 1986 (*Source: Adapted from Simelton et al., 2017*)

According to a report of the Department of Agriculture and Rural Development in Dien Bien (2019), agriculture is the major source of people's livelihoods in Dien Bien province with over 80 percent of the local population dependent on this sector. The slash-and-burn practices in the hilly and sloped areas have caused significant negative environmental impacts, which have resulted in low crop productivity, food insecurity, and deforestation. To restore soil fertility, improve forest conservation, and ensure increased crop productivity, several projects have been implemented in the Dien Bien region, such as Decision No. 661/QD-TTg on the targets, tasks, policies, and organization for implementation of the project on planting five million hectares of forest; Decree No. 163/1999/ND-CP influencing the allocation of forests and forest land, and Resolution No. 30a/2008/NQ-CP on the National Program for Sustainable Poverty Reduction (Program 135). However, very little information is available to identify and analyze the drivers affecting national policies and their impacts on local farmers' decisions.

The Rubber Plantation Project (RPP) has been in progress in Dien Bien since 2008 with the goals of reducing slash-and-burn practices and achieving food security to gain better livelihoods for the local people. The arrangement model of this project was a large-scale investment, of which, farmers participated by contributing capital like land and labor under contract, while the Rubber Joint-stock Company invested in other capital and secured the market for the produce. Assessment of the supported policies in the Afforestation and Perennial Crops Project in relation to the local livelihoods of people living in Dien Bien province has played an important role in encouraging other regions of Vietnam to adopt the policies widely. Therefore, the objectives of this study were to review the policies and subsidies in the Afforestation and Perennial Crops Project in Dien Bien province in the Northwest region of Vietnam; to examine the socioeconomic features and livelihoods of the local people directly involved with the Afforestation and Perennial Crops Project; and to determine the effects and conflicts arising from the Rubber Plantation Project implementation on the local people.

Methodology

The case study and data collection

Dien Bien province has a natural area of 9,563km^2 with about 70% of the land area having a slope over 25 degrees and more than 50% of the land area located at over 1000m above sea level. The land use for agriculture and forestry occupies 7,450km^2, equivalent to 78% of the total natural area. It has a high rainfall amount of 1400-1900 mm annually. The main socio-economic features are a large percentage of ethnic minorities and a high number of poor households. Up to April 2009, the total population of this province was 493,007 people with a population density of around 52 people per square kilometer. The poverty rate is 50.01%, representing the poorest province in Vietnam. The researchers selected Dien Bien district, Dien Bien province because this district was the first Rubber Plantation Project implementation area in this province in order to investigate the different livelihood systems and the effects of the policies and subsidies for growers in the Afforestation and Perennial Crops Project on the local people's livelihoods in this area.

Secondary data collection

The desk-review of existing official statistics, relevant policies, and scientific publications related to the rubber tree plantations in Northwest Vietnam and Dien Bien province focused on identifying policy incentives and disincentives for rubber adoption, and gaps/weaknesses inherent in the policies or implementation issues/challenges at the national, regional, and sub-provincial levels. The Department for Internal Development (DFID) and World Banks' transmission channels were used as checklists to ensure a wide range of aspects (Carney, 1998).

Primary data collection

Field observations: For a comprehensive overview related to the Rubber Plantation Project, the researchers met and discussed with

representatives from the district level, commune level, DB Rubber Joint-stock Company, and households. At the district level, a consultation with the representative authorities who were in the departments of planning and investment, agriculture and forestry, and resources and environment offices was made to discuss relevant information of the rubber project implementation in Dien Bien district. Then, another meeting was made with the authorities of the Muong Pon and Thanh Nua communes, as those communes were the unique regions for rubber planting in the whole district. The main purpose of these meetings was to: (i) list all the existing relevant policies, legislation, and the status of the RPP implementation at the district level; (ii) identify the data and information needed, and the sources for each kind of data; and (iii) prepare good conditions for fieldwork to ensure the accuracy and quality of field data collection. In addition, this approach aimed to obtain common data about the status of the rubber area, density, rubber tree distribution, and basic information related to livelihood components such as infrastructure and people's activities for their livelihoods

Household interviews: The households (HH) that were chosen for the survey were divided into three clusters, namely, cluster 1 (HHs that contributed land and were working as wage workers in the Rubber Plantation Project); cluster 2 (HHs that contributed land in the Rubber Plantation Project); and cluster 3 (HHs that were not involved in the Rubber Plantation Project). The respondents who were selected for the household survey were selected under the probability proportional to size (PPS) sampling method (Baker, 1999). With the probability of 25% of households that participated in the RPP to be selected for clusters 1 and 2 (60 respondents). Also, HHs that were not involved in the Rubber Plantation Project was selected as a cluster 3 (30 respondents). The questionnaire was formulated accordingly based on its target groups: cluster 1, cluster 2, and cluster 3.

*Key informant interview*s: Key informant interviews were used to interview heads of local governments such as communes, villages, and land officials to have a basic view of the implications the Rubber Plantation Project had in this area and its effects on local administrative management and land management. The elders of each ethnic minority were also interviewed to get essential information about their main livelihood activities, the previous tree plantation projects, and the vulnerability context of local communities when these projects were implemented. These respondents also helped to cross-check collected data from focus group discussions. Regarding the Dien Bien Rubber Company (DBRC) data and information, several in-depth discussions were held with the representatives of the company and administratively responsible managers of the project. Especially, interviews were conducted separately with the four rubber work unit heads who were operating rubber plantation activities in the two communes. Data collection in this phase was the realistic total land area in the rubber plantations, the contract farming between the company and the farmers, the total number of workers, and the workers' rights and responsibilities, etc. Also, the interviews were made to ask the land officials of both communes in order to be aware of land management and the effects of the RPP on land use for other purposes in the whole.

Focus group discussions: In this study, group discussions within each interviewing group were carried out randomly in the two communes. In total, six groups were made that contained four to six farmers as they belonged to a suitable cluster. The interviews aimed to understand general information about the study site such as the RC policy implementation, interactions among local people and DBRC, and their suggestions for the local government. This step also helped to identify major problems related to the topic and causes of each problem; rank the significance of these causes and effects of the problems; and find some potential solutions under the local people's perceptions.

Data analysis

For measuring the policies and subsidies related to the local people's livelihoods, comparison groups were used to be able to assert some contributions of the policies to their

outcomes and impacts. In this case study, a comparison between groups whose members were affected by the policies (cluster 1 and cluster 2, as mentioned above) and a group in the community without involvement with the policy (cluster 3).

For data analysis, two types of approaches were applied, namely policy analysis and sustainable livelihoods analysis. In the policy analysis, this study identified the existing policy concerns about rubber plantations, including policy processes, policy arrangements, and policy implementation in order to identify the gap between policy regulations and the actual implementation of the rubber project in the study site. Especially, there was a focus on policies which supported the local people who participated in these projects. To assess the sustainability of the people whose livelihoods depended on the afforestation and perennial plantations, a sustainable livelihood framework was used to formulate a response for the question "How does the Afforestation and Perennial Plantation Project contribute to achieving sustainable livelihoods?" as outlined in **Figure 2**.

This concept has been applied to analyze the capital of livelihood assets by several researchers (Scoones, 1998; TNEPRP, 2004; Pensuk & Shrestha, 2008; Brown *et al*., 2012; Chen *et al*., 2013), and the indicators of each form of capital were chosen and scored on the context of achieving a sustainable livelihood. The indicators for this study were human capital (working ages of members, education, skill, knowledge); natural capital (landholding size, irrigated land area); financial capital (income from wage-work, income from land compensation, income from non-plantation sources); physical capital (infrastructure, distance to forest area); and social capital (access to the Afforestation and Perennial Plantation Project, member of the Afforestation Volunteer Association).

To compare the indicators of each capital and have a meaningful interpretation, a rating scale with values from 0 to 1 was used for measuring and rating the livelihood indicators.

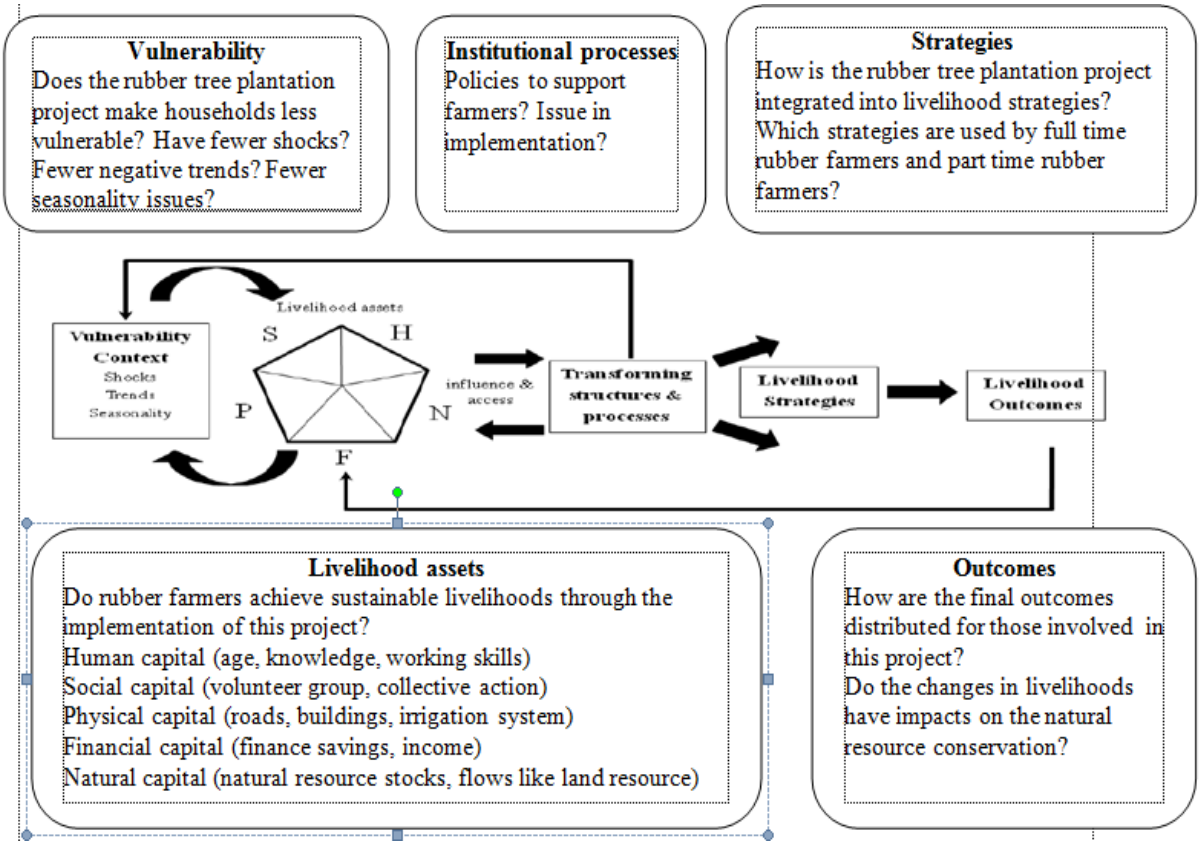

Figure 2. The sustainable livelihoods framework by DFID (*Sources*: Carney, 1998)

In each indicator, three critical values were used to express different degrees: "0.33" was defined as "poor", "0.66" was defined as "average", and "1.00" was defined as "good" (Muangkaew & Shivakoti, 2005). Based on the indicators and design features of the questionnaire, the weighting methods of this study were applied in three ways.

The first method was applied to the indicators "working-age member" and "education", and was ranked as the opportunity to earn a wage or salary with a rating of good, average, and poor.

I = Good%×1.00 + Average%×0.66 + Poor%×0.33

The second weighting method was used with the indicator "join a volunteer group". The responses from respondents had two choices: yes and no.

I = Yes%×1 + No%×0

The third one was related to the indicators "income", "landholding size", and "irrigated land area". The "mean" value was the key point in this method. Of which, "0" was defined as "poor", with the weight value of "0.33"; less than or equal the "mean" was classified as "average", equal to the weight value of "0.66"; and more than the "mean" was sorted as "good", and given a weight value of "1.00".

I = (0)%×0.33 + (≤Mean)%×0.66 + (> Mean)%×1

After the weight calculations, the value of each type of capital was calculated. The integrated measurement equation was applied as follows:

$$C = \sum_{n=0}^{n} \frac{I_n}{T_n}$$

where C is the criteria score for each asset ($0 \leq C \leq 1$), n signified the n^{th} indicator of the criteria ($n = 1, 2, 3, \ldots n$), I denotes the indicator, and T is the total number of indicators.

The total livelihood assets of each cluster were calculated as

LA = (Cp + Cn + Ch + Cf + Cs) / 5

of which, LA is the livelihood assets; and Cp, Cn, Ch, Cf, and Cs are the capital values of each type of livelihood asset; with Cp marked as physical capital, Cn as natural capital, Ch as human capital, Cf as financial capital, and Cs as mean social capital (Muangkaew & Shivakoti, 2005). Additionally, to illustrate the differences among clusters, the statistic method of a rank order Kruskal–Wallis ANOVA was used to test the livelihood capital subcomponents like landholding size and income.

Results and Discussion

The Supported Policies in the Afforestation and Perennial Crops Project: A case study in the rubber plantation context in Dien Bien district

In Dien Bien province, the government has promulgated policies to support local people regarding planting forests and perennial trees. One of which was Decision No. 10/2011 of the Dien Bien Provincial People's Committee, promulgating support for forest development and forest protection in Dien Bien province from 2008 to 2020. The policy included investment support of about 15,000,000 VND (about 750USD) over 4 years for planting protective forests and special-use forests. While the protecting forests (including planting forests and natural forests) received investment support of 200,000 VND/ha/year (nearly 10USD), the boundary forests for natural regeneration combined with supplementary planting received investment support of 1,000,000 VND/ha (about 50 USD) over 6 years.

In the case of subsidies for perennial plantations, Decision No. 02/2014 of the Dien Bien Provincial People's Committee promulgated policy support for agro-forestry and fishery production in Dien Bien province and had clear improvements to promote the local people. For coffee plantations in the planned area, the subsidy was 4,500,000 VND/ha (about 230USD) and 50% of the cost of seedlings. In tea and fruit tree developments in the planned area, the farmers received 100% and 50% of the costs of seedlings, respectively. Livelihood improvements were clearly mentioned through the support activities, individuals, and enterprises engaged in agricultural production in Dien Bien province in Decision No. 02/2014, including seedlings of rice, corn, beans, and grass; piglets for pig-farming; reduced interest

rates of bank loans; and technical training about plant protection, veterinary services, and aquaculture.

In fact, the main objectives of the above subsidies were to reduce the pressure on deforestation and reduce the poverty in mountainous areas of some parts of the province. However, there were very limited guidelines on the administrative procedures for receiving the subsidies while the dependent people – mainly ethnic minorities – lacked information and lived far away from the commune center. Not surprisingly, the local people often complained that they neither understood the forest policies nor did they know the exact process for accessing support (in-depth interviews with farmers).

In the case of the rubber plantation context, the Rubber Plantation Project was introduced as an alternative to shifting cultivation in the mountainous area. The aims of this project were to improve the percentage of green coverage and alleviate poverty for ethnic groups. With these goals, the sustainable livelihoods for people in the projected area were one of the major targets of project management. The arrangement model of this project was large-scale investments, of which, farmers participated by contributing capital like land and labor under contract; while the Rubber Joint-stock Company invested in other capital and secured the market for the production. The results identified that the government had issued several policies to help the investors and farmers involved in this project. However, concerns about their practice were raised, some of which included: the low percentage of dividend sharing for farmers, unclear land use rights, and the inadequate application of policies to reality (Trædal & Angelsen, 2020). Moreover, in the study area, rubber plantations expanded into to cropland areas. This caused a number of conflicts, such as conflicts between land use for agriculture and land for rubber plantations (in-depth interview with farmers). A set of strategies and recommendations were given to utilize alternative farming methods and sustain the livelihoods of the local ethnic minority groups.

With the aims of supporting new livelihood options and reducing poverty for poor upland farmers, the local government considered several policies to equalize the potential between the Dien Bien Rubber Company and local farmers.

By Decision No. 25/2008 and Decision No. 1498/2008 of the Dien Bien Provincial People's Committee about promulgating the interim policies on the development of rubber trees in DB province up to 2020, when local individuals and households contributed land capital to the DBRC, they had the following rights: (1) Calculation of land value as shared capital to the Company with the amount of 10 million VND/ha. Land capital contributions contracted with the Company to plant rubber would be managed by the Company until the end of the latex exploitation (about 30 years). The Land Use Right Certificate of that land would be managed by the Company. Households and individuals who received a land contribution capital record were entitled by the Company and had legal validity in the process of land capital contributions according to the land use rights; (2) Be entitled to interest on the amount of land contributed when the latex would be exploited. The profits would be based on the percentage of land contributed (for example, the total value of investment in one hectare of rubber is 100 million VND. Of which, 10 million of the capital contribution belonged to individuals and households, and 90 million to the Company. From the 8th year onwards, while tapping, the total annual value obtained after subtracting costs and depreciation of property, and the interest earned would be divided into 10 parts. Households and individuals would receive 10% interest from that time on to liquidation); (3) At the end of the rubber business cycle (30 years), the land would be returned to the users. If the RPP continues beyond that time, the value of the land capital contribution would be calculated into the next 30-year cycle based on the farmers' agreement and the price at that time; (4) The households would be supported by the Company with an amount of 500,000 to 1,500,000 VND/ha for the remaining vegetation in the area (depending on the density of vegetation); (5) The Company would have a priority policy to hire the young local men to be long-term workers in the company. The workers would be entitled to a

labor contract and have rights and responsibilities according to the current regulations of the nation. While working at the company, the workers would be granted receive labor protection equipment like protective clothing, raincoats, boots, gloves, etc.; (6) Those households that were not eligible to become long-term laborers could make a farming contract with the Company to take care of the rubber farm and receive income based on the contract; and (7) Farmers would receive support for their land contributions: (i) an amount of 5.0 million VND/ha (250 USD) for land used for perennial trees contributing to the Rubber Plantation Project; (ii) an amount of 3.0 million VND/ha (150USD) for land used for annual crops contributing to the RPP; (iii) an amount of 6.0 million VND/ha (300USD) for land used for forest purposes contributing to the RPP; and (iv) Farmers would be given 100% support for rice, legume seed, and fertilizer during the first two years.

These guidelines faced many problems related to land management and land compensation. The project did not receive the high consent of the local people. Some farmers still prevented the use of their land and did not want to contribute. It may have been because of the unclear policies on contract farming, the schedule of compensation payments, and the lack of support (in-depth interviews with key stakeholders).

Expression of farmers about project's benefit

> The reality is somewhat different from what we expected at the beginning days. When they persuaded us, they promised to help us rice, money, job and build roads and schools. After 4 years, I do not see any new infrastructure that would be built from this project. They promised to create job, but only young men could be hired to work for Rubber Company. Now, we just wait and pray that rubber have good latex so we can share

Source: In-depth interviews with a key stakeholders

To improve the regulations, the Dien Bien Provincial People's Committee issued Decision No. 16/2011, with the aim of increasing land compensation and a clear schedule of payments. In this decision, the DBRC support for families and individuals who contributed their land for rubber tree growing would receive the following: (1) Support for contributing their land at the rate of 7.0 million VND/ha (350USD) for perennial trees, which would be paid once at the time when the land was contributed; (2) Farmers would receive support for contributing their land at the rate of 4.5 million VND/ha (225USD) for annual crops, which would be paid once at the time when the land was contributed; and (3) Farmers would receive support for contributing their land at the amount of 6.0 million VND/ha (300USD) for land used for product forest cultivation, which would be paid once at the time when land was contributed.

Besides, the rubber farmers would also be supported in agricultural development and professional training transformations. With the support of intercropping in rubber growing areas, the households and individuals would receive 100% support for rice, legume seed, and fertilizer during the first two years.

Although the policies highly supported the farmers, the local people still complained about their implementation as stated in the box below:

Complaint of farmer about policy implication

> "The policies are unclear for some issues, for example, some Decisions to help farmers. I followed the Decision to recover land but it was unclear about the policy to help farmers except for the promise from the local government. After land acquisition, I did not receive the 100% support for rice, legume seed, and fertilizer during the first two years as mentioned in Decision 16/2011 of the Dien Bien Provincial People's Committee. Also, the money for land compensation was released at a later year. I received the money in 2010, instead of 2008 which was the year the land was acquired."

Source: In-depth interviews with farmers

The policy for sharing dividends between the Dien Binh Rubber Company and contributors was also unclear. In both Decision No. 1498/2008 (issued on October 17, 2008), and Decision No. 25/2008 (issued on December 30, 2008) by the DBPC about promulgating the

interim policy on the development of rubber trees in the DB province up to 2020, the decrees were vague in deciding how much dividends the farmers would receive from their land contributions. The basics for the calculation of the contributed land areas were that the land value would be shared capital to the company with the amount of 10 million VND/ha. The profits and dividends of the shareholders were based on the corporate charter of the Dien Binh Rubber Company and the production efficiency when the rubber trees were ready for latex exploitation. This means that the sharing dividend was highly dependent on the Dien Binh Rubber Company. The farmers did not know the costs, benefits, and total value of 1ha of rubber. They did not have a clear understanding of how much they could obtain from joining this project (in-depth interviews with farmers).

Because of the issues above, in Decision No. 16/2011 (issued on May 30, 2011), the DBPC decided that in the project, farmers who participated by contributing land capital under contract, would thereby become shareholders of the Dien Bien Rubber Join-stock Company. The company would invest and share benefits with the farmers. Once the rubber trees matured and produced latex, the farmers would receive 6% of the total product revenue after each extraction.

However, the "6 percent sharing" should be reconsidered in terms of equality and the farmers' livelihoods. In comparison, a study by Douangsavanh *et al.* (2008) reported that in Laos PDR, the sharing between rubber companies and farmers is common with the "2+3" contractual agreement. In this structure, while the contributors provide land and labor, the company provides technology, other capital, and a secure market. The total value that would be shared is 60% to farmers and 40% to the company. In short, even in a similar arrangement of large-scale rubber plantations, the benefits that the farmers in DB province, Vietnam received are much lower than the profits of rubber farmers in Laos PDR.

Moreover, up to now in the study area, the contracts for sharing dividends between the DBRC and farmers are still being processed. While the policy of dividend sharing was vague, a major concern of farmers was who will benefit from rubber planting. Most of the contributors belonged to an ethnic minority and had a high rate of illiteracy, hence most of them did not have a clear understanding of the realistic benefits that could be obtained from their land contributions. One of the issues was highlighted by a key stakeholder when he said, "If the DBRC is unfair in paying dividends and the farmer does not receive the value as they expected, it may lead to the destruction of the rubber plantation by farmers in the future" (in-depth interview with key stakeholders).

In the study site, a sustainable livelihood and food security were the most important things. Given the fact that the majority of the local people were members of an ethnic minority group, nearly 30% of them were from poor families. With the very limited amount of land for farming, one of the main concerns was sustainable livelihoods. If they contributed all their land to the rubber project, would it help them increase their income? Also, except for the group of rubber wage workers, a large number of farmers did not have land for farming and there were not any programs to create jobs.

In order to persuade farmers to contribute their land, the local governments and DBRC held several meetings with the local people and placed emphasis on their rights and interests when joining the project. However, from the in-depth interviews, many farmers complained that, when comparing the policies to reality, they were not able to receive the benefits from the project that they were promised. Some farmers who had low education and were illiterate still did not know about the policies and procedures of the program's implementation and their claims for benefits.

People's livelihood assessment

Livelihood assets in relation to participants and non-participants in the Rubber Plantation Project

Given a context of the implementation of the Rubber Plantation Project in the Dien Bien region, a comparison of changes in the livelihood assets was calculated among the three clusters of people who participated and those who did not

(non-participants), namely the cluster of households that contributed land and worked as wage-workers (cluster 1); the cluster of households that only contributed land (cluster 2); and the cluster of households that did not participate in this project (cluster 3). The analysis was conducted in the five capital assets, human capital, natural capital, financial capital, physical capital, and social capital, as shown in **Table 1** and **Figure 3**.

Assessing the livelihood capitals illustrated the constraining and enabling factors to achieve sustainable livelihoods among the clusters depending on their involvement in the Rubber Plantation Project (**Figure 4**). In short, in all the clusters, there were constraints imposed on the variables like irrigated land area, joining the Afforestation and Perennial Plantation Project Volunteer Group, and infrastructure. The improvement for sustainable livelihoods should

Table 1. Total value of livelihood assets among clusters

Capitals	Indicators	Cluster 1		Cluster 2		Cluster 3	
		Indicator weight	Capital value	Indicator weight	Capital value	Indicator weight	Capital value
Human capital	1. Working age member	0.73	0.8	0.74	0.64	0.77	0.52
	2. Education	0.52		0.51		0.46	
	3. Skill and knowledge	1.00		0.66		0.33	
Natural capital	1. Landholding size	0.34	0.49	0.36	0.54	0.73	0.53
	2. Irrigated land area	0.65		0.73		0.33	
Financial capital	1. Income from wage-work	0.83	0.78	0.33	0.61	0.33	0.47
	2. Income from land compensation	0.75		0.72		0.33	
	3. Income from non-rubber source	0.77		0.79		0.75	
Physical capital	1. Infrastructure	0.33	0.66	0.33	0.66	0.33	0.33
	2. Distance to forest area	1.00		1.00		0.33	
Social capital	1. Access to project	1.00	0.74	1.00	0.73	0.33	0.33
	2. Join the association	0.48		0.46		0.33	
			0.69		0.64		0.44

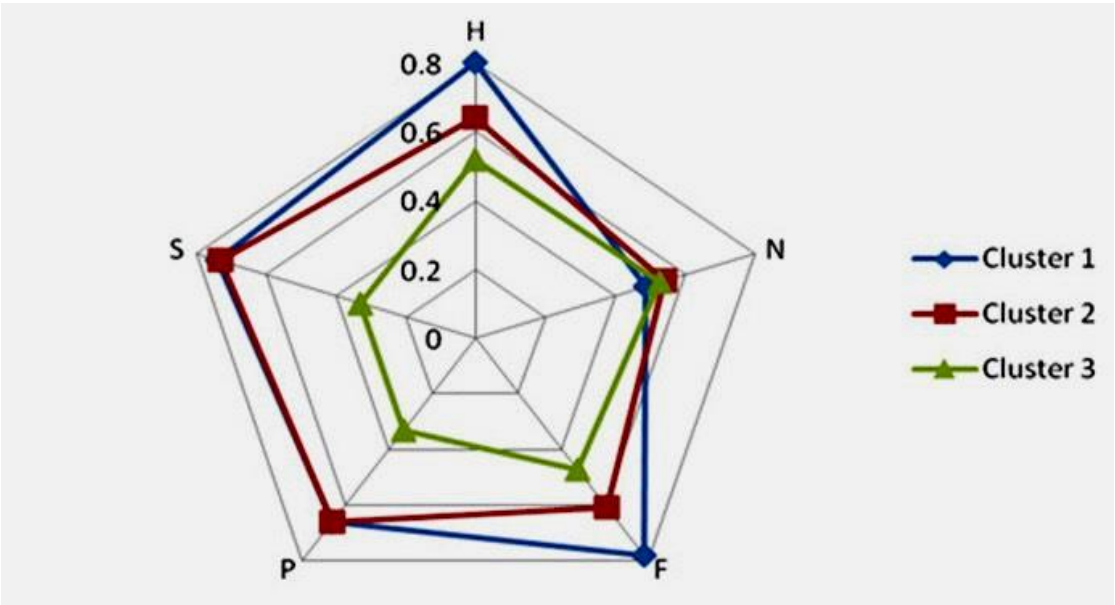

Figure 3. Livelihood assets within clusters

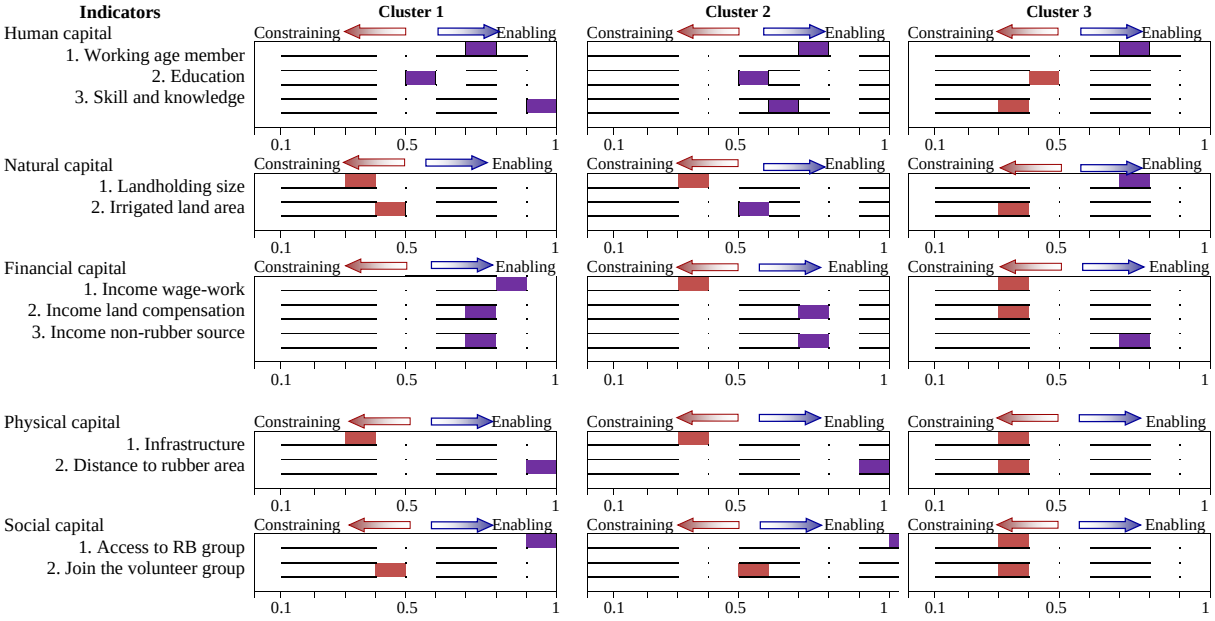

Figure 4. Constraining and enabling factors to achieve sustainable livelihood

focus on almost all the indicators in cluster 3. In cluster 1, consideration should be put on natural capital, while cluster 2 should focus on natural capital and financial assets.

Livelihood improvements should put emphasis on the non-rubber area (cluster 3) where there are ethnic minority group settlements, for example, H'Mong and Kho Mu. Living in the same commune, the Thai people (clusters 1 and 2) received subsidies from the government but the H'Mong and Kho Mu did not receive any support. The analysis showed that the H'Mong people were poorer than the Thai while they lived in similarly remote areas and they only shifted cultivation with low income. Therefore, policymakers must take more notice of these people in terms of increasing their livelihoods and providing them alternative farming opportunities.

Livelihood achievement from rubber plantation project

Based on the Agricultural Department of Dien Bien district, before joining the RPP, the farmers in the study area mostly cultivated upland rice, maize, and cassava. The yield from upland rice was around 1.5- 2 tons/ha with an average income of 12-16 million VND/ha/year (550-730 USD).

After four years of implementing the RPP, from the livelihood assessments and in-depth group discussions, the average income from 1 ha of land contributed to rubber was much higher compared with rice and maize cultivation. When one household contributed one ha of land for the rubber plantation, they would receive 3 million VND/ha from the government subsidy and could intercrop rice or maize in the first two years to get an income of 5 million/ha/year. Also, if the Dien Binh Rubber Company hired one worker from this family, they would be paid around 30 million VND/year. Each year, the total income gained would be about 30-35 million VND/ha (1360-1600 USD), as shown in **Table 2**.

Compared with the land use before contributing, the benefits from the rubber tree plantations were far higher than the income from annual crops. However, the final benefit seems to be distributed only to the group of farmers who work for the Dien Binh Rubber Company (rubber workers).

Up to now, it can be said that rubber is a suitable intensive farming practice to replace slash and burn cultivation in this district. This farming activity may help local people to escape poverty. Before this project, DB district had experienced several failed projects. Two

Table 2. Benefits from the first four years for 1 ha of land contributed to the RPP *(Unit: million VND)*

Benefit	1st year	2nd year	3rd year	4th year
Government Subsidy			3	
One hired worker	30	30	30	30
Intercropping	5	5		
Total	35	35	33	30

Source: Field survey

examples include small-scale coffee farming and perennial fruit tree farming that were not successful due to fruitless plants and very low yields. The evidence of the rubber tree development was justification that rubber can be well developed in the Dien Bien region. The DBRC representative reported that in Dien Bien district, the rubber latex would be exploited one year earlier than usual.

However, considerations about rubber plantations must be taken into account. Reforestation and environmental protection in areas used in rubber plantations must be a priority. Rubber as a monoculture does not contribute to eco-protection, but negatively affects biodiversity. Mono-crops of rubber do not keep water, maintain carbon stocks, or prevent soil degradation, as well as natural forests, do (WRM, 2010).

To sum up, the overall analysis showed several conflicts and effects of the RPP to the local people of whom about 80% of the total households contributed arable land for the rubber plantations. The main reasons they were involved in this project were the promise of better livelihoods and the expectation of benefits. When the natural land area was limited, the main conflict was land use for agriculture and land for rubber. The decline of cropland area by the amount of 60% of landholding size caused reductions of agricultural laborers. However, this project seemed to demonstrate good farming practices as it raised income and created working opportunities for local young people. To make improvements, livelihood strategies were addressed, for instance breeding pigs and poultry in the Thai community while raising cattle like buffalo and goats in the H'Mong village.

Conclusion

The research has shown the existing policies to support farmers involved in the Afforestation and Perennial Plantation Project. The purpose of these policies was to encourage and subsidize farmers to ensure their sustainable livelihoods. With this support, farmers in the projected area achieved higher benefits, reduced poverty, and seemed to have great satisfaction when involved in these projects.

This project brought some opportunities to create jobs and labour income for young men, and some subsidies like land compensation, rice, and aid to poor people. There were some differences between the written policies and reality in terms of running this project. Some rights of farmers were not considered as issued in the policies. Many farmers complained about how they did not get the benefits they expected.

This case indicated the prospect of utilizing rubber tree plantations in creating working opportunities, being major income sources, and reducing the occurrences of landslides in the rubber growing area. However, to be effective, this project required stakeholders to attend to the local people's livelihoods and benefits sharing. At the same time, support and alternative livelihood strategies should be made to improve and ensure sustainable livelihoods for the local community.

The livelihood improvements should also focus on non-rubber areas made up of ethnic minority groups such as the H'Mong and Kho Mu ethnic people. Policymakers must take into consideration policy applications in the regions where local people lack knowledge and do not clearly understand the way to receive the support and subsidies.

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