Creation of Farm Forestry on Allocated Forestland and Its Contribution to the Livelihoods of Local People in a Mountainous Region of Northeast Vietnam

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Nguyen Thu Thuy

Creation of Farm Forestry on Allocated Forestland and Its Contribution to the Livelihoods of Local People in a Mountainous Region of Northeast Vietnam

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Nguyen Thu Thuy

Abstract

As a countermeasure to serious deforestation under the state management, a policy known as forest land allocation (FLA) aiming at forest conservation and rural livelihood improvement was introduced in the early 1990s. The forestland has been allocated to individual households in forested regions, where the population was dominated by ethnic minorities, with a 50-year period. The recipients have been encouraged to replant trees on the barren land or degraded forestland with financial and technical support from a series of government reforestation programs. As of 2014, 12.6 million ha (79.7%) of the total forestland has already been allocated to various management entities, 34.9% (4.4 million ha) of which was distributed to households. Consequently, FLA led to creating numerous small-scale farm forests managed by ethnic minorities.

Regarding the initial stage of FLA, previous studies focused on negative impacts because FLA counteracted people's free access to forest products and land. Another critical point was inequity in local societies caused by unevenly allocated area. Nevertheless, the studies and government statistics on forest cover changes indicated an increasing trend. Compared to the concentration of the studies at the initial stage and on development project sites, studies on the matured stage are less and few studies clarified local-level land-use changes and their driving forces. Therefore, this study focused not only on the process and the current situation but the sustainability of FLA. How the allocated forestland had been converted and what were the driving forces, and how the benefits from FLA were distributed to recipients were examined.

Apart from the policy and process analysis based on secondary data and key-informant interviews, two upland villages in Northeast Vietnam were selected for the case study. These two villages (A and G) have similarities in FLA implementation, geographical settings, and ethnicity, namely Tay as the majority and non-Tay as minorities. On the other hand, Village A without a paved road was located in the furthermost area from the commune center, and Village G, in contrast, was located along a paved road. I focused on differences in locational conditions and compared the villagers' responses to FLA. Face-to-face interviews with 72 households were conducted from January to March 2016, and a supplemental survey was conducted in March 2017.

As a result of interview data analysis, it was found that FLA prompted the recipients to shift from shifting cultivation to sedentary upland uses. All 37 sample households (100%) of Village A and 33 households (94.3%) of Village G obtained production forestland, which was average 4.54 ha and 3.43 ha per household, respectively. Most of the recipients of both villages got the Land Use Certificate (LUC). There was no significant difference in the mean of allocated land between two villages and LUC issuance, but production forests were unequally distributed among the original recipients also ethnic groups in each village. In both villages, the mean of allocated land to non-Tay households was significantly smaller than Tay households. The issue of inequity as pointed out in previous studies was also observed in this study.

Remarkably, degraded allocated forestland was converted to tree plantations in both villages. However, the disparity of the allocated areas used for tree plantations among recipient households was little in both villages. That is, those who obtained larger allocations planted only a part of their land, whereas those who obtained smaller areas converted almost entire areas. The limit of the plantation areas was likely caused by the government supports. These supports were done under conservation programs, but they reached differently, earlier in Village G which had better accessibility. Consequently, the people of Village G could start harvesting in 2007, and now the allocated land is under the second tree cultivation with continuous government support. In contrast, in Village A with poor accessibility, there was no government support until 2005. Except for one recipient household in Village A, all remaining recipients had planted trees, and there was no significant difference in the average areas used for timber crops between the two villages. Thus, the road condition was not a direct determinant of tree planting, but affected when the government support was introduced, which consequently and indirectly influenced the start of tree planting. In addition to tree crops, food crops were also cultivated on allocated forestland, which was allowed as a transitional measure by the government. The number of households cultivated food crops was significantly larger in Village A than Village G.

FLA contributed to the income of recipient households in both villages, but the total income from FLA was unequally distributed among recipient households in each village as observed in previous studies in Central Highlands in Vietnam. In addition, in

comparison with previous studies, income from timber plantations has not been improved considerably due to small harvested areas.

As the tenure right was secured by LUCs, initial investment cost was supported by the government, farm forestry is being developed in northeast Vietnam so far as inferred from the cases. However, the third government reforestation program (Program 147) was completed in 2015, and currently, there is no subsequent program. Whether the sample households replant trees by themselves after harvesting the currently existing trees or just abandon the land after harvesting should be monitored. When the study was conducted, the government support was a determinant of plantation land expansion, but when self-sustaining farm forestry is developed, the unequally allocated area as mentioned above may amplify the economic disparity.

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Acronyms and Abbreviations

CPC	Commune People's Committee
DARD	Division of Agriculture and Rural Development
DONRE	Division of Natural Resources and Environment
DPC	District People's Committee
IAD	Institutional Analysis and Development
FAO	Food and Agriculture Organization of the United Nations
FLA	Forestland allocation
FPU	Forest Protection Unit
FRA	Forest Resources Assessment
HH	Household
LUC	Land Use Certificate
MARD	Ministry of Agriculture and Rural Development
MBPF	Management Boards for Protection Forest
MBSF	Management Boards for Special Use Forest
MONRE	Ministry of Nature Resources and Environment
NPV	Net Present Value
NTFP	Non-timber forest product
NWFP	Non-wood forest products
REDD+	Reducing Emissions from Deforestation and Forest Degradation
SFE	State Forest Enterprise
USD	US Dollar (1USD was equivalent to 22,470 VND on April 2016)
VND	Vietnamese dong

CHAPTER 1: INTRODUCTION

This chapter first compares the forest cover change in Vietnam to neighbor countries and provides general information about the policy reform. Next, previous studies that evaluate the effects of the policy reform are critically reviewed, and what are the prerequisites for farm forestry development were clarified. Following this, the chapter also illumined the issues, such as the impacts of the FLA implementation on the conventional forestland and resource utilization by the dwellers, distribution of forestlands to management entities, the effects of FLA on forest cover change, and the contribution of FLA to livelihood improvement, have already been studied. But, previous studies have not paid much attention to how the allocated forestland has been converted into farm forestry and what are the prerequisites for creating a farm forestry in the uplands of Vietnam. Also, lack of studies that examined the role of government programs in encouraging tree planting after FLA, and distribution and management of the different forestland categories under the FLA policy. In addition to the limitations of previous studies, forest cover changes after FLA has been examined mainly at the large-scale level by using satellite imageries and the author's opinions, this study emphasized on local land use changes.

1.1. General background

1.1.1. Vietnam in the global trend of forest-cover change

The forest cover change in a country or a region is one of the primary indicators of sustainable forest management. According to the latest Global Forest Resources Assessment (FRA) 2015 by the United Nations Food and Agriculture Organization (FAO), forest cover changes in Southeast Asia showed a high contrast. While Indonesia, Myanmar, and Cambodia experienced a significant drop between 1990 and 2015, which annual net losses of forests are estimated at 1.10 million ha (1.1%), 0.41 million ha (1.2%), and 0.14 million ha (1.2%) respectively (FAO 2016). In contrast, Vietnam stands out as one of the few forest gain countries among developing countries in the world, which annual net gain between 1990 and 2015 was about 0.21 million ha (1.8%) (*ibid.*). However, before the 1990s, Vietnam experienced serious deforestation. The U-shape recovery of forest cover in Vietnam promoted the researchers' interests, particularly those in the field of forest transition theory (Mather 1992).

The issue of forests has been set high on the international policy debates over the past three decades. In 1985, the Tropical Forestry Action Plan, an international framework to develop national and regional action plans for sustainable forest management, was issued by the FAO in collaboration with the World Bank, the United Nations Development Program (UNDP) and the World Resource Institute in response to deforestation, particularly in the tropics (FAO 1985). Forest loss connected with soil erosion, large-scale floods, and biodiversity loss became a central issue at the United Nations Conference on Environment and Development held in 1992, but it failed to shape an international convention directly dealing with deforestation issue.

After long debates in the international arena and yet progressing deforestation, finally in 2007, the thirteenth Conference of the Parties to the United Nations Framework Convention on Climate Change held in Bali agreed on roles of forests to reduce greenhouse gas (GHG) emissions, which was realized in the framework of Reducing Emissions from Deforestation and Forest Degradation (REDD+). REDD+ has been drawing significant attention and investments, both from the public and the private sector, because of its potential to reduce GHG emissions while benefiting local communities. In addition to the role of natural forests in environmental conservation, the REDD+ framework has created expectations for barren and degraded forestlands because of the high additionality in carbon credits when reforestation programs are successfully introduced, and the tree plantations are sustainably utilized.

Another trend in the international forest-related debates and policies is devolution and decentralization in forest administration and management. Devolution is generally conceived as a policy that aims to include a more diverse set of actors in forest management or to transfer property rights and responsibilities in forest management from the government sector to local actors (White and Martin 2002). The major trend following this paradigm shift has been realized in introducing small-scale collective actions such as Community-based Forest Management in the Philippines, and Community Forestry in Thailand and Cambodia. In contrast, the government of Vietnam adopted privatization of forestland management as explained in the next section.

1.1.2. Forestland allocation policy and related programs in Vietnam

In Vietnam, forest issues have been associated with ethnic minority issues. Forests are mainly distributed among three regions of the Northeast, North Central, and Central Highlands (FAO 2009), where their population is dominated by ethnic minorities (Kozei 2014). Unlike Kinh people, who accounted for 85.4% of the country's population in 2015 (GSO 2016) and have historically engaged in wet rice cultivation in plain areas, traditional livelihoods of ethnic minorities were associated with shifting cultivation (Castella et al. 2006). It is estimated that about 2.9 million people were engaged in shifting cultivation in 1989 (Tran 2007) and the total area under shifting cultivation was 3.5 million ha in 1991 (Do 1994). Thus, forests are not only indispensable for environmental conservation, but also for social stability and economic development, particularly in mountainous regions.

After the reunification in 1975, the then Ministry of Forestry was set up in 1976 and State Forest Enterprises (SFEs) were established to execute forest management (Nguyen et al. 2008); all forests and forestland were put under the management of a system of SFEs and other governmental entities. While local people who lived in or near forests had no legal access to forests, SFEs attained vast areas of forests though they did not have sufficient human power for effective management. The sharpest forest cover drop took place under the SFE era, from 33.8% of the total land area in 1976 to 27.8% in 1990 (de Jong et al. 2006). Deforestation was particularly serious in the Northeast region and Northwest region (Meyfroidt and Lambin 2008). Together with ineffective forest management by the SFEs, shifting cultivation was largely responsible for severe deforestation occurred in these regions (Donovan et al. 1997; Jamieson et al. 1998; de Koninck 1999). How to lead the ethnic minorities in the direction of sedentary agriculture and recover denuded hill slopes whereas reorganizing SFEs became a political challenge (Castella et al. 2006).

It is well-known that rapid forest cover increased after the 1990s in Vietnam, as emphasized in the FRA, is associated with a series of policy and program. The political challenge in ethnic minority issues and SFE issues was embodied in forestland allocation policy (FLA). Following the renovation (doi moi) policy in 1986 and the shift in the land policy from collectivization to decollectivization in the 1980s (Akram-Lodhi 2007), the FLA policy as the devolution program in Vietnam was introduced in the early 1990s and

the forestland previously managed by the state has been reallocated to various management entities with long-term contracts, among which individual household is one of the most important management entities. In other words, forest cover increase in mountainous regions is associated with responses of ethnic minorities to the policy reforms.

To provide the legal framework for involving various stakeholders in the forest and forestland management, the government issued the Forest Protection and Development Law in 1991 and Land Law in 1993. Following these laws, Decree 02/CP/1994 on allocation and Decree 01/CP/1995 on contracts were promulgated to guide the implementation of FLA. Under Decree 02/CP, individual households are allocated certain plots of production forest on a 50-year contract.

In accordance with the policy, recipients are encouraged to protect forest resources from harmful exploitation by other people and to replant trees on barren and degraded forestlands. A series of reforestation programs were accompanied to provide financial and technical support for tree planting activities. These programs have aimed at protecting existing forests, regenerating natural forests and establishing new plantations on forestlands without tree covers. In particular, the two national large-scale reforestation programs attached to the policy, namely the Greening Barren Hills Program (or Program 327 according to Decision 327/CT 1992) which started in 1993 and ended in 1998, and its successor program named Five Million Hectare Reforestation Program (or Program 661 according to Decision 661/ND-TTg) from 1998 to 2010, have provided various forms of financial and technical support to forest recipients in forest protection and tree planting on barren and degraded forestland. The purposes of the Program 327 were to re-green barren hills, protect existing forests, assist the natural regeneration of forests. The objectives of the Program 661 were to protect existing forest and to plant five million ha of forests, including two million ha of protection and special-use forests and three million ha of production forests. Notably, both Program 327 and Program 661 applied to all three forest categories. In 2007, the third afforestation program was introduced based on the Decision 147/2007/QĐ-TTg of the MARD (Program 147). This Program 147 only supported funds to develop production forests which were allocated mainly to local households in the period of 2007 – 2015. It aimed to plant two million ha in production forests, annually 250 thousand ha including replanting areas after felling.

As of 2014, 12.6 million ha (79.7%) of the total forestland has already been allocated to various management entities, 4.4 million ha (34.9%) of which was allocated to individual households (MONRE 2014). Consequently, the FLA policy resulted in the creation of numerous small-scale farm forests managed by ethnic minorities. On the other hand, as arable land in mountainous regions was critically limited, the creation of farm forestry on allocated forest land is necessary to make conservation and livelihood compatible. In addition to the goal of the policy on forest conservation, questions related to the impacts of FLA on livelihood improvement continue to be raised even after many years have passed since the introduction of the FLA policy. While achieving one of the goals, namely, forest conservation, whether or not the farm forestry achieved another goal of livelihood improvement should be questioned.

1.2. Literature review

1.2.1. Effects of FLA on forest cover change

One of the objectives of the FLA policy is to increase the national forest cover by encouraging local people to manage existing forests sustainably and to invest in tree planting. However, previous studies in the early stage of FLA mostly emphasized the negative impacts of FLA on forest resources. A study conducted in three villages of the Northwest region supplemented with satellite imageries of 1989, 1993 and 1996/1997 revealed that FLA has little impact on forest cover increase (Sikor 2001). According to the interviews with 20% households of three villages using semi-structured questionnaires, the respondents put a higher priority on agricultural intensification for food security than reforestation programs (*ibid*.). This finding is consistent with another case in the same region applying geographically weighted regression analysis to satellite imageries and statistical data between 1993 and 2000, where FLA had zero or negative impact on forest cover increase (Clement et al. 2009). In addition, a study conducted in four provinces of the Northwest and Northeast regions in 2006 showed that the reforestation program associated with FLA failed to encourage local households to plant trees due to poorly designed policy at the central level (Clement and Amezaga 2009). This study used the Institutional Analysis and Development (IAD) framework and interviewed to 20 provincial level officers and 80 farmers and commune authorities to

assess the impacts of FLA on afforestation, but there are no quantitative evidences to support their conclusions.

Likewise, the villagers continued to extract forests and cleared primary forests for shifting cultivation even after FLA in two upland communities of the North Central region (Gomiero et al. 2000). This study was conducted in 1997 by interviewing 150 households, but the data collection method was unclear. Another case study in the Central Highlands, FLA failed to prevent opening new agricultural fields in the allocated forest due to weak law enforcement (Sikor and Tran 2007). Through the field work conducted in 2002, the authors observed that the villagers seized opportunities provided by FLA to convert forestland into agricultural fields. However, qualitative data were not used in the article even though interviews with all village households using semi-structured questionnaires was a part of the research methods.

On the other hand, positive impacts of FLA on forest resources have also been realized. Meyfroidt and Lambin (2008), who conducted a satellite imagery analysis for a 1993-2000 period over the whole country, revealed that the effects of FLA in forest cover change varied regionally. Regeneration of natural forests occurred in the mountainous areas of the provinces, from the north to the central part, especially in districts with steep slopes which were not relevant to agricultural development. Natural forests in the Northern mountains increased considerably at an annual average rate of 1.82%. In contrast, in the Central Highlands, the annual average natural forest loss was 0.23% (ibid.). In addition, positive impacts of FLA have also been realized through promoting rural households to join tree planting. A study conducted on a district in the North Central region supplemented with satellite imageries of 2001 and 2004 revealed that degraded forests were converted into tree plantations after FLA (Thiha et al. 2007). FLA has also contributed to cease shifting cultivation among ethnic minorities in the Northeast region (Castella and Erout 2002, Castella et al. 2006). The authors observed reforestation appeared from 1995 since FLA was introduced by using the satellite imageries of 1995 and 1998.

According to the government statistics, the national forest cover increased to 40.8% in 2015, the main driving force of which was a rapid expansion of tree plantations (MARD 2011, MARD 2016). In fact, the area of planted forest increased from 0.74 to

3.34 million ha during the period of 1990-2015, which currently accounted for 24.7% of the total forest area (de Jong et al. 2006, MARD 2016).

1.2.2. Effects of FLA on local society and livelihoods

Local livelihood improvement is one of the FLA policy goals through benefits obtained from management activities and utilization of allocated forest resources and forestland to forest dwellers. As mentioned earlier, most of the forestland recipients were ethnic minorities. Indeed, the majority of ethnic minorities in the hilly and mountainous regions of Vietnam, where arable land is critically limited, so their traditional livelihoods were associated with shifting cultivation. Deforestation was particularly serious in the Northeast and Northwest regions (Meyfroidt and Lambin 2008). Rapid expansion of shifting cultivation was largely responsible for the deforestation (Donovan et al. 1997, Jamieson et al. 1998, de Koninck 1999). For this reason, when the FLA policy has deployed, ethnic minorities were given the first priority to encourage them in maintaining forest resources and enhancing the livelihood. In addition, a poverty assessment of the Work Bank (2012) based on the 2009 Housing and Population Census and the 2010 Vietnam Household Living Standards Survey claimed that ethnic minorities made up only 15 % of the population in Vietnam and nearly half (47%) of the total poor. New poverty maps show that minorities are concentrated in upland regions near the forest resources away from the coastal plains and major cities, with less infrastructure and much poorer connectivity (ibid.). Hence, poverty alleviation for ethnic minorities based on available potentials near their settlements, such as forest resources and forestland, through the development of alternative livelihoods has been deeply interested by the government over many years.

Some researchers pointed out that benefits from FLA were contributed unequally among the recipients. In the Northwest region and Central Highlands, better-off villagers took advantage of FLA to monopolize access to allocated forests and excluded poorer villagers from this access. Besides, households with kinship ties to local officials often tended to achieve higher quality forests and closer proximity to the villages than other recipients (Nguyen et al. 2008). The survey of this study was conducted in 2007 by interviewing key informants and all 180 households of eight villages, including four

villages from two communes in Hoa Binh province of the Northwest region, and four villages from three communes in Dak Lak province of the Central Highlands. Twenty-five households of each sample village in the Northwest region and 20 households of each village in the Central Highlands were selected to the household survey. In the Central Highlands, there was an unequal distribution of forestlands and forest resources among villagers (Sikor and Tran 2007). The authors reported that allocating forestland has frequently been conducted based by the number of laborers available per household at the allocation time, which means that households with more laborers had more opportunities to attain larger plots. In addition, the better-off households tended to harvest timber products more from the allocated forest than the poorer ones (Nguyen 2006, Sikor and Nguyen 2007). Inequity in forest land and resource access has not only happened between households within each village but also among villages. The allocated forestland to some villages had higher timber volume than that of neighboring villages, which leading to a major gap in generating income (ibid.). In both studies, fieldwork was conducted in 2002 where FLA took place between 1999 and 2000. Nguyen (2006) selected 13 villages in Dak Lak province of this region with 95 households of 2 villages and 228 households of 11 remaining villages for data collection. Field data from all 95 households of 2 villages in Dak Lak province was used in the study of Sikor and Nguyen (2007). Both papers focused on analysing differentiation in benefits from devolved forests among local households, these benefits included the value of the harvest from cultivated food crops, timber products, and NTFPs in the devolved forests. Also, Sikor and Nguyen (2007) indicated that local power relations and institutions may create disadvantages for poor households to get benefits from FLA. Furthermore, Clement and Amezaga (2009) concluded that staffs from former SFEs and civil servants were likely to seize most of the benefits from FLA, due to the political and economic context which has contributed significantly to supply financial and bureaucratic incentives to them. The findings of this study mainly based on descriptive information by applying the Institutional Analysis and Development framework.

FLA is expected to create positive changes in the economic condition of the recipients, especially among the poor strata of society. But, due to lack of capital for investment, many households in the Northeast and Northwest regions were unable to put the allocated land into productive use (To 2007), thus failing to capture any benefits from

FLA. In other words, rights given to the recipients have not automatically reflected in actual economic effects. Eventually, in a village of the Dao ethnic minority in the Northeast region, poor households sold a part or the whole of their allocated land to better-off households within the village, or to people outside the village because they could not afford the investment in the allocated plots. This made poor households landless (ibid.). This study was conducted between 2004 and 2005 in two villages of the Northwest region and a village of the Northeast region with all 82 households of three villages selected for interviewing. The sample household was selected randomly and applied at least 20% of total households in each village. In addition to household surveys, key informant interview, group interview, and observation were also applied to analyze the effects of the FLA policy on local society and rural livelihoods. In the Central Highlands, Nguyen (2006) also realized that legal rights on the allocated land did not directly contribute to material benefits as recipients did not always have the capacity to make use of their allocated forest (ibid.). Other study in the Central Highlands showed that: "changes in laws and regulations do often not translate into corresponding changes in actual property rights and forest use practices." (Tran and Sikor 2006). The author also concluded that three years after devolution of forest management, which transferred the rights and responsibilities from the state actors to local people, the local elites still played a dominant role in decision making on local forest-related matters. This study focused on examining the effects of FLA on property rights in two villages of the Central Highlands. In 2002, two in-depth village studies were conducted with interviews of 95 households of 2 villages, 14 key informants, and 3 group discussions to analyze the property rights with reference to layers of social organization, related actors, forest resources, and kinds of rights.

Various kinds of conflicts at the local level appeared when FLA was implemented. In the Northeast and Northwest regions, most conflicts among villagers derived from unclear boundary demarcation of the allocated plots and unequal distribution of forest land and resources. The general scarcity of shifting cultivation land, which villagers previously used to, cause conflicts between them and the local state agencies (To 2007). The transfer from shifting cultivation to sedentary livelihood system and forestland management under individual property rights interrupted conventionally collective land-use practices and conflicts over forest products and grazing land (Clement

and Amezaga, 2009). Conflicts among villagers and between villages in a case in the Central Highlands were derived from the inequivalent distribution of forest parcels in terms of soil quality and timber. In addition, they feared that if the forestland was allocated to neighboring villagers, they lost their traditional rights to open new fields on the land previously cultivated by them (Sikor and Tran 2007).

The significance of forest land and resources to the livelihoods of ethnic minorities, who live in or near the forests in the Vietnam uplands, has been recognized over many years, thus they were given the highest priority when the state implemented FLA. However, many of the previous studies emphasized the negative impacts of FLA on rural livelihoods. In a case study in the Northeast region provided that the policy threatened the food security of ethnic minorities who were restricted access to paddy fields and had to depend on shifting cultivation, and narrowed their original livelihood choices, due to eliminating them from free access to forest products and land after FLA (Castella et al 2006). The author examined the allocation process and impacts of FLA on traditional forestland and forest resource use by ethnic minorities. The fieldwork was taken place in 1999 and 2000 with 106 sample households (100% of total households) in 4 upland villages of this region, but quantitative data at the household level that related to how forestland was distributed per household and how the allocated forestland was used was revealed. Likewise, another case study in the North Central region also complained that the food security of ethnic minorities whose traditional livelihood activity dominated by shifting cultivation was seriously affected after FLA (Jakobsen et al. 2007). The author focused on examining changes in the agricultural system practices, household livelihood strategies and food self-sufficiency caused by the ban of shifting cultivation under FLA policy in an upland village. A questionnaire survey of the study was conducted in 30 households selected randomly to determine the livelihood portfolio of the household and their farming practices. In addition, the study interpreted six satellite images during the period 1991–2003 to examine the change in areas of shifting cultivation. Evenly, a descriptive study in Northwest region reported the local people's resistance against FLA (Sikor 2001), and other household surveys in the North Central region indicated forestland recipients did not comply with the policy, and higher dependency on forest resources was observed among the low-income group (Nguyen and Sato 2008). Nguyen and Sato (2008) focused on examining how households with different economic

conditions in a mountainous commune have used their allocated forestland and forests through direct observations, focus group discussions, and sample household interviews. The household survey was conducted in 2006 with 82 households (30% of total household in the commune).

On the other hand, in some villages in the Central Highlands, FLA generated to recipient household income by harvesting natural forest timber and cultivating crops on allocated forestland to them (Nguyen 2006, Sikor and Nguyen 2007). In addition, given the fact that only when FLA passed a certain amount of time, whether the desired outcomes have been achieved through long-term investment on the allocated plots can be evaluated. In addition, the recipient farmers need to have time to adapt to the new policy and the original legal framework need be enhanced and supplemented. Consequently, a few studies reveal that FLA brought benefits to local livelihoods by bringing allocated forestland into production. In upland villages of the Northeast and Northwest regions, FLA improved the income of recipient households by planting trees on their allocated forestlands (Sandelwall et al. 2010). The authors selected three villages of three different provinces for their survey, but the number of sample households in each village was not mentioned in the paper and only information related to income from plantations of 2010 in a sample village was only discussed. In the Northwest region, local households did not only acquire forestland but also participated in natural forest conservation under contracts with the state forest management boards, which consequently contributed to poverty alleviation (Tran 2012). The findings just based on secondary data collecting from local government officers and the author's opinion. In the North Central region, creation of *Acacia* spp. and rubber plantations on allocated forestland slightly increased household income (Hoang 2012). The fieldwork of the study was taken place in 2010 in two communes with 60 sample households per commune, but the author did not show how the mean areas of allocated forestland per household and how the recipient households used allocated land. In another study site of the same region, the Gini coefficient was also slightly improved when household incomes excluding allocated forestland and incomes including forestland were compared (Nguyen et al. 2016). A household survey was conducted in 2011 in a village of Nam Dong district with 78 randomly selected households (58.6%).

1.2.3. Potential of farm forestry in livelihood improvement

As described in Chapter 3, the FLA policy inevitably creates numerous small-scale forest tenures, and households, mostly ethnic minorities, are the management entities of those small-scale forestland. However, previous studies did not pay much attention to prerequisites for successful farm forestry.

According to the latest Global Forest Resources Assessment (FAO 2016), several developing countries experienced a significant increase in plantation area during the 1990-2015 period. Among all, plantations contributed to the whole forest cover gain in the Philippines (an increase of 5.8% per year during this period), Vietnam (5.5%), Ethiopia (2.8%), and China (2.6%). Regarding considering the potential for developing farm forestry in Vietnam, it is expected that the studies on farm forestry in these successful countries provide certain policy implication.

In Ethiopia, Kassa *et al*. (2011, cited in Sandewall et al. 2015) reported tenure insecurity regarded as one of the factors that limited farmers from expanding tree plantations. In addition, in Arsi Negelle District, the South Central Ethiopia, markets and favourable policies stimulated farmers to expand tree planting to such extent that their former crop land is now being converted to woodlots. All the respondents who converted their crop fields to plantations gave the two major drivers of conversion, including higher income from tree planting than from annual crops, and reduced crop yields from a decline in soil fertility (Jenbere *et al.* 2011). A study in six districts in the South Wollo and East Gojjam zones of the regional state of Amhara reported that the third most important source of household income is trees and related products (Bluffstone *et al*. 2008).

In China, Sandewall et al. (2015) reported while approximately two-thirds of the total planted forest area was being managed by individual households, farmers' encouragements were primarily on production forest. Change in tenure and property rights of forestland is recognized as a vital driver in China's forestry development. As a result of this change, SFA (2012, cited on Sandewall et al. 2015) summarized diversifying the use of farmers' forestlands created a significant increase of rural per capita net income from forestry, with an increase from 13% in 2009 to 19% in 2010.

In the Philippines, a study in six cases of farm-based tree growing in northern and central Luzon indicated the success conditions for sustainable tree plantations at the

farm level, including main factors such as (1) practice of intercropping, (2) the households' direct demand for tree products and other uses, (3) guaranteed access or property rights, (4) wood products market prospects, (5) the households' economic situation (Pasicolan et al. 1997). The authors also emphasized that upland farms were potential management units of government-driven reforestation programs in the Philippines, and farm forestry could be considered as the most cost-effective and sustainable strategy to reforest marginal remote areas.

From the experiences and observations related to farm forestry in Asia and Africa, including Vietnam, Byron (2001) concluded the keys to successful farm forestry are: secured land tenure, viable production technology, capacity for crop protection from natural risks, and adequate markets. In Vietnam, indeed, farm forestry has already developed in homesteads of the Mekong and the Red River Deltas without FLA (Sandelwall et al. 2010), where demand for raw materials has been generated by the wood processing industry. Likewise, Sikor (2001) also referred that the market was one of the factors influencing the development of farm forestry. Meyfroit and Lambin (2008) observed that allocated households living near major roads – convenient location to transport forest products – were quicker to start tree planting. Conversely, people in remote areas were reluctant to move into tree planting because of their poor accessibility (Lang 2002, Ohlsson et al. 2005, Sunderlin 2006). Generally speaking, secured land tenure and road accessibility were two key factors contributing to successful farm forestry. In regard to the case of FLA, once the land allocation is settled down, how road accessibility affects the allocated forestland use activities should be questioned. In this study, this study defined the road condition that links from each village to each commune center as road accessibility. In general, the site with paved roads is better accessible, whereas the site with only unpaved road is less accessible. Therefore, this study focused on location conditions that forms a prerequisite to expand farm forestry on allocated forestland.

1.2.4. Rationale of the study

It is worth noting that most of the negative findings derived from the previous studies were conducted at the initial stage of the FLA implementation, mostly from the

late 1990s to the early 2000s (Table 1.1), whereas current FLA framework is more complicated in the combination of forestland categories and various management entities. This study considered the initial stage of the FLA implementation that starting from 1995 (after the Decree 02/CP was issued in 1994) to 2007 when the legal framework of FLA was completed (see Table 3.1 for major milestones in the legal framework of the FLA policy in Chapter 3), and the matured stage could be defined from 2008 to present. In addition, the long-term effect of FLA may be different from the ones observed when the FLA process has only been implemented partially (Hoang 2006, Jakobsen et al 2007, Sikor and Nguyen 2007). Thus, how forest land distributed to the type of entities in a mature stage should be evaluated. In addition, while previous studies on forest cover changes after FLA focused mainly on the large-scale level by using satellite imageries, this study emphasized on land use changes at the household level. Furthermore, considering the major concerns about the effects of FLA on livelihood improvement from plantation areas on allocated forestland to recipient households, previous studies have not paid much attention to how farm forestry has been established on the allocated forestland and what are the prerequisites for the creation of farm forestry on the allocated forestland in upland areas. In other words, few studies analyzed the driving forces for engaging in tree planting and expanding plantation areas by the recipient households after FLA. In addition to market accessibility as a prerequisite for creating farm forestry on allocated forestland in accordance with previous studies as discussed above, this study also put the role of government support through reforestation programs into consideration. The reason for this concern is the government introduced these programs accompanying with FLA to encourage the households to join in tree planting. This study expected to know whether the government support plays the decisive role in encouraging tree planting. This study assumes that the road accessibility relates to the reforestation programs of the government, the government support may reach earlier in the location with better accessibility.

Ultimately, while the FLA policy may affect conventional land and resource use by ethnic minorities, most previous studies related directly to effects of FLA on local society and livelihood improvement of households focused mainly on the Central Highlands (Nguyen 2006, Tran and Sikor 2006, Sikor and Nguyen 2007, Nguyen et al. 2008), and North Central region (Jakobsen et al. 2007, Nguyen and Sato 2008, Hoang 2012, Nguyen et al. 2016). In addition, the significance of forest products to the household

livelihoods in or near the forests in the Vietnam uplands has been recognized over many years (Sunderlin and Huynh 2005, Sunderlin 2006, Muller et al. 2006, McElwee 2008). Hence, the interest of several researchers among contribution of the allocated forest to households' welfare and livelihoods concentrated mainly on the non-timber forest products (NTFPs) and timbers harvested from the allocated natural forests (Nguyen 2006, Sikor and Nguyen 2007, Nguyen and Sato 2008). However, if the forests allocated to local households were mostly degraded forests and denuded hills with no commercial value, the potential contribution of FLA to household income based fundamentally on various crops, not only timber crop also other crops, created on the allocated areas by themselves. Thus, evaluation of FLA through the benefits of farm forestry created by FLA is necessary to answer the question of whether the farm forestry on FLA achieved the goal of livelihood improvement.

Table 1.1. Summary of previous studies on effects of FLA on local society and livelihoods

Authors	Region	Data collection		Main findings
		Year	Number	
Sikor 2001	NW	1997	Interview at 3 villages (n.a. HHs, 20% of each village); RS/GIS	Local people's resistance against FLA
Castella et al 2006	NE	1999-2000	Interview at 4 villages (106 HHs, 100%)	Demarcation did not affect wet paddy field owners but affected the landless
Nguyen 2006	CH	2002	Interview at 13 villages (95 HHs of 2 villages + 228 HHs of 11 villages)	Uneven distribution of benefits from allocated forests among local households was detected.
Tran and Sikor 2006	CH	2002	Interview to 95 HHs of 2 villages, 14 key informant interviews and 3 group discussions	The legal rights which was entitled through FLA did not translate into parallel changes in actual rights and practices.
Jakobsen et al. 2007	NC	n.a.	Interview at a village (30 HHs, n.a.%); RS/ GIS	The food security of shifting cultivators was threatened.
Sikor and Nguyen 2007	CH	2002	Interview at 2 villages (95 HHs, 100%)	Local power relations and institutions may constrain the ability of the "poorest of the poor" to take advantage of the devolution
Sikor and Tran 2007	CH	2002	Qualitative data are not used in the article	Poorly designed implementation process resulted in forest clearance for farmland. In practice, rights understood and exercised by the villagers are different from legal rights.
To 2007	NE, NW	2004-2005	Interview at 3 villages (82 HHs, 100%)	Many HHs were unable to put the allocated land into productive use Conflicts between villagers and the local state agencies due to lack of shifting cultivation
Clement and Amezaga 2009	NW, NE	2006	IAD framework: Interview to 20 provincial level officers, and 80 farmers and commune authorities	Interrupted conventional land use practices caused conflicts between villagers and the local state agencies. FLA failed to encourage local households to plant trees.

Nguyen and Sato 2008	NC	2006	Interview at a village (82 HHs, 30% of a village)	The recipients did not comply with the policy, and higher dependency on forest resources was observed among the low-income group
Nguyen et al. 2008	NW, CH	2007	Interview at 8 villages (180 HHs, 34.5% of 4 villages, and 23.7% of 4 villages)	Power relations facilitated the access of wealthier households to forests under FLA. Poor households with limited access to power and information were often been left out.
Sandelwall et al. 2010	NE, NW	n.a.	Interview to stakeholders, key informants, and HHs (the sampling method is not shown)	Tree planting on the allocated forestland improved the income of recipient households, but it was difficult for poorest people to be benefited from th opportunity.
Tran 2012	NW	n.a.	Unclear	Local households did not only acquire forestland but also participated in natural forest conservation under contracts with the forest management board.
Hoang 2012	NC	2010	Interview at 2 communes (60HHs in each commune)	FLA slightly increased HH income from plantations
Nguyen et al. 2016	NC	2011	Interview at a village (78 HHs, 58.6%)	HH income was improved slightly from timber and food crops on FLA

Notes: 1) NE: Northeast, NW: Northwest, NC: North Central, CH: Central Highlands
2) Negative impacts are shown in gray.
3) n.a.: not available.

1.3. Objectives and thesis outline

1.3.1. Objectives and the research framework

By allocating forest land to individual households (arrow 1 in Figure 1.1), the State hoped to transfer responsibility to the households which would give the households necessary incentives to make rational use of their allocated forestland, leading to protection forestland (2). Private ownership rights would also encourage recipient households to invest in their forestland and develop perennial plantations (3). Developed plantations would lead to both an increase in forest cover increase and additional income for households, thus improving household livelihoods (4). Assuming that poverty was what motivates households in uplands to adopt short-term unsustainable land use practices as known shifting cultivation, the economic benefits from perennial plantations would allow to protect better forests and shifting cultivation would no longer be necessary (5).

In accordance with the design of the FLA policy (Figure 1.1), the research questions had been established to examine the goals of FLA on forest conservation and livelihood improvement. In terms of the first question, previous studies indicated the unequal distribution of forestland areas among the recipients (Sikor and Tran 2007, To 2007, Nguyen et al. 2008). Conflicts among villagers, and between villagers and local state agencies derived from an inequivalent distribution of forests and forestland were observed after FLA (To 2007, Sikor and Tran 2007, Clement and Amezaga 2009). Next, FLA had negative impacts the conventional forestland use practices of the ethnic minorities because narrowed their original livelihood choices (Castella et al 2006, Jakobsen et al. 2007, Clement and Amezaga 2009). Regarding how allocated forests are protected. Indeed, free access to forest resources by communities in uplands as the principal cause of the over-exploitation of forests was expected to cease when they granted individual property right. However, negative impacts of FLA on forest protection was also found in the studies of Gomiero et al. (2000), Nguyen (2006), Sikor and Nguyen (2007), Sikor and Tran (2007). The authors claimed that the villagers continued to clear primary forests for shifting cultivation after FLA in the North Central region (Gomiero et al. 2000) and the Central Highlands (Nguyen 2006, Sikor and Nguyen 2007, Sikor and Tran 2007). But, regeneration of natural forests in Northern mountains after FLA was observed through the studies of Castella and Erout (2002), Castella et al. (2006), and

Meyfroidt and Lambin (2008) by using satellite imageries. In parallel, barren and degraded forestlands allocated to the recipients were encouraged to convert into tree planting, but few studies have attempted to answer the question what are the driving forces for tree planting activities on allocated forestland under FLA policy. Meyfroidt and Lambin (2008) observed that plantation areas expanded more rapidly in the districts where the road network was more developed. Conversely, other authors complained that it was difficult to stimulate tree planting activities in remote regions due to poor road infrastructure (Lang 2002, Ohlsson et al. 2005, Sunderlin 2006). And then, the contribution of allocated forestlands to the household economy from tree plantations on their allocated forestland was revealed in studies of Sandelwall et al. (2010), Hoang (2012), Nguyen et al. (2016). Ultimately, a linkage between the household economies and protection activities could be found in a study of Nguyen and Sato (2008), the authors observed that the poor, especially very poor households were the most heavily dependent for their living on forests.

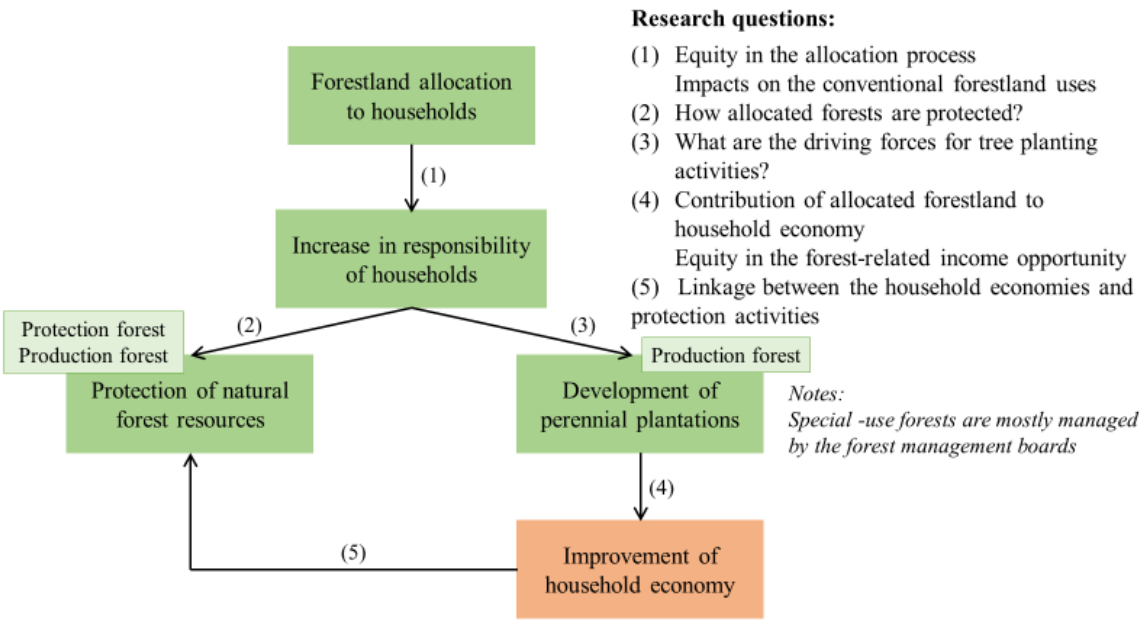

Figure 1.1. Design of the FLA policy (Castella et al. 2006) and the research questions

Table 1.2. Limitations of previous studies on evaluating the FLA policy

	Already/not yet been examined	Limitations
Impacts of FLA on the conventional forestland and resource utilization	Already	
Distribution of forestlands to management entities	Already	Conducted in initial stage
Distribution and management of the different forestland categories	Not yet	
Determinants of tree planting activities on allocated forestland	Already	Few studies
• Factor: Market accessibility	Already	Based on satellite imageries or the author's opinions
• Factor: Role of government support in initial investment	Not yet	
Contribution of FLA to household livelihoods	Already	Focused on Central Highlands, North Central region

Source: discussed previous studies on FLA in Section 1.2.1, 1.2.2 and 1.2.3

Following the previous studies, this study was designed to analyze the stepwise FLA policy. As the findings of previous studies were supported with a limitation of quantitative evidence, and they did not pay much attention to how the allocated forestland has been converted and what the driving forces were. Few studies mentioned the driving forces of reforestation on allocated forestland under the FLA policy were only derived from the author's opinions. They based on literature reviews or using satellite imageries (Table 1.2). As mentioned earlier, a series of reforestation programs of the government supported to the recipient to plant trees on these areas. It is necessary to pay more attention to the role of the government programs for tree planting activities after the FLA policy, especially, in locations having a limited initial investment capacity. In addition, it is necessary to pay attention to the difference in management and use of forest categories under the FLA policy. Indeed, the primary aim of my study is to evaluate the FLA policy through the creation of farm forestry on allocated production forestland to households. Thus, the research questions on the production forest management were designed to

examine the goals of the FLA policy through sample household surveys with equivalent indicators of each question (Figure 1.2).

To answer these questions, a case study approach was applied by studying two upland villages. The sample villages were certain representative of upland villages in rugged topography, inhabited by the ethnic minority, and traditionally dominated by shifting cultivation. Another criterion for their selection is that the FLA policy had already been introduced. These criteria could be used to examine impacts of the FLA policy on the conventional forestland and resource utilization of villagers, and how villagers used their allocated forest land. In addition, my concern is that the recipient household converted the allocated barren and degraded forestlands caused primarily by shifting cultivation into tree plantings or left abandoned under government reforestation programs. Case studies, where has not yet had projects by donor agencies aiming at creating specific forest management systems such as the World Food Program (PAM), and REDD+, except general supports of the government programs accompanying FLA up to the survey time, were easier to evaluate the linking the government support with tree planting activities on allocated forestlands. A further concern about one of the determinants of tree planting on allocated forestland in upland villages is the village road condition considered as market accessibility. This concern was derived from previous studies showed there was the reluctance of remotely located people in tree planting, or the local government officers found it difficult to convince the villagers to tree planting on their allocated land due to poor accessibility (Lang 2002, Ohlsson et al. 2005, Sunderlin 2006). At the current situation, whether the poor accessibility is still a critical barrier to the upland villages in engaging tree planting or not. Hence, apart from these criteria mentioned above, different road accessibility of two case studies was considered to compare the effects of the same land tenure policy in two villages with different road conditions. In other words, the specific concern is that, even in limited geographic villages, whether villagers have joined in tree planting on their allocated forestland or not.

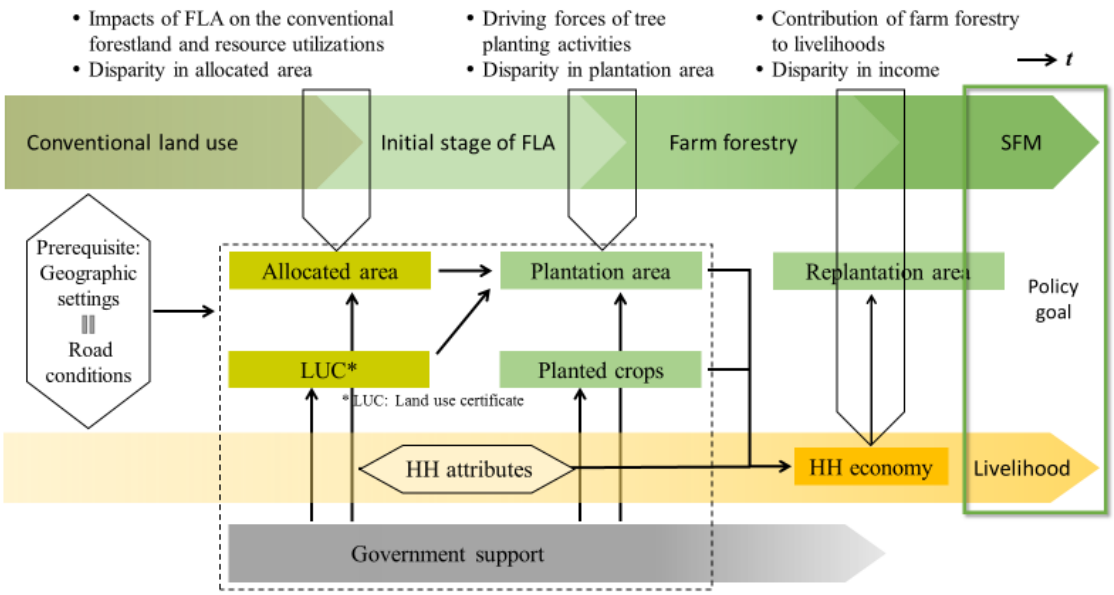

Figure 1.2. Research questions on the production forest management and selected indicators in the household survey

The objectives of this study were established based on the research questions in Figure 1.2. The overall objectives were to clarify how individual households in two villages of a northern mountainous region responded to the FLA policy and find the determinants of local-level land-use changes. In particular, the study has four specific objectives to answer research questions drawn in Figure 1.3 as follows:

(1) To evaluate the impact of FLA on shifting cultivation by recalling information on the initial stage of FLA;

(2) To elucidate the FLA implementation in current stage in two villages of a northern mountainous;

(3) To investigate driving forces of tree planting activities through comparison of allocated forestland use patterns between two villages with different road accessibility; and

(4) To examine how the farm forestry created the allocated areas contributed to household livelihoods.

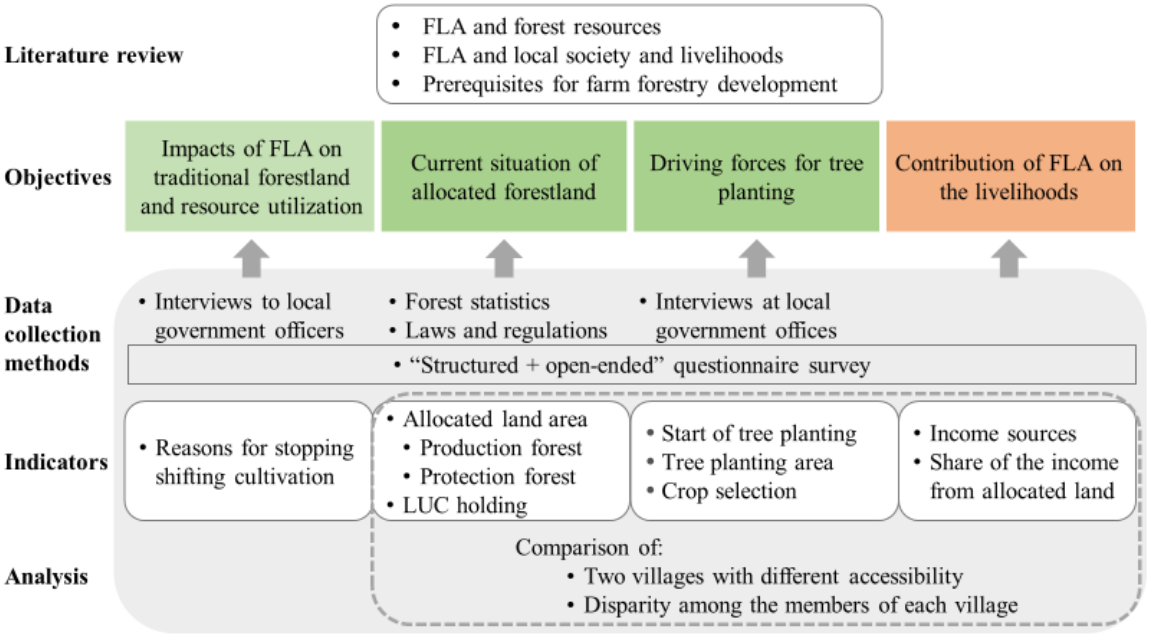

Figure 1.3. Research framework of the study

By addressing these objectives, this research is expected to provide information for policymakers in orienting policies relating to sustainable forestland management by examining upland communities' land use change after the FLA policy. The study is also expected to provide implications for the related upland community's livelihood development policies, projects and studies in the reforestation programs. To address the above objectives, a framework of the research is constructed as outlined in Figure 1.3. Based on literature review assessing the impacts of FLA on forest cover change and local livelihoods, four objectives were established to evaluating FLA through the potential of farm forestry on FLA in rural livelihood in a mountainous region of Northeast Vietnam.

First, with regard of FLA on forest cover change, in general, there are two ways to recover forest area in Vietnam, one is natural regrowth and the other one is a tree plantataton (Meyfroidt and Lambin, 2008). While shifting cultivation of upland communities has been considered as the major cause of deforestation in the mountain areas of northern regions (de Koninck 1999, Castella et al 2002). Hence, the question

need be taken into consideration whether the shifting cultivation stopped when FLA was introduced. To answer this question, the study based on perceptions of recipient households who had ever engaged in shifting cultivation before. I asked villagers what were the reasons for stopping shifting cultivation in the forestland and when they stopped. The impacts of FLA on conventional forest-resource and forestland use of villagers were analyzed through multiple free answers of the respondents about shifting cultivation and a history of forestland use in each village.

Second, while previous studies showed limitations in initial stage of FLA, such as land use and access right were unsecured, unclear boundaries of plots and unequal distribution of forestland and forests to entities caused conflicts between villagers, or even a large part of forestland was still under the management of the SFEs, this study reexamined these negative impacts in the mature stage to know the current situation of allocated forestland to management entities in study sites. From province to commune level, this study indicated which kind of forests were allocated management entities in each level. At the household level, this study used indicators of allocated forestland area per household and the LUC to analyze the current situation of allocated forestland to individual households in two upland villages in a mountainous region of Northeast Vietnam.

Third, to know what were driving forces for tree plantations of the recipient households. The study chose two upland villages with some similarities in the composition of ethnic groups, the time of forestland allocation, having a long history of use of forestland and forest resources (timber and NTFPs) for their livelihoods. But they differed from road accessibility: Village A without a paved road connecting to the commune center and Village G with a paved road. I hypothesized that there is a difference in allocated forestland use activities derived by the different road accessibility. I applied indicators the start of tree planting, the number of recipient households participating in tree planting, areas used for tree planting per household in each village to test the hypothesis. In particular, to find determinants of tree planting in my case studies, tree planting activities were examined in two steps, which considers first, the decision to plant trees (whether a household plants trees or not), and then the planting intensity (expanding tree planting areas). If the number of households engaged in tree planting of two villages, and allocated forestland areas used to tree planting per household of each village are

significantly different which means market accessibility affected tree planting activities of two sample villages. In addition, this study also put the reforestation programs in consideration and examine the role of the government support through these programs in tree planting activities. These indicators including the start of tree planting, the number of households, the allocated forest areas used for tree planting are analyzed.

Finally, the impacts of FLA on local livelihood were assessed by all products collecting their allocated forests. Indeed, the most vital uses of forest resources for communities in upland areas of Vietnam included the use of forest land for cultivation purposes, collecting timber for home use (e.g., building houses and furniture, tools) and NTFPs. Crop products on forestlands have been considered as the main source of local people's livelihoods. Especially, timber is most vital to rural livelihoods in planted forest areas, particularly where pulp material flourishes. Hence, the potential for local people to benefit from small-scale timber plantation can be created when the forest decentralization appears. According to FLA, forest owners were also allowed to harvest a part of the incremental volume of timber from natural allocated forests. But, the forests allocated to households in my case studies were mostly degraded and barren land with low commercial value, most direct benefits of allocated forestland contributed to household economy coming from crops cultivated on FLA. Hence, this study used the share of the income from crops on FLA to analyze the direct contribution of FLA on household livelihood.

1.3.2. Thesis outline

This dissertation consists of six chapters. The general background of the study is presented in Chapter 1. Chapter 1 also reviews effects of FLA on forest cover change, local society and livelihoods, and potential of farm forestry in livelihood improvement. The objectives of study and analyzing the framework of the study are also included in this chapter. In Chapter 2, the information about study sites that covering the climatic and socioeconomic features, livelihood strategies, the status of forestland and forest resources, and reasons for selecting study sites. This chapter also indicated the processing of collecting data and how data were analyzed to address all objectives of the study.

The results of case studies are presented from Chapter 3 to Chapter 5. At the beginning of Chapter 3 presents policy and legal framework related to FLA, this shows

forest management entities in Vietnam, and current forest management entities in study sites. Chapter 3 also addresses the first objective, namely, to examine impacts of FLA on conventional forest-resource and forestland use by ethnic minorities in the cases of Village A and G. Chapter 4 addresses the second and third objective of the study, namely, to examine how forestland are allocated to individual households, and evaluate how accessibility affects allocated forestland use patterns by comparing two villages with different accessibility. Chapter 5 deals with the fourth study objective to answer the question whether the farm forestry on FLA achieved the goal of livelihood improvement. This objective will be examined through analyzing the share of the income from FLA in total household income. In addition, perceptions of forestland recipients about FLA are discussed in Chapter 5. Finally, Chapter 6 summarizes the key findings of the study with a discussion of their implications. It also presents policy implications and recommendations and suggestions for further studies.

CHAPTER 2: STUDY SITES AND METHODS

In this chapter, I described the general setting of the study sites from the highest administrative unit, Bac Kan province, to the smallest administrative units, A and G Communes where two sample villages were located. The chapter provided a brief description of natural and socioeconomic condition that related to this study such as climate, topography, population, overall information about forestland and forest resource use and other livelihood activities. Next, I indicated the reasons for selection of my study sites, from province level to two sample villages, Village A and G. And then, to present in more detail about characteristics of two sample villages, I compared the general settings of the two villages. At the end of the chapter, I presented about how to select and analyze data by using sampling method and selection of sample households. The collected data were based on an estimation of land-use patterns, estimation of the annual income and explanation of the basic attributes of sample households.

2.1. Bac Kan Province and Cho Don District

2.1.1. The general settings of Bac Kan Province

Bac Kan is a mountainous province in the Northern region of Viet Nam (Figure 2.1), extending from 21°48, to 22°44', N latitude and from 105°26' to 106° 15', E longitude. The Northeast Region includes 11 provinces as shown in the following table. Based on my objectives and available statistics, I selected Bac Kan Province in Northeast Region, where the forest cover rate was the highest (71.0%) compared to surrounding provinces (MARD 2016). It was also one of the poorest provinces in this region with monthly average income per capita of only 1,404,000 VND (62.6 USD) (GSO 2016) that was compared with 3.049.000 VND of the whole country, and 2.038.000 VND of rural areas (Table 2.1).

Bac Kan province is divided into eight districts which include 122 communes (Bac Kan PPC 2016). The topography of Bac Kan province is highly variable with many valleys, hill and rocky mountains with an average slope of 26°. There are many rivers and streams flowing through the province, but most of them have steep slopes and short lengths. Five large rivers of the Northeast region have their sources in this province, the Lo river, the Gam river, the Ky Cung, the Bang river and the Cau river. The climatic

condition of the province is subtropical mountainous, with the annual rainfall 1400-1600mm. The weather is divided into two distinct seasons: the hot, rainy season (from April to September) and the cold, dry season (from October to March). The schedule of agriculture activities of Bac Kan farmers is determined by these two seasons. The total provincial land area is 4,859 km^2, as of 2016, the population of the province, was 319.0 with a density of 66 people km^{-2}. Seven ethnic groups dwelled in Bac Kan Province: the Tay, the Nung, the Kinh, the Dao, the Hoa, the San Chay. The majority of the population is from the Tay origin (Bac Kan PPC 2016).

Table 2.1. Socio-demographic characteristics and forest cover in 11 provinces in the Northeast Region of Vietnam

Provinces	Monthly average income per capita (thousand VND)	Population density (people km^{-2})	Forest cover (%)
Bac Kan	**1,404.0**	**66**	**71.0**
Tuyen Quang	1,757.0	131	64.3
Lang Son	1,684.0	92	60.6
Yen Bai	1,802.0	116	62.2
Quang Ninh	3,791.0	198	53.6
Ha Giang	1,326.0	103	56.3
Cao Bang	1,640.0	179	53.5
Thai Nguyen	3,023.0	348	48.8
Lao Cai	1,853.0	108	53.1
Phu Tho	2,367.0	391	39.3
Bac Giang	2,767.0	426	36.4

Source: GSO 2016, MARD 2016

The majority of the population (83%) depended on agriculture as the main sources of livelihoods (Bui et al., 2002). Most of the subsistence agriculture in the province was based on paddy rice cultivation in the limited valley-bottoms, but paddy fields consist of only 3.8% (18,611 ha) of the province's land (MONRE 2014). Other important subsistence crops such as maize and cassava, which were used mainly for feeding livestock, could cultivate partly in the sloping lands classified as forestlands. The forestland made up 78% (379, 416 ha) of the province's territory (MONRE 2016). As of 2015, the total forests in Bac Kan were 370,243 ha, which consisted of natural forests (281,672 ha) and plantation forests (88,571 ha) (MARD, 2016). With the large areas of

forests and forestlands, the province has a big potential for developing economies based on the forestry sector.

2.1.2. The general settings of Cho Don District

Cho Don District is one of eight districts in Bac Kan Province and located in the northern part of the province (Figure 2.1) with a total land area about 911 km², where has a latitude of 21°57' to 22°25 N and a longitude of 105°25' to 105°43' E. The district is divided into one township and twenty-one communes. The topography of Cho Don District is an intricate mixture of numerous valleys and hills, rocky mountains with an average slope of 20° to 30°. The altitude of the district ranges between 200m and 1500m. Up to 2012, the population density of Cho Don District was about 55 people km^{-2}. Tay people made up predominantly around 70.0%, the other ethnic groups consisted of: the Kinh (19.4%), the Dao (8.6%), the Nung (1.7%) and the Hoa (0.3%) (Cho Don DPC 2012). As for land use, forestlands accounted for 79,958 ha (87.7%), agricultural land occupied only 6,137 ha (6.7%), the remaining 5,040 ha (5.6%) consisted of residential areas and other use purposes (DONRE, 2016).

2.2. Selection of sample villages and the general settings

2.2.1. The reason for selection of sample villages

Local administrative units in Vietnam, from the highest to the lowest level, are: province, district, and commune. Each commune consists of many villages. To provide answers to the research questions in Figure 1.2 and satisfy the conditions for examining all objectives in the research framework. I selected Village A from A Commune, and Village G from G Commune in Cho Don District (Figure 2.1) with the following similarities: i) most of the population was comprised by Tay people, ii) shifting cultivation once prevailed, and iii) the FLA policy started at about the same time in 1995. Selected two sample villages could be as representatives of upland villages in rugged terrain where the majority of the territory is categorized as forestland, and their dwellers had a long history of forestland and forest resource utilization for their livelihoods. In addition, settlements of two villages were formed in between the lowlands and hills,

parallel to the river which topography is commonly observed in mountainous areas. Hence, when the FLA policy was introduced there, it is necessary to know how the villagers responded to the FLA policy through land use patterns on their allocated forestland and the FLA policy affected their livelihoods. Indeed, most of the previous studies on evaluating the effects of the FLA policy on household livelihoods in uplands based mainly on these criteria to select their study sites. But, in this study, I expected to classify whether the village road condition is a prerequisite for the tree planting activity in upland villages. In other words, whether poor road accessibility still have caused an obstacle for upland villages to engage in tree planting on their allocated forestland as mentioned in previous studies (Lang 2002, Ohlsson et al. 2005, Sunderlin 2006). Thus, another criterion of the selection of study sites was a different road accessibility of two sample villages. Village A is in one of the most remote areas from the center of A Commune, and the villagers had to follow mountain trails before an unpaved road reached the village in 2005 (Figure 2.2). In contrast, Village G is located along a paved road connecting it to the commune center, which was first opened in 1990 as an unpaved road and then widened and paved in 2003 (Figure 2.2). In addition to these criteria, except the government supports through the reforestation programs accompanying FLA up to the first survey time (January to March 2016), Cho Don had not yet had projects aiming at the creation of specific forest management systems supported by donor agencies. This situation could facilitate to examine the role of government support in forestland utilizations allocated to households.

2.2.2. General settings of sample households

Village A is one of ten villages in the A commune and about 5 km away from the A Commune center. As of December 2015, the population of Village A was 38 households (159 people) (A CPC 2015). It consisted of 31 Tay households and seven Nung households. Village G is one of seventeen villages in the G Commune and about 2 km away from the G Commune center. The population of Village G was 71 households (312 people), which involved 61 Tay households and 10 Dao households (G CPC 2015). The Tay people were the first settlers of the two villages, and now control the majority of the paddy fields and forestlands there. The Nung people in Village A and Dao people in Village G started to migrate to Village A and Village G since 1998 and 2002, respectively.

The main reason for the population movement in each village was paddy field shortage in the original areas.

Village A's location is 5 km away from the A Commune center where a primary school is located. There is no secondary school in A Commune, and villagers had to attend the secondary school located in the center of G Commune. The distance between Village G and the G Commune center is around 2 km. The distance to a high school located in the center of Cho Don district is around 14 km from Village A and 9 km from Village G. All households of Village G and 37 of 38 (97.4%) households in Village A had electricity. The government provided clean water to both villages, but in the sample households who used clean water in Villages A and G were only 8.1% and 34.3% respectively. Instead, they piped spring water from the slopes behind their settlements by themselves.

According to the wealth ranking by the commune administration, poor and near-poor households made up 39.5% of total households in Village A, but only 12.0% in Village G. As shown in Decision 59/2015/QĐ-TTg, wealthy rank among households are classified based on the criteria, including average income in a prior year, limited access to basic services, such as medical care; education; house; clean water providing systems and sanitation; information. But the average household income was the most important and easy measured criterion in classifying poor and near-poor households. In rural areas: (i) a poor household is a household having an average income per capita of 700,000 VND (31.15 USD) per month; (ii) a near- poor household is a household having an average income per capita of between over 700,000 VND (31.15 USD) and 1,000,000 VND (44.50 USD) per month.

Table 2.2. Comparison of the two sample villages

Item	Village A	Village G
Commune	A	G
Topography	Inland valley bottom	Inland valley bottom
Ethnic minorities	Tay, Nung	Tay, Dao
Total population	159	312
Total HHs	38	71
No. of Tay HHs	31	61
No. of non-Tay HHs	7	10
Distance from the CPC (km)	5	2
Distance from the DPC (km)	14	9
Road condition	Unpaved road constructed in 2005	Paved road constructed in 2003
School	Primary school	Primary school Secondary school
Location of allocated forests	Behind the settlement	Behind the settlement
No. of HHs who used clean water (% of total sample HHs)	8.1	34.3
No. of HHs had electricity (% of total sample HHs)	37 (97.4%)	35 (100%)
Poor and near-poor HH (% to the total HHs)	39.5	12.0

With respect to the livelihood activities, the major economic activities of the people in the two villages were agriculture, mainly farming and livestock raising. The products collected from surrounding natural forests were mostly used for self-consumption. Agricultural mechanization was limited to hand tractors for wet paddy field preparation and rice threshing machine, while other farming activities and forestland cultivation relied on manual labor.

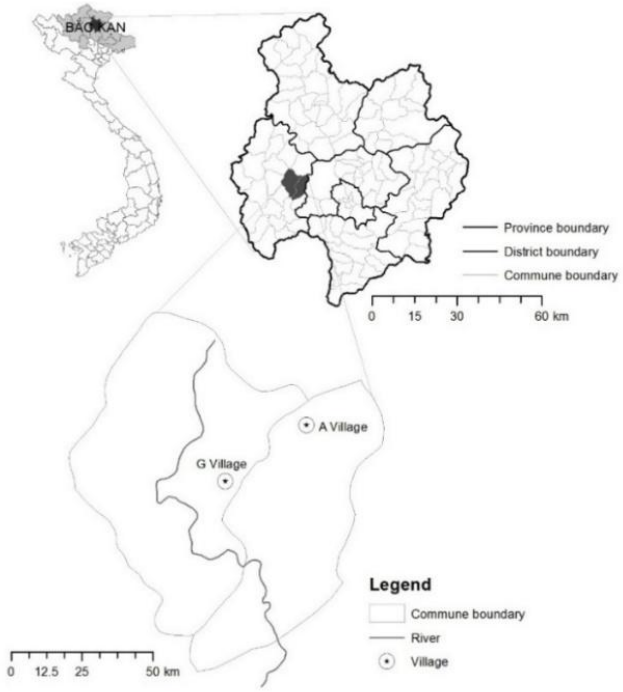

Figure 2.1. Location of study sites

Figure 2.2. The main road connecting the village to the commune center (March 2017).

2.3. Data collection

2.3.1. Terms and definitions

According to Vietnam Civil Law, each household is given a household registration book (*so ho khau*), which is the fundamental legal proof of residence in Vietnam. The household head, either the wife or the husband, is designated on the book as the representative of the household in civil transactions for the common benefit of the household. We followed this definition and used those registered on the household registration book as the household member and head of household. Labor force of households was confirmed by all household members at labor age 15-60 for males and 15-55 for females. Education level was measured based on years of schooling; primary school consists of 5 years, which are equivalent to grades 1-5, secondary school is for grades 6-9, high school for grades 10-12, and higher education is grades 12-16.

2.3.2. Sampling method and sample households

To conduct my research, both secondary and primary data were used. Official statistics, legal and policy documents and information related to forests and forestry activities and implementation of FLA from state offices provided secondary data, while the primary data attained from direct observation, key informant interviews and a household survey. Regarding forest land and forest resources management and use in Vietnam, at the national level, the Ministry of Agriculture and Rural Development (MARD) is responsible for forest management, while the Ministry of Natural Resources and Environment (MONRE) assumes a role in land administration. At the provincial level, the Forest Protection Department (FPD) is a sub-department of the Department of Agriculture and Rural Development and supervises the actions of local forest protection officers who are in charge of FLA controlling and coordinating local program management committees. The FPD has recently been entitled the task of forest monitoring and evaluation. It also received and compiles the changes in forest reported by all forest owners at the local level. At the district level, the Division of Agriculture and Rural Development (DARD), Division of Natural Resources and Environment (DONRE), and the Forest Protection Unit (FPU) are in charge of FLA and supervise the law enforcement. At the lowest level of local administration, Commune People's Committees (CPCs) are

responsible for forest protection and forestland utilization. I collected official documents and information of FLA from the FPD of Bac Kan Province, DONRE, DARD, and FPU of Cho Don District. Commune- and village-level statistics were collected at A and G CPCs. Direct observation was carried out to obtain an overall background of land use patterns, the forest uses of local people, and geographical condition of the study site. Key informants were interviewed coming from the District officers (including DONRE, DARD, and FPU), the Commune officers, and elderly people of the villages.

After a preliminary survey, face-to-face interviews with household heads and their spouses using semi-structured questionnaires were conducted from January to March 2016, and a supplemental survey was conducted in March 2017. For determinants of land use patterns, I collected data on land area, labor force of households, and the age and educational background of household heads. The questions used in this study are: basic information on the households and household heads, reasons to stop shifting cultivation, farmland and allocated forestland areas, land use patterns in the allocated forestland, and household economic activities household properties, perceptions of forestland recipients about the FLA policy, and information about governmental supports in livelihood activities of villagers. Because of the small population size in Village A, I interviewed with every household. In Village G, I selected odd numbers from the resident list because a family tended to domicile in a plot and received consecutive numbers. Due to a long absence of one household during the survey period, the sample in Village A included 30 Tay and seven Nung households, while the sample in Village G included 30 Tay and five Dao households (Table 2.3). I asked the same questions to all sample households, but for the questions regarding the early stage of FLA such as information about shifting cultivation, I received only 23 valid answers from Village A and 25 from Village G.

Table 2.3. Sample household (HH) number

Ethnicity	Village A			Village G		
	Population	Absence	Sample HH (%)	Population	Absence	Sample HH (%)
Tay	31	1	30 (96.8)	61	-	30 (49.2)
Nung	7	-	7 (100.0)	-		-
Dao	-	-	-	10	-	5 (50.0)
Total	38	1	37 (97.4)	71	-	35 (49.3)

2.4. Data analysis

2.4.1. Estimation of land-use patterns

Land area was confirmed by LUCs, but the land areas of those who did not have LUCs were obtained through interviews. Likewise, timber tree plantation areas were obtained through interviews. When asked about fruit tree plantings, respondents could not recall fruit tree plantation areas but could provide the approximate number of existing trees. Hence, I applied a standard density of 400 trees ha^{-1} to estimate the fruit plantation areas.

To evaluate how different accessibility affected allocated forest and use patterns of two villages. Firstly, the t-test was applied to compare two villages about attributes of sample households, the allocated forestland area per household, the LUCs and tree plantation areas on allocated forestland per household, while the Chi-square test was used to analyze differences of allocated forestland use patterns. In addition, the correlation between the allocated areas and the areas without tree plantations were analyzed by the Pearson correlation coefficients to know the level of allocated forestland use intensification of recipient households.

2.4.2. Estimation of annual income

Annual net income of each household was computed from all net income sources in the prior 12 months of the survey. Period of annual income was calculated from February 2015 to January 2016. Agricultural net income was calculated by multiplying the annual harvest amount with the average farm-gate price and then subtracting cash input. Regarding income from non-wood forest products (NWFPs) and livestock, only cash derived from selling the products was included in income from these sources. Information about prices was attained from the agricultural division of each commune, from local markets or from the villagers themselves. For calculating the farm net income, the own-labor value was not deducted from net income due to estimating the cost of labor is complex and inconsistent.

During the survey time, income from timber of both villages came mainly from *Manglietia glauca* and *Cinnamomum cassia*. The rotation of *Manglietia glauca* and *Cinnamomum cassia* were usually 10 years and 15 years respectively for the trees to reach the size that could be sold at local markets. Thus, this study applied the Net Present Value (NPV) to calculate annual income from timber crop for the rotation of 10 years with *Manglietia glauca* and 15 years with *Cinnamomum cassia*. The NPV of all costs and benefits of tree planting is identified as follows:

$$\text{NPV} = \sum_{t=0}^{n} \frac{B_t - C_t}{(1+r)^t}$$

where B_t, C_t are the benefits and costs at time t, respectively, r is the discount rate, and n is the time period or a production cycle. Total benefits were earned from the sale of timber and total costs included expenditures for seedings, herbicides, fertilizer, pesticides, and labors. I used the discount rate given by the Vietnam Bank for Social Policies. The Bank applied the annual interest rate of 6.5% for loans to poor households. In addition, the cheapest loan for afforestation activity was from the Five Million Hectares Reforestation Program (Program 661) via the Bank of Agriculture and Rural Development with an annual interest rate between 6% and 7%. Hence, this study applied the discount rate of 6.5% to calculate the NPV of timber crops.

I used MS excel 2016 and IBM SPSS ver. 24.0 for the statistical analysis.

2.4.3. Characteristics of sample households

Despite different access to secondary education, the mean years of education for household heads were similarly low in both villages: 6.0 years in Village A and 6.5 years in Village G (Table 2.4). All household heads were literate, but in Village A, 16 (43.2%) completed only primary education. Likewise, 12 (34.3%) household heads in Village G completed only primary education. The labor force is also supposed to be a determinant of land use as well as household income, particularly where most farming activities depend on physical labor. There was no significant difference in the mean of two sample villages (t-test, $p > .05$). Other selected variables, namely household members, age of

household heads, and education year of household heads, also had no significant differences (t-test, $p > .05$).

The mean of wet paddy field area per sample household was 0.33 ha for Village A and 0.28 ha for Village G (Table 4.1). There was no significant difference in the mean of the two villages ($p > .05$). Wet paddy could be cultivated twice a year when the water was sufficient. Otherwise, maize was cultivated before rice. Such single cropping of wet paddy made up 10.2% of the total wet-paddy fields of sample households in Village A and 9.1% in Village G.

Table 2.4. Attributes of sample households in two villages (2016)

Items	Village A (n=37)		Village G (n=35)	
	Mean	SD	Mean	SD
Household members	4.2	1.2	4.6	0.9
Members at labor age*	2.8	1.3	2.9	1.0
Age of household head	42.9	8.0	44.1	10.6
Education year of household head	6.0	2.9	6.5	3.1

* Labor age: 15-60 for males and 15-55 for females.

CHAPTER 3: CHANGES IN FOREST MANAGEMENT ENTITIES AND THE IMPACTS OF FLA ON CONVENTIONAL FOREST RESOURCE AND FORESTLAND USE

This chapter is partially based on *Nguyen and Masuda (2018) Land Use After Forestland Allocation and the Potential for Farm Forestry in a Mountainous Region of Northeast Vietnam. Small-scale Forestry: 1-19,* doi: 10.1007 / s11842-018-9399-0, which was published based on this Ph.D. research work.

This chapter focuses on the implementation of the FLA policy and its effects on conventional forest-resource and forestland use by ethnic minorities in Village A and G. My first discussion in this chapter showed the legal framework of the FLA policy applied to allocate forestland to sample households with a long-term use right. I also indicated forestland categories of Vietnam and the activities allowed in each forestland category. Next, I paid attention to current forest management entities, the FLA procedure in my study sites. Finally, I discussed how villagers responded to the FLA policy through presenting about forestland and forest resources use activities of ethnic minorities in two sample villages before the FLA policy, and analyzing the reasons why villagers stopped shifting cultivation.

3.1. Forest policy and legal framework in Vietnam

3.1.1. Legal framework of land and forest management

Vietnam is one of the countries that have experienced a transition from net deforestation to net reforestation (Figure 3.1). Forest cover change in Vietnam reversed a downward trend in the mid-1990s with a significant increase by 39.5% in 2010 (FAO 2009) and up to 40.8% in 2015 (MARD 2016). According to the Government of Vietnam, this increase has resulted from land tenure policy reforms and afforestation programs initiated by the Government in the early 1990s (Deputy Prime Minister of the Government of Vietnam, 2005).

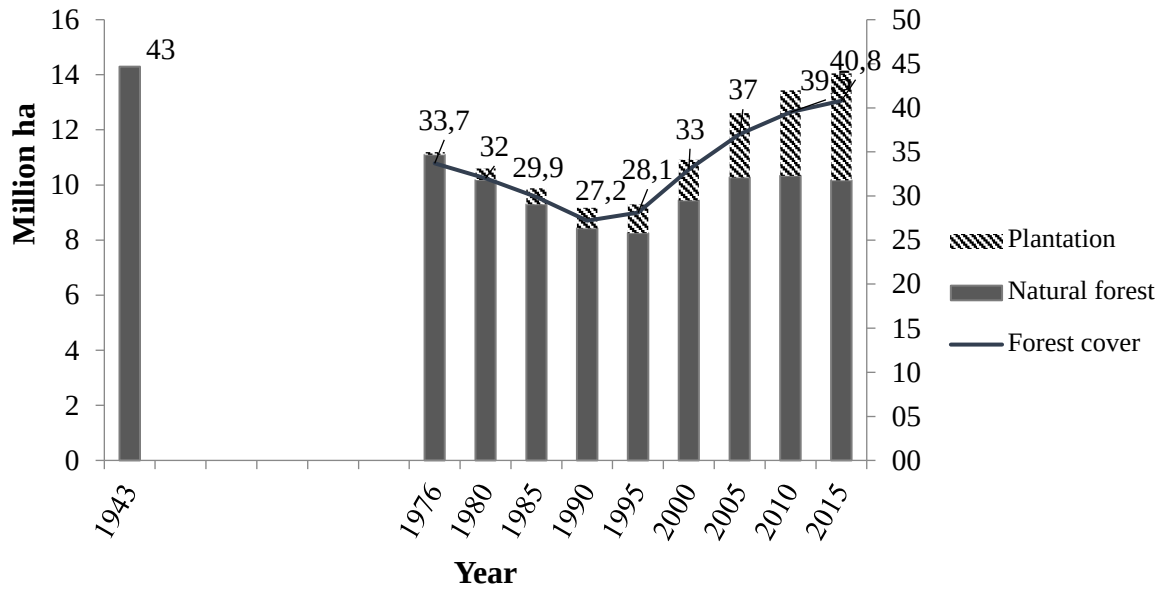

Figure 3.1. Forest cover change in Vietnam

Sources: Jong el al. 2006, FAO 2009, MARD 2013, 2016

After the reunification of Vietnam in 1975, the Ministry of Forestry was set up in 1976 and the SFEs were established to execute forest management (Nguyen et al. 2008). While the Ministry of Forestry was responsible for national forestry issues. At the provincial level, the Department of Forestry was created to control forestry issues in each province. The SFEs were mainly taken responsibility for forest exploitation and tree plantation. By the end of the 1980s, up to 413 SFEs in the whole country managed 6.3 million ha or about 70% of total national forestland area (Nguyen et al. 2001)

When forested area reduced sharply under the SFE management, it is obvious that the current SFE system was not able to manage effectively national forest resources. The success of the renovation (Doi Moi) policy and agricultural land tenure reforms of the 1980s (Sadoulet et al., 2002) supplied further driving forces for tenure reforms related to forest resources and forestlands. Since the early 1990s, forest policies of Vietnam have been launched market-oriented approach with participation of various stakeholders in forest and forestland management, which emphasized forestland allocation to individual households, and organizations with the long-term land use rights. This change also aimed to move wood logging away from natural forests toward planted forests (Do and Le, 2002).

This trend was illustrated obviously in the Land Law of 1993 and the Forest Protection and Development Law of 1991 (Table 3.1). The Forest Protection and Development Law of 1991 also provided a legal basis for establishing management boards for protection forest (MBPFs) and management boards for special use forest (MBSFs). In 1993, the Land Law was passed, empowering long-term use rights to the land users with the LUCs. Also, the law officially gave the recipients five rights: rights to transfer, exchange, inherit, lease, and mortgage. These two laws created the basic framework for the appearance of forests and forestlands management reform in Vietnam.

In accordance with the legal framework initially established by the Forest Protection and Development Law of 1991 and the Land Law of 1993, the government has made efforts to introduce private forest management rules and regulations. While the government still maintains the right to reclaim forests and forestlands for public purposes in necessary cases, it has attempted to assign the tenure rights necessary to engage various management entities in forest development. Decree 02/CP on FLA and Decree 01/CP on contracts for forest land were promulgated in 1994 and 1995 respectively, to guide the implementation of this allocation. Under Decree 02/CP, local organizations, households, and individuals were allocated forest lands for a long-term use of a 50 - year period for forestry purpose. The Decree encourages the recipients to plant trees and develop agroforestry activities on bare land, barren hills and degraded forestland. Decree 01/CP was passed to guide land allocation through contracts for agriculture, forestry, and aquaculture purposes. Under this decree, the state organizations such as the SFEs, MBPFs, and MBSFs (known as allocating agents) would sign contracts with local households for forest protection and tree plantations. In 1999, The Decree 163/ND-CP replaced the Decree 02/CP, it supplemented Decree 02/CP by adding regulations on the lease of forestland. Under Decree 02, the government leases to not only domestic organizations belonging to every economic sector, but also foreign households and organizations. In this decree, the state started to limit the allocated forest land area per household with the maximum 30ha.

In 2001, Decision 178/2001/QĐ-TTg was promulgated, issuing to detail regulations of benefits and the obligations of the households and individuals regarding allocated, contracted, or leased forest and forest land. According to this decision, one of the benefits that the recipients can obtain, such as, the owner of natural forests that was

of medium to rich quality at the time of forest allocation was entitled to 2% of the total value from each year of protection. The recipients could get 100% timber from poor-quality forests, 70–80% of timber from restored forests. In addition, they were also allowed to use on no more than 20% of allocated land without forest cover to cultivated agricultural crops.

By the early 2000s, forests and forestland managed by household groups and whole communities had been initiated as an official forest management form. Under the new Land Law amended in 2003 regarding community land tenure and the new Forest Protection and Development Law amended in 2004 related to community forest tenure, community-based forest management was recognized legally.

To facilitate the implementation of the FLA procedure, Circular 38/2007/TT-BNN 25 promulgated in 2007 by the MARD guiding the steps of procedures for forests and forestland allocation and lease to local organizations, households, individuals, and communities. The circular also regulated the responsibility of each appropriate authority in conducting the tasks of forestland implementation.

Table 3.1: Major milestones in policy and legal framework related in the FLA policy

Year	No. of act/ decree	Name
1991	Act 58-LCT/HĐNN8	Law on Forest Protection and Development
1993	Act 24-L/CTN	The Land Law
1994	Decree 02/CP	Allocation of forest land to local organizations, households and individuals for long term use
1995	Decree 01/CP	Contracting of land to use for agriculture, forestry and aquaculture purpose
1999	Decree 163/1999/ND-CP	Allocation and lease of forest land to local organizations, households and individuals for long term use
2001	Decision 178/2001/QĐ-TTg	Stipulation of benefits and obligations of households and individuals allocated or leased or contracted forestland and forest
2003	Act 13/2003/QH11	The Land Law (amended)
2004	Act 29/2004/QH11	Law on forest protection and development (amended)
2007	Circular 38/2007/TT-BNN	Guide on the sequence, procedures of forestland allocation, lease and withdraw

3.1.2. Forestland categories

Decision 3158 by MARD in 2016 indicated that by the end of 2015 Vietnam had around 14.1 ha of forest resources, divided into two types: natural forests (10.2 ha) and plantation forests (3.8 ha). Typically, to create a legal framework for the management, development, and promotion of protection and exploitation of other benefits of forests, forest resources in Vietnam were classified into three categories according to their functions as defined in accordance with the Forest Protection and Development Law of 1991, including, special-use forest, protection forest, and production forest. As of 2015, 2,106.1 ha (15.0%) was classified as special-use forest, protection forest and production forest were 4,462.6 ha (31.7%) and 6,668.2 ha (47.4%), respectively. While most of the plantation forests (70.2% of total plantation areas) were production forest, 96.2% of special-use forest and 86.0% of protection forest were natural forests.

Production forests are primarily used for timber and other forest products, combined with the other categories of forest to protect the environment. Protection forests are primarily used for the preservation of water resources; the prevention of natural disasters, soil erosion, the climatic regulation, and the total protection of the ecological environment. Special-use forests are primarily used for the conservation of nature, plants, animals and ecosystems, scientific research, and the protection of historical, cultural and tourist locations.

Following functions of each category as above, households were mainly allocated to production and protection forests. The management boards were mainly responsible for managing special-use forests. As this study focuses on household management entities, the activities allowed in protection forests and production forests presented as follows:

In term of natural forests, the recipient households are allowed to collect limited NTFPs. They could freely collect timber trees which are naturally dead, fallen, broken, or diseased. But, timber cutting in natural forests is forbidden unless they are allowed by state authorities, and logging in protection forests are managed more strictly than production forest.

Most of the special-use forests are allocated to the forest management boards and all activities on logging, scientific research, and ecological tourism according to the laws and regulations applied for natural special-use forest management. Logging in special-use forests is mostly prohibited except for special cases under monitoring strictly by the DARD.

Regarding planted forest, harvesting timber from planted forests was allowed and a permission from the state authorities is still need. However, exploitation intensity on protection forests was not exceeding 20% of total mature forests, and forest canopy after harvesting was made sure over 0.6.

According to Decision 3158 by the MARD dated 27 July 2016, by the end of 2015 Vietnam was 14.1 million ha, of which 2.1 million ha special-use forest, 4.4 million ha protection forest and 6.7 million ha production forest, the remaining area of 0.8 million was not designed three categories (Table 3.2).

Table 3.2. Forest resources in Vietnam (000 ha)

Forest type	Forest categories			Not belonging to three categories	Total
	Special use	Protection	Production		
Natural forest	2,026.9	3,840.0	3,940.2	368.4	10,175.5
Plantation forest	79.2	622.6	2,728.0	456.5	3,886.3
Total	2,106.1	4,462.6	6,668.2	824.9	14,061.8

Source: Decision 3158 by MARD (2016)

3.1.3 Forest management entities

3.1.3.1. Stakeholders in forest management

The MARD categorizes forest recipients into eight: forest management boards (FMBs), individual households, state-owned enterprises, CPCs, other economic entities, communities, army and other organizations. FMBs, household, CPCs and state-owned enterprises were main management entities which managed about 86.7% of the total forest area in the country. Forest Management Boards were the largest forest owners in Viet Nam (Table 3.3), in 2015 they were managing about 4.9 million ha (34.8 %) of the total forest area, and 42.8% (4.4 million ha) of national natural forests were managed by FMBs, compared with only 13.9% (0.54 million ha) of plantation forest. With 22.4 % of total forest area under their management, individual households were the second largest owner group. Especially, households owned the most plantation forest, with 45.0% (1.7 million ha) of the total plantation, and 13.7% (1.4 million ha) of the total natural forest area was managed by households. CPCs were the second largest owner groups of both natural forest making up 18.4 % (1.8 million ha) of total natural forest areas and plantation forest with 21.4% (0.8 million ha). State-owned enterprises were allocated 10.3% (1.4 million) of total forest area, including 1.0 million ha (9.9%) ha natural forest and 0.5 million ha (11.5%) plantation forest. Other entities owned 13.3% of total forest areas (MARD 2016).

Table 3.3. Forest are allocated to each user group in Vietnam (as of 2015)

User groups	Natural forest		Plantation forest		Total	
	ha	%	ha	%	ha	%
FMBs	4,357,168	(42.8)	538,992	(13.9)	4,896,160	(34.8)
State - owned enterprises	1,006,029	(9.9)	448,332	(11.5)	1,454,361	(10.3)
Other economic entities	108,297	(1.1)	133,237	(3.4)	241,534	(1.7)
Armed forces	114,968	(1.1)	55,193	(1.4)	170,161	(1.2)
Households	1,398,187	(13.7)	1,747,781	(45.0)	3,145,967	(22.4)
Communities	1,062,340	(10.4)	48,069	(1.2)	1,110,408	(7.9)
Other organizations	260,546	(2.6)	81,900	(2.1)	342,446	(2.4)
CPCs	1,867,985	(18.4)	832,834	(21.4)	2,700,829	(19.2)
Total		(100.0)	3,886,337	(100.0)		(100.0)

Sources: Decision 3158 by MARD (2016)

Forestland in Vietnam has been allocated to organizations, individual households and communities to manage and use with legal rights. As of January 2014, Vietnam had about 15.8 million ha of forest land, with 2,272.7 million ha special- use forest land; 5,974.7 million ha protection forestland; 7,597.9 million ha production forest land (Table 3.4). According to Decision 1467 by MONRE dated 21 July 2014, 12.6 million ha (79.7%) of national forestland was allocated to various management entities: individual households, CPCs, economic entities, state–owned organizations, other organizations, joint-venture companies, and communities. The remaining 3.2 million ha (20.3%) which has not yet allocated currently managed by communities and the CPCs. Of the 12.6 million ha allocated forestland, state forest organizations and individual households made up the highest rate, 41.6% and 34.9%, respectively, next is economic entities with 17.4%, while other user groups were allocated small portions just under 3% (Figure 3.1).

As shown in Table 3.3, of the 4.4 million ha allocated forestland of households, production forest land occupied 70.8%, protection forestland and special-use forestland were 29.2% of the total allocated land. However, unlike the allocated forest land to households, up to 49.1% protection forestland and 35.6 % special use forestland of the total 5.2 million ha allocated forestland belonged to state–owned organizations, while just

15.4% allocated production forest land. In general, production forestland was mainly allocated to individual households with 52.6% of total 5.9 million ha allocated production forestland in the whole country. But state organizations, namely the SFEs, MBPFs, and MBSFs, were mainly responsible for protection and special use forestland, 56.05 % of total 4.6 million ha and 82.2% of total 2.1 million ha respectively.

Table 3.4. Forestland allocated to each user group by forestland category (as of 2014)

User groups	Forestland categories (ha)			Total
	Special-use forest	Protection	Production	
Households	26,023	1,255,506	3,106,627	4,388,156
CPCs	4,094	53,505	95,600	153,199
Economic entities	22,442	379,494	1,785,253	2,187,189
State organizations	1,867,129	2,571,548	800,846	5,239,523
Other organizations	169,865	129,097	35,316	334,278
Joint-venture companies	20	0	32	52
Foreign companies	0	645	17,902	18,547
Communities	0	202,811	65,566	268,377
Total	2,089,573	4,592,606	5,907,142	12,589,321

Source: Decision 1467 by MONRE (2014)

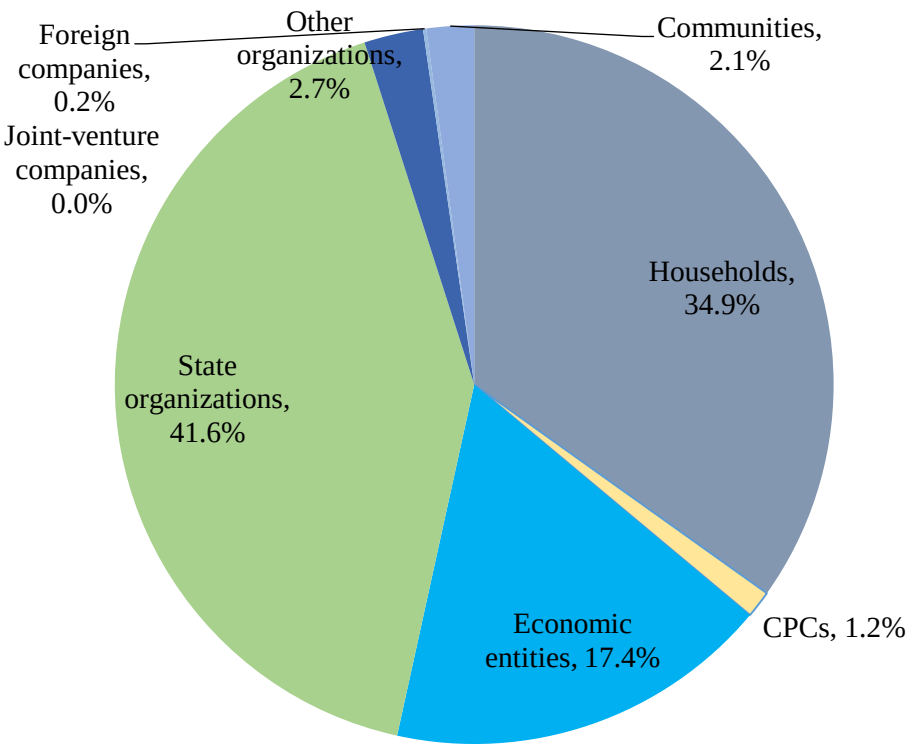

Figure 3.1. Forestland tenure by stakeholder groups

3.1.3.2. Rights and responsibilities of forest stakeholders

The following discussion focused on forest management by SFEs, MBPFs, MBSFs, individual households, CPCs, which kept a core role in managing forest resources in Vietnam, managed 86.7% of total forest areas. Other entities were not discussed due to there was little available information about them, and they only managed the small remaining part. Rights and responsibilities of main forest owners were presented below:

MBSFs were responsible for the management, protection, and conservation of special-use forest areas under their responsibility. They also took responsibility for the preparation and submission of proposals relating to investment in the forests under their management, and for the implementation of investment activities on their allocated forestland. MBSFs were also responsible for following changes in forest conditions. They had the right to conduct activities, including scientific research, socio-cultural activities, and ecotourism.

MBPFs were responsible for the protection, the management, the development, the use of their allocated protection forest areas according to the rules and regulations of the legal framework related to the FLA policy. They were responsible for the preparation of annual work plans based on approved master plans. MBPFs were also in charge of receiving investment funds and signing a contract with organizations or local people for the protection of their allocated forests. They monitored changes in forest conditions based on requirements of the MARD. MBPFs also had the rights for organizing production and commercial activities in their allocated forests.

SFEs were in charge of the production forest areas under their management and conducting effectively commercial and production activities in these allocated forests. They were also in charge of monitoring changes in forest conditions and performing periodical inventories of their allocated forest areas. In term of the rights of SFEs, they had rights to purchase, use, and process forest products according to the legal framework of FLA, to use a part of their forest land for fishery or agricultural purposes, to commercialize their allocated forest in combination with local households or other organizations, and to subcontract their allocated forest land to other organizations, local households for using in forestry, agricultural or fishery purposes.

Individual households could be supported by the government in activities relating in their allocated forestland use and management. Also, they were also entitled to collect timber and NTFPs and to use a part of their allocated forestland for agricultural purposes. In return, they had to make sure that their allocated forestland was used according to existing rules and regulations of the FLA policy. Forest stakeholders also had to pay taxes as required by law in certain cases, and report changes in the forest conditions of their allocated areas and to carry out periodical inventories of allocated forests.

3.1.4. Reforestation programs

The Vietnamese government has given high priority to forest rehabilitation through a series of reforestation programs which were launched all across Vietnam. The three national large-scale programs, namely Program 327, Program 661, and Program 147, attached to FLA with two major goals: to protect existing natural forests, and reforest on degraded forest land and bare hills (doi troc). Regarding financial incentives of these programs for forestland recipients joining in tree plantations, the local authorities often support seedlings, fertilizers, and pay a part of labor costs when they established their plantation areas. The total cost of the subsidy per ha depended on each program and each category of planted forests.

3.1.4.1. Program 327

Program 327 was officially launched by Decision 327/CT issued by the Chairman of the Council of Ministers in 1992 and lasted until 1998. Its objectives consisted of: (1) regreening the major part of the barren land and denuded hills; (2) protection of remaining natural forests and the environment; (3) utilization of denuded hill areas, of coastal alluvial flats, and water bodies for producing of goods and providing industrial raw materials; (4) performing sedentarisation and fixed cultivation; (5) integrating economic and social aspects in forestry activities; (6) stabilizing and improving gradually the livelihoods of inhabitants in new economic zones and indigenous ethnic minorities, and (7) bring incomes to the country and consolidating the national security. Hence, originally the focus of this program was very wide and ambitious, including the following aspects: aquaculture, agriculture, forestry, conducting fixed cultivation, sedentarization, and developing new economic zones.

Later, in 1995, the Prime Minister instructed that rehabilitation of the barren lands and denuded hills would become the core task of the Program with two main concerns: protection of remaining natural forest from shifting cultivation, and rehabilitation of the barren land and denuded hills in mountainous, midland and plain regions, though the concentrate would be in the mountainous and midland regions.

As a result, Castrén (1999) reported that an area of about 6.79 million ha forests was protected under Program 327. Morris et al. (2003) also claimed that nearly 0.30 million ha of forest was naturally regenerated, about 0.40 million of new plantations was established and more than 466,000 households achieved Forest Protection Contracts with the total forest area of about 1.60 million ha.

3.1.4.2. Program 661

Program 327 was followed by Program 661 which lasted from 1998 until 2010. Fundamentally, Program 661 aimed to reforest 5 million ha of forests and protect existing forests to increase forest cover up to 43% in 2010. In particular, the goal of the government when conducting this program as follows: (1) reforest 2 million ha of protection forests and special-use forests (1 million ha for new plantations, and 1 million ha for natural forest regeneration that combinate with supplement tree planting), and 3 million ha of production forests (2 million ha for timber trees, 1 million ha for industrial and fruit trees); (2) expect to provide a volume of 1.5 million m^3 timber and 20 million stere fuelwood, parallelly to alleviate pressure on natural forests; (3) create jobs for about 2 million people and improve household income in forested regions which could contribute to poverty reduction, hunger eradication and develop rural mountainous areas.

According to a report of the MARD (2011), the national forest cover increased from 32.0% in 1998 to 39.5% in 2010. After twelve years of the implementation, about 0.90 million ha of protection and special use forests, total 2.45 million ha production forest (including 1.55 million ha of timber plantations and 0.94 million ha of industrial and fruit trees) were planted. At the same period, 1.3 million ha protection and special-use forest area were naturally regenerated, 2.45 million ha protection forests and special-use forest were managed by households, communities under Forest Protection Contracts (Table 3.5).

Table 3.5. Achievements of Program 661 from 1998 to 2010 (ha)

Achievements	Planned to 2010	Result
Allocated forest for protection		2,454,480
Afforestation		
Protection forests, special-use forests		
New plantations	1,000,000	898,088
Natural regeneration	1,000,000	1,283,350
Production forest		
Timber plantations	2,000,000	1,551,922
Industrial and fruit trees	1,000,000	941,460

Source: MARD, 2011

3.1.4.3. Program 147

Program 147 is the latest reforestation program up to the survey time (January 2016). Unlike two former programs, the design of this program only focused on developing production forests and it was scheduled to run between 2007 and 2015. It aims to (1) plant 2 million ha of production forests, an annual average of 250,000 ha, (2) create jobs, increase income to stabilize the life of people living in or near forested areas, and (3) promote the establishment of a long-term sustainable market of the forestry sector, including the market for seed and seeding supply, technical services, and forest product processing. Up to now, the government officers have not yet published any official reports about results of Progam 147.

3.1.4.4. Selected species for reforestation programs

According to instructions of the MARD when implementing reforestation programs of the government, selected species in forest rehabilitation need to satisfy criteria of each category of forests, promote their functions, and achieve targets of the programs. While species planted in special-use forests were selected by MBSFs, Provincial People's Committee would determine species planted in protection and production forests in the scope of each province.

Table 3.6. List of principal species for production forests in the nine ecological regions of Vietnam

	Name of species	Forest ecological regions								
		1	2	3	4	5	6	7	8	9
1	*Acacia auriculiformis*	+	+	+	+	+	+	+	+	+
2	*Acasia crassicarpa* A.Cunn. ex Benth					+	+		+	
3	*Acacia mangium* Wild	+	+	+	+	+	+	+	+	+
4	*Acacia mangium x Acacia. aunculiformis*	+	+	+		+	+	+	+	
5	*Aquilarria crassna* Pierre ex Lecomte	+				+	+	+	+	+
6	*Bombax malabarica* DC	+			+					
7	*Calamus tetradacthylus* Hance				+					
8	*Canarium album* (Lour.) Raeusch	+	+	+						
9	*Casuarina equesetifolia* Forst et Forst f.				+	+	+			
10	*Cedrela odorata*				+				+	
11	*Ceiba pentandra (L.)* Gaertn						+		+	
12	*Chukrasia tabularia* A.Juss	+			+	+				
13	*Cunninghamia lanceolata* Lamb.		+	+						
14	*Cinnamomum casia (*L.) J.Presl		+			+	+			
15	*Dendracalamus ohlami* Kengf		+		+					+
16	*Dendrocalamus membran- ceus* Munro	+	+			+				
17	*Dipterocapus alatus* Roxb.- Ex.G.Don						+	+	+	
18	*Eucalyptus camal- dulensis* Dehanh						+		+	+
19	*Eucalyptus tereico- rnis* Sam				+	+	+			+
20	*Eucalyptus. urophylla* S.T.Blake	+	+	+	+	+		+		
21	*Eucalyptus. urophylla x Eucalyptus camal*	+	+	+	+	+				
22	*Hopera odorata* Roxb						+	+	+	
23	*Ilex kaushue* S.Y.Hu			+						
24	*Illicium ve rum* Hook.f.			+						
25	*Khaya senegalensis* (Desr) A.Fuss				+			+	+	
26	*Litsea glutinosa* (Lowr.) cu B.Rob.							+		
27	*Lipthocarpus flssus* Champ. ex benth			+		+				
28	*Mangletia conifera* Dandy		+	+						
29	*Melaleua cajuputi* Powell									+
30	*Melaleuca leucadendra L.*									+
31	*Melia azedarach L*	+	+		+		+	+	+	
32	*Micheha meriocris* Dandy							+		
33	*Neolamarckia cadamba* (Roxb) Bosser								+	+
34	*Phyllostachys pubescens* Majiel ex.H.de lehaie			+						
35	*Pinus caribaea* Morelet					+	+	+	+	
36	*Pinus kesiya* Royle ex Gordon							+		
37	*Pinus masoniana* Lamb			+						
38	*Pinus merkusii* Jung- h.et.de Vries			+		+				
39	*Rhizophora apiculata* Blume									+
40	*Sophora Japonica L.*				+					
41	*Styrax tonkinensis* (Pierre) Craib ex Hardw		+							
42	*Tarrietia javanica* Blume					+				
43	*Tectona grandis*	+						+	+	
44	*Toona sinensis* (A.Juss) M.Roem			+						
45	*Toona suremi* Blume Merr								+	
46	*Vernicia montana*	+								
	Total species	13	13	15	14	16	14	14	16	10

Note: 1: Northwest region, 2: Central part of North Vietnam, 3: Northeast region, 4: Red River Delta, 5: North Central, 5: South Central, 7: Central Highlands, 8: Southeast, 9: Southwest

Source: MARD 2005

To facilitate the implementation of the reforestation programs, the MARD suggested a list of 46 principal species for production forests in the nine ecological regions of Vietnam according to Decision 16/2005/QĐ-BNN dated 15 March 2003 (Table 3.6). Up to 23 November 2015, this Decision was invalidated and replaced by Decision 44/2015/TT-BNNPTNT issued by the MARD which showed a list of 40 main timber species planted in Vietnam (Table 3.7).

Table 3.7. List of 40 main timber species planted in Vietnam

1. *Acacia auriculiformis* A.Cunn. ex Benth	15. *Docynia indica* (Wall) Dec	29. *Pasania cerebrina Champ.* Ex Benth
2. *Acacia crassicarpa* A.Cunn. ex Benth	16. *Erythrophloeum fordii* Oliv	30. *Pinus caribaea* Morelet
3. *Acacia difficilis*	17. *Eucalyptus camaldulensis*	31. *Pinus kesiya* Royle ex Gordon
4. *Acacia mangium* Willd	18. *Eucalyptus pellita*	32. *Pinus massoniana* Lamb
5. *Acacia* hybrid	19. *Eucalyptus urophylla* S.T.Blake	33. *Pinus merkusii* Junght. et de Vries
6. *Azadirachta indica* A. Juss	20. *Eucalyptus* hybrid	34. *Rhizopphora apiculata* Blume
7. *Bruguiera sp*	21. *Hopea odorata* Roxb	35. *Schima Wallichii* Choisy
8. *Canarium album* (Lour) Raeusch	22. *Illicium verum* Hook.f	36. *Sonneratia caseolaris* (L.) Engler
9. *Canarium tramdenum* Dai &Ykovl	23. *Litsea glutinosa* (Lowr) C.B.Rob	37. *Sterculia foetida* L
10. *Casuarina equisetifolia* Forst. et Forst.f	24. *Macadamia integrifolia* Maid. Et Betche	38. *Styrax tonkinensis* Piere
11. *Chukrasia tabularis* A.Juss	25. *Mangletia conifera* Dandy	39. *Tectona grandis* L
12. *Cinamomum cassia* Presl	26. *Melaleuca cajuputi* Powell	40. *Terretia javanica* Blume
13. *Cunninghamia lanceolata* (Lamb.) Hook	27. *Melaleuca leucadendra* L	
14. *Dipterocarpus alatus* Roxb	28. *Michelia mediocris* Dandy	

Source: MARD 2016

3.2. FLA process and current forest management entities in the study sites

3.2.1. Procedure of FLA to individual households

In Cho Don District, FLA began in 1995. Before 1999, the FPU took full responsibility for FLA and issued the allocation land records (*ho so giao dat lam nghiep*) known as Green Books for the green-colored cover page (Figure 3.2) to recognize legal right of forest land owners. However, since issued the Decree 163/ NĐ-CP in 1999, there was additionally the DNRE, the DARD participating in the allocation process and the DNRE has been directly in charge of giving the LUCs known as the Red Book (Figure 3.2).

While the District People's Committee (DPC) will give a final decision to distribute forestland to individual household entities, other entities need to get a permission from the Provincial People's Committee. The current allocation process to individual households in Cho Don District was implemented based on the Circular 38/2007/TT-BNN. The process began at the district level and progressed down the administrative hierarchy to each village (Figure 3.3). Firstly, the DPC established an allocation plan which was disseminated through the communes to the villages. Each household who wished to receive a plot of forestland had to fill in a request form, which was submitted to CPC, and then CPC confirmed and transferred to the competent authorities at district level (including DARD, DNRE and FPU) to check. After the DARD, DNRE and FPU had completed a checking process, created the statement of allocation to ask for final approval of the DPC. Finally, DNRE would give the certificates of land use rights after finalizing the allocation process. Each village was then able to conduct the own forest management, protection, and development manners based on the own circumstances. Of course, the rules and regulations carried out by all villages had to comply with the common regulations of the state. For this reason, although the steps of the FLA process have been obviously written in the legal documents applied nationwide, Castella et al. (2006) said that: "Instructions were passed down from one hierarchical level to the next with minimal changes. It was not uncommon to find that the management rules of one village were nothing more than a photocopy of those of the neighbor village".

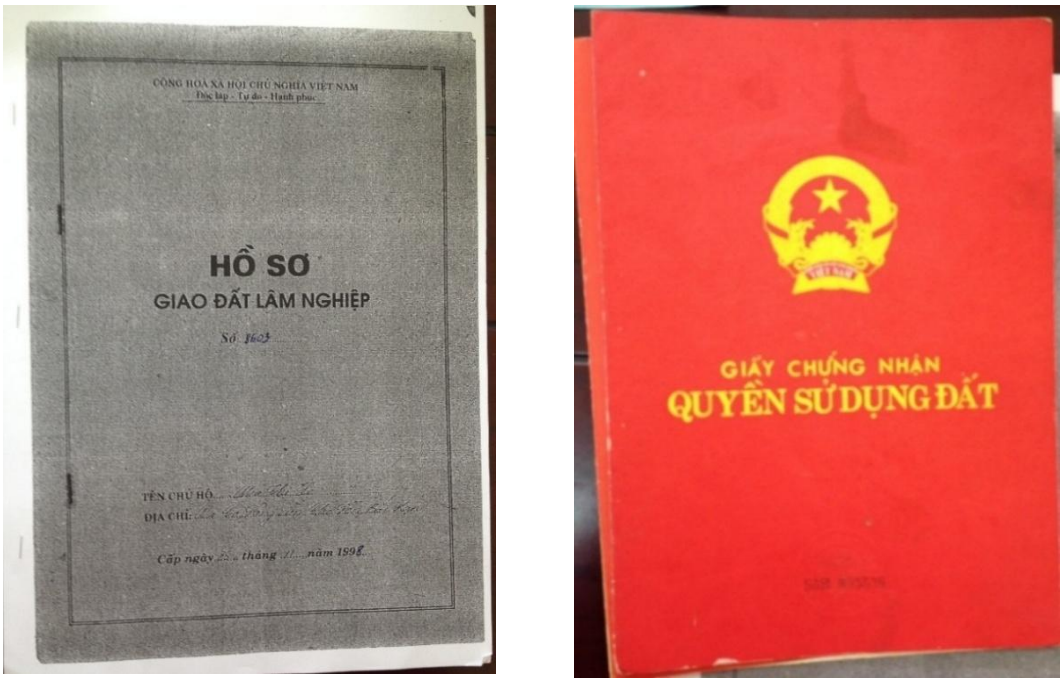

Figure 3.2. Green Book (left) and Red Book (right)

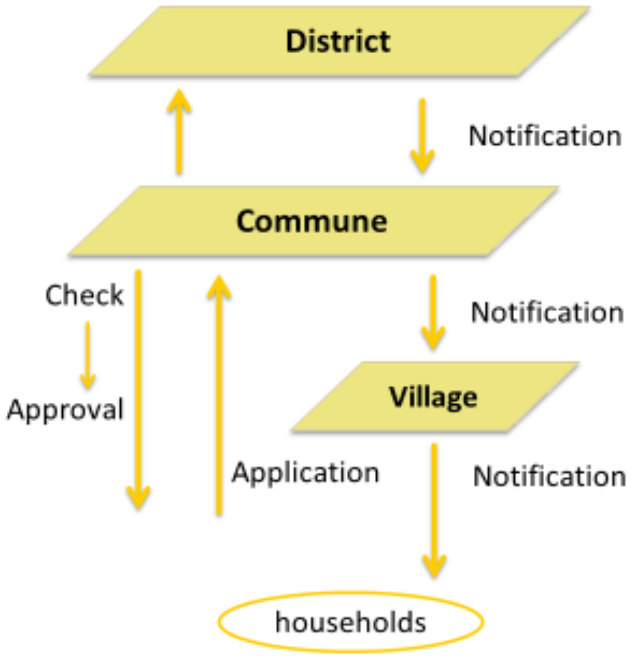

Figure 3.3. The FLA process to households

3.2.2. Forest management entities and allocated forests

As of 2014, Bac Kan Province had 379,416 ha of forestlands, including 255, 607 ha production forest land, 98,261 ha protection forest land, and 25,547 special use forest land (MONRE 2014). According to the Bac Kan FPD (2016), as of 2016, total forests of the whole Bac Kan Province was 370,245 ha of forests, including 281,673 ha of natural forest (76.1%) and 88,572 ha of plantation forest (23.9%), and allocated to eight management entities: households, CPCs, management boards, state - owned enterprises, other economic entities, communities, army and other organizations (Table 3.8). In the province level, households and CPCs obtained most of the forests, making up 57.0% and 29.6% of the total allocated forest area, respectively. Especially, 51.7% of total natural forest and 73.6% of total plantation forest were allocated to households.

Table 3.8. Type of forests allocated to management entities in Bac Kan Province

User group	Natural forest		Plantation forest		Total	
	Ha	(%)	Ha	(%)	Ha	(%)
Household	145,683.4	(51.7)	65,180.9	(73.6)	210,864.4	(57.0)
CPCs	93,102.2	(31.1)	16,316.3	(18.4)	109,418.5	(29.6)
MBSF	24,999.5	(8.9)	770.2	(0.9)	25,769.7	(7.0)
Army	1,737.0	(0.6)	642.9	(0.7)	2,379.9	(0.6)
Other economic entities	3,415.8	(1.2)	367.7	(0.4)	3,783.5	(1.0)
Other organizations	343.1	(0.1)	4.02	(0.0)	347.1	(1.0)
State - owned enterprises	11,347.4	(4.0)	5,225.5	(5.9)	16,572.9	(4.5)
Communities	1,044.7	(0.4)	64.5	(0.1)	1,109.3	(0.3)
Total	281,673	(100.0)	88,572	(100.0)	72,129.3	(100.0)

Source: Bac Kan FPD, 2016

As of December 2015, the forests of Cho Don District were allocated to six management entities except for state-owned enterprises (SFEs, forest companies) and communities. In the past, there was an SFE in the district jurisdiction, but it was closed out in 2006 after the government issued the Decree 200 in 2004 and guided to dissolve ineffective SFEs. As of 2015, households and CPCs were the two core entities, making up 62.9% and 32.9% of the total allocated forest area, respectively. Remarkably,

plantation forests were principally established and managed by individual households, whereas other entities played the minor role in the total allocated area and were mainly responsible for natural forest management (Table 3.9).

Table 3.9. Type of forests allocated to management entities in Cho Don District

User group	Natural forest		Plantation forest		Total	
	Ha	(%)	Ha	(%)	Ha	(%)
Household	35,850.7	(58.7)	9,545.7	(86.3)	45,396.4	(62.9)
CPC	22,261.6	(36.5)	1,496.9	(13.5)	23,758.5	(32.9)
MBSF	1,855.5	(3.0)	48.0	(0.4)	1,860.3	(2.6)
Army	920.7	(1.5)	2.8	(0.0)	923.5	(1.3)
Other economic entities	174.3	(0.3)	1.1	(0.0)	175.4	(0.2)
Other organizations	11.1	(0.0)	4.0	(0.0)	15.1	(0.0)
Total	61,074.0	(100)	11,055.3	(100)	72,129.3	(100)

Source: Cho Don FPU, 2016

In A and G Communes, production forests made up 52.2% in A Commune and 59.3% in G Commune. In both communes, forests were managed only by CPCs and individual households. Both production forests and protection forests were allocated to individual households, while CPCs were mainly responsible for protection forests. In A Commune, 1,343 ha (60.0%) was managed by households, while 895 ha (40.0%) was managed by the CPC. Of 1,343 ha allocated to households, 175 ha (13.0%) was categorized as protection forests and 1,168 ha (86.9%) was production forests. In G Commune, 2,151 ha (68.0%) was allocated to households whereas 1,002 ha (32.0%) were managed by the CPC. Of 2,151 ha, 275 ha (12.8%) were protection forests and 1,876 ha (87.2%) were production forests (Table 3.10).

Table 3.10. Allocated forest area (ha) by forest category and management entity in A and G Commune

Entities	A Commune			G Commune		
	Protection	Production	Total	Protection	Production	Total
Household	175	1168	1343	280	1871	2151
CPCs	895	-	895	1002	-	1002
Total (ha)	1070	1168	2238	1282	1871	3153

Source: A CPC, G CPC, 2015

3.3. Impacts on conventional forest-resource and forestland use by ethnic minorities: the cases of Village A and G

3.3.1. Ethnic minorities and the forests: before FLA

The Tay people have settled in both Village A and Village G for over a century. They have experienced a similar history of land use changes. The government started to establish collective management of farmland in the 1960s, and rice yield was distributed to each household based on a labor point system. During the cooperative period in upland communes of Bac Kan Province, it is reported that rice shortage forced people to open surrounding forests for upland rice cultivation (Sadoulet et al. 2002). According to Castella et al. (2002) who traced landscape changes in Cho Don District by satellite imageries, new forest clearance was observed in 1990-1995, and the effects of reforestation appeared in 1995-1998.

The information obtained from the respondents corresponds closely to these forest cover changes. Before FLA was introduced in 1995, the two villages shared a similar history of accessibility of forest land and forest resources, they used freely surrounding forests as a source of land for agricultural crops and livestock grazing land, timber, firewood, and various NTFPs. As I mentioned earlier, the Tay had traditional shifting cultivation, but the fallow periods were enough long which means that the forest can regenerate. From the late 1970s to the early 1980s, agricultural production from collective farm management could not keep pace with the growing population. Consequently, the villagers uncontrollably rushed to clear as much upland area as possible to meet their food demands. The size of annually cleared areas during the collectivization period depended on the labor availability of each household, which soon reduced available slopes for farming. When collective farms were closed in 1988, the Tay families

claimed the lowland, mostly wet-paddy fields, as their ancestors' land and allocated the land by themselves. However, some households whose lowland areas were insufficient continuously cleared the surrounding forests until when FLA was introduced. Villagers said that they often cultivated upland rice, maize, and cassava in monoculture on cleared forests for two to three successive years, then these fields were abandoned. In addition to free access to forest products and forestland for agricultural crops, cattle such as buffalos and cows was grazed freely in the surrounding forests before the FLA policy.

3.3.2. FLA and shifting cultivation in Village A and G

Though it was technically difficult for the respondents to recall detailed events 20 years ago, the answers to the questions about when and why they ceased shifting cultivation suggest that most of them had already become stuck when FLA was implemented. A shortened fallow period up to three to four years and degraded forestland made shifting cultivation an unrewarding effort. They stopped one by one, ranging from 1990-1995 due to several reasons as shown in Table 3.11. Seventeen respondents of Village A and 21 respondents of Village G ended shifting cultivation before the implementation of the FLA policy. Six households of Village A and 4 households of Village G maintained shifting cultivation until the government forbad through the FLA policy. Of 23 and 25 respondents in Village A and Village G who could recall the early stage, 17 (73.9%) and 21 (84.0%) listed soil degradation as the reason that shifting cultivation became unattractive. They said that they stopped shifting cultivation because the soil was poor, or soil became exhausted, or surrounding forests were denuded and could not recover after a fallow period. We categorized these free answers to "soil degradation". They became aware of soil degradation through crop yield decrease, soil hardness, and loss of the fertile top-soil. In addition, 15 (65.2%) and 18 (72.0%) answered that they started to pay more attention to and more concentrated on wet paddy field management (Table 3.11). Notably, the majority had ceased shifting cultivation before FLA, and there was no significant difference between the two villages (chi-square test, df = 1, χ^2 = .793, p > .05). Prohibition of shifting cultivation by the government might not play a decisive role but might encourage them to terminate shifting cultivation.

Table 3.11. Reasons to stop shifting cultivation (multiple answers were allowed)

	Village A (n=23)		Village G (n=25)	
	No.	(%)	No.	(%)
Reasons for discontinuing shifting cultivation (multiple free answers)				
Soil degradation	17	(73.9)	21	(84.0)
Acquirement of lowland	15	(65.2)	18	(72.0)
Prohibition by the government	6	(26.0)	4	(16.0)
Hard work	3	(13.0)	4	(16.0)
When they stopped shifting cultivation				
Before FLA	17	(73.9)	21	(84.0)
After FLA	6	(26.1)	4	(16.0)

Figure 3.4. Wrapping leaves were transported to the market in Village A (left) and timber was purchased in Village G (right)

Figure 3.5. Settlements along the foot of a hill (left) and a plantation of *Cinnamomum cassia* (right) in Village A.

CHAPTER 4: ALLOCATED FORESTLAND USE AND THE FACTORS CAUSED THE SHIFTS

This chapter is partially based on *Nguyen and Masuda (2018) Land Use After Forestland Allocation and the Potential for Farm Forestry in a Mountainous Region of Northeast Vietnam. Small-scale Forestry: 1-19,* doi: 10.1007 / s11842-018-9399-0, which was published based on this Ph.D. research work.

The chapter is about what were the driving forces for tree planting. First, I put attributes of sample households in two villages into consideration. I then examine the current situation of allocated forestland to sample households of two villages through the allocated area per household and LUCs. To find the factors caused the shifts in forestland after the FLA policy was introduced or determinants for tree planting activities in my study site, I compared allocated forestland use patterns of two villages with different accessibility about current land-use patterns on allocated forestland to recipient households, how kind of crops cultivated and arranged on the allocated forestland. At the end of the chapter, surrounding natural forest management issues at my study site after the FLA policy was also considered.

4.1. Allocated forestland to sample households

4.1.1. Comparison of allocated forestland in Village A and G

FLA started in both villages in 1995. The next allocation was conducted in 1998 including A Commune, and again in 2001 including G Commune. The next allocations were conducted to allocated remaining forestlands to households who had not yet been allocated in the previous allocations or households who had already received FLA but owned small areas. According to senior officials of the District FPU, they encouraged villagers to apply for FLA but many refused in the beginning due to fear of taxation on their allocated forestland. As pointed out by Clement and Amezaga (2008), another reason given by the villagers was that, under free exercise of shifting cultivation, they were not attracted to having the official approval of their rights over forestland. In other words, the villagers also did not see any benefits of receiving land use rights because the

advantages of having official land use rights for allocated land were unclear. Most respondents indicated that there were few conflicts among villagers during the FLA process.

At the survey time, all sampled households in Village A, and 33 households (94.3%) in Village G had FLA. All new immigrants of both villages did not get the land directly FLA because they move in each village after the government allocation was completed. But, ten non-Tay households purchased forestland from Tay households. Two households in Village G who did not have forestland were late Dao migrants. The mean of allocated production forest area was 4.55 ha in Village A, larger than the 3.43 ha in Village G (Table 4.1). The higher population density in Village G likely contributed to the smaller land areas. In addition, the government took part of the allocated areas to widen the road. However, there was no significant difference between the mean of allocated production forest area between the two groups ($p > .05$). Contrastingly, there was a large disparity among the forestland recipients in each village. In Village A, the maximum area per household was 15.94 ha. The reason was, according to the explanation of the respondent as well as the CPC, the household size was largest when FLA was implemented. The household that possessed 0.10 ha in Village A was a newly formed household, who got the land through inheritance from their parents in 2014. In Village G, the largest area was also allocated to a big family, while the household who had only 0.40 ha was a Dao family who recently migrated to Village G and purchased forestland from a Tay owner.

With the reorganization of the Ministry of Forestry into the MARD in 1995 and the establishment of the MONRE in 2002, every land-use category was standardized in the so-called Red Book issued by the DONRE. Sample households in Villages A and G were first given Green Books (*ho so giao dat lam nghiep*) issued by the District FPU for both protection forests and production forests. Later in 2000, local authorities withdrew all Green Books and replaced them with Red Books issued by the DONRE. Remarkably, the Red Books were only issued for production forests with a 50-year period. The 50-year period started from the date when a parcel of forestland was allocated to a household. When several parcels were allocated to a household, a separate Red Book was issued for each parcel. Both the husband's and the wife's names were written in each Red Book. However, two of new immigrant households in each village did not have Red Books. The

reason was that issuance of a new Red Book required authentication of both the buyer and seller, but these non-Tay households had purchased forestland from villagers who had left the village for other provinces. These purchasers without land titles were considered as forestland recipients by the local government and received the same rights and duties as the original owners.

As forestland allocation happened twice in each village, the mean number of plots allocated to the households were 1.8 plots per household (Table 4.1). In Village A, the maximum plot allocated the household was 4 plots and the minimum 1 plot. In Village G, the maximum plot was 3 and the minimum 1 plot. Because each plot was given a LUC, the household would have 4 LUCs if they owned 4 plots of allocated forestland.

Table 4.1. Land area (ha) per sample household (2016)

	Wet paddy field (ha)		Production forest (ha)		Protection forest (ha)	
	A (n=37)	G (n=35)	A (n=37)	G (n=33)	A (n=16)	G (n=0)
Min*	0.10	0.10	0.10	0.40	1.20	-
Max*	0.63	0.50	15.94	8.10	28.50	-
SD*	0.12	0.12	4.23	2.10	6.59	-
Mean*	0.33	0.28	4.55	3.43	5.13	-
Mean of LUC number issued on forestland*			1.8	1.8	-	-
No. of HH who did not have forestland			-	2	21	35

* Refers to the sample households who had land.

4.1.2. Comparison between the majority and minority in the ethnicity

As mentioned above, all 12 non-Tay sample households, seven Nung in Village A and five Dao in Village G, moved to each village after the government allocation under FLA policy finalized. Ten non-Tay households had production forestland by purchasing the original recipient Tay household, two Dao in Village G have not yet got production forestland. There was a large discrepancy between the allocated production forest area per Tay households and non-Tay households in both villages. The mean allocated area per Tay household in Village A was 5.50 ha compared with only 0.50 ha to non-Tay

household. In Village G, the mean allocated area per Tay household was 3.73 ha, but only 0.43 ha to non- Tay household (Table 4.2). The statistical analysis also concluded there was a significant difference between the mean allocated forestland area to Tay household and non-Tay household of both Village A ($p < .05$) and Village G ($p < .05$). Generally, non-Tay households of both villages purchased the quite small forestland area. Except for one household that purchased 1.83 ha, all the remaining non-Tay households owned no more than 0.50 ha.

Inequality distribution of allocated forestland between different ethnic groups was indicated in the studies of Castella et al. (2006), Tran and Sikor (2006), and Sikor and Tran (2007). Castlla et at. (2006) revealed that the FLA policy recognized legally traditional right to land use that already existed. Likewise, migrant households or newcomers who did not have traditional forest and land use rights were prevented from having access to forest resources and forestland under the FLA policy (Tran and Sikor 2006, and Sikor and Tran 2007). This implied that the recognition of traditional forest and forestland use rights excluded new immigrant households from the allocation of forestland. But, in this study case, immigrant groups did not reside in Village A and G at the time of allocation. Hence, there was no any immigrant household got forestland directly from the government allocation.

Table 4.2 Allocated production forestland (ha) per sample household of each ethnic group (2016)

	Production forest (ha)					
	Village A			Village G		
	Tay (n=30)	Nung (n=7)	Total (n=37)	Tay (n=30)	Dao (n=3)	Total (n=33)
Min*	0.70	0.10	0.10	0.60	0.40	0.40
Max*	15.94	1.83	15.94	8.10	0.50	8.10
SD*	4.16	0.61	4.23	1.95	0.05	2.10
Mean*	5.50	0.50	4.55	3.73	0.43	3.43
No. of HH who did not have	-	-	-	-	2	2

4.2. Current land-use patterns

4.2.1. Start of tree planting activities

Though FLA was introduced to both villages in the same period, the government supports reached them at different times. The villagers have several reasons to be interested in reforestation programs. Respondents of both villages first took advantage of collecting living wood after they cleared degraded allocated forestland for tree plantations, which would otherwise have been prohibited. They could then grow several cycles of annual crops on the cleared plots before tree cover thickens. Program 327 (1992-1997), and Program 661 (1998-2010) were two major subsidiary mechanisms to encourage forestland recipients to plant trees. Program 661 was replaced by Program 147 (2007-2015), with more focus on production forest recipients. Village G, with better accessibility, was given priority, where 23 of 33 forestland recipient households participated in Program 327 in the latter half of the 1990s (Table 4.2). The remaining 10 households joined the programs later, including Programs 661 and 147. These programs provided seedlings and the cost to take care of the plantations for three initial years. The total cost of the subsidy to recipient households in tree planting on their allocated production forestland from two former programs was 1,500,000 VND (66.75 USD) per ha, and the last program was 3,000,000 VND (133.5 USD) per ha. Twenty-three households of Village G who first joined the program had already experienced timber harvest and the lands were two cycles in.

Contrastingly, forestland recipients in Village A with worse accessibility started to participate in the government programs after 2005, when an unpaved road was constructed and connected the village with the commune center. Before the support started, there was only one household who purchased and planted seedlings on their own accord. Before the support under Program 661 was initiated, forestland recipients just cultivated food crops on the allocated degraded forests, and collected wood and NWFPs for their daily necessities. There were 22 households participated in tree planting by the support of the Program 661, they did not join at the same time, the starting time of tree planting for each household ranged from 2005 to 2009. The 14 remaining households engaged in plantations with the Program 147.

Table 4.3. Number of households by the year when they planted trees and the sources of seedlings

Period	No. of FLA recipient HH (%) who planted trees		Channel of seedling acquisition	Selection of the species
	Village A (n = 37)	Village G (n = 33)		
1996 - 1998		23 (69.7)	Program 327	Government
1999	1 (2.7)*		Market at the district center	Themselves
2005 - 2008	22 (59.5)	8 (24.2)	Program 661	Government
		1 (3.0)*	Market at the commune center	Themselves
2009 - 2015	14 (37.8)	2 (6.0)	Program 147	Government
2016 (total)	36 (97.3)	33 (100.0)		

* Note: Those who purchased the seedlings by themselves also received the seedlings from the programs

4.2.2. Comparison of allocated forestland use in Village A and G

During the survey period of 2015/16, though the support timing of tree planting was different in both villages, all the forestland recipient households had established and maintained timber plantations, except one single-parent household (Table 4.3). The female householder abandoned the allocated 0.70 ha and supported her household by seasonal wage work away from home. This household was excluded from the following statistical tests. During the survey time, and the mean of areas used for timber tree per household was 1.39 ha in Village A and 1.38 ha in Village G. Also, they were no statistically significant difference between two villages ($p>.05$) (Table 4.4).

The species for timber plantations in the two villages were: *Manglietia glauca*, *Cinnamomum cassia*, *Canarium album*, *Chukrasia tabularis*, and star anise (*Illicium verum*). The first two were the most commonly planted species with 10-year and 15-year

standard felling rotations, respectively. All the households who planted these two species responded that they got the seedlings through Programs 327, 661, and/ or 147. One household in Village A and another in Village G additionally purchased and planted seedlings of *Cinnamomum cassia* due to its high economic value.

Fruit-bearing trees were also planted. The species listed by the respondents were: orange (*Citrus sinensis*), mandarin (*Citrus reticulata*), persimmon (*Diospyros kaki*), and plum (*Prunus salicina*). Most of the fruit-tree seedlings were provided by Cho Don District in the 2010-2015 period; some were provided by Program 661, purchased, or self-produced. The seedlings were received from the District, and the District supported 70% the cost of seedlings and 300 gm fertilizers per a seedling. While waiting for the timber harvesting, the forestland recipients could earn income from fruit trees that started to bear fruits after five years. The ratio of households who planted fruit trees was slightly higher in Village A (48.6%) compared to Village G (42.4%) (Table 4.4), but there was no significant difference between the two villages about tree crops (Pearson's chi-square test, $df = 1$, $\chi^2 = .397$, $p > .05$).

In Village A, it was estimated that 49.90 ha (29.7%) of the total allocated area, excluding one household that abandoned their land, was covered by timber trees, and 7.75 ha (4.6%) was covered by fruit trees. In Village G, the total estimated area for timber trees was 45.62 ha (40.4% of the total allocated area), and the area for fruit trees was 5.69 ha (5.0%). The ratio used for timber trees was higher in Village G, but there was no significant difference between the mean of areas used for timber trees ($p > .05$) and fruit trees ($p > .05$) between the two groups.

Though almost all forestland recipients planted trees, the area actually planted was less than the allocated forestland (Figure 4.1). When I compared the allocated areas and the areas without tree plantations, there were high correlations in both Village A (Pearson's two-sided $r = .969$) and Village G ($r = .879$). It means that the households who were allocated larger production forestland tended to use a smaller percentage of the allocated land for tree plantations. In other words, even if larger areas were given – such disparity is particularly noticeable in Village A (Table 4.1), the forestland recipients planted trees in around the same areas. In the supplemental survey to households and local officers, they suggested two reasons: one was limited and balanced supports provided by

the reforestation programs, and another was that the people themselves restricted the requests of seedlings due to concerns about unachievable targets.

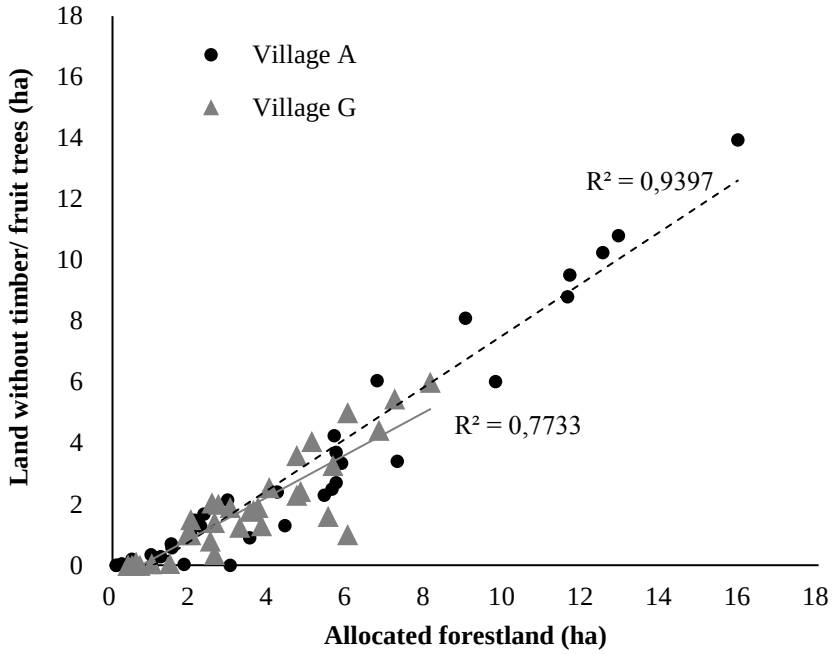

Figure 4.1. Comparison of allocated forestland and allocated land without timber/ fruit trees.

4.2.3. Crops arranged on the allocated forest land

Since arable land in upland regions is severely limited, the government allowed forestland recipient households to use 20% of allocated barren forestland for agricultural crops under the Decision 178 of the MARD in 2001. Indeed, wet paddy fields made up only 4.7% of the territory in A Commune and 7.3% in G Commune (A CPC 2015, G CPC 2015). As all production forestland allocated to villagers were denuded hill slopes and degraded natural forests caused by shifting cultivation in the past, forestland recipients could use up to 20% of the allocated land for agricultural crops.

Table 4.4. Allocated forestland utilization (2015/16).

	Village A (n=37)		Village G (n=33)	
Total allocated forest area (ha)	167.74		113.26	
Number (%) of HH who planted:				
Tree crops				
Timber trees only	18	(48.6)	19	(57.6)
Timber trees + fruit trees	18	(48.6)	14	(42.4)
No tree plantation*	1	(2.7)	-	(-)
Annual food crops				
Cultivated on the allocated area	35	(94.6)	25	(75.8)
No food crop on the allocated area*	2	(5.4)	8	(24.2)
Total area (mean**) of each crop				
Timber trees	49.90	(1.39)	45.62	(1.38)
Fruit trees	7.75	(0.43)	5.69	(0.41)
Annual food crops	6.32	(0.20)	5.29	(0.26)
Min. – Max. area (ha) per household**				
Timber trees	0.10 – 3.35		0.30 – 5.00	
Fruit trees	0.10 – 1.25		0.11 – 1.25	
Food crops	0.05 – 0.50		0.05 – 0.55	

* Includes one Village A household who got 0.7 ha of allocation but had abandoned it.

** Refers to the sample households who had each component

In addition to timber and fruit crops, annual food crops, such as maize and cassava, were cultivated on the allocated forestland. These were mixed with tree crops in the initial tree planting stage or arranged separately from tree crops. Three types of land use patterns were observed in during survey in two villages: including (1) timber crop only, (2) timber crops combining with annual food crops, (3) timber crops, and fruit trees combining with crops.

During the survey period, a larger number of households cultivated food crops in Village A (94.6%) compared to Village G (75.8%) (Table 4.4), and there was a significant difference between the two villages (Pearson's chi-square test, df = 1, χ^2 = 5.055, $p < .05$). In general, the households in village A, worse accessibility, depended higher on food crops and fruit crops.

4.3. Surrounding natural forest management

In these case, free access to forest resources and forestland had already stopped when the FLA policy was introduced. The forest protection rules under FLA, particularly the prohibition on clearing and burning of forests that caused a serious deforestation here before the allocation of forestland to households, were followed by the villagers. They said that they could no longer open new fields on surrounding forestlands, as these forest lands now belonged to the use right of other households under the new forestland policy.

Under the new policy, the villagers also took responsibility for the supervision of their cattle at all hours, and they would have to compensate for any damage that their cattle caused to other households' fields. During the survey time, freely grazing buffaloes and cows were no longer observed in both villages.

On the other hand, as previously mentioned, the Green Books issued on protection forests were not replaced with Red Books. Protection forests allocated to individual households came to be managed under contracts with the FPU based on Decision 57/2012 about the approval of the forest protection and development plan 2011-2020. Smaller ratios of protection forests in G Commune and location of Village G – closer to the commune center – is reflected in protection forest management. Since there were no nearby protection forests available in Village G, protection forest management contractors were only found in Village A (Table 4.1). Those 16 households received protection work fees from the district FPU. During the survey period, the provincial government defrayed 200,000 VND (8.9 USD) ha^{-1} $year^{-1}$ per contractor. Although the boundaries of each allocated parcel were specified on the contract, the villagers could freely collect dead, fallen, or diseased wood, and NWFPs from protection forests regardless of allocation.

CHAPTER 5: CONTRIBUTION OF FARM FORESTRY TO HOUSEHOLD LIVELIHOODS

This chapter paid attention to the contribution of the land use patterns on the allocated forestland to the livelihood of sample households. I first showed all income sources of sample households in two villages. And then, I determined all income sources deriving from allocated forestland to households (from FLA) and grouped in one group. Next, I analyzed the effects of the FLA policy on household livelihood through the share of the income derived from FLA per household to the mean of total annual income. Likewise, I compared the income derived from the allocated forestland areas between two villages and between ethnic groups of each village. At the end of the chapter, the perceptions of forestland recipients about the implementation of the FLA policy were also put into consideration.

5.1. Income sources of sample households

Income of the sample households in both villages was derived from various sources, including paddy field, livestock, NWFPs, income derived from FLA (including income from crops planted on FLA and forest protection work fee), and off-farm (Table 5.1). Major sources of off-farm income obtained from governmental salaries, wage-workers, pension, seasonal hired labors, and government subsidies. Crops on FLA comprised of mainly maize, cassava and fruits, timber harvested from tree planting areas of FLA, raising livestock comprising of income from selling cows, buffaloes, pigs, chickens, NWFPs extraction were only calculated from selling the NWFPs (excluding NTFPs for subsistence). Salary included monthly income of the employees recruited in the state officers, the private companies (e.g. ore worker). Business came from selling brewed liquor, having a small shop, buying food, small carpenter's shop and middleman activities. And other sources came mainly from seasonal hired – labors.

As indicated in Table 5.1, all sample households of both villages engaged in agricultural activities on livelihood strategies. Specifically, 100% of sample households of two groups had income sources from the paddy field. Thirty-two households (86.5%) and 30 households (85.7%) respectively had income sources from the livestock. While the NWFPs were also engaged considerably to generate income in Village A with 32

households (86.5%), there were only 17 households (48.6%) of Village G. Remarkably, all the non-Tay households of both villages had income from the NWFPs. Timber from FLA also generated income for 23 households (65.7%) in Village G, but only one household (2.7%) in Village A. In addition, fruit trees contributed income for 8 recipient households (21.6%) of Village A and 6 households (17.1%) of Village G. However, none of the non-Tay households had income from fruit and timber crops. Regarding other products on FLA, mainly food crops, the higher number of households had income from this source with 36 sample households (97.3%) in Village A, compared to 28 households (80%) in Village G. The number of the households in Village G, better accessibility, having off-farm income was more than, 33 sample households (94.3%) compared with 29 households (78.4%) of Village A.

Table 5.1. Number sample households by income source

Sources	Number of households (%)					
	Village A (n=37)			Village G (n=35)		
	Tay (n=30)	Nung (n=7)	Total (n=37)	Tay (n=30)	Dao (n=5)	Total (n=35)
Paddy field	30	7	37 (100.0)	30	5	35(100.0)
Livestock	26	6	32 (86.5)	26	4	30 (85.7)
NWFPs	25	7	32 (86.5)	12	5	17 (48.6)
Timber on FLA	1	-	1 (2.7)	23	-	23 (65.7)
Fruit on FLA	8	-	8 (21.6)	6	-	6 (17.1)
Other products on FLA	29	7	36 (97.3)	27	1	28 (80)
Off-farm	24	5	29 (78.4)	28	5	33 (94.3)

5.2. Contribution of allocated forestland to the household economy

5.2.1. Comparison between Village A and G

The result revealed the total annual income per household of Village G, with better accessibility, achieved noticeably higher than that of Village A, 2573.9 and 3996.6 USD, respectively (Table 5.2)

Regarding the benefits from the allocated forestland, the results showed the total income from FLA of Village A (680.0 USD), worse accessibility was light higher than compared with that of Village G (596.9 USD). But, there was no significant difference in the total annual income from FLA between two villages. In general, the households obtained more benefits from allocated production forestland offer had more components

cultivated on FLA. In other words, the households who obtained more the allocated forestland had the tendency to get more benefits from FLA than other households because they have more opportunities to diversify crops on their larger allocated forestland.

About the timber harvested from farm forestry on FLA. During the survey time, twenty-three Tay recipient households of Village G who joined tree planting in the late 1990s experienced timber harvest, but the mean of annual income from timber only made up 3.1% of total annual income (125.5 USD) per household (Table 5.2). Indeed, of these twenty-three households, annual income from timber calculated by using the NPV ranged between 41.2 and 452.5 USD per household. The small harvested tree plantation areas likely resulted in the limitation of the income from timber, ranging from only 0.25 and 1.5 ha per household. Another reason was the low tree survival rate at the beginning period of tree planting. Some respondents said that their prior tree plantation areas had been devastated by buffaloes and cows. In contrast, Village A, with worse accessibility, there was only one household that purchased seedlings and planted themselves before the government supported. During the survey time, only this one Tay sample household experienced timber harvest from 0.4 ha with 59.2 USD per year. Consequently, the share of income from timber harvest in the mean of total annual income of sample households in Village A was negligible, only 0.1% (1.6 thousand VND).

In terms of income from fruit crops on FLA. The current mean of areas used for fruit tree per household was 0.43 ha for 18 recipient households in Village A and 0.41 ha (14 households) in Village G. During the survey period, only the areas planted before 2010 was available for harvesting. Although only 8 Tay recipient households of 37 sample households had income from harvesting fruits, income from the fruit contributed considerably to the mean of total annual income of sample households in Village A, 22.0% of the total income (565.0 USD per household). In Village G, there were 6 Tay households of 35 households had income from fruits, this source comprised of just 6.9% (276.8 USD) of the mean of total income per household.

Food crop size in the allocated land ranged between 0.05 ha and 0.55 ha per household, averaging at 0.20 ha in Village A and 0.26 ha in Village G. In addition, some Tay households also cultivated vegetables and several savory species on FLA. Besides, during the survey time, there were 10 Tay households of Village G harvesting star anise (classified as an NWFP) from tree plantation areas and the study included this product on

other income from FLA. The share of the source from all other crops (except for timber and fruit crops) on FLA in the mean of total income was 112.7 USD (4.4%) in Village A and 194.6 USD (4.9%) in Village G. Apart from the crops on FLA, 16 Tay households of Village A got forest protection fees from the FPU which contributed only 19.7 USD (0.03%) to total mean annual income per household.

Apart from the products created on the farm forestry on the allocated land, the villagers also collected firewood and NWFPs from the surrounding forests. Firewood was gathered from both tree plantation and natural forests and used for own-consumption. All sample households of both villages used firewood for domestic energy but at different levels. 33 of 37 sample households (89.2%) in Village A used only firewood for domestic energy, compared with only 23 of 35 households (58.9%) in Village G. The remaining households used them at lower levels. The dependent level on firewood has not distinguished notably among the household groups of each village. However, where firewood could be collected was different between the recipient households and the non-recipient households in Village G. Thought the recipients had the right to stop others from exploiting the forest products on FLA based on the rules of the FLA policy, all respondents in Village A answered they could get firewood from all the natural forests surrounding the village regardless of FLA. However, 27 recipient households of Village G said that they often collect firewood from the allocated forest to themselves. The eight remaining households (including all five non -Tay households), who had either owned small allocated areas or not yet obtained FLA, answered they only gathered firewood from the forests that was managing by the Phuong Vien CPC and local people called these forest areas "the collective forest". In other words, the recipient households of Village G excluded other households from collecting firewood on their allocated land. Despite being heavily dependent on firewood in each village, this study was unable to estimate income from this because there was no firewood market in both villages.

On the other hand, regarding NWFPs, all sample households of both villages could collect freely them regardless of FLA. Various kinds of NWFPs were collected with many different use purposes, such as for food, animal husbandry, medicine and others (e.g. wrapping leaf). Bamboo shoot, medical plants and wrapping leaf provided mainly to generate income. It is the fact that all sample household (100%) of Village A and 33 sample households (94.3%) of Village G still engaged in collecting NWFPs for

their subsistence needs but at different levels. Village A depended more on these products than Village G. They used most of the products for self-consumption. However, only sold NWFPs were calculated in annual household income. Consequently, just 5.9% (151.9 USD) income from NWFPs contributed to the mean annual income per household in Village A, compared with just 2.3% (92.3 USD) per household in Village G.

Except for the non-Tay household group of Village G, income from livestock contributed significantly to total annual income of sample households in each village. Cows, buffaloes, pigs contributed mainly to the source from this activity. Apart from economic value, cows and buffaloes were also used for draught power. The number of cows and buffaloes per household in Village A on average were 2.1 head, in Village G was 1.8 head. Each household in Village G had about 2.1 head on average, compared with 3.4 head in Village G. In Village A, this source contributed 538.3 USD (20.9%) of the mean of total annual income. Likewise, the households of Village G got 764.1 USD (19.1%) in their mean of the total annual income compared with 117.9% of Tay household group. Strikingly, all 32 sample households of Village A and 30 sample households of Village G having income from livestock used mostly forage cultivated on FLA (being a non-FLA income source but still strongly related to allocated forestland) and got supplementary materials from the forest resources (categorized as the NWFPs) to feed their livestock.

In fact, the highest share of income was attained from off-farm in both villages, with 31.6% (814.2 USD) of total annual income in Village A, and 52.5% (2099.4 USD) in Village G. The results also suggest that households in Village G with better road accessibility depended more on off-farm activities for their livelihood. In other words, they had more opportunities in generating income from off-farm with better road condition.

The results of the correlation analysis between attributes of sample households (including the labor force, the age of household head, and education year of household head) and total annual income per household showed that in Village A where agricultural activities contributed mainly to household income, the labor force had a positive significant influence on the annual income (Person's two-sided $r = .515$, $p < .05$), whereas this is no significant correlation between the labor force and the annual income in Village G. Instead of, in Village G, better accessibility, the education level of the household head

had a significant positive correlation with the annual income (Person's two-sided r =.370, p<.05), but the years of education had no significant influence on the annual income of the sample household in Village A. In both villages, age of the household head had no significant correlations with the household annual income.

Likewise, when examining the relationship between these attributes of the recipient households with the total income sources from FLA in both villages, the result indicated that only the labor force per sample household in Village A existed a significant positive correlation with the income from FLA. The result indicated that the sample households of Village A with less accessibility tended to depend on more the allocated forestland for income generation.

5.2.2. Comparison between Tay and non- Tay people in each village

In both villages, the Tay households had considerably higher the mean annual income than non-Tay households, 2779.3 compared with 1791.9 USD in Village A, 4246.5 compared with 2497.6 thousand VND in Village G (Table 5.2).

On average, in Village A, Tay household attained 855.9 USD (30.8%) in the total annual income from FLA, compared only 26.8 USD (1.5%) of non- Tay household. Likewise, this source contributed 544.8 USD (12.8%) to total annual income on average per Tay household in Village G, compared with only 30.9 USD of non- Tay household (1.2%) (Table 5.2). Though main products from FLA contributed to household income in both villages included timber crops, fruit crops and food crops, income derived from crops on FLA for all non – Tay households only came from food crops. This means that there were no non- Tay households attaining income from timber and fruit crops.

In both villages, Tay household group got higher income derived from the crops on FLA than that of non- Tay household group. In Village A, Tay group achieved 4.8 % (132.8 USD per household) in the mean of total annual income compared with only 1.5 % (26.8 USD) of non-Tay group. Likewise, in Village G, while Tay group attained 5.2 % (221.9 USD) from this source in total income, this source contributed only 1.2 % (30.9 USD) to the total income of non-Tay group (Table 5.2).

Regarding NWFPs from surrounding natural forests, non- Tay households gathered more than compared with Tay Households in both villages. The non-Tay group of both villages got higher income from this source than that of Tay-group, just 125.9 USD (4.5%) of Tay group, compared with 263.2 USD (14.7%) of non- Tay group in Village A. Likewise, 82.7 USD (1.9%) of this income contributed to total annual income of the non- Tay group in Village G, 149.7 USD (6.0%) of non-Tay group (Table 5.2). Non-Tay household group of two villages depended on more natural forest resources for their livelihood.

In terms of livestock, this source contributed the highest rate to the total income of non- Tay household group in Village A with 736.6 USD (41.1%), compared with 492.0 USD (17.9%) of Tay household group. In Village G, Tay household group achieved 870.0 USD (20.5%) of their total income from livestock, while non-Tay household group attained only 129.1 USD (5.2%) from this source.

Table 5.2. Contribution of the income sources in mean income (USD *year*$^{-1}$) per household (2015/2016)

Income sources (USD)		Mean income (%)					
		A Village			G Village		
		Tay (n=30)	Nung (n=7)	Total (n=37)	Tay (n=30)	Dao (n=5)	Total (n=35)
Income derived from FLA	Timber on the FLA	2.0 (0.1)	0.0 (0.0)	1.6 (0.1)	146.4 (3.4)	0.0 (0.0)	125.5 (3.1)
	Fruit on the FLA	696.8 (25.1)	0.0 (0.0)	565.0 (22.0)	322.9 (7.6)	0.0 (0.0)	276.8 (6.9)
	Other crops	132.8 (4.8)	26.8 (1.5)	112.7 (4.4)	221.9 (5.2)	30.9 (1.2)	194.6 (4.9)
	Protection fees	24.3 (0.9)	0.0 (0.0)	19.7 (0.03)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
	Sub-total	855.9 (30.8)	26.8 (1.5)	680.2 (26.4)	544.8 (12.8)	30.9 (1.2)	596.9 (14.9)
Income derived from Non-FLA	Paddy field	379.6 (13.7)	430.9 (24.0)	389.3 (15.1)	445.0 (10.5)	437.5 (17.5)	443.9 (11.1)
	Livestock	492.0 (17.7)	736.6 (41.1)	538.3 (20.9)	870.0 (20.5)	129.1 (5.2)	764.1 (19.1)
	NWFPs	125.9 (4.5)	263.2 (14.7)	151.9 (5.9)	82.7 (1.9)	149.7 (6.0)	92.3 (2.3)
	Off-farm	926.2 (33.3)	334.4 (18.7)	814.2 (31.6)	2157.6 (50.8)	1750.4 (70.1)	2099.4 (52.5)
	Sub-total	1923.7 (69.2)	1765.1 (98.5)	1893.7 (73.6)	3701.6 (87.2)	2466.7 (98.8)	3399.7 (85.1)
	Total	2779.3 (100.0)	1791.9 (100.0)	2573.9 (100.0)	4246.5 (100.0)	2497.6 (100.0)	3996.6 (100.0)

In fact, the highest share of income was attained from off-farm in both Tay household group (50.8%) and non-Tay group (70.1%) in Village G. In Village A, while this income also contributed the highest rate to the total income of the Tay household group (33.6%), the share of them to the total income of non-Tay household groups closed behind income from livestock and paddy field, consisting of only 18.7%.

5.3. Disparity among recipient households of each village in FLA-related income opportunity

Regarding to benefits from crops planted on FLA, the results of the regression analysis between the size of allocated production forestland per household and income from all crops on FLA (excluding protection working fees) showed income from crops on FLA was significantly correlated with the allocated forestland in both Village A (Person's two-sided r =.480, p<.01) and Village G (Person's two-sided r =.347, p<.05). This means that the households who obtained more the allocated forestland had the tendency to get more benefits from FLA than those had less allocated forestland. Indeed, as mentioned earlier, there was a considerable disparity among the allocated production forestland area per household. In Village A, the allocated area per household ranged from 0.10 ha to 15.94 with 4.23 ha as the standard deviation. Likewise, the highest area per household was 8.10ha and the smallest area was 0.40 ha with 2.10 ha as the standard deviation. The unequal distribution of the allocated forestland to each household caused a disparity among value contribution of crops on FLA to their total income, ranging from 22.5 USD to 8344.5 USD per household in Village A, and from 53.4 USD to 5896.1 USD in Village G.

Though the households who allocated large areas used a small percentage of their allocated areas for planting timber and fruit crops, the households got more forestland often used more areas for timber and fruit crops. There was a significant correlation between allocated forestland area and the land area used for timber and fruit crops in both Village A (Person's two-sided r =.594, p<.01) and Village G (Person's two-sided r =.638, p<.05). In addition, allocated forestland area had a significant relation with forestland area used for food crops in both Village A (Person's two-sided r =.403, p<.01) and Village G (Person's two-sided r =.353, p<.05). The results suggested that the households got higher land areas had more opportunities to expand areas of crops.

In addition to disparity among the recipient households of each village in crops on FLA-related income opportunity, income from protection work fees under FLA also had a considerable difference. As only 16 households (43.2%) of Village A had protection contracts with areas ranging between 1.20 and 28.50 ha, inequality in working opportunities under FLA was observed.

5.4. Perceptions of forestland recipients about FLA

All respondents from both villages agreed that they preferred production forest, the reasons were that they could freely give their decision on harvesting the products cultivated on forestland. Further, they could intercrop the crops on tree plantation areas in initial stages for various purposes of their livelihood. The respondent's perceptions of FLA were presented in Table 5.4 and Table 5.5. Of all the allocated respondents of both villages, most of the respondents were very satisfied with LUCs, 30 respondents (81.1% of total recipient households), 29 respondents (87.9%) respectively. Likewise, only 5 respondents (13.5%) of Village A and 4 respondents (12.1%) of Village G were less satisfied with the support of government like seedlings and 3- initial year tree nursing fund for tree plantation, the other respondents were satisfied with this support. Ten respondents of Village A and eight respondents of Village G complained about location of the allocated plots. The complains were that they were too far from their home or they found it difficult to establish large-scale forest planting areas and put the allocated land in aggregated utilization and management due to the allocated plots were fragmented. As shown in Table 4.1, the mean of allocated forestland plot number per sample household was 1.8 in each village. Indeed, twenty-one recipient households (56%) in Village A and 21 recipients (63.6%) in Village G owned two or more allocated forestland plots. Eleven respondents of Village A and 10 respondents of Village G gave native comments about size of the allocated land, who expected to get more land. However, when respondents of both villages were asked about product consumption cultivated on FLA, they described different opinions. All respondents of Village G gave positive opinions, while most of respondents of Village A felt disadvantageous to selling products on FLA, expect for fruits that they could be transported easier to the market by motorbike and sold with a proper price. As road condition is an important determinant for the transportation cost of bulky commodities like wood, high transportation costs caused by poor road condition made households of Village A hesitate planting timber crops. All respondents preferred fruit trees to timber crops for cultivating on FLA with their current facilities.

Table 5.4. Perceptions on the FLA implementation process

Item	Perceptions									
	Very satisfied		Satisfied		Less satisfied		Dissatisfied		No idea	
	A	G	A	G	A	G	A	G	A	G
Government intervention	-	-	78.4	84.9	13.5	12.1	-	-	5.4	3.0
LUC issuance	81.1	87.9	-	-	2.70	3.03	-	-	16.2	9.09
Location	-	-	70.3	69.7	8.1	9.1	18.9	15.2	2.7	6.1
Area	-	-	67.6	66.7	5.4	9.1	24.3	21.2	2.7	3.0

Note: Figures are shown in percentage of the total forestland recipients (A: 37, G: 33).

Table 5.5. Perceptions on selling crops planted on allocated forestland

Crop	Perceptions							
	Satisfied		Less satisfied		Dissatisfied		No idea	
	A	G	A	G	A	G	A	G
Timber	-	75.8	27.0	12.1	59.5	-	13.5	12.1
Fruits	67.6	87.9	13.5	-	-	-	18.9	12.2
Other crops	-	78.8	27.0	-	54.0	-	16.2	21.2

Note: Figures are shown in percentage of the total forestland recipients (A: 37, G: 33).

Figure 5.1. Collecting maize from FLA (left) and wrapping leaf from forests (right) in Village A

Figure 5.2. *Manglietia glauca* on allocated land in Village A (left) and a small-scale local wood veneer processing mill in Village G (right)

CHAPTER 6: DISCUSSION AND RECOMMENDATIONS

6.1. Summary findings

The analysis of forest statistics, laws, regulations, and local-level implementation process revealed that the FLA policy was gradually streamlined and strengthened, and government support programs to forestland recipients were associated with the allocation process. As a result, tree plantations accounted for 40.9% of production forests whereas 96.2% of special-use forests and 86.0% of protection forests consisted of natural forests (Table 3.2). When focusing on plantation forests, 45.0% was managed by individual households, 21.4% by CPCs, and 13.9% by FMBs as of 2015 (Table 3.3). Those managed by FMBs are likely supplemental plantations inside protected areas. What should be noted is that SFEs do not play a dominant role any more in production forest management and the jurisdiction in pre-FLA era has been reallocated individual households and converted to plantations.

Two case studies in a mountainous region of Northeast Vietnam revealed some findings supporting previous studies paying attention to equity issues while the others do not. Both two sample villages consist of the Tay ethnic group as the majority and non-Tay as the minority, which suggests a necessity to pay attention to "minority of the minority". There was a significant difference in forestland areas allocated to Tay and non-Tay, but it was simply caused by late in-migration of non-Tay. When they moved from interior regions to sample villages, forests surrounding the settlements had already been allocated and they had to purchase the land from Tay people. Likewise, newly formed households also had a limited area obtained by inheritance. The local authorities explained the reason of unequally distributed forestland area as the difference of the labor force per household at the allocation time. However, it was technically difficult to examine it because two decades have passed since the allocation.

The cases were selected based on a hypothesis that road accessibility is a determinant of tree planting activities because bulky commodities, typically wood under the context of mountainous societies that depend on farming and forest resources, require road transportation. Indeed, spontaneous plantation forestry has already been developed

in the plains of northern Vietnam (Sandewall et al. 2010) and undulating hill areas of North Central region (Bueren 2004, Amat et al. 2010). However, forestland recipients in both villages have already planted trees and a difference was found in the time to start it. Since most of the recipients acquired seedlings through the government support programs, when the programs were introduced was the determinant of the activities, which reached earlier to villages with better accessibility (Fig. 6.1).

As a matter of course, forestland recipients in Village G, where the plantations are under the second rotation, obtained income from timber on allocated forestland at the survey time. However, the people of Village A could receive protection work fees regardless of the allocated production forestland area under the protection contract. In addition, both villages got income from fruit and food crops on their allocated forestland. In this study, total income from crops on FLA per household contributed 26.4% (679.3 USD) to total income in Village A and 14.9% (596.9 USD) in Village G. But, the contribution of timber plantations to the total annual income per household in Village G was only 125.5 USD, this value was higher than compared with those of medium household group (100 USD) and lower than those of the rich group (200 USD) in a case study in Northeast region (Sandewall et al. 2010). Likewise, the income from timber crops in Village G had a higher value compared with those of another study in North Central region (Hoang 2012), where the recipient households only attained 81.5 USD per household of timber plantations.

The potential of wood harvested from many small-scale farm forestry on FLA was expected to meet the growing demand of the wood processing industry in coming decades, while 45.7% of allocated forestland households in Village A and 44.1% in Village G have not yet utilized for tree plantations and contributed any cash income to recipient households up to the survey time. Thus, expanding tree planting in these areas could not only meet the demand of domestic wood market but also bring significant benefits to the recipient households. In addition, the growing global concern for carbon sequestration from tree plantation areas to mitigate climate change and the approval of the Government for Decision No. 799 /QĐ-TTg in 2012 about a National REDD+ Action Program could bring additional expectations on these unused allocated areas.

During the survey time, not only traditional shifting cultivation by the villagers has already ceased, but also illegal logging in surrounding natural forests mainly classified into protection forests after FLA was not observed in both villages. Especially, freely grazing livestock in the surrounding forests, that took place, popularly in both villages before the FLA policy was conducted, has already stopped now.

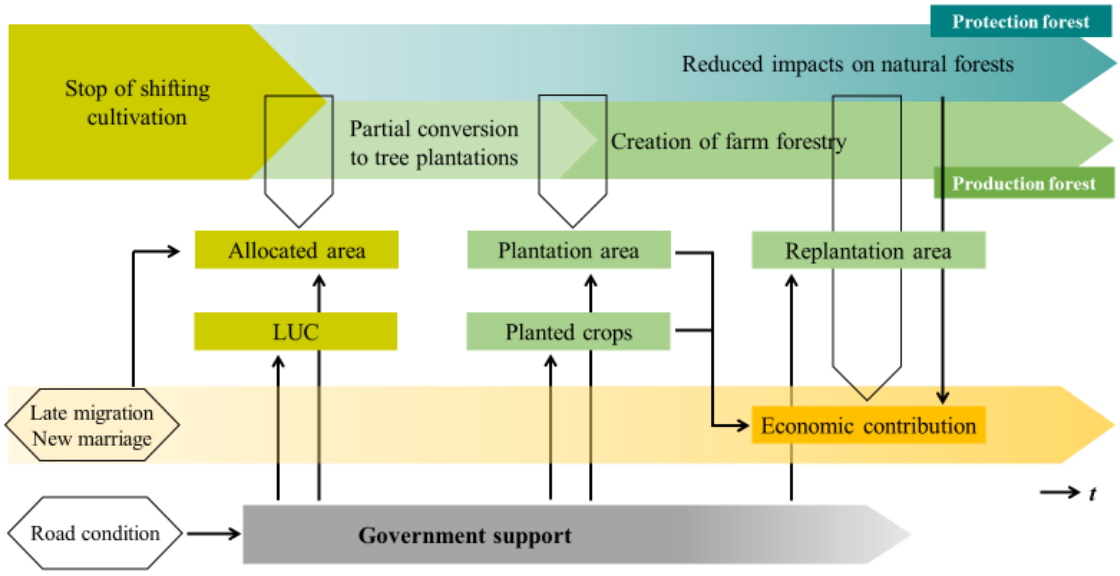

Figure 6.1: The effects of the FLA policy on forest resources and HH livelihoods and the prerequisite for expanding farm forestry on allocated forestland in two upland villages

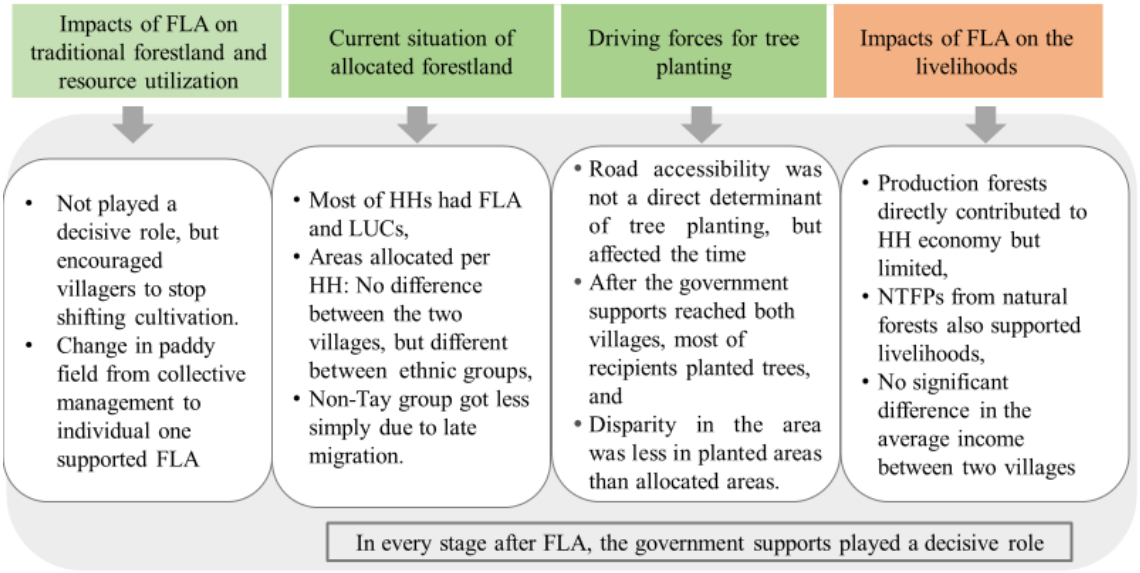

Figure 6.2: Summary findings from two case studies

6.2. The end of shifting cultivation

The results of my study differ from previous studies in several aspects. Negative impacts of FLA on traditional land and forest resource use of ethnic minorities and their hostile attitudes against FLA were reported in the Northwest region, the Central Highlands and North Central region (Sikor 2001, Sikor and Nguyen 2007, Sikor and Tran 2007, Jakobsen et al. 2007). After two decades, however, the respondents in the two sample villages recall the initial stage without clear complaints. Regarding the impacts on traditional land use, this case study suggests it is necessary to understand the background from a sequence of political changes from collectivization to decollectivization, which first took place on farmland and then on forestland. As already pointed by Sadoulet et al. (2002), it is likely that collectivization in farmland management resulted in excessive agricultural use of surrounding forests, but shifting cultivation had already become an unproductive practice when decollectivization of farmland started. Negative impacts of FLA could take place if local people's livelihoods fully depended on shifting cultivation, but previous studies that emphasized negative impacts on the society and forest resource use did not indicate whether those ethnic minorities also had lowland (Nguyen 2006; Sikor and Tran 2007).

These cases suggest that the areas under shifting cultivation were reduced in accordance with labor concentration on privatized farmland. In my study sites, narrow stripes of flat land along a river stream were converted to wet-paddy fields, which topography is commonly observed in mountainous areas. Settlements were formed in between the lowlands and hills, parallel to the river (Figure 3.5). With clear boundaries of allocated forestland and individual responsibility on the land might encourage each forestland recipient to have an idea of a comprehensive land use strategy over a stretch of lowland and upland. However, it should be noted that it is technically difficult to restage the situation of two decades ago.

6.3. Current situation of the forestland allocated to households in a mountainous region of Northeast Vietnam

As in the national-level statistics, the local level statistics show a rapid increase in forest cover. Nguyen (2006b) found that, based on the database of the MARD in 2004, the largest forestland recipients in Vietnam were the SFEs. In December 2004, they were managing 24.6 % (about 3 million ha) of the total forested area (including natural and plantation forest) (ibid.). However, the progress of FLA afterward set back the presence of the SFEs and made individual households one of the dominant forest management entity types. In addition, statistical data suggest that there is an appropriate division of roles between the public and the private sectors. At least in my study sites, individual households engaged mainly in production forest management while the communes took responsibility for the protection forests. According to the district statistics, 62.9% of the total allocated forestlands and 86.3% of tree plantations were managed by individual households as of the end of 2015 (Table 3.9). In the communes, Village A and G, where two sample villages are located, individual households got primarily the allocation land making up 60.0% and 68.0% of the allocated areas, respectively (Table 3.10). The situation protested the previous studies in the initial stage of FLA implementation claimed the largest recipients for the forest land were the local state agencies (Nguyen 2006b).

The results revealed that land title was guaranteed by LUCs, not only for the original recipients but also for inheritors and purchasers. Which led to introduce crops with longer harvest period. In addition, the conflicts in land use deriving from unclear

boundaries between allocated plots to each household that showed in prior studies (Sunderlin and Huynh 2005, To 2007), did not happen in these cases.

6.4. Determinants of tree planting activities in a mountainous region of Northeast Vietnam

My next questions were how individual households managed allocated forests and how the conversion from degraded natural forests to more profitable plantations were realized. From the conditions for successful farm forestry listed by Byron (2001), this study focused on land use rights and market accessibility. Villages A and G had similarities in the composition of ethnic groups where the Tay people are the indigenous inhabitants, Nung people in Village A and Dao people in Village G are new immigrants, household size, and age and educational background of householders, but there was a difference in village accessibility.

As mentioned above, the land use right was guaranteed by LUCs for most of the recipients in each village. How different accessibility affected expanding tree plantation areas in two sample villages. This question was provided with the evidence summarized in Table 6.1. This compared the findings of two villages related to tree planting activities on the allocated forestland. Contrary to my assumption and the findings of previous studies (Lang 2002, Ohlsson et al. 2005, Sunderlin 2006, Meyfroit and Lambin 2008), accessibility to the market caused by the road condition was not a direct determinant of tree planting activities in these cases. Almost all the forestland recipients in both villages had already planted timber trees, even in an upland village with limited accessibility like Village A, and there was no significant difference in the mean area of tree plantations between the two villages. In other words, effects of the road condition on expanding tree planting areas were not observed in these cases.

A difference was found in the time where tree planting started. The reason why Village G people started earlier was due to earlier government support. The study suggests that road accessibility, which influenced the timing of starting government support, was an indirect factor of tree planting activities in the two villages. As soon as the program support reached Village A, even with worse road accessibility, they also initiated tree planting. In both villages, it was estimated that around 40% of allocated

production forests were converted either to timber tree or to fruit tree plantations. Also, these results did not support for the findings of Clement el at (2009), Meyfroid and Lambin (2009) that concluded FLA failed to engage recipient households in tree planting or encouraged the recipients joined in reforestation programs. It is likely that the local people resisted reforestation programs or their interests in tree planting were limited when they had not yet achieved rice sufficiency as mentioned in the study of Sikor (2001), but these previous studies focused on the failure of reforestation programs accompanied by FLA did not mention whether those recipients have already captured food security. These cases suggest that ethnic households with sufficient paddy fields to meet their food needs, even in an upland village with worse accessibility, could actively join in reforestation programs in search of additional profits. The FLA policy could only positive impacts in locations where there was already food security.

The impact of FLA on local livelihood should not be measured just by allocated area but also by how forestland recipients utilize the allocated forestland. The most notable conclusion is that, though the allocated area differed among households and also between Village A and G, the mean timber tree plantation area and the standard deviation were similar between A and G (1.39 ha and 1.38 ha as the mean, and 1.09 and 1.01 as the standard deviation). The results suggest that the government support did not only play a decisive role in encouraging tree planting but also functioned as a determinant of tree planting area. In fact, only one household in each village spontaneously purchased seedlings in addition to what the government provided. Such similarity in planting areas resulted in a high positive correlation between the allocated areas and the areas without tree crops. This finding can be applicable to disadvantaged mountainous areas, where market pressures on raw materials from the wood processing industry are relatively low. In other words, expansion of tree plantation area largely depended on the government reforestation programs.

Table 6.1. Comparison of tree planting activities on allocated forestlands between Village A and G

Item	Village A	Village G	Difference	Notes
Forestland allocation				
Year allocated	1995	1995	No	
HH with allocation* (%)	37 (100.0)	33 (94.3)	No	
HH with LUC (% to*)	35 (94.6)	31 (93.9)		
Allocated forestland (mean, ha)	4.5	3.4	No (*t*-test, $p > .05$)	
Tree planting activities				
Year started	2005	1996	Yes	Delay of goverment support in Village A
No. of recipient HHs joined (%)	36 (97.3)	33 (100)	No	Supported by reforestation programs of government
Areas of timber trees (mean, ha)	1.39	1.38	No (*t*-test, $p > .05$)	

6.5. Distribution of the benefits from the allocated forestland among sample households

The study found that the farm forestry created on the allocated forestland was able to provide economic benefits for the recipients. In Village A, less accessibility, the households tended to depend more on the forestland areas to generate their income. In other words, the more interior, the higher dependency on the products from allocated forestland was observed.

The total value derived from FLA distributed unequally among the recipient households and different ethnic groups in each village. Variations in benefits from FLA also reflected the differences in the kind of crops and the timing that the recipients started to actually cultivate their allocated land. Indeed, the large disparity in the allocated forestland area does not currently make an issue because of less disparity in the area utilized for tree crops. But, it is undeniable that the households who received the larger land plots had more opportunities to income-generating activities, especially for the locations with limited off-farm activities. Households got more forestland often cultivated more components of crops on their forestland and had the higher area of each component. Likewise, all households had the mean of the highest annual income also achieved the

highest benefits from farm forestry on FLA in both villages and vice versa. In fact, FLA contributed not only direct income sources but only indirect benefits from the products on FLA. While all sample households of both were interested in FLA, the migrant households and new -formed households got the smallest benefits from FLA and most of the migrants belonged to the households had the lowest annual income in each village. According to the World Bank (2012), the households have enough land for cultivation tend to more opportunities to escape poverty. But, my present case study revealed that the lowest income households had less or had not gotten the forest land. It seems that the marginalized households and groups found it difficult to access the forestland under the FLA policy. Especially, when each recipient household established farm forestry, namely revolving investment on tree plantations, differently allocated area may become a defect of the FLA policy implementation, particularly in interior regions where livelihood options are limited.

The total income mean of households in Village A was considerably lower than compared with Village G, but the recipients in Village A with less accessibility attained the higher total annual income from FLA than those in Village G if only putting the total annual income derived from FLA into consideration. In Village G, though there were 23 households having income from the timber harvesting, unlike income from fruit and food crops was calculated through a previous year, income from timber sale was calculated by using the NPV of 10 years for *Magnolia conifer* and 15 years for *Cinnamomum cassia*. By doing this, actual income from timber sale of several households during the survey time was relatively higher.

In addition, labor force plays a decisive role in the total annual income as well as the total income from FLA of the households in Village A. This means that the households of Village A have fewer opportunities from off-farm activities, they had to exploit their own initiatives to ensure their livelihoods or they still depend heavily on the farm activities to generate their income.

During the survey period, although actual cash value of FLA contributed directly to the annual income of the recipient households in Village G was not high, all sample households of Village G was interested in FLA. The reasons were that they could cultivate annual crops for various purposes like fodder for their livestock that contributed the noticeable ratio to the income of the Tay households, perennial trees, and get firewood

from both tree planting areas by thinning and allocated natural forests. They could take advantage of the labors available for these activities. Especially, income from timber often attained at the end of the business cycle was considered as a significant saving for the villagers, they could use the income to purchase the valuable assets, improve their house, invest in children's education and other purposes. Also, they could attain cash whenever they needed due to a flexibility timber harvesting.

The finding realized that the road condition was not a determinant for expanding the tree planting areas, but it made the sample households of Village A be delayed on getting any benefits from timber planting areas supported by the government like Village G. Though the road condition is an important determinant of transportation cost of bulky commodities like wood, the benefits of timber from tree planting was unable to compare between two villages because the tree planting area supported by the government in Village A has not yet been harvested during the time survey.

Apart from production forests, Village A, which is located in a more interior area compared to Village G, was once allocated protection forests, but later the policy framework was replaced with protection contracts. However, local people collected wood and NWFPs from natural forests, regardless of the boundaries. Such diminishing boundaries of allocated protection forests and *de facto* free access to surrounding natural forests are also reported in the North Central region (Nguyen et al. 2016). Since the payment for protection activities can be regarded as a compensation for their labor input, the inequality observed in the area – only 16 (43.2%) households had protection contracts, and in addition, the areas vary from 1.20 to 28.50 ha – should be understood not as inequality in property but as inequality in working opportunities.

In mountainous regions where arable land is critically limited, the government allows utilizing part of forestland allocations for food crops. However, fewer households made use of the privilege in Village G, probably because of more livelihood opportunities. Even in Village A, where most households planted food crops during the survey period, the mean area was limited to 0.20 ha, less than the permissible ratio by the government (20% of allocated barren forestland). They planted maize and/ or cassava among the young trees or separately from tree plantations, mainly to feed livestock.

According to GSO (2016), the monthly average income per capita of the whole country was 3,049.0 thousand VND (135.7 USD), in rural areas was 2,028.0 thousand VND (90.3 USD). In these cases, the average annual income per household was 57,835.5 thousand VND (2573.9 USD) in Village A, and 89,804.1 thousand VND (3996.6 USD) in Village G. With 4.3 on average of the number of household members in Village A and 4.6 of Village G, the monthly average income per capita of two villages was 1,120.0 thousand VND (49.8 USD) and 1,626.9 thousand VND (72.4 USD) respectively. Currently, the average income of two villages was considerably lower than compared to the general condition of the whole country as well the rural areas. The finding could explain why the recipient households in Village G with better accessibility have still limited to invest in expanding tree planting areas on allocated forestland by their own account.

6.6. Policy implications and recommendations

The FLA policy prompted mountain dwellers to change the upland management from shifting cultivation to sedentary land uses. Stop of shifting cultivation led to natural regeneration in once degraded forests, and issuance of the land title associated with initial financial support by the government led to the formation of farm forestry. What were observed from two upland villages cannot be directly generalized to the whole country; land use development after FLA might follow different directions, for instance, in the areas where lowland is limited and the local people highly rely on NWFP collections; but the findings here can be applicable to the areas with similar geographical and economic settings.

From the findings of this study, it is important to know that the state could not simply give local people the rights to the allocated forestland and expect them to benefit from an endowment. To make the recipients benefit from the allocated land, the state policy should not only focus on how the recipient households get rights to allocated land but also on how they derive true economic benefits from it. This means the government should give incentives to the recipients to bring their allocated forestland into production. In addition, the state should also pay attention to strengthening the recipients' ability to derive entitlements from forests.

The potential of wood harvested from a large number of small-scale forestland owners through FLA was expected to meet the growing demand of the wood processing industry in coming decades. But most of the sample households owned more than 3 ha of degraded production forest land did not plant trees the whole allocated areas. These households should be encouraged to participate in joint-ventures for plantations: such as creating links between these households and private patterns that have the capital to invest in land. If the private sectors need land to establish plantations for the wood processing industry, they can collaborate with the smallholders who do not have the financial resources or technical capacity to invest in the land by providing them with financial resources and technical support. However, the private sector cannot afford the high transaction costs and possible risks associated with smallholders, who are perceived as undisciplined in financial matters. Addressing these constraints requires the facilitating role of local authorities. Local authorities can act as intermediaries between the private sector and smallholders, providing security to private sector investment, organizing smallholders to reduce transaction costs, and mitigating risks associated with smallholders through legal tools. In this collaboration, local authorities are important for protecting smallholders from predatory behavior by private sector actors (e.g. land capture).

6.7. Suggestions for further studies

As one of the future challenges in the FLA policy, there is a question regarding how long the government support will be needed. The third reforestation program (Program 147) was completed in 2015, and currently, there is no subsequent program. If the market remains limited, whether the sample households replant trees by themselves or just abandon the land after harvesting should be monitored to find the answer to this question. Even though the current plantations are abandoned, however, it is likely not going to matter as much in terms of forest cover because natural regeneration takes place if there are no strong human pressures like shifting cultivation. A revolving cycle of farm forestry can be achieved if timber market grows steadily, but at the same time, currently, uneven distribution of forestland, and the future possibility of land concentration to economically powerful households or any other agents may become pronounced if tree planting activities start to expand spontaneously under market mechanisms.

As previous studies did not pay much attention to the difference of forestland category, more study on the efficiency of protection forest management should be considered.

It has also the necessity of regional comparison in the FLA policy, particularly about the difference in responses of FLA recipients to the policy and program between northern and southern Vietnam because the difference of forest cover change is pointed out in one of the previous studies (Meyfroidt and Lambin 2008).

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Appendix 1: Questionnaire

Respondent: _____ Phone: _____ Sample No: _____ Date: / /2016

Interviewer: Nguyen Thu Thuy

I. Household attributes *** Wealth rank of the HH:** ☐Poor ☐Medium ☐Rich ☐Others [ ]

Number of labors:

II. Land tenure and management

1. Individually managed land

Category	Area (ha)	Location	Distance	Certification			Transaction			
				Type of Book	Owner	Year	Purchase/ sell	Year	Reason	Price
Farmland										
Paddy field										
Forestland										
Protection										
Production										

III. Agriculture

1. Cropping patterns including agricultural crops and fruits planted in forestland

Land	2016												2017
	1	2	3	4	5	6	7	8	9	10	11	12	1

2. Crop harvest including those from forestland (01/2016- 01/2017)

Land	Crop	Harvest (kg)			Sale		
		Season I	Season II	Total	Amount	Price/unit	Place of sale

3. Estimated self-consumption rate: rice ( )%, vegetable ( ) %, maize including feed ( )%

4. Agricultural input (02/2015-01/2016)

Crop	Seeds/ seedlings		Fertilizers		Pesticide/ herbicide		Employed labor/tractor/ buffalo		
	Input	Price	Input	Price	Input	Price	Person	Day	Wage

5. Did you borrow money for farming in 01/2016-01/2017?

☐NO ☐YES, for what purpose, how much, and from whom?

[ ]

IV. Livestock and aquaculture

1. Stock and flow of livestock

Livestock	No.	The way to feed		Self-consumption	Sale/ purchase (02/2015-01/2016)		
		winter season	summer season	(02/2015-01/2016)	Amount	Price/ unit	Total
Buffalo		Grazing at [ ]by[ ] Collect forage at [ ]	Grazing at [ ]by[ ] Collect forage at [ ]	Slaughtered Number [ ] Purpose:	Sale		
		Purchase: Material [ ] Amount [ ] Price [ ]	Purchase: Material [ ] Amount [ ] Price [ ]		Purchase		
Cow		Grazing at [ ]by[ ] Collect forage at [ ]	Grazing at [ ]by[ ] Collect forage at [ ]	Slaughtered Number [ ] Purpose:	Sale		
		Purchase: Material [ ] Amount [ ] Price [ ]	Purchase: Material [ ] Amount [ ] Price [ ]		Purchase		
Pig		Collect forage at [ ] Self-sufficiency	Collect forage at [ ] Self-sufficiency	Slaughtered Number [ ]	Sale		

		Purchase: Material [ ] Amount [ ] Price [ ]	Purchase: Material [ ] Amount [ ] Price [ ]	Purpose:	Purchase		
Goat		Collect forage at [ ] Self-sufficiency	Collect forage at [ ] Self-sufficiency	Slaughtered Number [ ] Purpose:	Sale Purchase		
Chicken		Purchase: Self-sufficiency Material [ ] Amount [ ] Price [ ]	Purchase: Self-sufficiency Material [ ] Amount [ ] Price [ ]	Meat [ ] Egg [ ]	Sale of meat Sale of egg		
Others (specify)							

2. Estimated self-consumption rate: Chicken ( )% Egg ( )% Pork ( )% Beef/ buffalo ( )% Goat meat ( )% Fish ( )%

V. Other income sources in the agricultural sector

1. Government supports in agriculture, livestock, or aquaculture (02/2015-01/2016)

☐NO support

Type	Items	From whom?	Cash/ goods	Amount/ time	Frequency
Agriculture	Money				
	Seeds				
	Fertilizers				
	Training				
	Others (specify)				
Livestock					
Fishery					

VI. |Tree plantation activities

1. Tree plantation (Note: fruit trees are included in the agricultural sector)

☐NOT yet planted trees

Location*	Area	Species	Reason**	Planted and harvested year						
					10	11	12	13	14	15

*Production forest/ protection forest; ** Reason for selecting these species to plant

2. Harvest of planted trees on allocated lands

Product	Year	Self-consumption		Sale		
		Amount	Purpose	Amount	Price/unit	Buyer*

* Middlemen from outside/middlemen of the village/ directly to wood processing factories/ etc.

3. Input for tree plantations

Species	Year	Seeding		Fertilizer		Labor*		Others
		Input	Price	Input	Price	Input	Price	

* Labor exchange or employed labor; if employed, details about type of work, number of employees, and working days.

4. Government supports in tree plantation

☐NO support

Items	From whom?	Cash/ goods	Amount/ time	Frequency	Notes
Credit					
Seedlings					
Fertilizers					
Training					

5. Did you borrow money for tree plantation? ☐NO ☐YES → **When (year)** [ ]

From whom [ ] **How much borrowed** [ ]

VIII. Perceptions

1. Which do you prefer, production forest or protection forest, and why?

Answer of husband

[ ]

Answer of wife

[

]

2. (For those who received Red Book) **Have you used the Red book for other purpose?**

☐NO ☐YES, for

[ ]

(For those who have not yet received the red book) **Why you have not yet received Red Book?** [

3. Is the allocated production forest area adequate for your household?

☐NO →How large it should be? [ ]

☐YES

4. Is the allocated protection forest area adequate for your household?

☐NO →How large it should be? [ ]

☐YES

5. According to your opinion, what are the advantages and disadvantages when practice allocated forest land utilizations

	Advantage	Disadvantage
Production forest		
Protection forest		

6. Request to the government

Appendix 2: T-test for attributes of households

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
members	Equal variances assumed	2,458	,121	-1,609	70	,112	-,41081	,25532	-,92004	,09841
	Equal variances not assumed			-1,622	66,552	,110	-,41081	,25330	-,91647	,09485
labours	Equal variances assumed	,894	,348	-,070	70	,944	-,01931	,27514	-,56806	,52945
	Equal variances not assumed			-,071	67,324	,944	-,01931	,27318	-,56453	,52592
agehead	Equal variances assumed	7,318	,009	-,518	70	,606	-1,13822	2,19728	-5,52056	3,24412
	Equal variances not assumed			-,514	63,232	,609	-1,13822	2,21425	-5,56272	3,28628
education	Equal variances assumed	,255	,615	-,638	70	,526	-,48571	,76184	-2,00516	1,03373
	Equal variances not assumed			-,636	68,381	,527	-,48571	,76394	-2,00999	1,03856
paddyfield	Equal variances assumed	,000	,987	1,585	70	,117	,04629	,02919	-,01194	,10451
	Equal variances not assumed			1,586	69,832	,117	,04629	,02919	-,01193	,10450
allcatedforestarea	Equal variances assumed	17,823	,000	1,578	70	,119	1,27253	,80651	-,33599	2,88106
	Equal variances not assumed			1,606	52,392	,114	1,27253	,79243	-,31730	2,86237

Appendix 3: T-test for tree crops

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
treeplantation	Equal variances assumed	2,550	,115	,058	67	,954	,01467	,25202	-,48837	,51771
	Equal variances not assumed			,058	66,961	,954	,01467	,25131	-,48696	,51630

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
treeplantation	Equal variances assumed	2,550	,115	,058	67	,954	,01467	,25202	-,48837	,51771
	Equal variances not assumed			,058	66,961	,954	,01467	,25131	-,48696	,51630

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