POLE DE FORMATION SPÉCIALISÉE (PFS) - CUD
ASSOCIATION IN TRAINING

BETWEEN HUA (VIETNAM) AND ULG (BELGIUM)

BUI QUANG NGUYEN

INCOME DIVERSIFICATION OF FARM HOUSEHOLDS IN BAC GIANG PROVINCE

MASTER THESIS IN INTERNATIONAL MASTER

IN RURAL ECONOMICS AND SOCIOLOGY

HANOI – 2013

Pole de Formation Spécialisée (PFS)
CUD

Université de Liège

MASTER THESIS IN INTERNATIONAL MASTER IN RURAL ECONOMICS AND SOCIOLOGY

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Income diversification of farm households in Bac Giang province

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2012 – 2013

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Association in Training between Hanoi University of Agriculture and University of Liege

Master Thesis in International Master in Rural Economic and Sociology

ABSTRACT

Income diversification has become an important component of household economy in Viet Nam for many years. However, in recent years, the industrialization –modernization process has some negative impacts on the model of famers' development. Should Vietnam apply the model of income diversification for household development? Therefore, the research aim to analyze the income diversification of farm households to provide useful information and give policy proposals for increasing income of farm households in site selection in Bac Giang province. To carry out the research, Simpson's Diversity Index (SDI) is used to measure the income diversification of households in the recent years. Moreover, the regression model is used to analyze the factors affecting to income of farm households. The resulted research shows that there are two forms of income diversification: 1) Diversification refer to an increase of income resources and the balance among them; 2) Diversification as a Shift to high-value activities of farmers. In the future, income diversification continues play an important role for increasing income of poor famers as well as reducing risk in their economic activities. Meanwhile, other households such as the rich famers with large scale production may apply the specialized model on their activities and shift to non-farm activities. The policies and supports for famers should base on the situation of famers and link to the regional policies.

Key words: income diversification, farm households, Simpson's Diversify Index (DSI), non-farm activities, household income.

ACKNOWLEDGEMENT

This study completed in addition to the efforts of myself. Equally important, I was received many support and advice from individuals and organization. I would like to express my gratitude to all the following people and organization for the supports.

I would like to say thank you to my promoters: Ms. Nguyen Thi Duong Nga (HUA) and Guillaume DUTEURTRE (MALICA) for their valuable guidance, suggestions, and comments.

I would like to express my deepest gratitude to Ms Nguyen Thi Tan Loc (Coordinator of MALICA), Mr Hoang Vu Quang –Rural Development Center, and Mr. Denis Sautier (CIRAD Viet Nam) for their suggestions.

I would like to say thank you all of the staffs at Lang Giang districts and 04 communes: Tan Thinh, Tan Hung, Van Trung, and Tan Quang communes for their supports.

Finally, I would like to express my deepest gratitude to my lectures in the program where I studied from 2012 to 2013.

Hanoi, Vietnam – July, 2013

BUI QUANG NGUYEN

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LIST OF ABBREVIATIONS

NRA	New Rural Area
CPI	Consumer Price Index
FAO	Food Agriculture Organization
GDP	Gross Domestic Product
GSO	General Statistical Office
HH	Household
ICTs	Information communications technologies
IFPRI	International Food Policy Research Institute
MARD	Ministry of Agriculture and Rural Development
OECD	Organization for Economic Co-operation and Development
PPP	Public-Private Partnership
SDI	Simpson's Diversity Index
VAC	Garden - Aquaculture - Raising livestock
VHLSS	Vietnam Household Living Standard Survey
VND	Vietnam dong

CHAPTER 1: INTRODUCTION

1.1. Context

The process of household economy development in developing countries is classified into the following three phases (Todaro, 1977): i) the period of self – sufficient agriculture: famers plant some main crops but with low productivity, simple technology and high risk. ii) The period of small business and diversification: famers convert their land to plant agricultural commodities; the famer can invest more technology in producing and developing non - agricultural activities. iii) The period of specialization: The farmers transfer to produce commodity and agri-business expansion; economic development focuses on specialization in production which has comparative advantage. In recent years, some studies about economic diversification of households have been conducted[1]. These studies showed the reasons why they need to diversify economic activities during that period; factors affecting on diversification; when to apply diversify of economy as well as current trend of economic diversification in rural areas. Therefore, it is believed that, economic activities diversification is good way for increasing income and poverty reduction.

In Viet Nam, household economy in rural area plays an important role in the industrialization - modernization process of Vietnam. First of all, the biggest amount of household and population belongs to rural area. According to the General Statistical Office of Viet Nam (GSO, 2012, page 22), in 2011, Vietnam had 60.1 million people living in rural areas, accounted for about 68.4% of the total population of the country. Of the 15.34 million rural households, the percentage of farm household in 2011 accounted for about 62.2% of the total rural households (GSO, 2012, page 31-32). Because of this, rural development has strong relationship with national development. Equally important, household economy is conductive to reconstruct to economic and

[1] FAO (2001). *Crop diversification in the Asia-Pacific region*; Centre for Rural research, University of Exeter (2003). *Farm Diversification activities*; Fournier et al., (2010). *Rural household's decision towards income diversification*; Simon C. K and David.T,(2008). *Agriculture and Livelihood diversification in Kenyan rural household*. World Bank (2005), *Agriculture diversification in Vietnam*; IFPRI (2003). *Income diversification and poverty in the Mountain and North Central of Vietnam.*

labor restructuring, which is the main contents of the industrialization – modernization process in Vietnam. There are many policies which focus on famers and rural areas were issued. Especially in 2008, the objective set to 2020 in the Resolution No.26-NQ/TW on Agriculture, Farmers and Rural Area are namely: to promote agricultural development in combination with industrial development, service and rural industries; to raise incomes for the rural population and decrease agricultural labor to about 30% of the total labors in the national economy.

1.2. Research problems

In Vietnam, income diversification has become a very strong component of household economy for many years. In general, income diversification contributes to increasing income, reducing risk, ensuring food security for farm households. Authors Dao The Anh and Vu Trong Binh (2000) indicated that after the innovation policy in 1988, with an increase from 228 kg in 1988 to 390 kg in 1993 of food quantities per capita per year, Vietnam ended shortage of food and became one of the leading food exporting countries in the world (Cited by Le Thi Nghe, 2006). From the 1990s, the VAC model (Garden - Aquaculture - Raising livestock) began as important guideline, which helped famers to diversify products in the market. VHLSS (2002) has shown that, 70% agricultural production joined the market. The number of income resources[2] increased from 4.02 in 1993 to 4.41 in 1998, and 4.67 in 2002 (IFPRI, 2003, page 57). Although, since 2005, the study on economic diversification deployed rarely, income diversification is still interesting subject and necessary for making policies of agricultural and rural development. Especially, in recent years, the industrialization – modernization process has some negative impacts on the model of famers' development. Should Vietnam apply the model of income diversification or specialization for household economy? Until now, the question has no clear answers.

[2] IFPRI (2003, page 52) divided income resource of household into 8 kinds of resources: Cultivation, Livestock production, Fishery, Forestry, Non-farm self-employment, Wages, Money transfer, and other resources.

Bac Giang is a mountainous province of the Northeast of Viet Nam, which is located in a highly diversity area[3]. Bac giang has strengths in developing annual crop productions, fruit trees. In recent years, Bac Giang promote the industrial development. The economic structure continues to change in a positive direction with agricultural sector accounted for 32.4% of GDP, followed by industrial sector of 37.2%, trade and services of 32.4% (People's Committee of Bac Giang, 2012). Besides the results achieved, the household economy in Bac Giang province has faced up to many difficulties and problems in the implementation of poverty reduction, and the restructuring of rural labor. The industrialization - modernization process lead to a decline of cultivated land per capita from 1794 m^2 in 2006 to 1559 m^2 in 2010 (VHLSS, 2006, 2008, 2010). In addition, lack of labor skills and expertise are the cause of unemployment because famers do not easily transfer from agricultural to non-farm with low labor skill. For instance, on average, 12.8% of household head has completed the upper secondary diploma and higher diploma, and 19.4% of them have not completed the primary school. Recent years, because of natural disasters and the fluctuations in the output price of agricultural products such as litchis fruit, livestock productions, annual crops, many famers producing intensive manufacturing products has faced up to difficulties in producing and selling their products.

Despite making a numerable of efforts, local authorities of all level are always in a shortage of information on household economy for making policies, especially long- term ones. The raised questions are that to which direction has the household economy changed? What factors affect to income and the diversification of farm households? Should Bac Giang apply the model of income diversification for household economy. From these above listed issues, I carry out the research with the name: "***Income diversification of farm households in Bac Giang province".***

1.3. Research objectives

*** Overall objective:**

[3] IFPRI (2003, page 57) shown that from 1992 to 2002, the biggest figures belonged to the *Mountain and North Central of Vietnam* area with 4.43 of income resource in 1992 and 4.97 income resources in 2002. The Simpson Diversify' Index was highest of 0.49 in 1992 and 0.59 in 2002.

Analyzing the income diversification of farm households both in the past and at present to provide useful information and give some policy proposals for increasing income of farm households in Bac Giang province.

***Specific objectives:**

- To systematize of basic theory and practice on household economy as well as income diversification of farm households;
- To analyze the income diversification of its meaning to household economy in the Bac Giang province;
- To analyze the factors affecting to income and income diversification of farm households in Bac Giang province;
- To identify the difficulties and the famers' strategies in diversification of economic activities to offer some proposals to increase income for the farm household in the province in incoming time.

1.4. Research questions

- Which economic activities create income for farm households in current years?
- What factors affect to the income and income diversification of farm households?
- Would income diversification be helpful to local people in improving their income?

1.5. Hypothesis

Households with high income become more and more specialized in their economic activities to increase benefit and income, but the poor households have the motivation to increase diversification of their economic activities aiming to reduce risk in their economic activities.

1.6. Scopes of research

Because of the limited time as well as budget, we only conduct the research in the period from 2006 to 2010 according to the VHLSS data.

We also conduct the field work at the three districts in Bac Giang province: Lang Giang, Luc Ngan, and Lang Giang districts. Due to limitations of time, in the three districts we will not mentions all of information and indicators which had in the VHLSS data 2006-2010. Therefore, we only focus on main indicators and issues which contribute to analyzing the research objectives.

1.7. Structure of the report

The thesis report is divided into four chapters. **Chapter I** introduces the context, research problems, research objectives, research questions, research hypothesis, research scope, and structure of the report. **Chapter II** introduces the basic theory and practice of income diversification of farm households, experience learned from others countries. **Chapter III** introduces side description (natural, social – economic condition of Bac Giang province), research methods (research steps and analytical framework, site selection, data collection, methods of data analysis). **Chapter IV** introduces income diversification of farm households in Bac Giang province, factors affecting income diversification, identifying difficulties in diversification of economic activities to improve the income of the farm households in Bac Giang province.

CHAPTER 2: LITERATURE REVIEW

2.1. Basic theory and practice of income diversification of farm households

2.1.1. Definition of farm households

In Vietnam, farmer households are the most basic object of researches on rural development because most of economic activities, including agriculture and non-agriculture in rural areas are mainly done by farmer households. The concept of farmer households according to Ellis (1988) has recently defined that **Farmer households are farmers who harvest living means from the land, mainly use family labors in the farm production, located in a wider economy, but basically featured by the participation as part of an active market with a lowly-completed level** (Cited by Dao The Tuan, 1997). The VHLSS report (2000, page 207) defines**: "Agricultural households are households who total labors or major number of labors engage in agricultural production (plantation, raising animal husbandry, agricultural services".** However, it can be seen that the accesses to farmer households' economic development in rural areas are more difficult to determine exactly the definition of farmer households and non-farm households because their income primarily gets paid from non-agricultural activities, they take the time for non-agricultural production rather than agricultural activities due to mainly to ensure food security for themselves and to be a sustainable source if non-agricultural activities are at risk.

2.1.2. Characters of farmer households

According to Prof. Dao The Tuan (1997), famers households have 3 characters:

- A farmer household is a basic economic unit which has three functions: just join in production, just join in consumption, and just join in assets accumulation.

- The relationship between production and consumption in the expression level of the farmer household from subsistence to full production of goods.

- Farmer households who not only join in agriculture activities, but also are involved in non-agricultural activities setting different levels. This makes difficulties for accessing what a farmer household is.

2.1.3. Typologies of farm households

A farmer household typology is a group of peasant who has a similar mode of operation. The purpose of the classification is to find out the laws of peasant farmers' development, behaviors based on their characteristics to analyze and find right solutions for each object of peasant farmer. There are 4 types way which are used to classify farmer typologies according to Dao The Tuan (1997):

- Household typologies based on production targets: For their goal is just to satisfy consumption demands, just to produce goods for sales, therefore different goals lead to different decisions in production and trade of household. Based on goals, farmer households can be divided into 3 types: **i) household classification of production who is complete subsistence:** According to the theory of Tchayanow, subsistence farmers who have the goal to maximize the benefits are to produce for domestic consumption. Factors which affect household's the demand and employment ability are the structure of population and labor, the percentage of population that are dependent from family **ii) household classification reacts to market:** their goal is self-subsistence and has the relationship to market products as inputs, output prices. They exchange a portion of their surplus products to external markets and are dependent on the market; **iii) household classification who specializes in production:** households produce their goods based on the demand-supply law and strongly response to output prices, inputs, labor market, land market.

- Household typologies based on production factors (household structure): The variables included in the model to classify households as variations of the particular structure of household for labor, land, capital ... to classify the similar characteristics for analyzing and finding out the laws and common problems for each group of household.

- Household typologies based on their income or revenue for comparison: the households are divided into groups with different income levels from low to high.

- Household typologies based on the production strategy: Household is classified by the production strategy of agricultural or non-agricultural commodities.

According to Professor Dao The Tuan (1997), the analysis of four types of typologies has the similar results. Because poor farmer households are often those with less productive resources (land, labor, capital), their productions aim consumption and rarely react to the market, while rich households are in contrast and have many business lines, with production goals for goods. Therefore, in this study, household income is used to classify household's typologies, and present the research results.

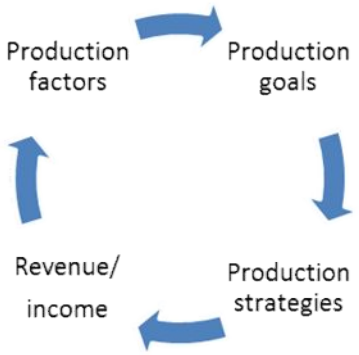


Diagram 1: Classifying household's typologies and their relationship

Source: Dao The Tuan (1997)

2.1.4. Resources of household Economics

In the study of peasant, land, labor and capital are three important factors which crucially determine the development of household economy.

- Household's human resources

Human resource is an important source of household's inputs and is important in all phases of production. Human resource is the basic source of capital that can take advantage and use 4 different sources of social capital, physical capital, natural capital and financial capital (GSO of Vietnam, 2007). At the family aspect, the number of workers and demographic scale, qualifications and skills of the employee are basic factors which contribute to the process of generating income for farmers. In a family, the division of labor among members is important, which contribute to increasing of income resources and maximizing other resources of family. Besides this, the structure of labor activities is also essential to determine the contribution of non-agricultural employment to total household income.

- Farmer household's land

Land has always been a particularly important means of production for peasants at all-time which decides the existence of agricultural production of farmers. For peasants, accesses to land and safety issues of land that they are exploiting are essential needs. In Vietnam, the State has taken to distribute land to farmers for cultivation and land management under the Land Law, but that does not mean that land for famers is secured. Agricultural production remains risks of natural disasters, on the other hand, land policies have much less clear (especially land use duration) and especially the risk of land loss due to industrialization, speculation, land corruption that threaten to land safely in some delta areas, direct influence on agriculture development as well as households' production decisions.

- Farmer household's capital

Capital is an important input to help farmers escape poverty by raising income from activities. According to Ray (1999), credit is essential for small-scaled agricultural producers because the duration from export to harvest is a quite long cycle, so they need to have credit sources to be used for working capitals, to invest and to be a tool for consumption balance when economic shocks happen. In discussions on economic development, the credit is considered a key element to "empower" for poor peasants.

In rural areas, farmers usually access to capital support from the *formal financial, semi-formal and informal systems* [4] while credit sources are provided mainly by the formal sources of the Bank for Agriculture and the Bank for social policies. According to the computed result from VHLSS (2006), the market shares of the Bank for Agriculture and Rural development accounted for 54.30 % of the total rural loan, followed by the Bank for social policies of 9.52%, and the remote relative of about 19%. In recent years, the rural credit market has developed quite rapidly, rural people can access to 9 credits sources such as the Bank for Agriculture and Rural

[4] **formal sector** consists the Bank for Agriculture and Rural Development, the Bank for Social Policies , the cooperative credit institutions, and the Joint Stock Commercial; **Semi-formal** area with the participation of society and non-governmental organizations; **informal sector** of the credit in society from family, friends and neighbors , from the moneylenders.

Development, the Bank for social policies, Vietnam Development Bank, people's credit Funds, unions, Commercial Banks, Private and microfinance organizations.

2.1.5. Economic activities and household's income sources

At present, there are several ways of classifying economic activities of households. The different classifications are due to different research objectives and scope.

According to FAO (2012, page 25), we can divide economic activities of farmers in two activities consisting of agricultural activities (on-farm activities) and off-farm activities). Meanwhile on-farm activities mention products from crops, livestock, organic products and crop products which bring energy. The increase in added value of household is due to food processing and other products, indigenous products, as well as the sale of agricultural products. Off-farm activities, including wage labor (including hired labor for companies in locality, seasonal workers, daily wage, migrant workers) and self-employment (small and medium enterprises).

According to Le Xuan Ba et al. (2006, page 8-11), economic activities can organize in agriculture and non-agriculture sectors. In particular, agricultural activities are activities which directly relate to crops and livestock while non-farm activities are activities which are outside of above mentioned activities. According to these researchers, the concept of non-farm activities is all activities which are not directly related to the production of crops and livestock. It includes activities in the processing of agricultural products and activities employed in large plants, not including activities in agricultural areas. For non-agricultural activities, the team came up with 2 meaningful groups of work which is important for wage employment and self-employment. This job classification is very important when we consider the factors to affect the restructuring of employment in rural areas, as well as to offer solutions for promoting the change of labor structure because of the nature of these different activities. The wage-earned labors are undertaken by contracts that employers make provisions for workers and workers' income depends only on working time. Activities which are seen as "self-employment" relate to self-management and holding a production establishment of goods and services. Buyers who are from this type of

employment cannot give direct terms about the product. For example, people have workshops, stalls and shops... they are solely responsible for results themselves.

According to the OECD (2009, page 16-17), in Mexico, economic activities which constitute income of rural households are 5 main areas: 1) wages and salaries; 2) non-agricultural activities and such as commercial business and services; 3) agricultural activities, 4) financial activities, deriving from equities, sale of stocks and bonds, loans, savings, patents, etc.; 5) gifts, donations and others, that comprise remittances, retirement payments, social subventions, government donations, interest on investments, properties loans, grants, etc.

Table 1: Activities and household's income

Groups	Activities/Sources	Details
Group 1. On-farm activities (including related agricultural services)	1Cultivation	Rice; food crops and other annual crops, annual crops and perennial fruit trees; cultivation services (tillage, irrigation, plant protection, harvesting)
	Animal production	Pigs, buffalos, cows, goats, sheep, chickens, ducks, geese, bees, silkworms, eggs, milk, hunting, veterinary services etc.
	Fish catching and aquaculture	Aquaculture: fisheries, aquaculture services
	Forestry	Timber harvesting, non-timber forest products, seeds, forestry services
Group 2. non – agricultural activities	Business, non-agriculture services, agro-processing	Rent, sale and repair of automobiles, motorcycles, motor vehicles, industrial processing, manufacturing, handicraft, transport services, food services and leisure, construction, services, etc.
	Wage, salary	Rent paid for private work, state
	Transfers, donation, others	Exported labor: insurance, interest on deposits, capital contribution, share, building for lease, machinery or property, etc.

Source: Collected from VHLSS 2010

According to GSO (2010), the VHLSS questionnaire indicates 99 kinds of occupations in the national economy. Economic activities of households can be grouped into the following main activities: 1) agricultural activities (cultivation, animal husbandry, fish catching and aquaculture, forestry, related agricultural

services); 2) non-agricultural activities; 3) activities bring money or wages; 4) old-age pension; 5) other activities such as lease, donation, and interest.

Within the scope of this study, household income is calculated from on-farm and non-farm activities, including 7 kinds of income resources (Table 1).

2.2. Income diversification of farm households

2.2.1. Definition

In the analysis of farmer household economy, the term of diversification is used to describe many different issues such as the diversification of crops, livestock, land, income, employment, etc. According to the IFPRI (2003, page 9), **income diversification refer to an increase in the number of sources of income and the balance among the different sources.** Joshi. PK et al, (2002) indicated that a household with two sources of income would be more diversified than a household with just one source, and household with two income sources, each contributing 50 % of the total, would be more diversified than a household with one sources accounting for 90 % of the income (Cited by IFPRI, 2003, page 9).

On the other hand, diversification mentioned three kinds of level: Crop, agricultural and livelihood diversifications (FAO, 2012, page 18). To specify, for crop diversification is calculated from five groups of crops: cereals, tubers and pulses, fruit and vegetables, industrial crops, and all other crops. In calculating agricultural diversification the study add three livestock categories to these five crop categories: cattle, goat sheep and pigs, and poultry. Livelihood diversification is calculated by adding four off-farm activity groups to the eight agricultural groups: salaried employment, informal businesses, remittances, and farm kibarua.

Within the scope of agricultural activities, diversification is **the shift from subsistence food production to the commercial agriculture (**Delgado, C and A Siamwalla, 1997). The author argued that farm diversification as an objective in African smallholder agriculture should refer primarily to the part of farm household output undertaken specifically for cash generation. It means that famers can move

from producing various grains, tubers, and vegetables for own consumption to specializing in one or a few cash crops.

Another way to classify the definition of diversification is to determine activities which become important sources of income for the household. **Income diversification is often used to describe expansion in the important of non-farm income, including off-farm wage labor and self-employment in small enterprises (Reardon, 1997).**

At the national level, there is the transfer of economic structure, namely the share of agriculture in total GDP. For example, agriculture's share of Vietnam's GDP at constant 2010 prices declined from 21.6% in 2005 to 19.8% in 2010, and 18% in 2012 (GSO, 2012, page 63). Thus at the household level, diversification is understood as the transfer of plant structure, moving from crop to livestock and non-farm activities.

In summary, based on the findings and views of above scientists there are many forms of diversification with different concepts and scopes and can be divided into two types: ***First****, income diversification refer to an increase of income source and the balance among sources (including cultivation, livestock, fisheries and aquaculture, forestry, non-farm self-employment, wages, and economic transfer and other income sources);* ***Second****, diversification as a shift from low-value crops to high-value crop production, an increase in trade of products produced by farmers.*

2.2.2. The significance of diversification of economic income to farmers

- Increase in income and poverty reduction:

According to World Bank (2005, page 3), in the past two decades, food production in the world, such as rice, wheat has increased significantly. However, the needs of these traditional food productions have decreased significantly over countries. Because general income of population increases, consumption demand of alternative foods such as milk, meat, fish and vegetables which are rich in vitamins increased significantly. This leads to the changes in production of farmers, followed by the diversity in production and processing to meet market demand. As a result of this

process, income of peasants increased significantly. Moreover, Thanks to the crop diversification, jobs in rural areas are created more for farmers. So, this situation contributes to the decreasing the gap between rural and urban areas, and reducing poverty in the rural society.

Huynh Thi Xuan Dan et al. (2011) studied to the occupation diversification in Can Tho City, Vietnam and had analyzed households who had from above three non-agricultural activities, they had an income of 30.1 million VND per household per year and those with one non-agricultural job only had an average of 26.1 million VND per household per year.

- Income safety and risk Reduction: Characteristics of agricultural production are highly seasonal and dependent on weather factors, leading to risks in the production and instability in market price. Therefore, diversity in crop or production systems in different times contributes to reducing risk through stable income and dispersive risk (World Bank, 2005, page 3). Do Kim Chung (2002) had answered the question why farmers were the bumper crop, but were still hungry: the answers were when it was a bumper crop, then the price dropped, people are restricted in accessing living condition services, poor farmers cannot afford to buy food what they need because they do not have jobs and their income was lower than food prices. The author also discussed solutions for food production, it was only a necessary condition, but more importantly was to diversify production, to create jobs that do not depend heavily on agriculture.

- Increase in using of resource efficiency: In economic activities, resources are limited and economic efficiency is the use of limited resources. This theory was carried out very early, started with the division of labor in rural areas, where many workers do not have jobs and the rate of employer-time is low. Due to the seasonal nature of agricultural production, if households engage in off-farm activities, then it will take time to increase income. The GSO of Vietnam (2007) has calculated that the households still allocate most of their labour to agriculture work with about nearly 37% of total household working time while the time that richer groups spent in wage work was 27%, followed by the poor group of 15%. Furthermore, through the

activities of production, diversification of production, farmers will use and exploit natural resources responsibly and effectively. For example, Inter-cropping and growing an overlapping crop to increase land-used coefficient, to use by-products for animal production and against these help to improve the value added for famers.

- Sustainable development: Economically speaking, diversification of economic activities, especially agricultural production will help protect and improve the natural environment and contribute to sustainable development. In many countries around the world, the phenomenon of agricultural monocultures, nomadism has created serious consequences on the environment such as soil erosion, reduced soil fertility, soil pollution. The diversification of production such as VAC in Vietnam has contributed significantly to the protection of the natural environment. In this activity, farming by-products such as straw, used as input for livestock production, mushroom cultivation and fertilizer for the next crop, livestock waste is used for gardening and fish, also reduces environmental pollution and increase soil fertility.

- Diversification contributes economic restructuring, rural labor structure
In some developing countries, the diversification of economic activities is a strategic choice to economic restructuring, employment structure towards industrialization - modernization. Through diversification of economic activities, labor will gradually shift from traditional agricultural activities into high-tech agriculture, from agricultural labor to non-agricultural labor; the structure of the rural economy will shift towards increasing the proportion of production value of industrial and service activities.

2.2.3. The factors affecting the level of income diversification

Income diversification of farm households begins from the diversification of agricultural production activities, then to the diversification of non-agricultural activities. There are many factors leading to the income diversification of households. However, studies in the past 10 years have been generalized to the diversification of economic activities for the following factors:

❖ **Internal factors of households**

- Land

Land is an important factor to farmers and a factor affecting economic activities and the diversification of household production. According to studies by Dao The Tuan (1997), the reduction of arable land and population pressures are increasing, farmers in the Red River Delta in Vietnam in general tend to diversify economic activities such as livestock growing, enhancing non-farm activities. According to the IFPRI (2003), the mountainous northern Vietnam, households with less arable land will tend to move to non-farm activities, against households with more arable land will have a higher land diversification index of agricultural land compared with households with less arable land. Households with more annual crop land will tend to produce more diverse products than those with land of perennial and fruit trees. According to the study's authors Le Xuan Ba et al, (2006), the less the production scale per household is low, the more the probability of employment transfer to other sectors is higher. This means that the arable land is producing less thrust to farmers involved in non-agricultural activities and against the land scale is increased; this will keep farmers in agriculture.

In Vietnam, the census of household living conditions-The General Statistic Office has classified arable land of household into 4 main categories: land for annual crops, perennial land, land for water surface for aquaculture and forestry land. The division of these lands is not only specific characteristics of each type of natural soil, but also differences in policies for each type. Thus, each household who used different types of land can hold different production systems and the impact of different policies.

- Demography and labour

According to Dao The Anh and Dao The Tuan (2003), labour is an important factor leading to the restructuring of labor from agriculture to other activities, contributing to the diversification of economic activities of households and then leading to the restructuring the rural economy. In the elements of rural labor, the labor skills, labor rates in the agricultural sector and labor fluctuations can be factors which impact on the restructuring of the rural economy. Therefore, the quantity and quality of labor will be important factors leading to the diversification of economic activities,

incomes of rural households. According VHLSS 1993 - 2002, there was 65% of the rural labor involved in two or more activities to make money. In particular, workers aged 35 years old or more in non- agriculture, they regularly engaged in seasonally hired activities, migration to city, construction...for earning, and those who were under 35 years old involved in employed activities in local companies or moved to find a job for seasonally hired labor.

Besides labour factors, households who have larger scale may be more favorable on labor conditions and therefore they more easily convert, and also large-size households in the agricultural production mean that the pressure of jobs is larger than, so families are forced to diversify into non-agricultural (Le Xuan Ba et al, 2006). The study also gave the comment that families with more children often have larger shift pressure, however, this must be also combined with other conditions such as many children combine with poor family, less land and become significant obstacles, make farmers cannot easily get out of agriculture.

- Credit: According to Dao The Tuan (1997), capital is the most popular factor to determine to the diversification level of household production. Results of income in the Red River Delta of Vietnam in 2006, a loan per household had a positive impact on the income of agricultural households with correlation coefficient R = + 0.57, which is at the diversification level of production is high, R = (+0.85).

- Other factors: According to Junior R. Davis (2003), the social capital, ethnicity and caste, gender dynamic are also crucial factors to the non-farm economy in rural areas at the household level. Research on income diversification in the Northern Midlands and Mountains Vietnam, IFPRI (2003) suggested that factors such as the proportion of children, elders, headed household who were female affected the level of diversification of household income.

❖ **External factors of household**

- Roads and infrastructure systems: According to Joshi, PK et al. (2004), roads and market are key drivers for shifting production portfolio in favors of high-value commodities and provide link from producer to consumer, cutting down on transport cost, reduce the risks of post-harvest losses in the case of perishable

commodities. The author found that all infrastructure-related variables like roads, markets, veterinary institutions, artificial insemination centers for livestock, etc. has a positive impact on the production of high-value commodities in India.

- Technology: Joshi, PK et al. (2004) shown that innovation in science and technology is seen as an important agent to promote the diversification of the economic activities of households. In agriculture, biotechnology is the key factor of the "Green Revolution" in India in the 1970s. Equally important, Information communications technologies (ICTs) has been used to help farmers access science and technology, to overcome the lack by the traditional technology with high prices and backward. According to Saran (2004), in India, through the use of ICTs, farmers have cut 68% of the cost of production and trade, process companies have cut 36% of cost of trade affairs (cited by Joshi, PK et al.,2004). Information technology has helped push down production costs, trade costs and promote production of high quality goods to meet the needs of the market.

- Policy: macro-economic policies have leverage effectiveness or inhibit the production of goods, promote or inhibit transformation of farming systems. In the agricultural sector, Frank Ellis (1992) shown that 8 major policies which directly effect on agricultural production in developing countries including; price, marketing, inputs, credit, mechanization, land reform, research, and irrigation policies.

- Other external factors: In addition to the above factors, a number of factors that directly affect the diversity of economic activities such as weather conditions, climate, resources, level of supply public services, the development of rural business environment (Junior R. Davis, 2003). According to Huynh Thi xuan Dan et al. (2011) is to develop diverse jobs, to increase income of farmers, the need to increase access to capital, training for workers, agricultural forestry and fishery development for farmers, besides these, it also solves the problem of market output and price of production inputs, trade promotion, market information, brand development, commodity associations, economiccooperation development.

2.3. Income diversifications of farm household in the world and Viet Nam

2.3.1. Experiences of countries in the world

❖ Diversification of crops in Thailand

According to researches summarized by FAO (2001), in the 1990s, Thailand had about 60% of population to conduct agricultural activities. Most of them grew food crops purely as rice, cassava, cereals, sugar…the proportion of income in agriculture activities compared to other sectors is only 1:13 in 1997. Several development programs broke down because there was no realistic assessment of resource limitations based on smallholder systems. Results of agricultural production during this period was relatively low because the product was mainly dependent on rainfall, farmers do not have the capacity to use science and technology to increase productivity. Furthermore, most farmers were not trained. In addition, agricultural production still faced the problem of disproportionate land in production. In this situation, the national social-economic development plan of Thailand 1992-1996 periods has focused on the following objectives: maintain growth and stability of agricultural income and income redistribution to farmers. To accomplish both goals, the diversification of crops is considered the main component of the policy to increase income and living standard of peasants through the low risk production system, with lower input costs.

From 2000 to 2005, the proportion of agricultural workers declined steadily and the proportion of non-agricultural workers increased. Most of non-agricultural activities were such as wholesales, retails, automotive repairs, motorcycles, household and personal appliances (accounted for 11.9%), manufacture (9.2%). Rural areas were 73% of workers to work in the agricultural sector, 27% of non-agricultural. However, the labor restructuring in Thailand was not stable across regions. The Bangkok area and Central regions, most of workers were in non-agricultural activities, 26.5% worked in wholesale and retail trade, and those who worked for wholesale and retail 14.9 %. Meanwhile, in the north and south, besides agriculture sector, the percentage of workers who engaged in wholesale and retail trade was 10.7% and 14.2% respectively, the proportion of industrial workers was 4.9% and 6.6% respectively. In

the North-east region, the proportion of non-agricultural employment was lower, only 6.2% of participants in the wholesale and retail trade and 3.2% of participants in the education sector.

❖ **In Nepal**

In the report of agricultural plan for the future 20 years (1990-2010) of Nepal, according to FAO (2001), crop diversification was likely a strategy to achieve different purposes. Crop diversification was not only for food security and commercialization of products, but also contributed to proper and effective use of land, water resources and other resources. Each of commodities that could be developed in terms of trade and was highly competitive and could be considered and reviewed so that it would increase income and reduce poverty. Due to the particular climatic conditions, Nepal has identified commodities for the diversification including vegetables, fruits, spices trees, sugarcane, beans, potatoes, peppers and corn. Although diversification of crops has met the food supply for humans, created jobs for farmers, the study also pointed out a number of binding factors to crop diversification such as policies, infrastructure system and budget.

❖ **In the South Asian countries**

Research by Joshi PK et al. (2003) in South Asia has shown that the diversification has taken place in most countries in the trend of increasing agricultural commodity production, high value. In India, in the south and west area, the diversification was the change from growing cereals to peas, beans, oilseeds, fruits and vegetables. In the north, farmers grew rice and commercial crops. Econometric analysis of the national level in recent years has shown that the diversification level associated with the road density, urbanization, farm size, average income per capita. Rainfall is also an important factor. Lower rainfall areas had more diversified crop structure than areas with more rainfall. Moreover, Delgado and Siamwalla (1997) showed that, in Asia, crop diversification associated with strategies of reducing the importance of rice and changing to fruit, vegetables and livestock. Farmers supposed that the government could play a constructive role in supporting institutions such as

cooperatives and agricultural production under contract to support large-scale production high-value for increasing households' income.

❖ **In Africa**

Crop diversification and the development of non-agricultural activities are choices of farmers in African countries. Readon (1997) summarized the results of 27 studies on non-agricultural employment in rural Sub - Saharan in Africa. The authors found that non-agricultural activities were relatively important in rural areas, in many cases, they accounted for approximately 30-35% of household income. Overall, employment in non-agricultural activities was more important than self-production in non-agricultural activities. Off-farm income in rural areas tended more importantly than in areas near cities where had good infrastructure and high population density. Author Delagdo and Siamwalla (1997) studied the structure of income diversification in Africa and have shown that farmers often applied the level of crop diversification as a strategy to reduce risks accompanied with changeable weather conditions.

In summary, through researches in a number of countries around the world, the diversification of household's economic activities will begin with the crop, livestock diversification and the promotion of non-farm activities. Researches also indicate that the diversification in less developing and developing countries is a strategy to ensure food security and increase income for rural households and to use efficient resources. Researches in several countries also show that barriers in the household economic diversification are limited by land, policy, budget, infrastructure, organization of farmers.

2.3.2. The income diversification in Viet Nam

Before 1989, Vietnam was a net importer. Food which was produced was not enough for the domestic consumption. People's income depended on agriculture, mainly rice. In the period 1995-1998, cultivation activities accounted for 80% of total value of agricultural production. After this time, the government had attempted to increase the restructure of animal production and services through industrialization and modernization of agriculture and rural areas.

According to the World Bank (2000) for the period from 1993 to 1998, the living standard in rural areas was mainly achieved by the diversification of agricultural activities. Since 2002 the diversification was to earn income from off-farm activities as the solution to escape poverty for small farmers.

Dao The Anh et al. (2003) shown that the restructuring of rural economy in Vietnam had close relationships with economic diversification. The negative correlation coefficient between the proportion of GDP in agricultural and the diversification coefficient indicated that if provinces where had the higher proportion of agriculture and forestry of GDP, then production activities were specialized. In contrast, agricultural diversification occurred when economic activities were restructured associated with the proportion of high industry and construction and the reduction in agriculture. The author also indicated that in the agricultural market conditions which are easily varied, then the agricultural diversification was an effective solution to minimize the risk and if the orientation only paid attention to export production, intensive development would be opposed to diversification strategy and as a consequence social differentiation and risks increased.

After the period of 2010, Vietnam continued to implement policies for the economic diversification of rural households. According to MARD of Viet Nam (2009, page 27-65), the strategy for Agriculture and Rural Development Vietnam from 2010 to 2020 was generalized by orientations of agricultural and rural development as the following: **The Red River Delta**: intensive rice development, vegetables, winter crops, concentrated livestock development, promotion in rural employment changes. **Midlands and northern mountains**: development of diversified agriculture, intensive centralized production of commodity products has advantages. **Central Coast**: Diversification of agricultural development as rice, vegetables, forage crops, pigs production, cattle; **Mekong Delta;** develop intensive rice cultivation areas for raw materials of processing and export. **Central Highlands:** develop intensive areas of industrial plants as large-scale commodity products, high value. **Southeast region:** develop intensive production areas of large-scale commodity products such as industrial crops and increase agricultural processing and services development. According to the above strategy, many regions were oriented towards agricultural

specialization, to implement intensive agricultural production. Therefore, if it was compared with the oriented development of the diversification at the household level, then this was two different trends and was an issue to be considered.

CHAPTER 3: SITE CHARACTERISTICS AND RESEARCH METHODOLOGY

3.1. Site description

3.1.1. Natural conditions

- Geographical location: Bac giang is a mountainous province, located 50 km north far away from Hanoi and 110 km to the south of the international border Huu Nghi (Lang Son) and 100 kilometers East from Hai Phong port. The north and northeast are near Lang Son province, the west and northwest are nearby Hanoi, Thai Nguyen, the southern and eastern are near provinces of Bac Ninh, Hai Duong and Quang Ninh. With a convenient location, Bac Giang has strengths and potential industrial development - commercial than other provinces in the region.

- Land: Bac Giang is 382 200 ha of natural land, including 32.2% of agricultural land, 28.8% of forest land, including the barren soil (Feralit) accounted for 63.13% of the natural area, suitable for planting forest, fruit trees and crops. In addition, alluvial soil accounts for about 13.14% of natural land, is distributed mainly in the flat terrain along the river. This is the soil nutrient content, suitable for agricultural crops, especially the short crops. Nutrient soil areas are 11.22% of natural land, the soil is on ancient sediments, mainly in the districts of Viet Yen, Tan Yen, Hiep Hoa. This is the flat group, poor urea, phosphorus, rich kalium, porosity, well-drained, suitable for tubers, nuts such as potatoes, sweet potatoes, beans and other short-term crops.

- Climate: Bac Giang province is located in the northeastern tropical monsoon climate Vietnam, a year with four distinct seasons, average annual humidity is 83%, average annual sunshine is from 1500-1700 hours favorable for cultivation, crop development, subtropical and tropical.

- Hydrology: The territory of Bac Giang province has 3 major rivers flowing through the total length of 347 km, and store large amounts of water throughout the year, ensure that the water supply for the industry and living activities. Cau river: it passes through the territory of Bac Giang where has a length of 101 km, and provide

districts: Tan Yen Yen Vietnam, Hiep Hoa, Bac Giang city part. Luc Nam River: the flow through the territory of Bac Giang has a length of about 150 km, and provides districts: Son Dong, Luc Ngan, Luc Nam. Thuong river has 87 km in length, and provide water for Lang Giang district, Luc Nam, Yen Dung and Bac Giang city. In addition, Bac Giang has about 70 large rivers with a total area of 5,000 ha and provides to irrigate the Luc Ngan district, Son Dong, Luc Nam.

3.1.2. Social-economic conditions

- Population and ethnicity*:* The total population of the province until the end of 2010 was 1,567,557 people; the average population density is 408.1 people per km2, higher than the average of the region and the country. Population in rural areas is 1,416,614, accounting for 90.38%. People who are at the working age account for approximately 64.15% of the population; the poverty rate in 2012 is 12.4%. In Bac Giang province has 20 ethnic groups such as Kinh, Tay, Hoa, Nung, Dao, San Diu, San Chi, Muong, Thai, Khmer, Hmong, ... in which Kinh ethnic majority (84.1%), the proportion ethnic Khmer is small (0.002%), Hmong (0.002%), Thailand (0.004%).

- Economic development*:* In recent years, Bac Giang economy shifted sharply to the industrial sector and services (Table 2). GDP growth in 2012 reached 9.7% in the industry - building 17.3%, services 9.1%, agriculture, forestry and fishery products increased 1.6%. The economic structure continues to shift towards positive: Industry - construction 37.2%, services 32.4%, agriculture, forestry and fisheries accounted for 30.4%.

+ Industrial Development: After 10 years of development, until now, Bac Giang has established 5 Industrial Zone and 34 industrial complexes in the area. In the period of 2004-2012, the revenue from operations in the industrial zones accounts for at 52 754 billion VND, exports reached 1.517 million USD, submitted 113 billion VND in the provincial budget and the revenue from industrial clusters continued to increase from 637 billion VND in 2009 to 950 billion VND in 2011 and reached 1,140 billion VND in 2012. The establishment and development of industries contributes to the province's economic growth, creates more jobs and income for the rural population, and reduces the pressure of population migration to cities. By the end of 2012, there

had been 35229 employees working in the enterprises and industrial zones and 21,000 workers in the industrial zones, including local labors were always more than 50%.

Table 2: Economic growth and structure of Bac Giang province, 2010- 2012

Indicators	**2010**	**2011**	**2012**
GDP growth - %	9.3	10.5	9.7
Divided by sector - %			
- Agriculture, Forestry, Fishery	3.1	1.8	1.6
- Industry-Construction	16.7	18.2	17.3
- Service	9.1	9.2	9.1
Economic structure - %			
- Agriculture, Forestry, Fishery	32.5	31.0	30.4
- Industry-Construction	33.5	36.0	37.2
- Service	24.0	31.0	32.4

Source: Social-economic report of Bac Giang province in 2012 and http://bacgiang.gov

+ Traditional villages: At the end of 2010, the whole province had nearly 15 thousand households of handicraft production, recovered and developed nearly 500 villages, of which 33 villages reached the village criteria of handicraft as prescribed; infrastructure support for Van Ha village, Tang Tien, Dong Thuong, Nam Duong villages etc. every year, the villages had created stable jobs for thousands of local labor and sent hundreds of billion VND to the budget.

+ Agricultural production: growth rate of agricultural GDP on average in the period 2006-2010 was only 2.6%; in 2012 down to 1.6%. The proportion of crop production value decreased from 62.4% in 2005 to 48.7% in 2010, up from 34.5% livestock in 2005 to 48.1% in 2010:

Fruit trees: Bac Giang has strengths in producing fruits. Total area of fruit trees across the province by 2010 reached 43336 ha, of which the intensive area of litchi is 36218 ha, and is the nation's largest area. Also, in recent years, because of market demand and the decline of economic value of litchi, many households tend to diversify crops, convert crops into the structure of other trees such as grapefruit, longan, citrus, etc.

Food Plants: The total area planted with annual crops in 2010 was 124 545 ha, down from nearly 3,000 ha cultivated area in 2005 (1,756 ha of rice, 1,050 ha of maize). However, yield and output of grain crops continued to increase due to the increase in productivity. The province has established the area of intensive rice production with an area of about 35,000 ha, an average yield of 57-58 kg/ha.

Food crops: area of growing vegetables were formed centralized processing in some districts such as Lang Giang, Tan Yen, Luc Nam ... with an area of 1203.7 hectares, producing about 20 thousand tons of processing vegetable seeds and seed structure is additional variables as sweet corn, cucumber, tomato, green onion, beet, peppers, etc. to meet the needs of processing plants in the area.

Livestock operations: Total livestock and poultry increased, rising from 928 pigs thousand in 2005 to 1.16 million pigs in 2010, the percentage of lean pork accounted for 38% of all pigs; poultry increased from 9 million in 2005 to 15.4 million in 2010. The province has formed the production area of goods such as Yen The hill chicken (nearly 4 million chicken). At present, the province has more than 420 concentrated pig farms (100 or more), 3,900 poultry farms (500 or more children) and 5,000 in poultry farms (200 or more).

Forestry production: In 2010, Bac Giang had area over 110,000 hectares of forest. In particular, accounting for 14.62% of protection forests and production forests account for 75.56% of the total forest area. Despite the huge potential, but economic efficiency brought from the forest is very low, accounting for only 2.3% of the total value of agricultural production.

3.2. Research methods

3.2.1. Research steps and analytical framework

- **Steps to study**

Step 1: Study, summary the methodology and practicality of income diversification in the world and Vietnam to identify the concept of income diversified forms of diversification, the factors affecting diversification and the method to calculate income diversification

Step 2: Analysis of economic-social condition in order to overview of the study area. In addition, the VHLSS data will be processed to determine the income diversification in order to choose study areas.

Step 3: Identify study areas and conduct the field works in order to clarify research issues: income diversification of its meaning to household economy; the factors affecting to the diversification; the difficulties in diversification of economic activities; proposals of farm households to improve income.

Step 4: Synthesizing information, writing reports and conducting scientific discussions to writing final report.

❖ **Analytical Framework**

Open system Approach is used to analyze the use of household resources in relation to external factors such as policy, market, natural conditions, and economic – social infrastructure. Base on this, the study will determine the capabilities and limitations of the household, as well as strategies of households participating in the diversification of economic activities to propose appropriate support in order to increase the household's income (Diagram 2).

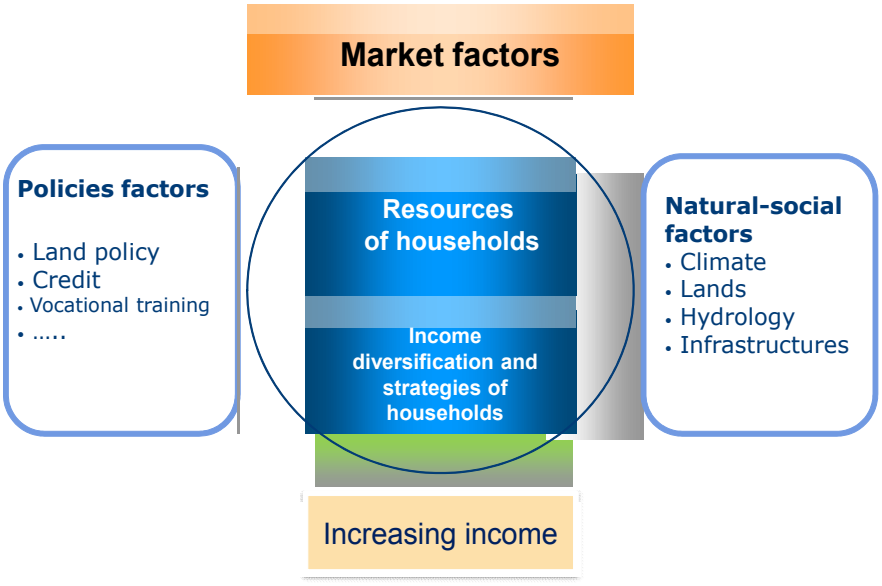


Diagram 2: Analytical framework of income diversification

3.2.2. Site selection

Based on statistics of the production system in the province and the results of calculation from VHLSS data 2010, the study area will be selected based on the level of income diversification of farm household, representing for the economic systems at provincial level.

❖ **Selection districts**

There are 3 districts will be selected (Figure 1) based on the criteria of diversity levels (low, medium, high), ability of the market access (near the highway), or topography (mountains or delta areas):

Lang Giang district (high diversity areas): The district is mainly midland terrain and plains areas; having National Highway 1A (Ha Noi - Lang Son) passing through areas; having potential to develop industry and services; the level of diversification is highest in the province, most of which focus on annual crops; the proportion of agriculture - industry and services production in 2010 is 40% - 30% - 30%.

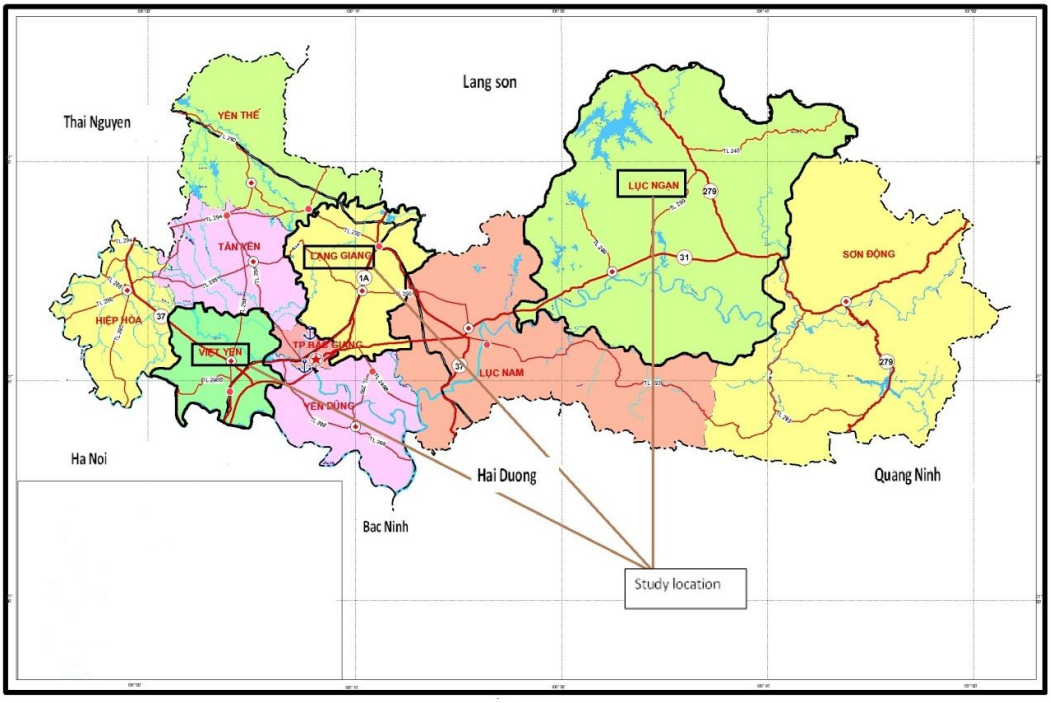


Figure 1: Study location in Bac Giang province

Viet Yen district (Medium diversity area): Viet yen is a plain district, near Bac Giang city. Viet Yen has advantage in industrial development; the form of diversification is off-farm activities; the sector of agriculture accounted for 21% of total production while industry nearly 55%, and services of 24%.

Luc Ngan district (low diversify area): Luc Ngan is a mountainous district, remote from the highways. Luc Ngan has 13 poor communes with many difficult conditions. Luc Ngan is strength of fruits production, especially litchis fruits is a famous production among Vietnam. The level of participation in non-agricultural activities of households is low compare to other districts. Value of agricultural production accounted for 60% of total production in 2010, followed by industry of 13.4%, and services of 26.6%.

❖ **Selection communes**

In each district, communes which represent the production systems of the district will be selected to conduct the investigation (Table 3).

At Lang Giang district: There are two different territories of diversity: crop diversification and economic diversification. Because of this, two communes were selected to study. Tan Thinh commune is located near the National Highway 1A, near the town; both of agricultural production and non-agricultural production are much diversified. However, Tan Hung is an agricultural commune, it is located away from the highway, the main economic activity is agriculture such food crops, vegetables and livestock production. Tan Hung commune is more diversify in crop productions.

Table 3: Districts and communes selected for field survey

Level of Diversify	District	Communes	Poverty rate (%)	Nearly Poverty rate (%)
High	Lang Giang	Tan Thinh	5.3	5.3
		Tan Hung	8.6	7.5
Medium	Viet Yen	Van Trung	6.7	8.8
Low	Luc Ngan	Tan Quang	9.3	5.1

Source: Research results, 2013

In Luc Ngan district, production systems are quite similar between the communes, so one commune will be chosen. Tan Quang Commune which is selected is a terrain of low hills, located in specialized areas of litchi fruits. In recent years, famers have tended to convert litchis to other fruits.

In Viet Yen district, most of communes in the district are impacted by industrial zones which have high density in the province. Van Trung commune is a representative commune of Viet Yen district. Van Trung is located near the National Highway 1A and near some key industrial zones in Bac Giang province.

3.2.3. Data collection

❖ ***Data source and sample structures***

1) Secondary data

Secondary data were collected from available documents such as previous surveys, national reports, statistical yearbooks, reference materials in Vietnam and abroad, dissertations, scientific journals, internet, policy documents, and economic – social reports.

Specifically, this study uses available data from ***Household Vietnam Living Standard Survey (***VHLSS). The 1998 – 2010 VHLSS was planned and implemented by Viet Nam's General Statistical Office (GSO). This survey was designed to provide a source of data on household living standard to be used in policy design and evaluation the policies. Household are the principal subjects of the survey. The household questionnaire consists of over 1000 questions under following topics: household information, education, health, employment, migration, housing, fertility, family planning, agricultural production, non-farm economic activities, food expenditures and consumption, non-income, borrowing, lending, savings and anthropometry (weight). This study will use the VHLSS data which relate to economic activities of household, farm income, and resource of farm household.

2) Primary data:

After selecting districts and communes, we conduct to select villages and interviews famers and local staffs. Due to limited conditions, in each commune we just

interview three local staffs and 20 farmers. Due to Tan Hung is the second commune in Lang Giang district so we only interview 15 household (Table 4).

+ In - depth Interviews: Each level of investigation (district and commune), study interviews at least 3 staff by in-depth interviews in order to understand the production system in communes, factors affecting income diversification, difficulties in development of non-agricultural occupations, and proposal of local staffs to improve living standard of famers.

+The questionnaires which is prepared carefully will be used to interview farmers

Table 4: Site selected and sample structures

Districts	Location	Contents	Number of interviewees
Lang Giang district	Lang Giang district	In - depth Interviews (Local staffs)	3
	Tan Thinh commune	In - depth Interviews (Local staffs)	3
		Household questionnaires	20
	Tan Hung commune	In - depth Interviews (Local staffs)	3
		Household questionnaires	15
Viet Yen district	Van Trung commune	In - depth Interviews (Local staffs)	3
		Household questionnaires	20
Luc Ngan district	Tan Quang commune	In - depth Interviews (Local staffs)	3
		Household questionnaires	20
Total of interviewee			**90**

Source: Research results, 2013

❖ **Sampling methods:** Stratified sampling method is used to select interviewee:

Step 1, the decision the variables for stratification: Base on the method presented in Chapter 2, study use variable of economic conditions to stratify.

Step 2, determining the rate of each type of household in the total of population (% of poor household, % nearly-poor household, and % of the remainder of households) based on a list of the head of villages or commune[5]. It is noticed that the

[5] Standards of the poor and near-poor households is defined by government in each period

rate of each type of household in this step aim to select sample with highly representative sample of the population and analysis of farm households is based on the household's typologies which is mentioned in the next part.

Step 3, set up the sampling frame: Based on the number of sample's quota in each village and proportion of household in each sub-population, the quantity of household's interviewee is computed by the corresponding ratio.

Step 4, making three lists of households by economic condition of households.

Step 5, household selection: from these lists, random sampling method is used to take the sample into household interview list. This sample method will be used to determine the sample by the best representative

3.2.4. Methods of data analysis

❖ **Calculation of household income and household classification**

According to the VHLSS data, there are 13 types of sources creating household income. Based on the results of VHLSS data processing and experience of previous studies, this research will combine 13 income resources into 7 kinds of income resources which will used to present the results of research (Diagram 3).

Types of farm households which are used to present the results are classified by household income. After computing, income will be arranged in ascending order up. Stata statistical software will be used to classify households into some household's typologies (income groups) according to household income levels. The number of household's typologies base on the result of VHLSS data processing. However each group has to ensure differences in average income of household when comparing with other groups.

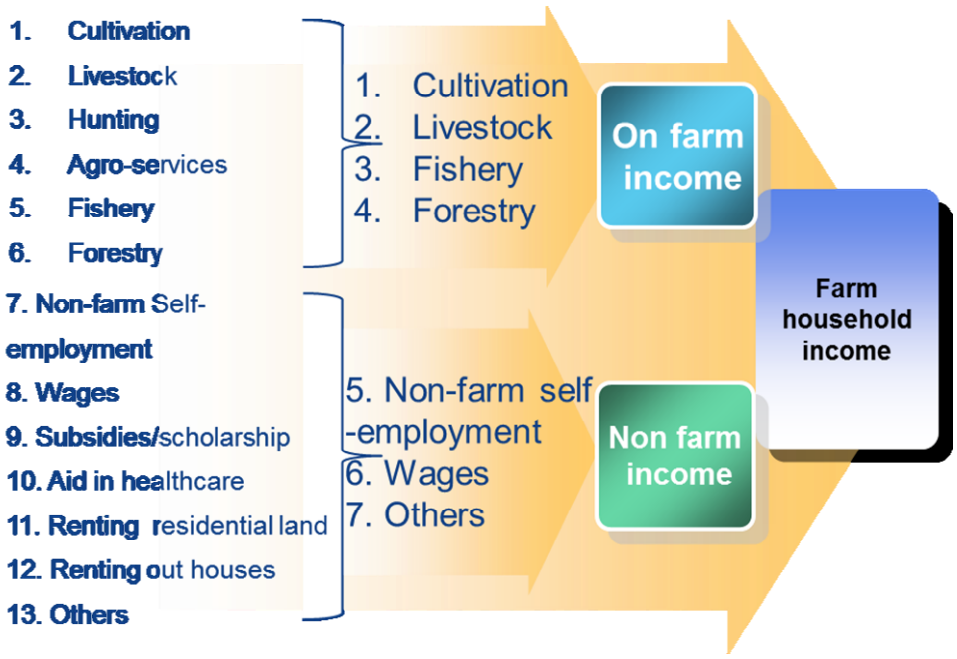


Diagram 3: Calculation of household income

❖ **Methods for measuring the income diversification**

To answer the first objective, we conduct to measure the diversification of household income in the two diverse forms:

***First**, diversification is in the meaning of more sources of income and income balance level among sources (seven kinds of income resources)*

In point of fact, there have some of case studies such as the IIFP (2003*): "Income diversification and poverty in the Midlands and Northern Mountains of Vietnam"*; Dao The Anh et al. (2003): "*Scientific research of the restructuring of agriculture and rural economy: status and impact factors in Vietnam"*. These authors have applied the index measuring biological diversity: Simpson - Simpson's Diversity Index (Joshi. PK et al., 2002) to measure the diversification at household level. Therefore, this study will apply the Simpson's Diversity Index (SDI) to measure the diversity of household income in Bac Giang province by the following formula:

SDI =$SDI = 1 - \sum_i (Pi)^2$

In which: Pi is the percentage of income from sources i. If quantities of income resources increase, (Pi) 2 will decrease, SDI values will increase to near 1. If households have only income resource, then Pi = 1 so that SDI = 0.

Table 5: The forms and Indicators to measure income diversification of rural households

Form of diversify	Indicators
More sources of income and income balance level among sources	1) Number of income resources 2) Simpson index
Diversification as a Shift to High –value activities	3) % of non-farm seft-employment income 4) % of income form wages activities 5) % of commodities in total production

Source**:** Collected from the research result, 2013

Second, Diversification as a Shift to High –value activities *(non-agricultural activities, an increase in trade of products produced by farmers)*

❖ **Methods of regression analysis**

To answer the second objective, study will use the regression model (semi - log) to analyze the factors affecting to the famers' income. The VHLSS data 2010 is used in this model. The form of regression model is:

$$Ln(Y) = f(X1, X2 \dots Xi \dots D1, D2 \dots Dj)$$

In which: Y is dependent variable (1000 VND per farm household in 2010)

Xi, Dj are independent variables (Dj are dummy variables)

❖ **Qualitative analysis method**

At 3 district survey, study will conduct the quantitative analysis in order to identify the trends of income diversification; Factors affecting income diversification; Strategies of farm households in the future.

❖ **Tools analysis**

The application programs such as Excel, Stata will be used to analyze and present the research results.

CHAPPTER 4: STUDY RESULTS AND DISCUSSIONS

4.1. Income diversification of farm households in Bac Giang province

4.1.1. General description of households

Although the sample is difficult to be representative of all farm households in Bac Giang province, but studies have tried to create a good representation based on available resources. According to VHLSS data, there was 150 farm household which was interviewed in 2006, followed by 144 farm household in 2008, and 140 farm households in 2010. In 2013, at three districts, 75 farm households was selected for interviewing but one questionnaires which was interviewed cannot use for analyzing because of mistaking information. So 74 samples is use for computing results. On the other hand, the percentage of household head who was ethnic minority accounted for around 6-17.9% of total sample (ethnic minority in the population accounted for about 16% in 2011). Other characteristics, there are four kinds of farm household's typologies which are divided based on household income such as the poorest (Group 1), the second poorest (Group 2), middle (Group 3), and richest groups (Group 4). Each group account for nearly the same percentage of household's quantities compare to other groups.

❖ **Production lands**

In general, agricultural and forestry land areas of famers have declined strongly in the past six years. The statistical analysis from VHLSS and survey in 2013 have shown that, production land areas per household went down from 7143.3 m2 in 2006 to 6237.0 m2 in 2010, and 5244.7 m2 in 2012 (Appendix 2). Due to this, production land areas per capita declined significantly from 1785.8 m2 in 2006 to 1637.9 m2 in 2010 (the decrease was 147.9 m2 per capita), and 1326.1 m2 in 2012. Especially, annual crop area per capita declined from 583 m2 in 2006 to 560 m2 in 2010 declined 3.8% through this period. Strikingly, annual crop land per capita in the surveyed was only 377 m2 in 2012, which followed by a strongly decline to about 1326.1 m2 of total farm land per capita in 2012 (Table 6).

Table 6: Agricultural and forestry land area by type of land (m2) in Bac Giang province , 2006-2010 and three districts suveyed in 2012

Year	Annual crop	Perennial crop	Water Surface	Forestry	Other land	Total
2006	583.0	246.4	25.1	763.3	176.5	1794.3
2008	570.6	247.7	31.6	740.5	160.4	1750.9
2010	560.4	204.7	15.7	756.6	100.4	1637.9
2012*	377.0	221.6	34.1	649.3	44.1	1326.1

Source: computed from VHLSS data 2006 – 2010 and households survey in 2013

Note: * computed from the survey, 2013

Because the average numbers of person per household through these years were no significant changes so the cause of this problem was conversion of the land use. According to statistics of Bac Giang province, over 1800 ha of agricultural lands (about 1.46% of annual lands) was replaced because of industrial development from 2005 to 2012. In addition, as planned to 2015, there are only 49,000 ha of rice land areas, down over 50% compared to 2011.

Furthermore, statistics from the survey has shown that while most of annual crop and perennial crop land areas belongs to households with richest income the opposite was true of poorest income group.

Table 7: Average agricultural and forestry land area per household in 2012 at three districts surveyed by income groups (m2)

Income groups	Annual crop	Perennial crop	Water Surface	Forestry	Other land	Total
Poorest	1458.4	437.9	121.1	4484.2	90.5	6592.1
2nd Poorest	1232.2	502.2	200.0	2788.9	272.2	4995.6
Middle	1247.4	1422.1	0.0	26.3	247.4	2943.2
Richest	1711.1	1306.7	266.7	3083.3	133.3	6501.1
Total	**1410.7**	**917.6**	**144.6**	**2586.5**	**185.4**	**5244.7**

Source: computed from the survey, 2013

On average, households in the poorest has about 1458 m2 of annual land , and 437 m2 perennial crop land while their figure at households with the richest was1711.1 m2 and 1306.7 m2. Strikingly, household in the poorest and the second

poorest have more forestry land areas than the richest group. It means that forestry activities have not brought economic value for farmers (Table 7).

At three districts surveyed, there was significant different in land use (Table 8). To specify, in annual crop areas per household, the highest figure belonged to Lang Giang district of 1963.4m2, followed by Viet Yen district with about 996.3 m3 and Luc Ngan district with about 837m2.

Table 8: Agricultural and forestry land area per household in 2012 at the households surveyed (m^2)

Districts	Annual crop	Perennial crop	Water Surface	Forestry	Other land	Total
Lạng Giang	1963.4	14.3	262.9	91.4	114.3	2446.3
Việt Yên	996.3	113.7	42.1	0.0	52.6	1204.7
Lục Ngạn	837.0	3262.0	35.0	9410.0	436.0	13980.0
Total	**1410.7**	**917.6**	**144.6**	**2586.5**	**185.4**	**5244.7**

Source: computed from the survey, 2013

However, the highest figure of forest and perennials land areas were seen in Luc Ngan district with about 3262 m2 perennials land, and 9410 m2 forestry land. By contract, due to the process of industrialization, Viet Yen district saw the lowest figure with only 1204.7 m2 of total land per household in 2012, which decline at least 30% compare with that in 2005[6].

❖ Population and Education

Although the number of person, labor, and the percentage of labor were unstable from 2006 to 2012 between groups, the figures of the richest income group always outstripped the poorest group's figures. To be clearer, table 9 indicates that there was a high proportion of the dependent people who less than 16 years old or higher than 65 with man and 55 with women. For example, between 2006- 2012, while the percentage of dependent people in the richest income group fluctuated between 32 – 36%, its figure in the poorest income group fluctuated from 40% to 59%.

[6] According to Bac Giang's statistics on http://www.bacgiang.gov.vn: Bac Giang has five industrial parks with an area of over 1500 hectares, and four industrial parks were located in Viet Yen district.

Table 9: Household characteristics, by demographic and labor, 2006-2012

groups	Indicators	2006	2008	2010	2012*
Poorest	Person/HH	3.3	3.1	3.1	3.8
	Labor/HH	1.8	1.4	1.7	2.3
	% Labor per HH	54.6	40.6	51.5	60.2
2nd Poorest	Person/HH	4.1	4.0	4.3	4.2
	Labor/HH	2.6	2.7	2.9	2.8
	% Labor per HH	63.8	66.2	67.4	67.3
Middle	Person/HH	4.3	4.4	4.0	4.2
	Labor/HH	3.1	2.9	2.9	2.8
	% Labor per HH	72.6	67.2	71.9	66.4
Richest	Person/HH	4.2	4.3	4.4	4.3
	Labor/HH	3.0	3.0	3.2	3.2
	% Labor per HH	71.0	72.4	75.5	75.3
Total	Person/HH	4.0	4.0	4.0	4.1
	Labor/HH	2.6	2.5	2.7	2.8
	% Labor per HH	64.7	62.0	67.3	67.5

Source: computed from VHLSS data 2006 – 2010 and households survey in 2013

Note: * computed from the survey, 2013

On average, the household head has no different of age between groups with about 47.2 years old. Eighty percent of the household in the survey has a female household head. In addition, each household has 4 – 4.1 person, and 2.6 – 2.8 labor. In the lowest group, the number of person per household fluctuated between 3.1 and 3.8 people from 2006- 2012 while its figure in the richest income group fluctuated from 4.2 to 4.4 people. Similarly, the number of labor per household in the poorest income group was less than other groups by at least 1.3 times during this period.

Table 10 indicates an overview of educational attainment between groups. The statistics has shown that over 50% of the household heads was below the level of primary school or primary school. The percentage of household heads that has upper secondary diploma was 8.2% in 2006, 12% in 2010, and only 7.2% in 2012 (the case of the survey at three districts). The ratio of household heads who has higher upper secondary diploma or professional training certificate increased slightly from 0.2% in 2006 to 0.3% in 2008, 0.7% in 2010, and 1.4% in 2012. In brief, most of household heads has a low education level which is main obstacle for household to access to training programs, apply the new technology in production.

Table 10: Highest education levels of household heads (% households), 2006-2012

Education degree	2006	2008	2010	2012*
Less than primary	18.0	18.3	19.4	15.9
Primary diploma	34.3	36.6	30.1	43.5
Secondary diploma	39.3	37.3	37.7	31.9
Upper Secondary diploma	8.2	7.5	12.1	7.2
Higher Upper Secondary diploma	0.2	0.3	0.7	1.4
Total	**100.0**	**100.0**	**100.0**	**100.0**

Source: computed from VHLSS data 2006 – 2010 and households survey, 2013

Note: * computed from the survey, 2013

Looking at the division by income group, there are some interesting things to indicate (Table 11). Household heads in the poorest group has lowest shares of the percentage of high education levels. To specify, while over 23% of household heads in the poorest group has not completed the primary school and 49% of household heads has primary diploma, their figures of the richest group was only 5.6 % and 38.9%. Strikingly, while the percentage of households who has upper secondary school in the richest group was about 30%, the opposite was seen in the two poorest groups with only 0%. This situation of education levels means that education may has an important impact on farmer's income.

Table 11: Highest education levels of household heads in 2012 in the districts surveyed by income groups (% households)

Education degree	Poorest	2nd Poorest	Middle	Richest	Total
Less than primary	23.5	25.0	11.1	5.6	15.9
Primary diploma	47.1	37.5	50.0	38.9	43.5
Secondary diploma	29.4	37.5	33.3	27.8	31.9
Upper Secondary	0.0	0.0	5.6	22.2	7.2
Higher Secondary	0.0	0.0	0.0	5.6	1.4
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Computed from the survey, 2013

❖ **Credit**

Because of the considerable time lag between the application of inputs and the harvest of the output, credit is used to provide working capital, credit facilitates

investments and acts as a tool for consumption smoothing in the presence of shocks (Ray, 1999). In these years, besides the annual preferential credit programs, policies for famers in the past, the Vietnamese government issued Decree No.41/2010/NĐ-CP dated April 12, 2010 on credit policy for agricultural and rural development. This policy gives famers opportunity access to credit with more preference. According to VHLSS 2010 data in Bac Giang province, the ration of famers who received preferential credit accounted for 26.1% of total sample (140 farm households). In which, 90% of famers have loans from the Vietnam bank for social policies, 7% from social union, and 3% from other programs. On average, the loan size per famer was only about 12 million VND.

After two years of implementation the new credit policy, famers have faced up to difficult of access to preferential credit form government, especially Lang Giang district (high diversity) and Luc Ngan district (the intensive agricultural production). Result surveyed with 74 famers in three districts in 2013 (Table 12) indicates that only 47.5% of all famers borrowed money form credit organization. However, only 27% famers received preferential loans with the poorest group was 10.8 % farmers, followed by the second poorest of 4.1%, and the richest of 5.4%. The average loan size per household in 2012 was 23.59 million VND.

Table 12: Some characteristics of all loans in the districts surveyed, 2012

Income groups	Loan size (Million VND)	Number of famer	% Famer	Number of famers having preferential credit	% Famer
Poorest	17.70	8	10.8	8	10.8
2nd Poorest	8.90	9	12.2	3	4.1
Middle	22,0	10	13.5	5	6.8
Richest	47.93	8	10.8	4	5.4
Total	**23.59**	**35**	**47.3**	**20**	**27.0**

Source: Computed from the survey, 2013

4.1.2. Income diversification

This part mainly focuses on diversification of farmer's income in Bac Giang province with two forms of diversification what are mentioned above: 1)

Diversification when we refer to an increase in the number of income resource or the balance among the different income resource. 2) Diversification with significance that the increase of economic activities with high income or high –value commodities.

a. Form 1: Diversification refers to an increase the number of income resource or the balance among the different income resource.

To measure level of diversification, the study, first of all, classify income resource into different resource. There are 13 different indicators and data resources which are mention in VHLSS from 2006 to 2010 is taken in the computing. Base on experiences learned from other studies, the share of each kind of income in total household income and the classification of agricultural activities, 7 income resources which are determined in the Chapter 2 are used for measuring the level of diversification. In this form, two measures are used. First is the number of income resource. Second measure is Simpson index.

In general, while the number of income resource saw a fluctuation from 2006 to 2012, the Simpson index tends to decline during the time (Table 13). To specify, on average, each famers has 3.9 income resources in 2006, followed by 3.73 resources in 2008, 4.07 resource in 2010, and 3.76 in 2012. This issue is caused by the sampling methodology which is used in the survey in 2013 or the real situation of the famers. On average, Simpson index saw a significant decline form 0.56 in 2006 to 0.53 in 2008, and 0.52 in the last two years.

By comparison, an interesting point was seen between income groups. While the richest group has less diversification of Simpson index than the poorest, the number of income resource in richest group was higher than that in the poorest group most of years. In the poorest group, the number of income resource fluctuated from 3.38 to 3.89 sources meanwhile Simpson index in the poorest group went up from 0.52 in 2006 to 0.54 in 2010, and 0.56 in 2012. However, in the richest group, although the number of income resource fluctuated, Simpson index saw a strongly decline from 0.57 in 2006 to 0.50 in 2010, and 0.44 in 2012. In the rest groups, both of the number of income resource and Simpson index saw a light fluctuation during the time.

Table 13: Diversification of famer's income in Bac Giang province, 2006-2012

Income groups	Indicators	2006	2008	2010	2012*
Poorest	Income resource	3.68	3.38	3.76	3.89
	Simpson index	0.52	0.45	0.54	0.56
2nd Poorest	Income resource	3.95	3.78	3.93	3.61
	Simpson index	0.58	0.58	0.53	0.52
Middle	Income resource	4.02	3.98	4.19	3.68
	Simpson index	0.58	0.60	0.51	0.54
Richest	Income resource	3.94	3.75	4.36	3.83
	Simpson index	0.57	0.47	0.50	0.44
Total	Income resource	3.90	3.73	4.07	3.76
	Simpson index	0.56	0.53	0.52	0.52

Source: computed from VHLSS data 2006 – 2010 and households survey, 2013

Note: * computed from the survey, 2013

Equally important, the Simpson index saw two different trends from 2006 to 2010 between groups. While the Simpson index of the poorest group was less than that in the richest group between 2006 and 2008, the opposite was true of the rest years. For instance, in 2010, Simpson index of the poorest group was 0.54 while its value of the richest group was 0.52. Similarly, in 2012, Simpson index of the poorest group was 0.56 but its figure of the richest group was only 0.47. These results contribute to answering the hypothesis: famer with low income is more diversification than famer with high income while the famers with high income become more diversity in their economic activities. It is true when income diversification refer to an increase in the number of income resource or the balance among the different income resource. Theoretically speaking, it is noticed that the diversification may help households to reduce the risks, ensure income safety but may not bring more benefits to all famers.

Looking at the economic activities by income groups, there are more famers in the poorest group participating in agricultural activities than famers in the richer groups (Table 14). By contrast, the percentage of famers having non-agricultural activities in the richer group is higher than percentage of famer in the poorer groups. The Statistical analysis from VHLSS 2010 has shown that 91.6% of the richest group participated in cultivated activity, which was less than its percentage in the poorest

group. The percentage of poorest group having at least one livestock activity was 80.3%, which less than that figures in other groups by at least 5%. On average, 15% of famers participated in fishery activity and most of these famers belonged to the two poorest groups.

Table 14: Percentage of famer participating in the different activities by income groups in Bac Giang province, 2010

Income resource	Poorest	2nd Poorest	Middle	Richest	Total	Richest-Poorest
Cultivation	96.9	100.0	91.4	95.3	96.1	-1.58
Raising livestock	80.3	87.9	88.4	88.2	86.5	7.86
Fishery	27.1	29.3	5.9	0.0	15.2	-27.07
Forestry	10.1	4.8	23.4	22.2	15.1	12.17
Non-Farm Self - employment	13.2	19.8	29.3	51.6	29.6	38.37
Salaries and Wages	39.9	58.9	58.6	63.1	56.1	23.26
Others	96.9	92.8	85.5	95.3	92.7	-1.58

Source: computed from VHLSS data, 2010

In the non-agricultural activity, the percentage of famer saw an increase trend between groups. For example, while the lowest percentage of famer was seen in the poorest group with about 13.2%, the opposite was true of the richest group with about 56.1 %. In the same way, the percentage of famer having salaries and wages activity in the richest group was over 20% higher than the percentage in the poorest group. In addition, most of famers have other income resources which contain money from abroad, bank rates, allowances, superannuation, subsidies. Strikingly, only in the fishery, non –agricultural, Salaries and wages did the gap between percentages of famer in the richest group and poorest group see the highest figures with around 23.26 % to 38.37%.

Result of the survey in three districts in 2013 also saw the high percentage of famer participating in non – agricultural and salaries and wages activity (Appendix 4) . In general, there was different between the poorest and richest groups in the percentage of famers participating in economic activities. Therefore, the figure 2 focuses more about these income groups.

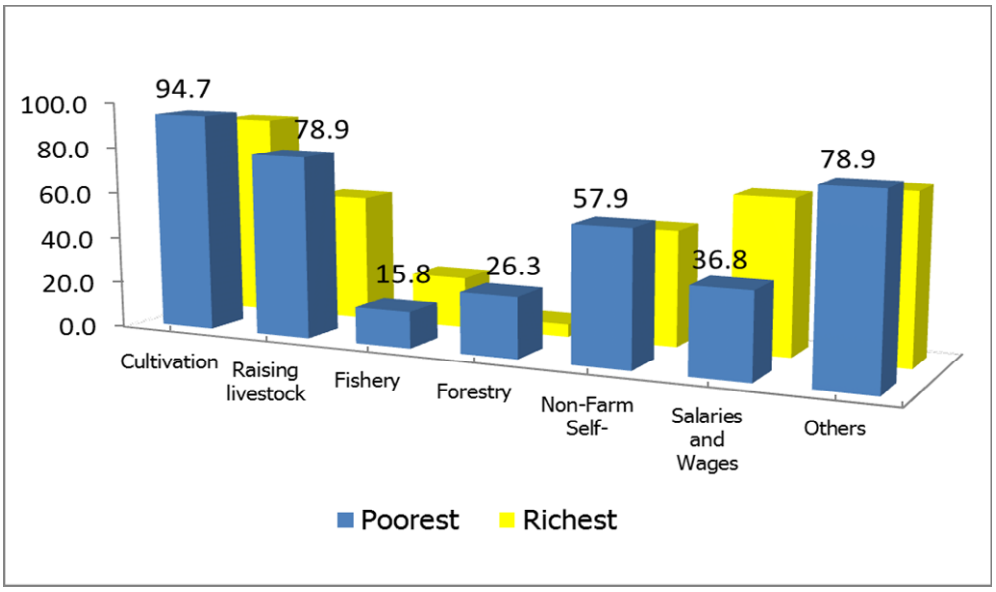


Figure 2: Percentage of famer participating in the different activities by income groups in the three districts surveyed, 2012

Source: Computed from the survey, 2013

The rate of famers who has planting activities was less than that in 2010; especially the percentage of famers having livestock production declined 16.3%. However, the percentage of fames having non –farm activities was 13.7% higher than that in 2010. This result may be is caused by the sampling method and different sample size compared with 2010 but this situation reflects that famers tend to participate more strongly in off –farm activities.

To understand deeply the trend and forms of diversity, the study conducted to measure diversify in some activities of famers. Due to limited information, some indicators described only in 2006-2010 at provincial level, and a number of indicators will be updated to the 2012 survey in 3 districts surveyed.

- Diversity in cultivated activities: Table 15 shows the number of plants per famer and the Simpson index in cultivated activities of famers according to VHLSS 2006 – 2010 data in Bac Giang province. Overall, all groups of famers tend to reduce significantly in the number of plants and Simpson index. However, both the number of plants and Simpson index in the richest group declined stronger than their figures in the poorest group. On average, the number of plants per household declined from 7.37 in 2006 to 6.05 in 2010, a decrease of 17.91%. Similarly, Simpson index saw a decline

trend, from 0.33 in 2006 to 0.29 in 2010 with a decline of 12.12% from 2006 to 2010. Strikingly, the number of plants in the poorest group was lower compared to the other groups in most years.

Table 15: Diversification in cultivated activities, 2006 – 1010

Income groups	Indicators	2006	2008	2010	% growth2006-2010
Poorest	Income resource	5.94	5.52	5.74	-3.37
	Simpson index	0.33	0.25	0.29	-12.12
2nd Poorest	Income resource	8.08	8.98	6.39	-20.92
	Simpson index	0.34	0.37	0.33	-2.94
Middle	Income resource	8.23	8.20	6.16	-25.15
	Simpson index	0.33	0.33	0.31	-6.06
Richest	Income resource	6.83	7.03	5.83	-14.64
	Simpson index	0.28	0.29	0.22	-21.43
Total	Income resource	7.37	7.47	6.05	-17.91
	Simpson index	0.33	0.31	0.29	-12.12

Source: computed from VHLSS data 2006 – 2010

Rice production: On average, over 95% of famers engaged in rice production. In 2010: 93.8% of famers planted year- round ordinary rice, 33.8% of year – round glutinous rice, and only 2.1% of year –round specialty rice.

Other foods and vegetables: From 2006 to 2012, although the average number of plants per famer saw a decline trend, the percentage of household which has one to two kinds of plants increased significantly. For instance, after an increase from 15.7% in 2006 to 17% in 2008, the percentage of famer having 1 -2 plants went up significantly to 28.3% in 2010, and 30% in 2012. The percentage of household having 3 – 5 plants decline slightly form 41.2% in 2006 to 37.3% in 2010. Similarly, the proportion of household having 6-9 plants and over 10 plants declined significantly from 2006 to 2012. In brief, famer has trended to decline quantities of plant (foods and vegetable) with the percentage of household having 1 – 2 plants increased significantly.

Table 16: Percentage of household by number of other foods and vegetable, 2006-1012

Number of plants	2006	2008	2010	2012*
0	16.6	18.2	16.3	29.2
1-2	15.7	17.0	28.3	30.0
3-5	41.2	42.2	37.3	27.1
6-9	25.0	20.6	17.3	13.7
>=10	1.5	2.0	0.7	0.0
Total	**100.0**	**100.0**	**100.0**	**100.0**

Source: computed from VHLSS data 2006 – 2010 and households survey, 2013

Note: * computed from the survey, 2013

Annual and perennial industrial crops: Overall, famers trend to decline annual and perennial industrial crops (Table 17). Analysis of VHLSS data from 2006 to 2010 indicates that the percentage of famer having annual and perennial industrial crops declined strongly from 50.5% in 2006 to 30.9% in 2010. The percentage of famer having industrial crops in 2012 at the survey was only 29.9%. On average, each household has maximum of 4 kinds of industrial crops but the percentage of famer who has one crop saw the highest figure during these period from 2006 to 2012. According to the survey, due to price of industrial crop output was unstable so annual industrial crops were converted to other crops.

Table 17: The percentage of famers by the number of annual industrial crops, 2006-2012

Number of plants	**2006**	**2008**	**2010**	**2012***
0	49.6	50.3	64.1	70.1
1	42.8	39.1	30.8	21.7
2	7.0	8.5	5.1	8.2
3	0.6	1.4	0.0	0.0
4	0.0	0.7	0.0	0.0
Total	100.0	100.0	100.0	100.0

Source: computed from VHLSS data 2006 – 2010 and households survey, 2013

Note: * computed from the survey, 2013

Fruit crops: Table 18 indicates the percentage of famers having fruit crops[7] from 2006 to 2012 in Bac Giang province. In general, the famers tend to decrease the

[7] According to VHLSS questionnaire, fruit crops include Citrus truits, Pineapples, Bananas, Mangoes, Apples, Grapes, Plus, Papayas, Longans, litchis, rambutans, Sapodillas, Custard apples, Jackfruits, durians, Mangosteens, Other fruit trees.

diversity from over 6 fruit crops to around 1 – 2 fruit crops. To specify, the ratio of famers without fruit crops increased significantly from 23% in 2006 to 25% in 2008, and 35% in 2010. Although there were maximum 11 kinds of fruit crop per famer, the percentage of famers having from 1 to 5 crops saw the highest figures. While the percentage of households having 6 - 9 fruit crops declined from 3.1% in 2006 to 0.7% in 2010, the ratio of households having 2 crops saw a slight increase trend. It is noticed that because of the sampling method in the survey in 2013, the percentage of famers without fruit crops saw a high figure of 55.4%. As the result, 100% of famers in Luc Ngan district having fruit crops and most of them have from 2 to 3 kinds of fruit crops.

Table 18: Percentage of famers by the number of fruit crops, 2006-2012

Number of fruit crops	2006	2008	2010	2012*
0	23.0	25.0	35.0	55.4
1 -2	38.6	33.4	43.6	29.2
3-5	35.2	36.1	20.7	14.7
6-9	3.1	4.4	0.7	0.7
>=10	0.0	1.1	0.0	0.0
Total	**100.0**	**100.0**	**100.0**	**100**

Source: computed from VHLSS data 2006 – 2010 and households survey, 2013

Note: * computed from the survey, 2013

- Diversity in livestock breeding: In the same way of cultivation activities, the figures saw a significant decline in Simpson index as well as the quantity of sub – activities[8]. Analysis of VHLSS indicates that the number of livestock activities declined 13.13% in the period from 2006 to 2010 while Simpson index decreased 10.42% in the same period. To specify, the number of livestock activities in the poorest group saw a decline trend from 4.02 in 2006 to 3.69 in 2008, and 3.01 in 2010. However, the opposite was true of the richest group with an increase of 10.13% from 2006 to 2010. Strikingly, the number of activities and Simpson index of the richest group which was highest figures in 2006 declined to the lowest figures in 2010.

[8] According to VHLSS questionnaire, ten kinds of activities are define to calculate total income from livestock breeding such as: Pigs, Buffalos and cows, Horses, Sheep and goats, Chickens, ducks, thai ducks, geese, Other poultry, Bees, Silkworms, Others.

Table 19: Famers' diversification in livestock breeding activities

Income groups	Indicators	2006	2008	2010	% changes 2010/2006
Poorest	Income resource	4.02	3.69	3.01	-25.12
	Simpson index	0.45	0.46	0.40	-11.11
2nd Poorest	Income resource	4.17	4.59	3.72	-10.79
	Simpson index	0.51	0.47	0.46	-9.80
Middle	Income resource	4.49	4.45	3.34	-25.61
	Simpson index	0.48	0.40	0.40	-16.67
Richest	Income resource	3.85	3.74	4.24	10.13
	Simpson index	0.47	0.37	0.44	-6.38
Total	Income resource	4.19	4.17	3.64	-13.13
	Simpson index	0.48	0.43	0.43	-10.42

Source: computed from VHLSS data 2006 – 2010

Analysis of ten kinds of livestock activities that are classified in this study shows that each household had maximum nine kinds of different livestock breeding activities (Table 20). Overall, percentage of famers raising livestock fluctuated significantly in these years and famers who having one to four kinds of different livestock tended to rise. For instance, the percentage of famers who have from one to two kinds of livestock increased strongly from 10.1% in 2006 to 13.6% in 2008, 21.8% in 2010, and 27.5% in 2012. In addition, the highest figure belonged to famers having 3-4 kinds of livestock with around 32.5% to 42.7% from 2006 to 2012. The lowest figure was seen of famers having over seven kinds of livestock. On the other hand, the percentage of famers without livestock fluctuated during the period from 2006 to 2012. For example, after a strong increase form 13.7% in 2006 to 20.2% in 2008, the percentage of famers without raising livestock went down to 13.5% in 2010.

Table 20: Percentage of famers by quantity of livestock breeding activities, 2006-2012 in Bac Giang province

Quantity of species	**2006**	**2008**	**2010**	**2012***
0 livestock	13.7	20.2	13.5	24.3
1 -2 livestock	10.1	13.6	21.8	27.5
3-4 livestock	42.7	32.5	42.7	34.7
5-6 livestock	27.3	29.2	18.6	13.0
>=7 livestock	6.2	4.4	3.5	0.5
Total	**100.0**	**100.0**	**100.0**	**100.0**

Source: computed from VHLSS data 2006 – 2010 and households survey, 2013

Note: * computed from the survey, 2013

According to the survey in the three different districts, there was a significant change in raising livestock. Looking at some livestock breeding activities from 2008 to 2012, the ratio of famers raising pigs declined from 78% to 62%; the percentage of famer raising cows and buffalos declined from 28% in 2008 to 12% in 2012; the percentage of famer raising chicken, ducks, and geese declined from 84% in 2008 to 60% in 2012.

b. Diversification with significance that the increase of economic activities with high income or high –value commodities.

Three measurement indicators which are used to estimate the second form of diversification include: 1) the percentage of income from non – farm self-employment; 2) the percentage of income from wages; 3) the share of commodity's trade of the total agricultural production. With developing countries like Vietnam, due to income from agricultural activities share higher percentage compare to other incomes, therefore when these figures having high value mean that famers can get higher income.

- Diversification refers to transform into activities with higher income (non – farm self –employment and wages). Non-farm self –employment of famers is the self – employment economic activities of famer outside agriculture, forestry and aquaculture. During the 6 years from 2006 to 2012, percentage of households and the percentage of income in the both non –farm self – employment and wages increased strongly with the rate of households outnumbering the rate of incomes (Table 21). To specify, in the non-farm self – employment activities, after a slight decline from 2.7% in 2006 to 1.9% in 2008, the ratio of households climberd strongly to 29.6% in 2010 while that of 2012 reached to the highest point of 43.2%. Similarly, non –farm self – employment tended towads increase from 0.8% in 2006 to 7.4% in 2010 and 10.2% in 2012. On the same way, the percentage of household with wages activity increased slightly from 52.3% in 2006 to 53.1% in 2010 while that of income increased from 19% in 2006 to 22.8% in 2010. The result from the survey in 2013 saw the same trend with these figures were higher than that compared to other years. Strikingly, in the non-farm sefl –employment activites, the majority of famers are involved in small scale activities:

most of activites have income estimated at less than 10 million dong per household/year; activities involving one laborer account for 80% of household. In conclustion, although there are more famers participating in non-farm-self employment and wages activities, income from wage and salary activites are more important than income from non-farm self employment and famers tend to earn more income from non-farm avtivities than agricultural agricultural activities.

Table 21: Diversification in Non-farm self-unemployment and Wage activities

Activities	Indicators	2006	2008	2010	2012*
Non - farm self – employment	% household	2.7	1.9	29.6	43.2
	% income	0.8	0.1	7.4	10.2
Wages	% household	52.3	52.3	56.1	54.1
	% income	19.0	18.8	22.8	28.8

Source: computed from VHLSS data 2006 – 2010 and households survey, 2013

Note: * computed from the survey, 2013

Relationship between household income and the percentage of households participating in Non- agricultural activities saw a positive correlate. The above results show that household income of famers increases if they participate in this form of diversification (Figure 3).

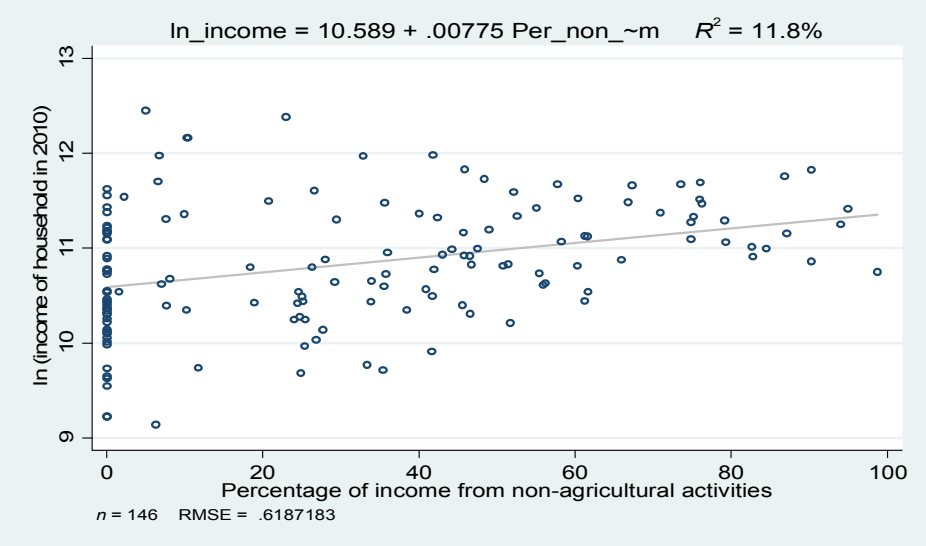
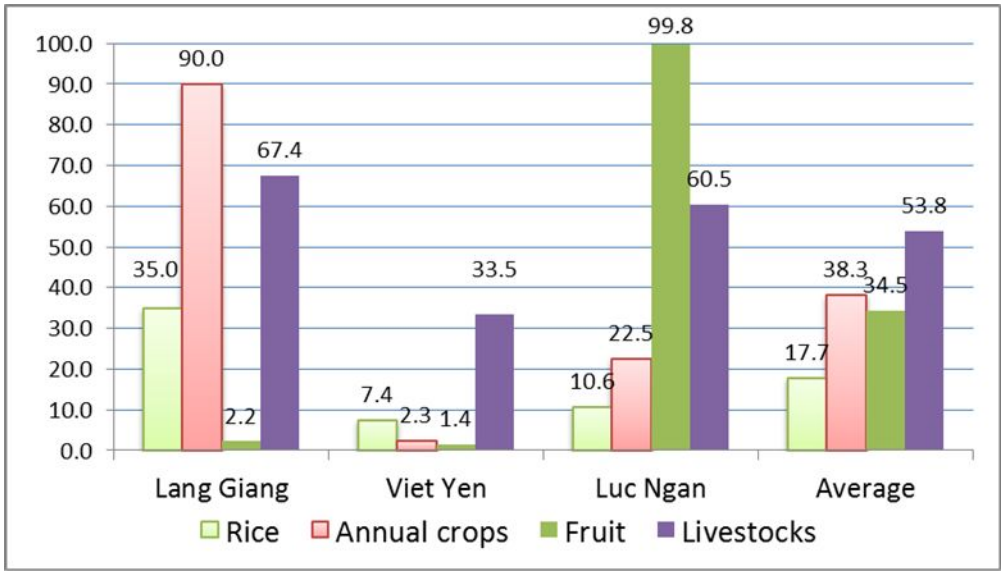


Figure 3: Relationship between Ln (household income) and the percentage of famer having non-agricultural activities in 2010

Source: computed from VHLSS data 2010

- Diversification in the sense that the increase in the proportion of agricultural commodities. Results of the survey in the three districts in 2013 showed significant differences between the indicators (Figure 4). Specifically, in diversified areas like Lang Giang district, the highest value belonged to annual crop and vegetable with about 90 % of agricultural commodities, followed by livestock with 67.4%, and rice with 35 %. In contrast, in Luc Ngan district, the proportion of commodities from fruits accounted for 99.8 %, followed by livestock with 60.5 %. Particularly in Viet Yen district, the proportions of commercial products were low in all agricultural products. The analytical results by income groups did not have a big difference. These issues showed that this diverse form depends on the nature condition and social elements rather than by income group.

Figure 4: The proportion of commodities / total of farm's products in several major agricultural activities in 2012



Source: computed from the survey, 2013

4.1.3. Importance of income diversification on farm household

In this section, the study will analyze the importance of income diversification to farmer economics as well as determine economic activities which attracted more households in Bac Giang province. Figure 5 indicates the shares of household income from income resources in the period from 2006 to 2012. In general, income diversification contributed to the restructuring of household income. To be more

specific, while the proportion of income from cultivation fluctuated between 35-39% from 2006 to 2010, the percentage of income from livestock declined from 15% in 2006 to 12% in 2010, and in 2012. Moreover, the proportion of income from non-farm self-employment activities increased nearly 10 %, and the shares of income from wages increased by nearly 10 % from 2006 to 2012. In agricultural sector, the food crops still dominated others, followed by livestock. Income from fisheries and forestry accounted for only one small part of the total household income. In addition, the other income of households also account for a big figures with around from 15 to 29 % of the total household income in the same period from 2006 to 2012.

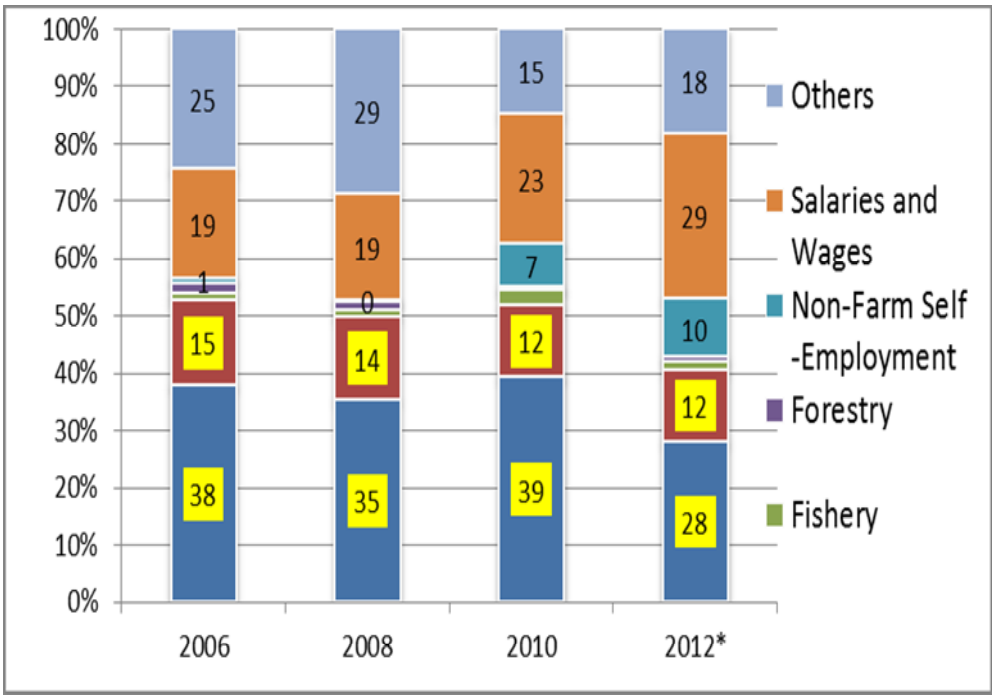


Figure 5: The contribution of income diversification to the restructuring of household income over the years (% of total household income)

Source: computed from VHLSS data 2006 – 2010 and households survey, 2013

Note: * computed from the survey, 2013

To detail the important of household's economic activities, we studied more about the cultivation, livestock, non-farm self-unemployment and wage activities of farm households in the VHLSS data 2010. The results showed that, a mainly annual crop of households was rice with 95.2 % of households who have planted, followed by maize (40.7 % household), the cabbage, and other vegetables. Notably, rice is the main income source, accounting for 58 % of total revenue (Table 22).

Table 22: Important of annual crops, vegetables for households in 2010

Plants	% farm Households	Revenue (1000 VND)	% Revenue
Rice	95.2	94714	58.5
Maize	40.7	4827.8	3.0
Sweet potatoes	33.1	3304.3	2.0
Cassava	15.9	7992.4	4.9
Spinach	9.7	5245.6	3.2
Water spinach	62.1	4410.2	2.7
Kohlrabi	22.8	4309.9	2.7
Cabbage, cauliflower	27.6	4750.0	2.9
Mustard greens of all kinds	39.3	4788.4	3.0
Fresh beans	8.3	3667.0	2.3
Tomatoes	2.1	2410.7	1.5
Spiced herbs	11.0	8331.3	5.1
Other vegetables	26.2	6039.3	3.7
Other annual crops	21.4	7169.4	4.4
Total	**98.0**	**161960.3**	**100.0**

Source: computed from VHLSS data 2010

The table 23 indicates the important of planting activity. There were 65 % of households having at least one kind of fruit trees, including litchi, mango with 40 % of households, banana 31 %, mango 12%, orange, and grapefruit with 13 %. The highest value fruit belonged to sapodilla with about 37% of total value, followed by apple fruit of 17.3%, papaya of 7.2%, oranges, pomelos, lemon with about 6.1%. Notably, litchi that is a favorite fruit for many years in Bac Giang province accounted for only 5.5% of total revenue in 2010.

Table 23: The importance of fruit growing activities for households in 2010

Plants	% farm Households	Revenue (1000 VND)	% Revenue
Orange, lemon, pomelo	13.1	13270.9	6.1
Pineapple	2.8	9626.3	4.4
Banana	31.0	8958.6	4.1
Mango	12.4	2841.9	1.3
Apple	0.7	37809.0	17.3
Plum	0.7	1750.0	0.8
Papaya	9.7	15733.6	7.2
Litchi, Logan	40.0	12067.4	5.5
Sapodilla	0.7	81500.0	37.3
Na	9.0	11990.4	5.5
Jackfruit	4.8	1106.4	0.5
Other fruits	13.1	10932.4	5.0
Other perennials trees	1.4	11000.0	5.0
Total	**65.0**	**218586.9**	**100.0**

Source: computed from VHLSS data 2010

The table 24 shows the importance of livestock activities for farm households in Bac Giang province in 2010. The key livestock were chicken that accounted for about 79 % of households, followed by pigs with 50 % of household, poultry eggs with about 48%, pigs for breed (22.1 % of households), cattle for breed (22.8 % of households). The livestock that brought high economic value to the farm households were goats, chickens, poultry eggs, and bee's honey.

Table 24: The importance of livestock activities for households in 2010

Livestock	% farm Households	Revenue (1000 VND)	% Revenue
Pig pork	50.3	25644.7	3.84
Buffalo and cow	2.1	28160.0	4.22
Sheep, goat	0.7	100510.0	15.05
Chickens	79.3	25547.7	3.82
Ducks, geese	9.7	30035.6	4.50
Other poultry	1.4	133050	19.92
Pigs for breed	22.1	50686.1	7.59
Buffaloes, cows for breed	6.9	42278.6	6.33
Other cattle for breed	22.8	27229.6	4.08
Other livestock	11.0	37026.7	5.54
Poultry eggs	48.3	33644.7	5.04
Bee's honey	0.7	33380.0	5.00
Other livestock	2.1	72458.3	10.85
Livestock breeding by-products	66.9	28310.3	4.24
Total	86.5	667962.3	100.00

Source: computed from VHLSS data 2010

When we asked farm households about the three important economic activities, the majority of the comments were cultivation, livestock, and wages. In the first important activities, 25.7 % of farm households answered that cultivation is the most important activity, followed by salaries with 2.7 % of feedback, and livestock of 6.8 % of feedback. Fishery, forestry, and non-farm self –employment activities are less important than others. Strikingly, some cultivated activities like rice, vegetable, according to the survey in 2013, contribute to ensuring food security, ensuring life when the risks from non-agricultural activities happen. In the second important

activities, the highest percentage of feedback belongs to cultivation of 29.7%, followed by wages of 6.8%, non-farm self –employment and livestock activities with around 4.1%. In the third important activities, livestock activity saw the highest feedback with about 28.4% of feedback.

Table 25: The importance of economic activities to the household's livelihoods (% of feedbacks/ total number of responses , n = 74)

	Firstly important	Secondly important	Thirdly important	No idea and others	Total
Cultivation	25.7	29.7	10.8	33.8	100.0
Raising livestock	6.8	5.4	28.4	59.5	100.0
Fishery	0.0	0.0	1.4	98.6	100.0
Forestry	1.4	4.1	0.0	94.6	100.0
Non-farm self-employment	0.0	4.1	1.4	94.6	100.0
Wages	2.7	5.4	6.8	85.1	100.0

Source: computed from the survey, 2013

- Income of farm households: The important issue when considering the diversification of income sources is household income and the improvement in income through the years. To remove the effects of price fluctuations on earning between years, we used the formula for calculating the consumer price index (CPI[9]) to convert household income in 2008, 2010, and 2012 to 2006 (original year).

$$CPI(t) = \frac{Updated\ cost\ at\ time\ (t)}{Base\ period\ cost}\ 100$$

Table 26 describes the farm household income in the period from 2006 to 2012 in Bac Giang province. Although nominal income of household in 2010 and 2012 was two times higher than that of household in 2006, real income per household per year has not increased significantly compared to average income in 2006. To specify, in 2010, the average real income was 39.8 million VND per household with confidence interval from 35.2 to 44.5 million VND, significance level of 95%, an increase of about 8 million VND compared with 2006. In 2012, according to the survey in three districts, real income per farm household was only 41.8 million, the confidence

[9] According to Viet Nam's GSO, PCI 2007 = 108.3%, 2008 = 123%; 2009=106%.9; 2010 = 109.2%; 2011=118.6%; 2012=109.21%

intervals from 34.9 - 48.7 million with a 95 % significance level. In particularly during the 2006 -2010 period the average real income growth rate increased only 3.3% per year. In conclusion, during the period from 2006 to 2012, real income of farm households increased at a low level.

Table 26: The statistical indicators of real income per farm household per year (1000 VND)

Year	Mean	Std. Err.	[95% Conf.	Interval]
2006	30738.8	2500.2	25798.3	35679.2
2008	39356.4	3121.8	33187.3	45525.4
2010	39877.1	2344.2	35242.2	44511.9
2012*	41839.1	3478.1	34907.2	48771.0

Source: computed from VHLSS data 2006 – 2010 and households survey, 2013

Note: * computed from the survey, 2013; income in 2008, 2010, 2012 are converted to income in 2006 by the consumer price index (CPI)

Comparing income by groups: there was the large difference in income between the poorest and the richest with the increase in household income was very low within a group through the years (Figure 6). On average, income of the poorest was around 5-5.7 times lower than that of the richest. Average income of the poorest group was 17,772 thousand dong in 2010, an increase of 1,575 thousand dong compared with that in 2006. Similarly, income of the poorest group was 14.64 million VND in 2012, an increase of 3.2 million VND compared with 2006. In the same way, average income of the middle group in 2012 was 42.08 million VND, and in 2010 was 39.9 million VND, an increase of over 7 million VND compared with 2006. Strikingly, although outnumbering other groups, average income of the richest group did not increase significantly over the years and fluctuated around 83 million VND.

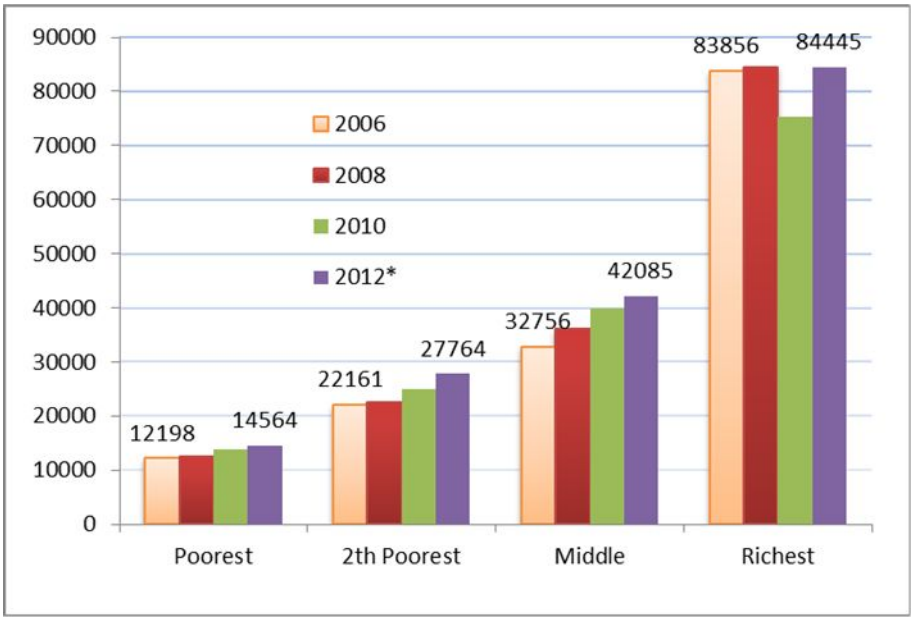


Figure 6: Real income per farm household per year by income group, 2006-2012 (1000 VND)

Source: computed from VHLSS data 2006 – 2010 and households survey, 2013

Note: * computed from the survey, 2013; income in 2008, 2010, 2012 are converted to income in 2006 by the consumer price index (CPI)

4.2. Factors affecting income diversification of farm household in Bac Giang province

4.2.1. Factors affecting to income diversification and household income

Research was conducted to collect qualitative feedback of farmers on the factors affecting household income and income diversity. Figure 7 indicates some main factors affecting to income diversification of farm household, which was analyzed from the survey data in Bac Giang in 2013. To specify, 40.5 % of interviewee replied that labor skills are essential to meet the requirements of the labor market, especially non-agricultural works. Secondly, 39.2 % respondents suggested that non-agricultural activities including non-farm self-employment and wages activities should be developed to create employment for rural labors. For example, famers in Luc Ngan district, due to there was no non-farm jobs in the local areas so most of them only focus on agricultural activities or migrate to the other areas like Bac Ninh province or cities to look for jobs.

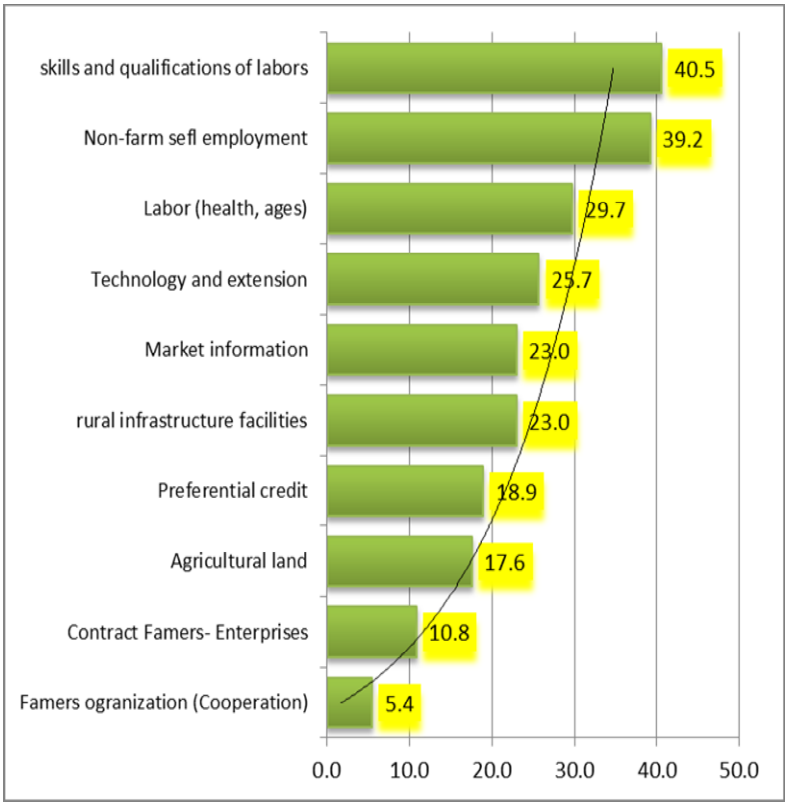


Figure 7: The factors necessary for income diversification (% of respondents said Yes, n = 74)

Source: Result of households' survey in 2013

In addition, the age and health of workers and whether workers are also important factors affecting to income diversification. In many poor families or families lacking labors, labors over 40 cannot participate in agricultural activities like industrial parks. 29.7 % of comments related to this issues that labors do not meet the requirements of the job. Moreover, the factors of production land, rural infrastructure, credit policy, extension, market information are the key factors for income diversification with from 23-26% of feedbacks. Furthermore, issues contracts with farmers, production organization, and business collaboration are also important factors that help households diversify production or intensive commodity production, especially areas as Luc Ngan, and Lang Giang districts.

4.2.2. The regression model of factors affecting to household income

Based on a qualitative assessment of the people of the factors affecting household income, the study conducted simulations model of factors affecting to farmers income. The VHLSS data 2010 is used to estimate the regression model. The dependent variable is Ln of total income of famer. To avoid multi- collinearity problem which one independent variables in the model depends on the other independent variables, the study conducted the research whether or not the dependency between the independent variables.

Three ways was done to consider whether or not the relationship between the independent variables:

- The coefficient of adjusted R-aquared is high but the values of |t_ statistic| is low, multi-collinearity phenomena maybe occur with high probability;
- Using Stata software to compute the correlation R between the independent variables: If the correlation coefficient (R) is higher than 0.8, we can concluse that multi-collinearity phenomena has occurred.
- Using a regression model to estimate the regression model between the independent variable X with the rest independent variables. If the independent variables have a linear relationship regression model multi-collinearity.

The analytical results have taken out some variables from the model. Moreover adjusted R-aquared is not high, the correlation coefficient (R) between the variables in the model is low, and there is no linear relationship between the independent variables. Therefore selected variables for the model are quite suitable (Table 27).

The test results of regression model show that $F_{observation}$= 10.56 > 0.05 so the regression model is suitable.

Similarly, using t-test for significance of individual regression coefficient (βj) with:

$$H_0 : \beta_j = 0; \qquad H_1 : \beta_j \neq 0$$

Methodological speaking, if P_value <0.01 we reject H_0, the coefficient is significant or not equal to zero ($\alpha = 0.01$); P_value <0.05 the coefficient is significant ($\alpha = 0.05$); P_value <0.1 the coefficient is significant ($\alpha = 0.1$).

Table 27: The independent variables which will be used in the regression model

Variables	Detailed	Interpretation	Expectations
X1	Simpson_index	The diversification of income (value from 0-1)	-
X2	Hhsize	Number of people per household	+
X3	Non_labor	Number of people outside of working age (too young or over working age)	-
X4	Income resources	Number of income resources per household	+
X5	Livestock species	Number of livestock species per household	+
X6	Ln_land_total	Total of agricultural, forestry land areas (m^2)	+
X7	Age	Age of household head	-
D1	Education4	Dummy variable of education degree (D1 = 1: upper secondary diploma; D1 = 0: lower secondary diploma)	+
D2	Ethnic1	Dummy variable of ethnic (D2 = 1: household head is Kinh ; D2 = 0: others)	+
D3	Credit1	Dummy variable of preferences credit policy (D3 = 1 if household borrowed ; D3 = 0 if household did not borrowed)	+

Source: Collected from VHLSS data, 2010

There are two variables which cannot explain the meaning of household income: Although the coefficient of elasticity is consistent with theory, agricultural, forestry land areas and the age of household head cannot explain the meaning of household income because their individual regression coefficient are not significant. Adjusted R-aquared = 0.4238 means that 42.38 % of the changes of household income is explained by independent variables in the model.

From the analysis, the regression model takes the following form:

Ln Y= 8.73 - 0.83X1+0.16X2+0.18X3+0.14X4+0.09X5+0.05LnX6-0.004X7+ 0.37D1+0.63D2+0.26D3

Based on the regression model, in eight variables which are statistically significant, six of them have a positive signs with average income of farm household and two variables have opposite sign. The model is explained as follows:

Table 28: The regression model of farm household income in Bac Giang province in 2010, the dependent is ln (household income per year)

Number of obs	=	131
F(10, 120)	=	10.56
Prob > F	=	0
R-squared	=	0.4681
Adj R-squared	=	0.4238
Root MSE	=	0.48076

	ln_income	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
X1	simpson_index	-0.837	0.342	-2.45	0.016	-1.514	-0.160
X2	Income reresource	0.157	0.061	2.58	0.01	0.036	0.277
X3	Hhsize	0.184	0.039	4.77	0.00	0.107	0.260
X4	non_labor	-0.139	0.044	-3.19	0.00	-0.225	-0.052
X5	soVatnuoi	0.098	0.030	3.23	0.00	0.038	0.158
X6	ln_land_total	0.053	0.042	1.27	0.21	-0.030	0.136
X7	age1	-0.004	0.003	-1.13	0.26	-0.011	0.003
D1	education4	0.366	0.126	2.91	0.00	0.117	0.616
D2	ethnic1	0.629	0.134	4.71	0.00	0.365	0.894
D3	credit1	0.253	0.109	2.32	0.02	0.037	0.469
	_cons	8.730	0.482	18.13	0.00	7.777	9.684

Source: Computed from the VHLSS data, 2010

In terms of other factors constant, then:

- The coefficient of Simpson index (X1) = -0.83 with α = 0.05. It means that Simpson index is the opposite of household income. This is consistent with the trend of agricultural development that is mentioned in chapter two: farmers have been growing with high specialization level in their economic activities;
- The coefficient of income resources (X2) = +0.16 with α = 0.01. It means that if the number of income resource increase more one unit, household income increase by 15.7%;
- The coefficient of farm size (X3) = 0.184 with α = 0.0. It means that if the number of people in household increase more one people, household income go up by 18%;

- The coefficient of number of people outside of working age (X4) = -0.139 with α = 0.01 means that if household having more one people outside of working age, household income will decline by 13.9%;
- The coefficient of number of livestock species (X5=0.098) with α = 0.01 means that household income will increase by 9.8% if famers having one more of livestock specie;
- The coefficient of dummy variable of Education degree (D1) = 0.366 with α = 0.01 means that if household head have upper secondary diploma, household income will increase by 36.6%;
- The coefficient of dummy variable of Ethnic of household head (D2) = 0.629 with α = 0.01 means that if household head is Kinh people, household income will increase by 62.9%;
- The coefficient of dummy variable of credit policy (D3) = 0.253 with α = 0.05 means that if households borrow from preferential credit program, the income will increase by 25.3%.

In conclusion, for the variables in the model, the variables: the number of income resources, the number of household members, the number of dependents' people, credit policy, ethnic and education level of the household head have a positive impact on the household income. Especially, Simpson diversity index is inversely related to household income. This issue means that farmers with a high balance among household income belong to the poorest.

4.3. Problems in diversifying economic activities of farm household

In this section, study will identify and analyze the difficulties in income diversification to improve the income of the farm households and offering some proposals to promote economy and income for the household in the province in incoming time. It is notable that the previous section has shown two forms of income diversification: 1) Diversification with an increase the number of income resource or the balance among the different income resource; 2) Diversification refers to transform into activities with higher income (non –farm self –employment and wages).

4.3.1. Difficulties in income diversification and improving income of the farm household

The results of qualitative research by interviewing farmers and collecting information from other agents showed that farmers are facing up to thirteen major difficulties (Figure 8).

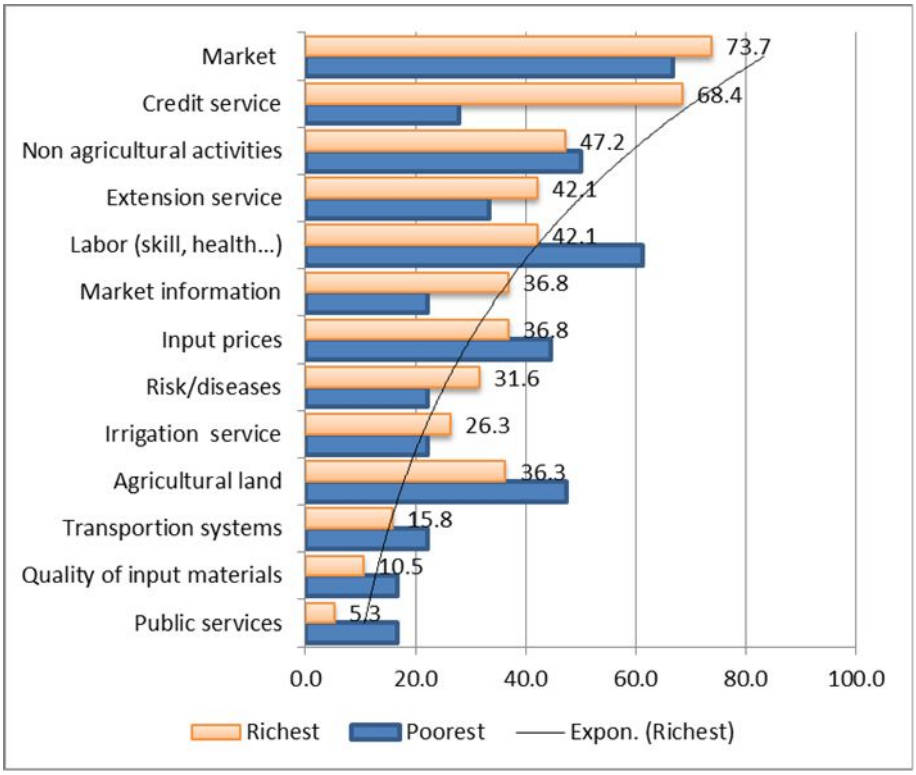


Figure 8: Difficulties affecting the diversity of farmers' income (measured by the percentage of households answered Yes/Total number of interviewee, n = 74)

Source: Computed from the survey, 2013

- Output market of production: According to the survey in Bac Giang province in 2013, most of interviewee told that output market of their products is the most difficult with over 65% of feedback of the poorest groups and about 73.7% of feedback of the richest group. The famers are facing up to the reduction of output market and the fluctuation of output price of agricultural products these years. Moreover, 36% of the richest mentioned about the lack of market information, followed by the percentage of feedback of the poorest of about 18%. Strikingly, these problems are concentrated at Luc Ngan and Lang Giang district which are known as the high diversify area, and intensive agricultural productions. Some possible

explanations for this problem are that the economic crisis or the low quality of commodities as well as export – import policy of Vietnam as well as the policy of import countries. Most of famers said that the prices of litchi always depend on the intermediate trader or collectors who come from China. Especially, some farmers, because of profits sometime used pesticides, chemicals which is prohibited when producing and processing. As a result, this problem may put this value chain in danger.

Box 1: Difficulties in selling agricultural productions

Mr Ha Tien Loi, the famer at Tan village, Tan Thinh commune, Lang Giang district said that: before 2011, the import – export company of agricultural product had contracts for buying tomatoes in the commune. Thanks to this, output price of products was so high which contributed to improve living condition of the famers. However, from 2012 due to the lack of market, the company decided to reduce the material production area. As the result, the tomatoes production lands declined strongly by at least 70% compared to that in 2010. Moreover, some kinds of agricultural products were in trouble. Although experiencing a significant fluctuation in the period from 2010 to 2012, the output price of pigs for meat was often higher 55,000 dongs per one kg. However, in May, 2013, prices of pigs for meat went down strongly to about 37,000 dongs per kg, which leads to the negative income by at least 4000 dong per kg of pork.

At the Luc Ngan district, price of litchi which is known as the special product of Bac Giang province witness unpredictable ups and down. For instance, in 2010, average price of fresh litchi was only 2000 dong per kg, followed by 2012 with around 12,000 to 15,000 dong per kg, and 2012 with around 15,000 to 18,000 dong per kg.

Source: Collection from the survey, 2013

- Difficulties in labor issues: The lack of labor skills and qualifications are reflected in all the households meanwhile the poorest are facing up to the problem of shortage of labor and dependent people. 42% of interviewee in the richest people replied that they did not professional skill while 61% of feedback in the poorest group lack of skill and workmanship to meet the needs of the labor market, specially off-farm works. 27 % of households answered that they attended by at least a short –term vocational training courses in the last two years (mostly from the new rural development program new). However, workers who over 40 years old in Viet Yen and Lang Giang districts are not admitted to work in the industrial park which is known as the solution to restructuring the rural labor. Other example, famers in the Four Village, Van Trung commune said that Quang Chau Industrial Zone only recruit female workers. Furthermore, due to 59% of household heads do not pass the primary school

and 39% of household heads have the highest education degree of secondary school, households are limited access to the vocational training courses.

- Difficulties related to production land: Production land is always hot and pressing issues of farmers who live close to the industrial areas. Only in 5 years from 2007, a large area of fertile agricultural land was taken away, followed by the appearance of industrial zone. However, the compensation is very low with around 16.8 million in 2007 to 25.2 million VND in 2008 million VND per one Sao (one Sao =365 m^2 of land). The first important of household's livelihoods are lost, but most of them are not prepared. Therefore, the transition from on-farm activities to non-farm activities is a passive process, and coercion. According to the survey, 36% of the richest and 43% of the poorest people are not satisfied with the compensation policy and land use which was replaced by industrial zone.

Van Trung Industrial Zone after 5 years implementation
Photo: Quang Nguyen, 2013

Box 2: Pressing issues when converting agricultural land to industrial lands

After 5 years implementing the policy of industrialization in Bac Giang province, The companies and international corporations has just built about 15 % of the total 1555 hectares of industrial lands. Specifically Quang Chau Industrial Park which was established in 2006 with 426 hectares of lands has built only 92 hectares. Although there were seven projects investing in this area with 44 hectares but until now only three companies are operating. Van Trung Industrial Park which is located in Van Trung commune with an area of 425 hectares, investors has just clearned up only 144 hectares.

(Sources: Le Quang Dong –Invenstment forum, dated May fourth, 2013)

According to Van Trung commune's officer, from 2007 until now, 170 hectares of agricultural has been revoked for two industrial zones (Quang Chau and Van Trung) with price of land compensation was 18.6 million in 2007 and 25.2 million per Sao in 2009 (one Sao = 365 m^2 of agricultural land). As a result of this, over 1000 households, or over 4000 local people were directly affected by this process. Mr Duong Van Tu – the head of Hai village said that from 2008, 30 hectares of agricultural land has been revoked, which accounted for only 50% of plan. Because companies pay compensation to famers with low price, and companies were slow in the construction and operation, the majority of famers do not want to receive compensation, and give lands to the industrial zone.

Source: Collection from the survey, 2013

- Difficulties in non-agricultural occupations: To diversify income sources according to two forms that mentioned above, non-agricultural firms should be built and they have to bring good opportunities for the local labors. Over 47 % of responses in both the poorest and the richest groups said that they have difficulty in converting labor to non-agricultural activities. In mountainous areas, and the delta area, due to lack of non- agricultural business people are difficult to diversify income sources. By contract, famers living near the industrial areas are limited access to non-farm works because they lack of labor skill, or over ages. Moreover, non-agricultural employment is unstable. For instance in 2012, although 43 % of farm households having non-farm self-employment, and 54 % of farm household having wages activities but two these activities provided only a 10 % and 29 % share of total household income. Another example, Sanyo OPT Vietnam Company which is located in Quang Chau Industrial Zone has decided bankruptcy and ceasing operations in January 2013 leaded to the unemployment of 3,750 workers[10].

- The policy was implemented but less effective: In recent years, although the Vietnamese government and local government have implemented many policies to support agriculture and rural areas farmers are still not receiving effective (Table 29).

Table 29: The limitations in implementing supportive policies

Policy	Main contents	problems
Credit policy: Decree 41/2010/NĐ-CP	Preferential loans size, low interest rates for agriculture and rural areas	Average amount of loan is low: 27 % household borrowed preferential loans from the banks of social policy; the average loans: 23.6 million VND per household
Land policy: Decrees 42/2012/NĐ-CP	Management and use of land for rice cultivation	Localities do not have land for industrial development, handicrafts production, and service activities.
Policies of compensation: Decision 71/2007/QD-UBND, dated August 24, 2007 of the People's Committee of Bac Giang province	When the State recovers 1,250 m2 of agricultural land, households will be 72m2 of land for developing business-services activities	Policies have not been implemented due to the delays of industrial investors; Only monetary support, lack of support vocational training, career change

[10] http://vtv.vn/Thoi-su-trong-nuoc/Hang-nghin-cong-nhan-Sanyo-OPT-Viet-Nam-mat-viec/55361.vtv#sthash.QbdLdd4i.dpuf

Source: Collection from the survey, 2013

Extension policy and market support: 42% of the richest and 32% of the poorest are facing up to science and technology as well as services related to extension. There are 36.8 % of richest households and 20% of the poorest answered that they are difficult of access to market information or advice from extension network. 54 % of feedback said that quality of extension services at commune level is Poor and Very Poor. 29.73 % of the households have received advice on encouraging the development of production, mainly in the high diversification areas like Lang Giang district. Conversely, due to the risk of production and selling, many farmers in Tan Quang commune, Luc Ngan district has transformed from litchi tree to other fruits without any recommendations, which seems contrary to the province's Orientation[11].

Box 3: the restructuring of fruits in the intensive production areas of litchis

Mr. Nguyen Van Bo, Commune party secretary of Tan Quang said that from 2009, The movement of converting from litchis crop to other fruits has been increasing exponentially. Many farmers tend to plant other crops to minimize risk because of low output price and natural disasters. In 2012, litchis crops area was 847 hectares, a decline of 193 hectare compared to that with 2009, followed by an increase of citrus areas from 10 hectare in 2009 to 74 hectare in 2012.

Mr Nguyen Van Hat – the head of Truong Sinh village, Tan Quang said that, because of low output price many famers has converted persimmons fruit, and litchis fruit to other like citrus, lemon, pomelos fruits which are seen as high-value crops these years in Luc Ngan district. Strikingly, many households who transferred litchis fruit to pomelos re-transferred pomelos to citrus fruits after three years. According to him, this transition is entirely spontaneous and production always depends on buyers.

Source: Collection from the survey, 2013

Lychee orchards have been removed and replaced by oranges

[11] Resolution No 43-NQ/TU dated on 22/02/2011 of the Provincial Party Committee of Bac Giang

Other difficulties: The issue of infrastructure and rural services is a barrier to increasing the number of income sources or converted to other economic activities with high value. For instance, in Luc Ngan district, people have difficulty in transporting commodities in the rainy season, due to the lack of agro-processing system with high technology so most people have to sell unprocessed products at low prices. In Viet Yen district where the process of industrialization develop strongly, infrastructure systems for agricultural production received a little attention.

The inter-village road to the Truong Sinh village, Tan Quang commune, Luc Ngan district after a heavy rain in July, 2013

Photo by: Tran Dang Duc (Tan Quang Commune)

4.3.2. Livelihood strategies and famers' recommendations to improve income

From the situation of household's livelihoods as demographics, labor skills, capital, production land, economic activities of households, the problems and difficulties of famers above, this section will found out famers' strategies in their future. Whether or not the difference between income groups, and what do famers need to improve living standard.

- Livelihood strategies of famers

In recent years, the change in household livelihoods and economic activities lead to both opportunities and risks for farmers. We asked famers about the activities which they used to produce or they are giving up because of less economic efficiency: cultivated activities accounted for 32.4% of replies, followed by livestock production of 45%, non-farm self-employment of 16%, and wages of 21%. In cultivated activities, annual industrial crops, fruits crops fluctuate strongest. For example, famers tend to covert litchis, persimmons fruits to others like pomelos, and citrus fruits. For livestock

production, poultry and pigs reduced significantly in both livestock sizes and the number of households raising livestock.

Figure 9, according to the survey indicates the future strategies of famers. In general, the majority of households are going to work in non-farm self-employment and wages activities. Over 30 % of households who have no non-farm activities reply that will participate in this activity. The percentage of households having wages activities still see at high figure from 56-58% of households. In agricultural sector, some famers tend to give up cultivated production although they still keep their land. The percentage of famers who has cultivated activities will reduce at least 7% compare to 2012. Although the percentage of famers having cultivated activities, and livestock production tend to reduce, most of famers still answers that these activities are important in their livelihoods.

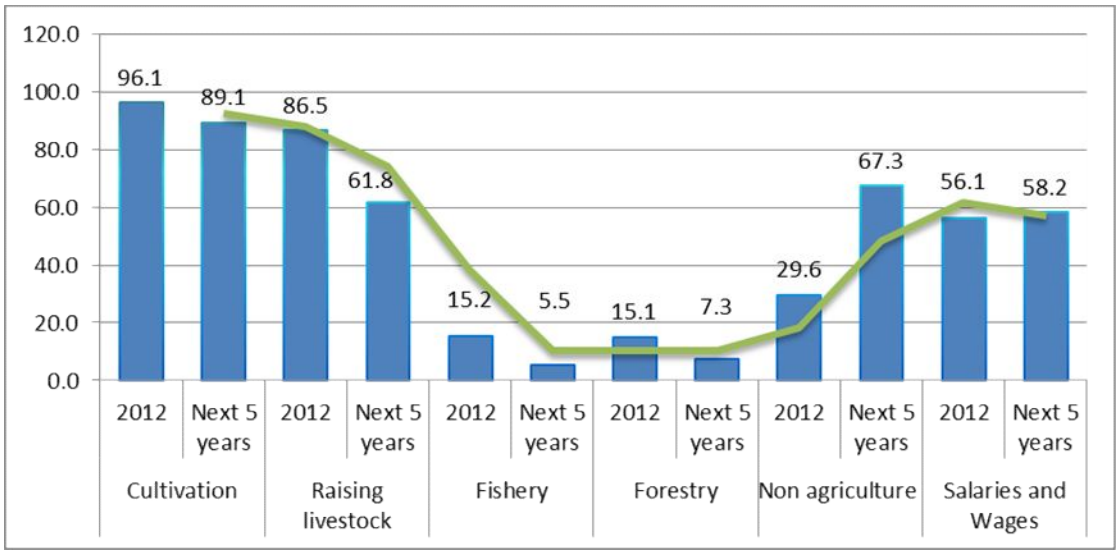


Figure 9: The percentage of households participating in economic activities in 2012 and plans in next five years

Source: Collection from the survey, 2013

- Proposal of farmers

Based on the real situation, farmers propose some key supports such as: creating non-farm jobs or occupations with 40.5 % of the interviewee; increasing loan size and preferential loans with 28.4 % of the interviewees.

Table 30: Proposal support of farmers to increase their income (% of proposals / total household response, n = 74)

Supporting proposal	Poorest	2th Poorest	Middle	Richest	Total
Non-farm self-employment	42.1	38.9	42.1	38.9	40.5
Credit policy	26.3	16.7	42.1	27.8	28.4
Extension services	26.3	11.1	31.6	22.2	23.0
Output market	5.3	11.1	36.8	22.2	18.9
Vocational training	26.3	11.1	10.5	16.7	16.2
Agricultural lands	26.3	5.6	10.5	11.1	13.5
Output contracts	10.5	11.1	15.8	5.6	10.8
Market information	5.3	11.1	21.1	5.6	10.8
Irrigation services	5.3	11.1	5.3	11.1	8.1
Quality of input material	5.3	16.7	5.3	5.6	8.1
Deal with natural disasters	15.8	0.0	15.8	0.0	8.1
Management of input prices	0.0	5.6	15.8	5.6	6.8
Transport systems	0.0	5.6	10.5	0.0	4.1

Source: Result of households' survey in 2013

The issue of land production, markets, extension services, vocational training are more important with around 13-23 % of the proposition. There are some differences between the propose by income groups: the richest proposes the supports on output market, credit, irrigation, and creating non non-agricultural development while poorest proposes to support on deal with natural disasters, extension services, ensuring agricultural land, and vocational training courses (Table 30).

Table 31 indicates the proposal of farmers by different regions. Overall, because each region has different advantages and problems so proposal supports of farmers are different.

+ The areas with high diversification in agricultural and non-agricultural activities (Lang Giang districts): promote support loans with preferential interest rates and increase loan sizes (44 % of respondents); support shifted to non-agricultural occupations (44 % of respondents), vocational training for farmers linked to using labors (16.7 % of respondents), supporting product sales ,market, linking production - consumption (16.7 % of respondents), providing public services, management of input materials, reducing natural disasters (11 % of respondents).

Table 31: Proposals of farmers in the different diversification regions (% of suggestions/ total of interviewee)

	Highly diversified area	Industrial development area	Intensive production of fruits area	Total
infrastructure systems	5.6	0.0	10.0	5.5
Input prices	11.1	0.0	15.0	9.1
Irrigation services	5.6	0.0	25.0	10.9
Quality of input	5.6	0.0	25.0	10.9
Management of risk	11.1	0.0	20.0	10.9
Output prices	5.6	0.0	35.0	14.5
Market information	0.0	5.9	35.0	14.5
Production lands	5.6	47.1	5.0	18.2
Vocational training	16.7	52.9	0.0	21.8
Contracts of output	16.7	5.9	50.0	25.5
Extension services	11.1	5.9	70.0	30.9
Credit support	44.4	41.2	30.0	38.2
Support non-farm jobs	44.4	76.5	45.0	54.5
Total	100.0	100.0	100.0	100.0

Source: Computed from the survey, 2013

+ The areas with high- speed industrialization (Viet Yen district): solve the problem of converting job from agricultural activities to non-agricultural activities (76.5 % of respondents); vocational training linked to employment (52.9 % respondents); implement compensation policies; support to famers who lost agricultural land having lands to develop services and business activities.

+The areas of intensive fruits: Enhancing the quality of extension services, production recommendations (70 % respondents); supporting output market (50 % respondents), building the processing system (45 % respondents), credit support, disease management, market information (15-30 % respondents).

- Proposal of local staffs

To diversify income for farmers by increasing income resources and restructuring of rural labor, local authorities, according to the survey, focuses some following proposals (Table 32):

Table 32: Some proposals of local staffs to increase income of households

Contents of proposals	Districts
- Building of 1-2 small and medium industrial zone in each district	Lang Giang, Luc Ngan
- Development of traditional crafts , handicrafts	Lang Giang, Luc Ngan
- Creating jobs for labors overs 40 years old	Viet Yen, Lang Giang
- Supporting the policies to ensure output markets for agricultural productions	Lang Giang, Luc Ngan
- Supporting business activities for famers after they loss agricultural land	Viet Yen
- Reducing the loan procedures	Lang Giang, Luc Ngan
- Promoting the systems of processing and storage of agricultural products	Lang Giang, Luc Ngan
- Ensuring input prices	Lang Giang, Luc Ngan
- Building infrastructure systems	Lang Giang, Luc Ngan

Source: Collection from the in - depth Interviews, 2013

Should develop handicraft and industrial areas through supporting each district having 1-2 clusters - small and medium industrial zones; improve rural infrastructure to attract companies investing in the disadvantaged areas; support Labor looking for jobs after they loss agricultural land for industrial zone such as vocational training courses, services lands; create non-farm jobs for famers in who over 40 years old; support famers selling their product by contracts with buyers (companies or traders); enhance the quality of public services

4.4. Recommendations

4.4.1. Conclusion

In recent years, agricultural and forestry land areas of famers have declined strongly in the past six years. The statistical analysis from VHLSS and survey in 2013 have shown that , production land areas per capita declined significantly from 1785.8 m^2 in 2006 to 1637.9 m^2 in 2010 (the decrease was 147.9 m^2 per capita), and 1326.1 m^2 in 2012. The cause of this problem was conversion of agricultural land to industrial lands.

Due to the impact of the industrialization process, fames have to convert from agricultural activities to non-farm jobs while they lack of conditions to meet the needs of the labor market. The statistics has shown that over 50% of the household heads

was below the level of primary school or primary school. The percentage of household heads that has upper secondary diploma was 8.2% in 2006, 12% in 2010, and only 7.2% in 2012 (the case of the survey at three districts). Therefore, most farmers were left out of the process of diversification of income in the form of enhanced activity with high economic value.

There are two forms of diversification what are mentioned above:

Form 1) Diversification when we refer to an increase in the number of income resource or the balance among the different income resource.

In general, while the number of income resource saw a fluctuation from 2006 to 2012, the Simpson index declined significantly in the same time. Richest income group has less diversification of Simpson index than poorest group most of years. In 2010, Simpson index of the poorest group was 0.54 while its value of the richest group was 0.52. Similarly, in 2012, Simpson index of the poorest group was 0.56 but its figure of the richest group was 0.47. This situation contribute to answer the hypothesis of the study that famer with low income is more diversification than famer with high income. It is true when we refer to an increase in the number of income resource or the balance among the different income resource.

Form 2) Diversification with significance that the increase of economic activities with high income or high –value commodities:

Although there are more famers participating in non-farm-self employment and wages activities, income from wage and salary activites are more important than income from non-farm self employment and famers tend to earn more income from non-farm avtivities than agricultural agricultural activities. Relationship between household income and the percentage of households participating in Non- agricultural activities saw a positive correlate. Therefore, household income of famers increases if they participate in this form of diversification.

Income diversification contributed to the restructuring of household income. While the proportion of income from cultivation fluctuated between 35-39% from 2006 to 2010, the percentage of income from livestock declined from 15% in 2006 to

12% in 2010, and in 2012. Moreover, the proportion of income from non-farm self-employment activities increased nearly 10 %, and the shares of income from wages increased by nearly 10 % from 2006 to 2012.

Income of farm households: Although nominal income of household in 2010 and 2012 was two times higher than that of household in 2006, real income per household per year has not increased significantly compared to average income in 2006. In 2010, the average real income was 39.8 million VND per household. In 2012, according to the survey in three districts, real income per farm household was only 41.8 million. During the 2006 -2010 period the average real income growth rate increased only 3.3% per year. Strikingly, income of the poorest was around 5-5.7 times lower than that of the richest.

Factors affecting to income diversification and household income: There are some main factors affecting to income diversification of farm household according to the survey: skills and qualifications of labors, Non-farm self-employment, Labor (health, ages), Technology and extension, Market information, rural infrastructure facilities, Preferential credit, Agricultural land, Contract Famers- Enterprises, Famers organization (Cooperation). Based on a qualitative assessment of the people of the factors affecting household income, the study conducted simulations model of factors affecting to farmers income. There are eight variables which are statistically significant such as: the number of income resources, the number of household members, the number of dependents' people, credit policy, ethnic and education level of the household head (have a positive impact on the household income); Simpson diversity index is inversely related to household income. This issue means that farmers with a high balance among household income belong to the poorest.

The results of qualitative research by interviewing farmers and collecting information from other agents showed that farmers are facing up to some major difficulties: Output market of production, labor issues, production land, non-agricultural occupations, and inefficiency of supporting policies.

4.4.2. Recommendations

The general view:

Making diversify income sources in various forms will lead to the development of different models, different solutions for different areas or type of famers. However, the important goal of these solutions is to improve farmers' income towards reducing the proportion of the value of agricultural production and labor in the agricultural sector.

Giving solution should be based on the general policy, natural -social conditions, difficulties and limitations of different groups of households. Furthermore, the solution should be based on the situation of the farmers as well as their recommendations.

Some proposals to Bac Giang Province:

- First, support output market for agricultural products: Base on the advantages of the agricultural production of Bac Giang and difficulties in output of products, market solutions should focus on: improve the quality and reduce the production cost of products by building transport systems, market media; support enterprises and traders, intermediaries trade in buying agricultural products for farmers such as tax assistance, trade promotion; develop production – distribution links forms such as cooperatives of farmers, cooperatives and associations to create cohesion between production and consumption in the market mechanism; build systems of maintenance and processing of agricultural products to enhance value for some commodities such as litchis, vegetable, annual industrial crops; promote the application of science and technology in production, good agricultural practice, management of geographical indications products with lychee.

- Second, Improve agricultural -rural public services: Strengthening the quality of support services such as agricultural production, animal health , irrigation, plant protection to minimize the risk of disease and increase the productivity and quality of products . Especially extension system should ensure the role of market information to provide advice on science and technology for farmers; implementing socialize in providing public services such as extension, veterinary services, and plant protection services; implementing the model of Public-Private Partnership (PPP) in some value

chain of agricultural products such litchis in Luc Ngan districts, and annual industrial crops in Lang Giang district.

- Thirth, Develop rural industries: industrial development have to bring opportunities for people to engage in non-agricultural activities, and contribute to diversification of non-farm activities; implementation the policies of cultivated land use consistent with the policies that attract inventions into rural area; enhance the capacity of state management of industrial land use to avoid hanging planning, waste of land resources; industrial development should link to the agriculture sector in term of creating jobs to famers.

- Fourth, implement appropriate policies of vocational trainning and employment support policies: Mobilize social resource in vocational training to ensure the quality of rural labors appropriating with work conditions at industrial zone; promote vocational training courses in response to the demands of agricultural works as well as the need of labors market; support people who is lost agricultural land by industrialization having lands to develop business – services activities.

- **Fifth,** implement the appropriate model of income diversification by income groups: With the poorest group, diversification in income resources is a good strategy that contribute to reducing the risk and ensure their food security; continue; Implementation of special policies to support the poor and low-income households through concessional loans, assistance to education, health care services, vocational training, development of craft industries to create occupations at their local areas. On the other hand, other income groups should diversify sources of income at least form 2-3 economic activities per households to ensure the certainty of income. Moreover, support farmers to participate in non- farm activities; formulate policies to help farmers become skilled labor**Some proposals to three districts**

- Sixth, for Lang Giang districts:

Income diversification continue play an important role on the process of farm household's development in the nearly future. Lang Giang authority should keep the high level of economic diversity at farm household level. Each household should have 3 – 4 economic activities to avoi the rich in their activities, and ensure income safety.

Implementing industrial development is very important strategy which contribute to creating non-farm job for famers. However, the solution have to create jobs for local famers, specialy famers over 40 years old who are facing difficulties in finding jobs in industrial zones.

Moreover, support famers to develop agricultural commodities through mean solution: Support for the agricultural enterprise about credit policy, market promotion to maintain production of farmers under contract with buyer, particularly in a number of vegetables and annual crops; in the long term, the district should invest more in agricultural production systems with using the advanced technology to ensure the quantity and quality of agricultural products such as chicken, pigs, vegetables which are strength of Lang Giang district.

- Seventh, for Viet Yen district:

Bac Giang authority should focus more on creating jobs for farmers who have lost agricultural land for industrial zones. Particular, create jobs for famer over 40 years old through commitment with famer; creates services and business jobs by implementing the land policies to provide business and service lands to famers;

Enhance the State management of industrial areas to reduce waste of agricultural lands.

Improve training effectiveness by supporting companies participating in training courses and using labors after training. Training activities must be linked to market requirements and needs of workers.

Avoid the situation that famers losing land leads to underemployment; keep a high degree of income diversification for poor families to ensure income safety.

- Eighth, for Luc Ngan district:

In this context, consider the implementation of agricultural diversification. Every household should have 1-2 crops to reduce the risk.

Besides, develop livestock production to increase income source and create employment for the farmers create jobs for farmers while they are waiting for fruit harvesting.

In long-term, improve the value chain for lychee by applying the high-technology model to improve product quality, increase the value added to the product after harvesting; strengthen the role of the state in supporting the exporters of agricultural products, ensure stable output market for litchi product; apply the PPP models for value chain of lychee.

Improve the quality of infrastructure systems for the development of production and trade such as market, transport system, and system of post-harvest processing.

Attract investment and industrial, handicrafts development in the district to restructure of rural labors; develop rural industries which will support to agricultural development or create employment and income for rural farmers.

Enhance the quality of public service such as credit, extension, veterinary, and plant protection services. In particular, the public services should focus more on poor households, and nearly poor to bring them opportunity to reduce poverty.

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APPENDICES

Appendix 1: Characteristic of the sample in the research

Year	Total interviewees (Households)	In which:					
		Household head is Ethnic minority (%)	Household head is female (%)	Poor (%)	2nd Poor (%)	Medium (%)	Rich (%)
2006	150	6.0	12.7	28.0	30.7	28.0	13.3
2008	149	8.7	12.8	23.5	24.2	27.5	24.8
2010	140	17.9	15.0	20.7	29.3	22.1	27.9
2012	74	12.2	24.3	25.7	24.3	25.7	24.3

Source: computed from VHLSS data 2006 – 2010 and households survey in 2013

Note: * computed from the survey, 2013

Appendix 2: Agricultural, forestry land per household (m^2), 2006-2012

year	Annual crop	Perennial crop	Water Surface	Forestry	Other land	Total
Year 2006	2332.0	985.6	100.4	3053.0	706.1	7177.1
Year 2008	2282.3	990.9	126.5	2962.1	641.7	7003.5
Year 2010	2076.5	862.6	65.0	2892.5	340.4	6237.0
Year 2012*	1410.7	917.6	144.6	2586.5	185.4	5244.7

Source: computed from VHLSS data 2006 – 2010 and households survey, 2013

Note: * computed from the survey, 2013

Appendix 3: Demographic and labors in the surveyed communes

Commune/District	Population (Person)	Number of housholds	% of Labors	Poverty rate	Nearly Poverty rate
Tan Thinh/Lang Giang	8699	2561	58.9	5.3	5.3
Tan Hung/Lang Giang	10737	2752	70.0	8.6	7.5
Van Trung/Viet Yen	7715	2150	68.0	6.7	8.8
Tan Quang/Luc Ngan	10040	2133	65.0	9.3	5.1

Source: computed from VHLSS data 2006 – 2010 and households survey, 2013

Note: * computed from the survey, 2013

Appendix 4: Percentage of household by the number of income resources

Number of income resources	2006	2008	2010	2012*
2 activities	4.3	5.7	2.8	5.4
3 activities	26.1	32.5	20.6	29.7
4 activities	49.5	46.1	50.1	50.0
5 activities	15.7	14.4	19.3	13.5
6 activities	4.4	1.4	7.1	1.4

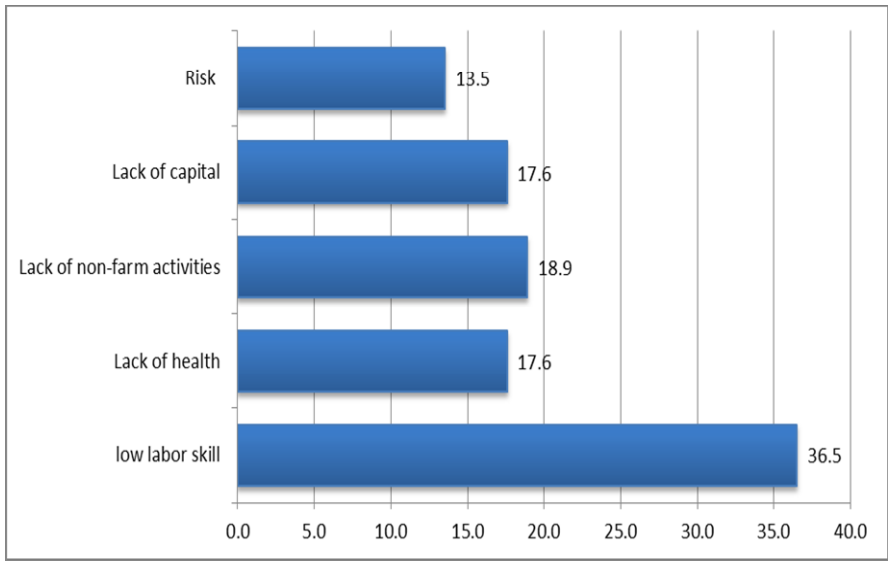
Source: computed from VHLSS data 2006 – 2010 and households survey, 2013

Note: * computed from the survey, 2013

Appendix 5: Percentage of household by income source in three districts surveyed in 2012 (n=74)

Income groups	Cultivation	Raising livestock	Fishery	Forestry	Non-Farm Self-	Salaries and Wages	Others
Poorest	94.7	78.9	15.8	26.3	57.9	36.8	78.9
Second Poorest	100.0	77.8	16.7	16.7	27.8	44.4	77.8
Middle	89.5	68.4	10.5	5.3	36.8	68.4	89.5
Rich	88.9	55.6	22.2	5.6	50.0	66.7	72.2

Note: * computed from the survey, 2013



Appendix 6: The cause of poverty situation in the three districts (% of feedbacks)

Note: * computed from the survey, 2013

QUESTIONAIRE ON HOUSEHOLD SURVEY

Research on income diversification of farm households in Bac Giang province

Number…

A/ GENERAL IMFOMATION

1. The interviewee…… 2. Age: ..... 3. Gender: male/ female

4. Address: Village…….Commune……District…… Province……..

5. Positions in the village / commune.....

6. Phone number.....

7. Type of household

1. Poor household ☐ 2. Nearly-poor household ☐

3. Middle-income ☐ *4.* Rich ☐

8. Total of members in the familiy :……(people)

9. Total of labor of the households:…… ……(people)

In which:

a) Agricultural activities: ……. People
b) Non-agricultural activities …… people
c) Both agricultural and non-agricultural activities ……. People

10. Highest diploma attained of household head: …….

Note: 1. Primary diploma; 2 lower secondary diploma; 3: upper secondary diploma: 4: professional secondary; 5. University, College; 6. Masters and over

11. What is your type of household by economic condition?

1. *Agricultural household*
2. *Agricultural and Non-farm household*
3. *Non-farm household*

B. ACTIVITIES AND ECONOMY OF HOUSEHOLD INCOME

1. In 2012, which **activities do your household have? (Tick X and Fill in the necessary information)**

☐ *Cultivation, detail* .....

☐ Livestock**,** *detail*.....

☐ Fisheries, detail .....

☐ Forestry, detail .....

☐ Non-farm self-employment, detail .....

☐ *Wages/Salary, detail* .....

☐ Others .....

3. How much income did your household earn last year for each activity?

code	**Income Resources**	Income (1000VND)	***Give a mark from 1 to 8*** (1. The first important ; 8.The Less important	**Risks level** 1. Tallest 2. Medium 3. Highest
1	Cultivation			
2	Livestock			
3	Fisheries			
4	Forestry			
5	Non-farm seft employment			
6	Wages/Salary			
7	Others			

4. Please give detail information about cultivation activities?

		In 2008	In 2012		
		yes (1) /no(2)	yes (1) /no(2)	Area (M2)	% commodities
1)	Rice				
2)	Food crops				
3)	Vegetable				
4)	Fruit				
5)	Annual industrial crops				
6)	Perennial industrial crops				

5. Please give detail information about livestock production?

		In 2008	In 2012		
		yes (1)/ no(2)	yes (1)/ no(2)	*Total of livestock (head)*	% commodities for sale
1)	Pigs				
2)	Buffalos, cows				
3)	Horses				
4)	Sheep, goats				
5)	Chicken				
6)	Duck, musk duck, geese				
7)	Others……				

6. Please give detail information non-farm activities

	Activities	yes(1)/ No (2)	Start of implementation	Sustainable level*
1)	Food processing			
2)	Garments, textiles			
3)	Wood , bamboo			
4)	Construction			
5)	Wholesale and retail			
6)	Transport services			
7)	Restaurant services			
8)	Wages activity			
9)	Others……..			

**)1: Risk; 2: Less sustainable ; 3: Sustainable; 4: High sustainable*

C. LAND

Please you describes about agricultural land of your household (2012)

Type of land	a. Area (m^2)	B. uses (1):	c. Increase / decrease or no change over 3 years ago	d. changes (%)
1. annual crops				
- *rice land*				
2. Perennials crops				
3. Water surface				
4. Forest land				
5. Others land…….,				

(1)Forms of land use: 1.Allocated land; 2. Auctioned land; 3. Rented land; 4. Long term use land

(2) The change of land*: 1.* Increase*: 2.* decrease*. 3.* No change

D. CREDIT

1. At present, does your family owe money from anyone (organization / individual?)

☐ *Yes* ☐ *No*

2. If yes, how much money have you borrowed (from all sources) ……VND)

3. Did the loan contribute to expanding your business does not?

☐ *No* ☐ *Yes, those business……*

4. If no, Please give reasons

☐ *No need*

☐ *Did not know information of program*

☐ Register but not be lent

☐ *Did not know to use capital*

☐ The procedure is difficult

☐ High interest rates

☐ *Other: ……..*

E. VOCATIONAL TRAINNING

1. From 2010, have you participated in any vocational training cources?

(Note: extension training is not any vocational training courses*)*

☐ *Yes* ☐ *No*

2. If yes, do you think the training help to increase your income?

☐ *Yes, about …… %* ☐ *No*

3. If No, Why do not you participate **vocational training**?

☐ *No need*

☐ *Did not know information of program*

☐ Register but not be choice

☐ The training does not match the needs

☐ *Not enough money*

☐ *Because busy*

☐ *Other reasons ……..*

F. EXTENSION SERVICES

1. In the last12 month, how many times did you take in extension trainings?

2. Has extension staffs been advised, or encouraged *your household on production?*

☐ *Yes* ☐ *Never*

3. In your option, how do you assess about the quality of extension service at your commune? ***Give a mark from 1 -5 (1: very bad; 5: Very good)***

☐ *1. Very bad*

☐ *2. Bad*

☐ *3. Medium*

☐ *4. Good*

☐ *5. Verry good*

G. ECONOMIC INFRASTRUCTURE - SOCIAL

1. The distance from your house to road …….(m)
2. The distance from your house to the market……(m)
3. The Distance from your house to communal postal …….(m)
4. Percentage of annual agricultural land is irrigated by irrigation system ……..(%)
5. Please assess the effectiveness of some infrastructure below:

TT	INFRASTRUCTURE	***Give a mark from 1 to 5*** (1 = very bad, 5 = very good)
1.	Roads	
2.	Irrigation systems	
3.	Power Systems	
4.	Rural markets	
5.	Post office	
6.	Information system (speakers , radio ...)	

H. CHALLENGES AND RECOMMENDATIONS OF HOUSEHOLD

1. In your opinion, to diversify income resource which factors is necessary (tick x)

☐ *Labor* ☐ Skilled labor ☐ *Land* ☐ capital ☐ Science and technology ☐ good infrastructure (electricity, roads , irrigation , markets ...)	☐ Having farm organization ☐ Manufacturing with contract ☐ *Having non-agricultural firms* ☐ Market information ☐ *Other……*

2. In your opinion, what are the cause of poverty situation and low income in your commune?? (tick X less than three major causes)

☐ No labor skills	☐ Lack of capital to invest
☐ Lack of health	☐ Electricity, traffic
☐ There are no production facilities in the nonfarm business communal	☐ Lack of land
☐ *No* market information	☐ Calamity
☐ Output prices are not stable	☐ *Others*……
☐ Input costs always increases	

3. Do you think that growing from 2-3 different crops will bring more income compared to one kind of plant? ☐ *Yes* ☐ *No*

4. Do you think that more economic activities will have more income compared to one activity? ☐ *Yes* ☐ *No*

5. *Which activities did your household used to do or your household is doing but now they are less* economic efficiency?

☐ *Cultivation*……..

☐ *Livestock* ……

☐ *Non-farm self-employment* ……

☐ *Wages*……..

6. List three major constraints to diversiy income of your household:

Circle 3 major difficulties of households	Describe specific difficulties
1) Credit	……
2) Production land	……
3) Labor skill	……
4) The extension service	……
5) Irrigation systems	……
6) Market information	……
7) Input price	……
8) The quality of animal breed	……
9) Output price low / unstable	……
10)Roads systems	……
11)Disaster / Disease	……
12)Additional job / non-farm	……
13)Market information	……
14)Extension	……
15)Other…….	

7. Which activities does your household continue to do in the next five years?

Code	Economic activities	1. Yes 2. No	Important level 1: Most important 8: Les important	Reason for your plans
1)	Cultivation			
2)	Livestock			
3)	Fisheries			
4)	Forestry			
5)	Non-farm self-employment			
6)	Wages/Salary			
7)	Others			

8. To increase income in the future, which support does your household need from the government?

Pleas click three most important factors	Explain
1) Credit	……
2) Production land	……
3) Labor skill	……
4) The extension service	……
5) Irrigation systems	……
6) Market information	……
7) Input price	……
8) The quality of animal breed	……
9) Output price low / unstable	……
10) Roads systems	……
11) Disaster / Disease	……
12) Additional job / non-farm	……
13) Market information	……
14) Extension	……
15) Other…….	……