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Farmland Acquisition and Household Livelihoods in Hanoi's Peri-Urban Areas

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of the requirements for the degree

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by

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ABSTRACT

While farmland loss (due to urbanisation and industrialisation) causes job losses for a huge number of farmers and threatens food security, it can bring about a wide range of new job opportunities for local people through which they can change their livelihoods and improve their welfare. The literature in Vietnam and some other countries reveals that although there has been much discussion about the mixed impacts of farmland loss on rural household livelihoods, none of these impacts has been quantified thus far. This thesis is the first study to use econometric methods for quantifying the various impacts of farmland loss on households' livelihood strategies and outcomes.

Using survey data from 477 randomly sampled households in 6 communes in a peri-urban district of Hanoi, several regression models were used to examine how and to what extent farmland loss has affected rural household livelihoods in Vietnam. Specifically, three key relationships were considered and tested: (i) the relationship between farmland loss and household livelihood strategies; (ii) the relationship between farmland loss and household livelihood outcomes (income and consumption expenditure); and (iii) the relationship between farmland loss and household income shares by source.

It was found that farmland loss has a positive impact on the choice of non-farm work-based strategies, notably the informal wage work-based strategy. Given the impact of farmland loss, households' income shares actually diversified into non-farm sources, especially informal wage income. Interestingly, the results indicate that farmland loss, coupled with compensation, has no negative impact on livelihood outcomes (neither income nor consumption expenditure per capita). Possibly this can be explained by the fact that a number of households used part of their compensation money for smoothing consumption. In addition, income earned from jobs outside of farming might compensate for or even exceed the loss of farm income due to the loss of farmland. This suggests that farmland loss can have an indirect positive effect on livelihood outcomes (through its positive effect on non-farm participation).

This thesis makes several key contributions. Firstly, with a combination of an adapted analytical framework and appropriate econometric models, this study provides a proper approach for studies of the relationship between farmland loss and rural household livelihoods. Secondly, it provides the first econometric evidence for the links between farmland loss and household livelihood strategies and outcomes. Finally, based on the empirical results, this study proposes valuable policy recommendations for mitigating negative impacts of farmland loss on rural households and helping them achieve better livelihood outcomes.

NOTES ON PUBLICATIONS

A number of conference papers and journal articles have been produced from this thesis as follows. In all of these publications I was the lead author.

Tuyen, Tran and Lim, Steven. (2011). Farmland acquisition and livelihood choices of households in Hanoi's peri-urban areas. *Economic Bulletin of Shenshu University*, *46(1),* 19-48. (This paper was based on some material in Chapter Four.)

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LIST OF ABBREVIATIONS

ADB	The Asian Development Bank
DARE	The Deagrarianisation and Rural Employment
CIEM	Central Institute for Economic Management
DFID	Department for International Development, UK
FDI	Foreign Direct Investment
FLM	Fractional Logit Model
FMLM	Fractional Multinomial Logit Model
GSO	General Statistical Office, Vietnam
GMM	Generalised Method of Moments
IFPRI	International Food Policy Research Institute
IV	Instrumental Variable
LLHHs	Land-Losing Households
LIML	Limited Information Maximum Likelihood
MLM	Multinomial Logit Model
MONRE	Ministry of Natural Resources and Environment
NLLHHs	Non-Land-Losing Households
ODA	Official Development Assistance
OLS	Ordinary Least Squares
ROSCAs	Rotating Saving and Credit Associations
2SLS	Two Stage Least Squares
UNs	United Nations
VARHS	Vietnam Access to Resources Household Survey
VBSP	Vietnam Bank for Social Policies
VHLSS	Vietnam Household Living Standard Survey
VND	Vietnam Dong
WB	The World Bank

CHAPTER ONE: INTRODUCTION

1.1 Background of land acquisition in Vietnam

Following periods of slow economic growth, decreased food production, and the risk of famine as a consequence of having pursued a collective agriculture system, Vietnam has made a number of reforms since 1986 to change itself from a centrally planned to a market-oriented economy. The reform (Đổi Mới) not only dissolved collective farms but also granted land use rights to farm households (Kirk & Nguyen, 2009). The first Land Law of 1987 recognised the land use rights of households and individuals. Since the second Land Law was promulgated in 1993, farmers' long-term and stable use of agricultural land has been secured (Nguyen, 2012). By 1999, more than 10 million households had been granted land use certificates (LUCs) for agricultural land, accounting for 87 percent of agricultural households and 78 percent of agricultural land in Vietnam (ANZDEC Limited, 2000).

Similar to the second Land Law of 1993, the third Land Law of 2003 (the current Land Law of Vietnam) continues to confirm that land is not privately owned because it is the collective property of the entire people, which is representatively owned and administrated by the State, but that land use rights are to be granted to individuals, households, enterprises and other organisations. Such rights include the rights to exchange, transfer, inherit, lease or mortgage land and use land as a capital contribution (National Assembly of Vietnam, 2003). It should be noted that land acquisition is the only way to take land for projects in Vietnam (Thien Thu & Perera, 2011). Prior to the Land Law of 2003, the compulsory acquisition of land by the State was the only way to take land for projects. However, the Land Law of 2003 proposed a new method of land acquisition, which is voluntary land conversion based on a voluntary agreement between project investors and land users (the World Bank (WB), 2011a).[1]

[1] Land conversion means a process through which land (agricultural, urban or residential land, etc) is acquired compulsorily or voluntarily from land users (households, individuals or organizations) for projects.

Compulsory land acquisition is applied to cases in which land is acquired for national or public projects; for projects with 100 percent contribution from foreign funds (including FDI (Foreign Direct Investment) and ODA (Official Development Assistance)); and for the implementation of projects with special economic investment such as building infrastructure for industrial and services zones, hi-tech parks, urban and residential areas and projects in the highest investment fund group (WB, 2011a). Voluntary land conversion is to be used in cases of land acquisition for investment projects by domestic investors that are not subject to compulsory land conversion, or where the compulsory acquisition of land can be carried out but the investors volunteer to acquire land for their projects through a mutual agreement between the investors and the land users (WB, 2011a).

According to the current Land Law, for land-users whose land is compulsorily acquired, a general principle is to provide adequate assistance so that they can find new jobs, recover their livelihoods and be compensated for income loss. In practice, the greatest problem is the lack of opportunities for farmers to transfer jobs and recover livelihoods. This is because farmers might not meet the necessary qualifications requirements for non-agricultural jobs, and the local government and the investor may not be active in searching for a practical solution to this issue (WB, 2011a). According to Decree 17/2006/ND-CP by the Government of Vietnam, in the acquisition of agricultural land from farmers, farmers must be compensated with other types of cultivable land, and cash compensation is the last option. In the event of having no more cultivable land available for compensation, the provincial authority can compensate farmers by providing a plot of land suitable for use in carrying out services, such as running a small business or a boarding house, which provides farm households with conditions to change their livelihoods. If cash compensation is the only choice, the provincial government must have specific planned solutions for job assistance to farmers (General Department of Taxation, 2006). In some localities, the provincial authority compensates farmers who lose more than 30 percent of their farmland with a plot of commercial land close to industrial zones or residential land in urban areas. This compensation with "land for land" has been successfully implemented in some localities, while others do not believe in the appropriateness

of this policy because more agricultural land needs to be converted to nonagricultural land (WB, 2011a).

When land is acquired compulsorily for a project, farmers will receive direct compensation from investors (compensation for the loss of land, crops and assets attached to the area of acquired land, job transfer, etc). Some additional assistance is also provided by the city/provincial government in the form of job transition training courses, agricultural extension and new job introduction services (Nguyen, Nguyen, Nguyen, Pham, & Nguyen, 2005). Subject to Decree 197/2004/ND-CP dated 03/12/2004, compensation for land loss will be based on the land area and land category (residential, nonagricultural, or agricultural land) involved. As indicated in this Decree, the land prices applied to the compensation will be decided by the Province People's Committee at the time of making the decision on land acquisition (The Government of Vietnam, 2004). In fact, however, there is a large gap between the compensation level defined by the government guidelines and that determined by market principles (Han & Vu, 2008). Such compensation is unsatisfactory to many farmers because the compensation price is often much lower than the real value of the land, leading to a boom in complaints about land acquisition in Vietnam (Thien Thu & Perera, 2011). This topic, however, is beyond the scope of this study.

In the remainder of this thesis, the term "*land loss*" also means *farmland loss*, and households whose farmland was lost partly or totally by the State's the farmland acquisition are called *land-losing households* (LLHHs). Households whose farmland was not taken by this policy are called *households without land loss* or *non-land-losing households* (NLLHHs). In addition, the term "*land-losing households*" will be interchangeably used with the term "*households with land loss*" in this study.

1.2 Statement of the problem

By 2009, Vietnam has a total area of around 33 million hectares and a population of 86 million. With less than 0.3 hectares of land per capita, Vietnam is one of the countries with the lowest land endowment per person (WB, 2011b). Nevertheless, the combination of fertile land, favourable weather conditions and an abundant

labour force enables the country to assure national food security and succeed in exporting a number of crucial agricultural products such as rice, rubber, cashews, coffee and pepper. As a result, in Vietnam's rural areas, which represent three-quarters of the total population and most of the poor, agricultural production is the main living for more than half of the total workforce (WB, 2011b).

The conversion of agricultural land to non-agricultural uses is a common way to provide space for urbanisation and industrialisation and is, therefore, an almost unavoidable tendency during phases of economic development and population growth (Tan, Beckmann, Van Den Berg, & Qu, 2009). In Vietnam over the past two decades, escalated industrialisation and urbanisation have encroached on a huge area of agricultural land. Despite this, there are no accurate statistical data on the total area of land, especially the area of farmland, that has been acquired by the State since the early 1990s (Nguyen, 2009a). Le (2007) calculated that, from 1990 to 2003, 697,417 hectares of land were taken for the construction of industrial zones, urban areas and infrastructure and other national use purposes. In the period from 2000 to 2007, about half a million hectares of farmland were converted for non-farm use purposes, accounting for 5 percent of the country's farmland (VietNamNet/TN, 2009).

Agricultural land is of great importance to the livelihood of the majority of the Vietnamese rural population, especially unskilled labourers. In 2011, about 60 percent of the labour force was engaged in agriculture, of which 11.2 percent were skilled workers (GSO, 2011). Therefore, farmland acquisition has a major effect on poor households in Vietnam's rural and peri-urban areas (the Asian Development Bank (ADB), 2007). On average, the loss of 1 hectare of farmland will cause job loss for 13 farmers, and the figures are much higher in the Red River Delta (15.53) and Hanoi (20) (Huyen Ngan, 2009). Consequently, in the period 2003-2008, it was estimated that the acquisition of agricultural land considerably affected the livelihood of 950,000 farmers in 627,000 farm households. About 25-30 percent of these farmers became jobless or had unstable jobs and 53 percent of the households suffered from a decline in income (VietNamNet/TN, 2009).

Land acquisition directly and indirectly affects livelihood choices by creating new non-farm employment opportunities and livelihood asset changes, respectively. However, apart from a number of rural households who attain benefits from this process because such households have enough resources or take full advantage of urbanisation to obtain better livelihoods, many other households have become jobless, vulnerable and have precarious livelihoods even after receiving a significant amount of money as compensation for their land loss. In practice, farmland acquisition has resulted in distinct impacts on households. As indicated in ADB (2007), approximately 60 percent of land-losing households received favourable opportunities for non-farm employment, improved infrastructure, and a significant amount of compensation money for losing land. Nevertheless, this process resulted in the interruption of economic activities, a decrease in or loss of income, and life upset in a large number of other households. Other figures drawn from a recent survey on the reality of employment and income of those whose land was converted for urban and industrial expansion in the 8 provinces having the highest urbanisation rate in Vietnam after land acquisition, displayed a picture of 8 percent unemployment increase, 18.17 percent decline in farm jobs, and only 2.8 percent job growth for each of the industrial and trade sectors, while the number of wage-employment earners and those doing other jobs rose by 6.7 percent (Le, 2007).

Increasing urban population and rapid economic growth, particularly in the urban areas of Vietnam's large cities, have resulted in a great demand for urban land. In practice, there has been an intensive conversion of agricultural land into higher value nonagricultural land, especially in the urban peripheries. In the 1993-2008 period, about half of a million hectares of farmland was converted to urban, industrial or commercial land (WB, 2011b). In order to satisfy the rising land demand for urban expansion and economic development in the Northern key economic region[2], most farmland acquisitions have taken place in the Red River Delta, which has a large area of fertile agricultural land, a prime location and high population density (Hoang, 2008). Taking Hanoi as an example, according to its land use plan for 2000-2010, 11,000 hectares of land - mostly annual crop land -

[2] This key economic region includes Hanoi, Hai Phong, Vinh Phuc, Bac Ninh, Hung Yen, Quang Ninh, and Hai Duong.

was taken for 1,736 projects related to industrial and urban development. (Nguyen, 2009a). Consequently, the encroachment of farmland at such a large scale has raised special concerns about rural household livelihoods. This farmland conversion would cause the loss of agricultural jobs of 150,000 farmers (Nguyen, 2009a). Moreover, thousands of households have been anxious about a new plan for massive farmland acquisition for the expansion of Hanoi to both banks of the Red River by 2020. This plan will induce about 12,000 households to relocate and nearly 6,700 farms will be removed (Hoang, 2009).

In the setting of accelerating conversion of farmland for urbanisation and industrialisation in the urban fringes of large cities, a number of studies in Vietnam have addressed the question of how farmland loss has affected rural household livelihoods. The studies have mostly used either qualitative or descriptive statistics methods (Do, 2006; Le, 2007; Nguyen, Vu, & Philippe, 2011; Nguyen, 2009b; Vo, 2006). In general, almost all of these studies indicate that while the loss of agricultural land causes the loss of traditional agricultural livelihoods and threatens food security, it can also bring about a wide range of new opportunities for households to diversify their livelihoods and sources of wellbeing.

Negative impacts of farmland loss are not confined to Vietnam. They have been found elsewhere, for example in China (Chen, 2007; Deng, Huang, Rozelle, & Uchida, 2006; Xie, Mei, Guangjin, & Xuerong, 2005) and in India (Fazal, 2000, 2001). Nevertheless, other studies show positive impacts of farmland loss on rural livelihoods in China (Chen, 1998; Johnson, 2002; Parish, Zhe, & Li, 1995) and Bangladesh (Toufique & Turton, 2002). Although there has been much discussion in the available literature about the mixed impacts of farmland loss on rural household livelihoods, no econometric evidence of these impacts has been provided thus far. My study, therefore, is the first attempt to apply an econometric approach to answer the key research questions: *how, and to what extent, has farmland loss had affected households' livelihood strategies and outcomes in Vietnam?* My study focuses on Hanoi's peri-urban areas, which have been experiencing a massive farmland conversion for urbanisation and industrialisation in recent years.

1.3 Significance of the research

This thesis provides the first econometric evidence for the impact of land loss on households' livelihood strategies and outcomes. In addition, this study was conducted in the specific context of Hanoi's peri-urban areas, which have not been adequately studied. To fulfill this study, a quantitative livelihood approach was combined with the framework of the rural sustainable livelihood approach. By combining these approaches, the study makes the following significant contributions:

1.3.1 Implications for methodology

Firstly, the rural sustainable livelihood framework was applied and adapted as an analytical framework for analysis that best fitted the context of this case study. Based on this framework a set of indicators concerning livelihoods were identified that helped to collect quantitative data at the household level. This study was the first to use appropriate econometric models for examining various impacts of land loss on households' livelihoods. Secondary data were also gathered to provide insight into the local historical and institutional context that affects household livelihoods. With a combination of an adapted analytical framework and appropriate econometric models, this study provides a proper approach for studies on the impact of land loss on rural household livelihoods, making a significant contribution to the existing methods for conducting studies of rural livelihoods.

1.3.2 Implications for understanding

This study provides the first econometric evidence of the impacts of land loss on households' livelihood strategies and outcomes. The findings of this case study of Hanoi's peri-urban areas can be seen as valuable to other regions in Vietnam as well as to other developing countries which are similar in socio-economic characteristics. Thereby, the study contributes new perspectives concerning the relationship between farmland and rural households' livelihoods, given the context of farmland shrinking in Vietnam and other developing countries.

1.3.3 Implications for policy makers

This case study of Hanoi's peri-urban areas was conducted using a survey to investigate and assess the impacts of agricultural land loss on households' livelihoods. The research will provide policy makers, researchers, and the authorities with a better understanding of the impacts of land loss on rural livelihoods. This study, therefore, provides valuable policy recommendations for mitigating the negative influences of farmland loss on rural people and helping them achieve better livelihood outcomes.

1.4 Research objective

My research objective was to investigate the impacts of farmland loss (due to urbanisation and industrialisation) on households' livelihood strategies and outcomes in the context of Hanoi's peri-urban areas. Accordingly, the specific research objectives addressed were:

1. To analyse the various forms of livelihood assets and identify distinct livelihood strategies among households.
2. To examine the impact of land loss on livelihood choices of households.
3. To examine the impact of land loss on livelihood outcomes of households.
4. To investigate the impact of land loss on household income shares.
5. To analyse the relationship between income inequality and income shares by source, given the context of accelerating acquisition of farmland in Hanoi's peri-urban areas.
6. To make policy recommendations for improving households' livelihoods, given the diverse impacts of land loss.

1.5 Background of the case study

1.5.1 Description of the study area

My research was conducted in Hoai Duc, a peri-urban district of Hanoi (see Figure 1.1 and Figure 1.2). Before 1st August 2008, Hoai Duc was a district of Ha Tay Province, a neighbouring province of Hanoi Capital, which was merged into Hanoi on 1st August 2008. The district occupies 8,247 hectares of land, of which

agricultural land accounts for 4,272 hectares: 91 percent of this area is used by households and individuals (Hoai Duc District People's Committee, 2010a). There are 20 administrative units in the district, including 19 communes and 1 town. Hoai Duc has around 50,400 households with a population of 193,600 people. In the whole district, employment in the agricultural sector dropped by around 23 percent over the preceding decade. Nevertheless, a significant proportion of employment has remained in agriculture, accounting for around 40 percent of the total employment in 2009. The corresponding figures for industrial and services sectors are 33 percent and 27 percent respectively (Statistics Department of Hoai Duc District, 2010). Prior to its transfer to Hanoi, Hoai Duc was the richest district in Ha Tay Province (Nguyen, 2007). In 2009, Hoai Duc GDP per capita reached 15 million VND per year (Hoai Duc District People's Committee, 2010b), which is less than half of Hanoi's average (32 million VND per year) (Vietnam Government Web Portal, 2010).[3]

Of the districts of Hanoi, Hoai Duc has the biggest number of land acquisition projects and has been experiencing a massive conversion of farmland for non-farm uses (Huu Hoa, 2011). Hoai Duc is located on the northwest side of Hanoi, 19 km from the Central Business District (CBD) (WB, 2011c). The district has an extremely favourable geographical position, surrounded by various important roads, namely Thang Long highway (the country's biggest and most modern highway) and National Way 32, and is in close proximity to industrial zones, new urban areas and Bao Son Paradise Park (the biggest entertainment and tourism complex in North Vietnam). Consequently, a huge area of agricultural land in the district has been taken for the above projects in recent years. In the period 2006-2010, around 1,560 hectares of farmland were acquired for 85 projects (LH, 2010).

[3] 1 USD equated to about 18,000 VND in 2009.

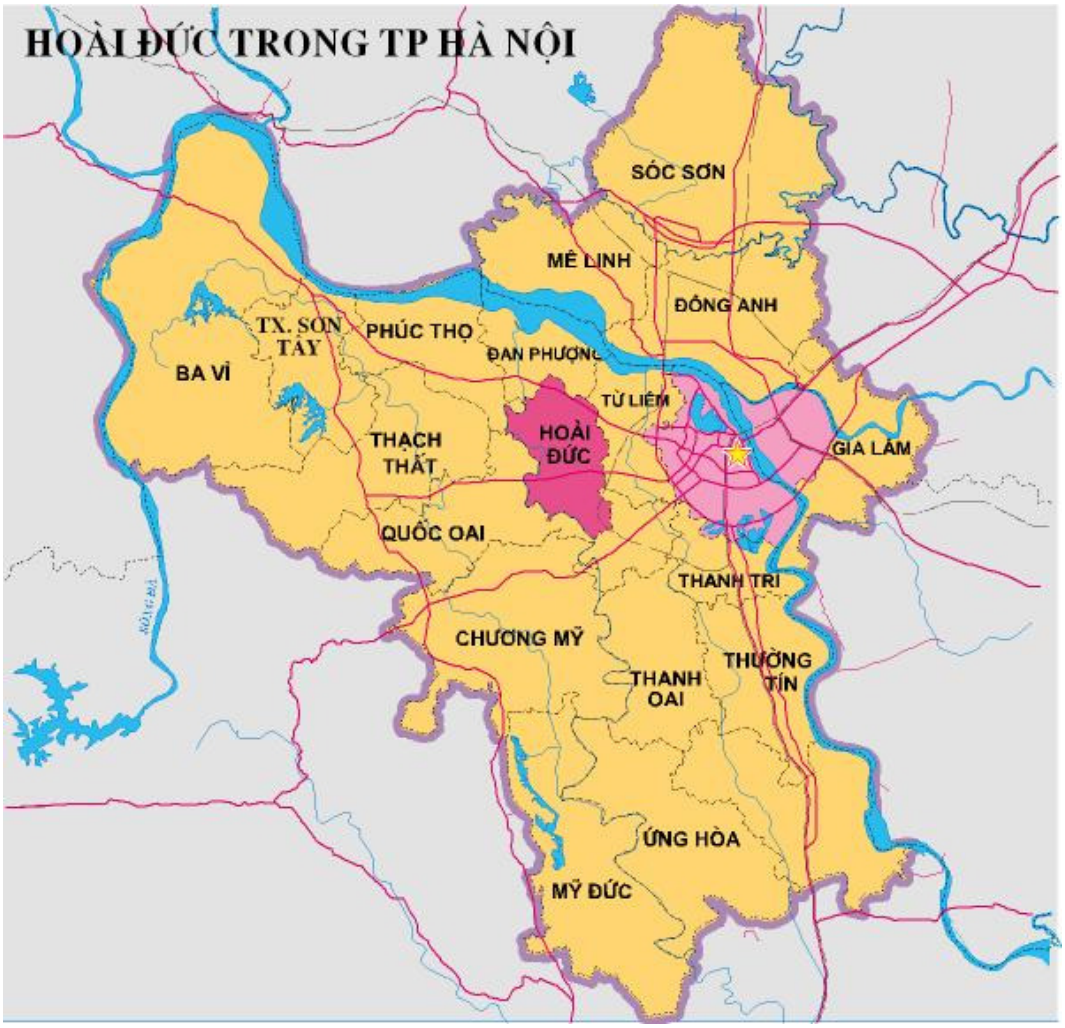

Figure 1.1: Map of Hanoi, Vietnam (Thuy, 2011b)

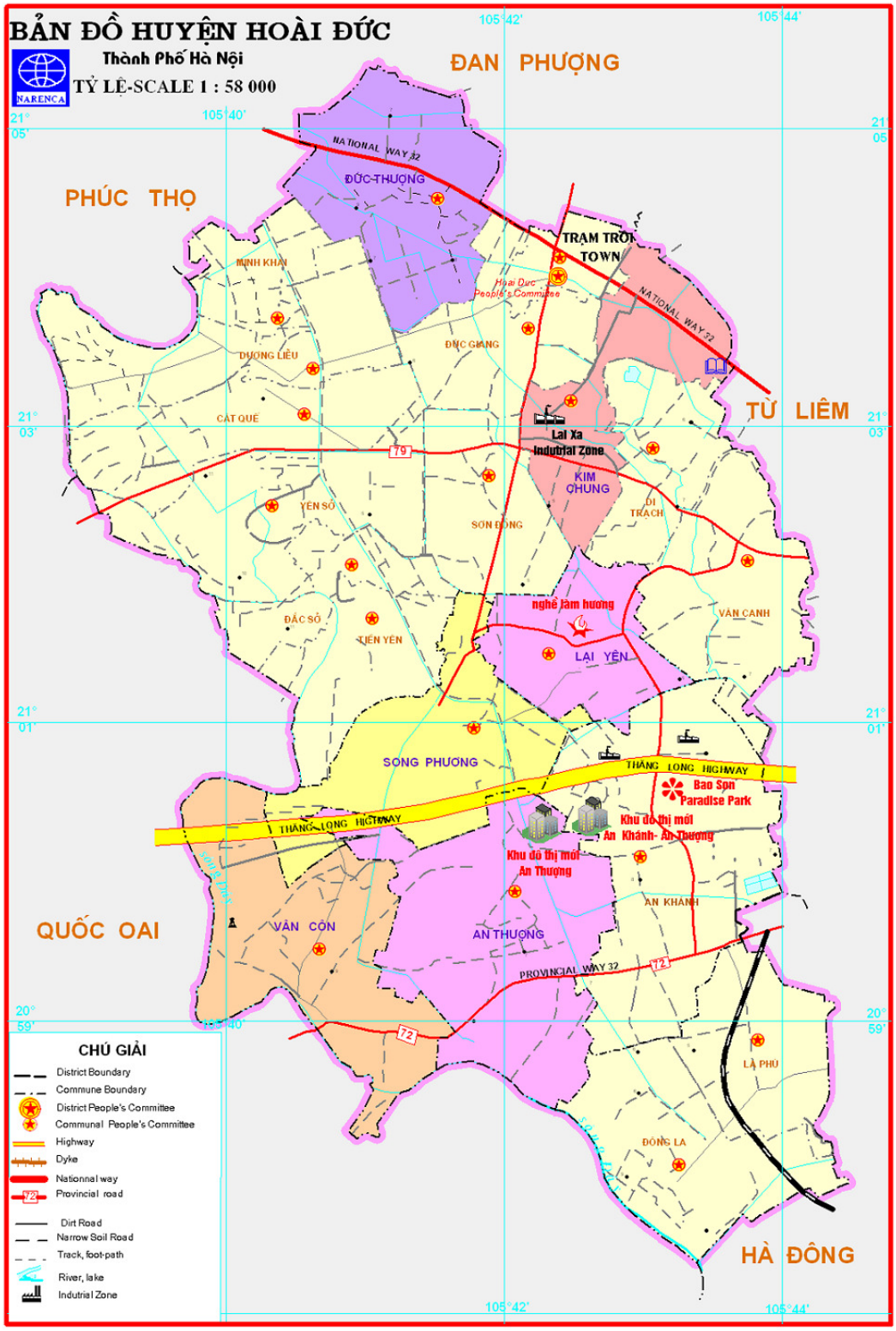

Figure 1.2: Administrative Map of Hoai Duc District, Hanoi (Thuy, 2011a)

1.5.2 Compensation policies for land-losing households

According to Decision 289/2006-QĐ-UB, issued by Ha Tay Province People's Committee, apart from compensation for the area of lost land due to the State's land acquisition, households will receive other payments. These include support for relocation and job generation, support for those whose lost land adjacent to Hanoi City, and other support (Ha Tay Province People's Committee, 2006). In general, the compensation for 1 Sào (360 m^2) of agricultural land in Ha Tay was about 45,700,000 VND in 2008 (Truong Giang, 2008)[4]. In addition, households receive payments for the existing property attached to land and for expenses invested in the area of lost land (Ha Tay Province People's Committee, 2008a).

Also, Ha Tay Province People's Committee issued the Decision 1098/2007/QĐ-UB and Decision 371/2008/QĐ-UB, which states that a plot of commercial land or *"land for services"* will be granted to households who lose more than 30 percent of their agricultural land. Each household receives an area of *"land for services"* equivalent to 10 percent of the area of farmland that is taken for each project (Hop Nhan, 2008). Thanks to this compensation with "land for land", land-losing households will have not only an extremely valuable asset[5] but also a potential new source of livelihood, particularly for elderly land-losing farmers. This is because *"land for services"* can be used as business premises for non-farm activities such as opening a shop or workshop, or for renting to other users.

1.6 Outline of the thesis

The remainder of the thesis is organized as follows:

Chapter 2 reviews various definitions, terms and frameworks related to the sustainable livelihood approach. The chapter also presents a general literature review on the relationship between land and livelihoods. Specifically, this chapter

[4] 1 USD equated to about 17,000 VND in 2008.

[5] The prices of *"land for services"* in some communes of Hoai Duc District ranged from 17,000,000 to 35,000,000 VND per m^2 in 2011, depending on the location of the commercial land plot (Minh Tuan, 2011) (1USD equated to about 20,000 VND in 2011). Note that farmers have already received the certificates which confirm that *"land for services*" will be granted to them but they have not yet received "land for service". However, these certificates have been widely purchased (Thuy Duong, 2011).

focuses on studies about the impact of land loss (due to urbanisation and industrialisation) on rural household livelihoods in Vietnam.

Chapter 3 first provides a detailed description of data collection. In addition, it gives a brief description of data analysis methods but a fuller and more specific description will be given in each chapter. This chapter also provides a detailed picture of households' livelihood assets, and identifies different livelihood strategies that households pursued before and after the farmland acquisition. Furthermore, the differences in means of values between two or more groups of households are also examined.

Chapter 4 examines the determinants of households' livelihood strategy choice, including the impact of land loss and other factors on household activity choice.

Chapter 5 examines factors affecting households' livelihood outcomes. It specifically measures the impact of land loss, livelihood choice and other related-asset variables on household income and expenditure.

Chapter 6 first investigates the effect of land loss on households' farm income share. Then, the chapter examines the effect of land loss on households' various non-farm income shares. Finally this chapter analyses the link between income inequality and income sources using a Gini decomposition analysis of income inequality by source.

Chapter 7 presents the conclusions. The shortcomings of the thesis are also discussed to propose some avenues for future research on this topic.

CHAPTER TWO: LITERATURE REVIEW

This chapter presents a brief review of the literature concerning land and rural livelihoods. It begins by looking at definitions and the framework of the rural sustainable livelihood approach. This is followed by a review of the relationship between land and rural livelihood and a discussion about the impacts of land shrinking and land loss on rural livelihoods in Vietnam and other developing countries.

2.1 Conceptual framework

2.1.1 Livelihood and sustainable livelihood

The term "livelihood" is defined in many ways. According to Chambers and Conway "A livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living." (Chambers & Conway, 1992, p. 6) and they also indicate that "Livelihood in its simplest sense is a means of gaining a living" (Chambers & Conway, 1992, p. 5). In addition, a livelihood can be conceptualised as consisting of five types of capitals (natural, physical, human, financial and social capital), the activities, and the approach to these capitals (mediated by other factors such as institutions and social relationships) that together decide the living of the individual or household (Ellis, 2000).

"A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base" (Department for International Development (DFID), 1999b, p. 1). In elaborating on sustainability, Chambers and Conway divided this term into environmental and social sustainability. The former is used in reference to the external influence of livelihood on other livelihoods while the latter concerns the internal ability to deal with outside pressures (Chambers & Conway, 1992).

Scoones indicates that the concept of sustainable livelihood engenders a wide range of debates about the relationship between poverty and environment and

little existing literature has clarified the contradictions and trade-offs between them (Scoones, 1998). Starting from this point, Scoones (1998) proposed five elements to consider in determining whether a livelihood is sustainable or not. These include the number of working days, poverty reduction, wellbeing and capabilities and the last two elements for assessment of sustainability, namely livelihood adaptation, vulnerability and resilience and natural resource base sustainability.

2.1.2 Livelihood resources or livelihood assets

According to the above definitions, livelihood assets include tangible and intangible assets. Sometimes such assets can be seen as material and social resources and these resources are the combination of different types of capital. As pointed out by Scoones (1998), the ability to adopt various livelihood strategies is based on the material and social assets that people own. DFID (1999b) identifies five assets constituting livelihood resources, namely human, financial, physical, natural and social capitals.

Human capital:

According to DFID: "Human capital represents the skills, knowledge, ability to labour and good health that together enable people to pursue different livelihood strategies and achieve their livelihood objectives." (DFID, 1999a, p. 7). In brief, human capital can be measured as the level of education and health state of individuals and population (Ellis, 2000). At the household level, this capital is a component of the quantity and quality of family labour available. Furthermore, this asset also varies with the size of household, skill levels and health status, etc (DFID, 1999a). Among livelihood capitals, human capital seems to play an important role since it promotes the effective use of other types of capital and should be considered a decisive factor. Any changes in human capital will result in transformation of other assets and therefore must be considered as a supportive factor for other livelihood capitals (Kollmair & Gamper, 2002). Scoones also emphasised that human capital is a crucial factor for success in pursuing various livelihood strategies (Scoones, 1998).

Social capital

Social capital is defined as "the social resources upon which people draw in pursuit of their livelihood objectives." (DFID, 1999a, p. 9). In addition, Ellis indicates that this capital refers to networks and associations in which people engage and from which they can receive assistance for their livelihoods (Ellis, 2000).

Social capital is developed through networks and connections; membership of more formalised groups and relationships of trust, reciprocity and exchanges (DFID, 1999a). Thus, as pointed out by DFID (1999a), in many ways social capital brings about several positive effects. For instance, through networks and connections, people raise their belief and ability to co-operate and broaden their approach to wider institutions, such as political or civic organisations. Consequently, by enhancing the performance of economic relationships, social capital can improve people's income and savings. In addition, being a member of a formalised group forces people to adhere to common rules, norms and regulations, which can mitigate "free rider" issues related to public goods. In certain situations social capital may help with mitigating shocks and compensating for shortages in other capitals (DFID, 1999a). Therefore, people utilise the networks to lower risk, access services, defend themselves from distress, and gain information to reduce transaction costs (Frankenberger, Drinkwater, & Maxwell, 2000). Conversely, in some cases, social capital may cause negative effects. For instance, membership may exclude non-members from access to opportunities and resources, which disadvantages outsiders (DFID, 1999a). Moreover in a stringently hierarchical network, a lower hierarchical member may be at a disadvantage (Kollmair & Gamper, 2002).

Natural capital

"Natural capital is the term used for the natural resource stocks from which resource flows and services (e.g. nutrient cycling, erosion protection) useful for livelihoods are derived" (DFID, 1999a, p. 11).

In fact, there are a variety of factors that constitute natural capital, ranging from intangible public goods such as the atmosphere and biodiversity to tangible assets such as soil, plants, etc that can be directly used for production (DFID, 1999a). In short, natural capital is composed of the land, water and biological resources that are exploited by people to create a means of living (Ellis, 2000). Obviously, natural capital is most important to those whose livelihood strategies depend partially or totally on natural resources such as fishing, farming, forestry, mineral extraction, and ecological tourism (DFID, 1999a; Kollmair & Gamper, 2002).

Physical capital

"Physical capital comprises the basic infrastructure and producer goods needed to support livelihoods" (DFID, 1999a, p. 13). Hence, this capital has a wide range of components, including affordable transport; secure housing; sufficient water provision and sanitary conditions; clean and affordable energy; and access to information (DFID, 1999a; Kollmair & Gamper, 2002). In addition, Ellis (2000) indicates that physical assets include capital that is created by processes of economic production. Therefore buildings, irrigation systems, roads, machines, equipments, tools and so on are physical capital. Also, looking at physical capital from an economic angle, this capital is denoted as a producer good as opposed to a consumer good.

Physical capital is important to livelihoods since with poor infrastructures such as roads, rail, telecommunications, and irrigation people suffer from high costs of transport, lower productivity and difficulties in exchanging goods. Without access to services such as water, energy, and sanitation, human health may deteriorate (DFID, 1999a; Kollmair & Gamper, 2002). At the household level, physical capital comprises equipment and tools that can be used to work more productively (DFID, 1999a). Moreover, households' physical capital also includes other assets such as livestock, vehicles and housing (Jansen, Pender, Damon, & Schipper, 2006). Rural households who do not have productive assets such as buffalo, horses, tractors, and water pumps will have to use their human physical strength, spending more time on hard work and therefore functioning less productively.

Financial capital

"Financial capital denotes the financial resources that people use to achieve their livelihood objectives" (DFID, 1999a, p. 15) This capital consists of two main sources: available stocks and regular inflows of money. The first source exists in the form of cash, bank deposits and other liquid assets such as jewellery and livestock. Financial capital can also be obtained through credit institutions. The second source is received from pensions, transfers from state and remittances (DFID, 1999a; Kollmair & Gamper, 2002). As briefly defined by Ellis (2000), financial capital concerns stocks of money which the household can access and this capital is most likely to be savings, and access to credit in the form of loans.

In comparison with other types of capital, financial capital is the most flexible since it can be easily converted into other capitals and furthermore it can be used to immediately obtain desired livelihood outcomes (Kollmair & Gamper, 2002). While financial capital is vital for the adoption of any livelihood strategies (Scoones, 1998), this capital seems to be the least available to the poor and so other types of livelihood assets are important to them (DFID, 1999a).

2.1.3 Transforming structures and processes

"Transforming structures and processes within the livelihoods framework are institutions, organisations, policies and legislation that shape livelihoods". (DFID, 1999a, p. 17). They affect all levels, from the international, national, and regional to communities and households (DFID, 1999a; Keeley, 2001; Kollmair & Gamper, 2002). Consequently, at the household level, transforming structures and processes effectively determine access to different types of capital, livelihood choices, exchange between various types of livelihood assets, and returns to livelihood strategies (DFID, 1999a).

2.1.4 Livelihood strategies

Livelihood strategies can be defined as the range and combination of activities and choices that people pursue in order to achieve their livelihood objectives (Kollmair & Gamper, 2002). According to Scoones (1998), livelihood strategies can be identified at different levels, ranging from the individual, household, and

village level, to regional and even national levels. Ellis (2000) defines a household livelihood strategy as a combination of activities that create the means of household survival.

For research or policy work, classification of livelihood strategies may be useful. For example, Scoones (1998) categorises three strategy types, comprising extensive and intensive farming, livelihood diversification, and migration, which can be usefully applied to analyse rural livelihoods in practice. People's access to different levels and combinations of livelihood capitals probably has a considerable effect on their choice of livelihood strategies. In addition, although different livelihood strategies require different conditions, the common rule is that those who are abundantly endowed with assets are more likely to make better livelihood choices (DFID, 1999a).

2.1.5 Livelihood outcomes

Livelihood outcomes are achievements or outputs of livelihood strategies which can be measured by various indicators, such as income, wellbeing, vulnerability, food security and sustainability of environmental resources (DFID, 1999a).

Such indicators themselves indicate whether a livelihood is sustainable or not. However, Scoones asserts that these five indicators are quite distinct in scope, and can be measured using a wide range of criteria, from precisely quantitative assessments to diffuse indicators with qualitative measures (Scoones, 1998). Ellis notes that "…the composition and level of individual and household income at a given point in time is the most direct and measureable outcome of the livelihood process." (Ellis, 2000, p. 10). Furthermore, Ellis suggests that it is useful to decompose total household income into various categories and sub-categories of income sources or activities. Such decompositions enable one to identify different attributes of the resources that are required to create different income sources.

2.1.6 Vulnerability context

"The vulnerability context refers to the seasonality, trends and shocks that affect people's livelihoods" (DFID, 1999c, p. 1). The vulnerability context is important

since it has a direct effect on people's livelihood asset status and enables them to obtain profitable livelihood outcomes (DFID, 1999a).

The vulnerability context comprises various trends (population, resource, economic, political, and technological trends), shock (natural hazards, economic shocks, diseases, wars, conflicts) and seasonality (prices, climate variation, seasonal employment). Vulnerability is caused by many factors, some of which are associated with policies, institutions and a lack of livelihood capitals, rather than with specific trends, shocks or seasonal aspects (DFID, 1999c). It should be noted that such trends are not always negative nor cause vulnerability. For instance, technological trends may promote productivity, and seasonal fluctuations in prices can result in favourable outcomes (DFID, 1999a; Kollmair & Gamper, 2002).

2.2 Land and rural household livelihoods

2.2.1 Land and rural livelihoods in developing countries

In the poor world, where most people rely largely on agricultural production, land becomes the crucial livelihood asset. In almost developing countries, agricultural production plays a crucial role in growth, employment and livelihoods (DFID, 2002b). Therefore, land and rural livelihood have been topics of interest for researchers and development practitioners. As concluded by Deininger and Feder (1999, p. 1): "In agrarian societies land serves as the main means for not only generating livelihood but often also for accumulating wealth and transferring it between generations." For this reason, land continues to play a key role in the livelihood strategies of rural people and land change will result in significant impacts on their livelihoods.

In a consultation document regarding the role of land in poverty eradication, DFID (2002b) asserts that land is a basic livelihood asset since it provides shelter and food and all other livelihood activities rely on it. The document also states that the contribution of land to sustainable economic growth is through the productivity and efficiency of land use in agriculture, industries and services. Furthermore, this resource helps achieve higher equality by improving the poor's

access to land security and mitigating vulnerability for the poor by securing their rights to land. Moreover, for farmers, land and their investment in it becomes the most valuable unique asset. Therefore the ability to use their land in many ways, not only farming but also selling or leasing, provides a safety net for those who are unable to cultivate the land themselves. However, while discussing the role of land policy in poverty alleviation, the document notes that secure, safe and accessible land is an essential but not always sufficient condition for poverty reduction, and land policy reform must be accompanied by improved access to services (education, health, transport, finance, etc), technology and markets. Therefore, DFID suggests that improvement of land access is vital for the poor if they are to contribute to and benefit from economic growth (DFID, 2002b).

Due to the importance of land to rural livelihoods, a huge number of studies have investigated the relationship between land and rural livelihoods in developing countries (e.g., Bryceson, 1996; DFID, 2002b; Griffin, Khan, & Ickowitz, 2002; Jansen, Pender, Damon, Wielemaker, & Schipper, 2006; Mattingly, 2009; Rigg, 2006; Shackleton, Shackleton, Buiten, & Bird, 2007; Shackleton, Shackleton, & Cousins, 2001; Soini, 2005). A large scale study on many African countries indicated in past decades, urbanisation and the underperforming industrial sector growth has been unable to absorb the surplus rural labour available. Meanwhile the increasing population density in rural areas has led to a rapid decrease in farmland size per household, posing severe challenges to rural livelihoods in this continent (Bryceson, 1996). Soini (2005) examined the interactions between land use change and livelihoods in the Chaga farming system on the slopes of Mt. Kilimanjaro, Tanzania. They showed that due to increased population and global climate change, farm size declined at an alarming rate, which induced farmers to expand cultivation to the lowlands to support their living. Simultaneously, farmers adapted to new circumstances by intensifying farm production and diversifying their livelihood. Unfortunately, due to the lack of skills and adequate support, not all households were able to equally access attractive non-farm employment. Additionally, the absence of supportive factors such as credit and markets has considerably restricted farmers from farm production diversification and intensification.

A study by Shackleton et al. (2001) in South Africa indicates that the arable land resource plays a key role in rural livelihoods. Farmers pursued different land-based livelihood strategies such as arable farming and livestock husbandry. The study concluded that income from farm activities is probably greater than the total of other income sources, including transfers from formal employment and state pensions. Furthermore, various studies have pointed out the role of land in rural poverty eradication and that the small and declining farm size is a severe constraint that the majority of rural households have already confronted in Malawi (Ellis, Kutengule, & Nyasulu, 2003), Tanzania (Ellis & Mdoe, 2003), and Uganda (Ellis & Bahiigwa, 2003). A similar reality can be seen in Central America where households with small landholdings and landless farm workers have become the most vulnerable group among the rural poor (Siegel, 2005).

Hanstad, Nielsen, and Brown (2004) applied the rural sustainable livelihood framework to examine the role of land in rural livelihoods in India. They stated that land plays a central role in Indian rural lives. It holds inherent value, and it forms value. A parcel of land can be utilised as a physical or financial asset, and it can be a source of food security and income for a household. In addition, land determines identity and social position within a family and community. Finally, land can also be a basis for political force. For such a strategic role of land in rural livelihoods, the authors proposed some policy implications for securing land rights for the Indian rural poor.

International experience indicates that rapid urbanisation and economic growth coincide with conversion of land from the agricultural sector to industry, infrastructure and residential uses (Ramankutty, Foley, & Olejniczak, 2002). In the context of rapid urbanisation in large countries such as China and India, many studies of farmland loss and rural livelihoods can be found in the recent literature. In China, the most populous country, urbanisation has been encroaching upon a considerable area of farmland and such encroachment raises special concerns about food security and rural livelihoods (Chen, 2007; Deng et al., 2006; Wei et al., 2009; Xie et al., 2005). Consequently, farmland shrinking has significantly affected the livelihoods of rural dwellers. Tan, Li, Xie, and Lu (2005) indicated that from 1987 to 2000, an amount of cultivated land equivalent to around 10

million hectares was converted for urban development or devastated by natural disasters and about 74 percent of total urban land was converted from arable land in the country. Every year, this process caused 1.5 million farmers who lived in the populous suburban areas to lose their cultivated land. Tsering, Bjonness, and Guo (2007) examined the relationship between farmland conservation and urban farmers' livelihoods in the Tibet autonomous region of China. Their study found that the arable resource is the most important asset because of its scarcity and this valuable resource is declining on a large scale in this area. They also concluded that land is actually essential for the food security of households and local sustainable development in the future. However, the authors noted that for achieving better livelihood outcomes in the future, farmers should be well-educated and well-equipped with labour skills to mitigate their livelihood dependence on farmland.

Indian rural households' livelihoods have also faced the challenge of farmland loss on a large scale. Between 1955 and 1985, approximately 1.5 million hectares of farmland were converted for urban sprawl in India (Fazal, 2000). This process resulted in huge impacts on rural livelihoods. The scenario seems to be more severe in India because its large population places great pressure on food supply. To cope with this hardship, technological advances are likely to push up agricultural productivity. Such an increase, however, may be offset by cropland shrinking and increasing population in this country. In addition, due to the decline in agricultural land, job generation for rural labour is a great challenge for the country, with around 67 percent of its total workforce engaging in the agriculture sector and about two thirds of the total population living in rural areas (Fazal, 2001).

Using secondary data gathered from various published documents in India, Mahapatra (2007) examined how landlessness affected livelihood choices in rural Orrisa, India. The study revealed that about one third of landless households adopted a livelihood strategy which absolutely relied on wage employment. Due to not having sufficient land for cultivation, many rural labourers were compelled to sell their labour. This sometimes can put them at a disadvantage because of fluctuations in the labour market. Furthermore the decline in available arable land

lowered households' consumption and income in this rural area. Not only influencing livelihood outcomes and strategies, landlessness has also become the main cause of social conflicts which significantly affect the vulnerability context in Indian rural areas (Mahapatra, 2007). Accordingly, the most recent conflicts in India stemmed from land and jobs. The Indian northeast area is a typical case of land shortage causing ethnic conflicts (Fernandes, 2011). Such conflicts are an inevitable consequence of land deficiency and lack of job opportunities which have also been witnessed in other areas such as Rwanda and Kosovo (Ohlsson, 2000).

Because of the importance of land to rural livelihoods, many nations have carried out agrarian policy reforms in order to improve rural livelihoods. Such reforms often focus on land distribution and ensuring farmers' land ownership (Bokermann, 1975; Bradstock, 2006; Griffin et al., 2002). Agrarian reform programs notably succeeded in Japan and South Korea, parts of West Asia (DFID, 2002b) and in Egypt (DFID, 2002a). In Japan, South Korea and Taiwan, land reforms were extremely successfully implemented by securing private ownership of land for small farmers (Keliang & Prosterman, 2007). Land policy reforms have also been implemented in several developing countries such as South Africa (Bradstock, 2006), Ethiopia (Kebede, 2008), Brazil (Quan, 2005), and other Latin American countries (DFID, 2002b).

On the other hand, there are arguments that in certain situations, the rising landless level or land shrinking should be seen as a positive trend because this creates opportunities for diversifying livelihood strategies and mitigating dependence on farmland (e.g., Bouahom, Douangsavanh, & Rigg, 2004; Davis, 2006; Deshingkar, 2005; Koczberski & Curry, 2005; Rigg, 2006). Ellis (1998) and Barrett, Reardon, and Webb (2001) distinguished pull and push factors that determine rural livelihood diversification. Land scarcity was categorised as one of the push factors which induces rural households to diversify their livelihood in response to the adverse livelihood contexts. Koczberski and Curry (2005) investigated the relationship between farmland size decline and change in livelihood strategies among oil palm settlers in Papua New Guinea. Their research findings indicated such settlers successfully responded to the farmland shrinking

by adopting non-farm livelihood strategies and intensifying farm production. A similar finding could be found in a study by Jansen, Pender, Damon, Wielemaker, et al. (2006), who utilised econometric methods for investigating the determinants of livelihood strategies and outcomes of households in the hillside areas of Honduras. Their findings reveal that land is not the key constraint prohibiting the potential for higher incomes, and more land does not lead to higher per capita income of households. Households possessing less land tend to gain higher productivity or to engage in non-farm activities. Other econometric evidence in several developing countries provided by Winters et al. (2009) also reveals that land-limited households are driven into agricultural and non-agricultural wage activities and thus households are encouraged to follow, on average, this way to raise household welfare. The authors, therefore, confirm the important role of rural non-farm activities in the livelihood strategies of rural households. The above discussion implies that landlessness or land shortage could be regarded as a positive determinant of rural livelihood diversification.

Farmland loss due to urbanisation has detrimental impacts on livelihood strategies which largely or partially depend on farmland or other natural resources. Nevertheless, such drawbacks are likely to be offset by a host of new job opportunities triggered by urbanisation. Such opportunities can be seized by farmers to improve their livelihoods. For instance, shortage of agricultural land results in higher levels of rural-urban linkages, making it easier for farmers to access urban markets and non-farm jobs (Tacoli, 2004). Additionally, improved infrastructure may facilitate farmers' productivity promotion and farm product diversification. In China, a large share of high value farm production was made in urban and peri-urban areas (Xie et al., 2005). Furthermore, farmland shrinking is often accompanied by economic space expansion to rural areas, offering landless farmers wide choices of non-farm employment. A study in Bangladesh showed that despite a vast amount of farmland being converted for urban expansion, a wide portfolio of new non-farm employment was created for farmers. Many landless farmers are likely to pursue non-farm livelihood strategies and for the time being, human capital such as skills and education are emerging as crucial livelihood assets to take advantage of new job opportunities (Toufique & Turton, 2002).

Rigg (2006) reviewed the links between land, farming, poverty and livelihoods in the rural areas of southern countries. Using the evidence from several studies in Asian and African countries, the author demonstrated that livelihoods and poverty have become less related to land while remittances play an increasing role in livelihood outcomes, and that rural livelihoods are diversifying. His main argument is that non-farm activities are rapidly emerging as the crucial components of rural livelihoods in many developing countries. The Deagrarianization[6] and Rural Employment (DARE) research program conducted in six African countries (Ethiopia, Nigeria, Tanzania, Malawi, Zimbabwe and South Africa) in the period 1996-1998 revealed that non-farm income contributed from 60-80 percent of total household income in these countries (Bryceson, 2002). In China, for example, rapid expansion of township and village enterprise development resulted in new non-farm livelihood opportunities for farmers (Chen, 1998; Parish et al., 1995). It was estimated that nearly 100 million new jobs were created by township and village enterprises in China between 1985 and 2002 (Johnson, 2002). Especially in some African and Southeast Asian countries, farmers abandoned their farmland to take up more lucrative non-farm employment in urban areas (Benayas, Martins, Nicolau, & Schulz, 2007; Ellis, 2000; Kabeer & Tran, 2000; Kato, 1994). Therefore, land has lost its crucial role in shaping rural livelihood and its role has been gradually replaced by other factors such as education, skills, and networks. For this reason land distribution policy should not be regarded as a main approach to rural poverty eradication (Rigg, 2006).

2.2.2 Land and rural livelihoods in Vietnam

In Vietnam, land reform and the process of decollectivisation have been performed as part of the economic renovation policies (Đổi Mới) of the country (Kirk & Nguyen, 2009). Since the Land Law that was enacted in 1993, farmers' long-term and stable use of agricultural land has been secured (Nguyen, 2012), and this law was implemented by granting land titles (or Land-Use Certificates (LUC)) to all households (Do & Iyer, 2008). Together with land reform, the liberalisation of agricultural markets was also implemented. In part, such policies

[6] "Deagrarianization is defined as a process of: (i) economic activity reorientation (livelihood), (ii) occupational adjustment (work activity), and (iii) spatial realignment of human settlement (residence) away from agrarian patterns" (Bryceson, 1996, p. 99).

stimulated the intensification of rice cultivation, and diversification into new and high value crops such as coffee, which resulted in a considerable improvement in rural household incomes, food security and nutritional state, partially thanks to increases in rice production (Kirk & Nguyen, 2009).

Land reform actively stimulates buying, selling and renting activities in the land market and thereby agricultural land can be transferred to and accumulated by more efficient farmers. It may, however, result in the rise of a landless class because some rural poor households may be forced to sell their land in times of urgency (Kirk & Nguyen, 2009). This phenomenon has led to a number of censures that land reform has worsened enduring poverty by increasing the number of landless rural households (Ravallion & Van de Walle, 2008). Nevertheless, using the household panel data from various Vietnamese Household Living Standard Surveys (VHLSS), Ravallion and Van de Walle (2008) provide econometric evidence to reject the hypothesis that in general, increasing landlessness has led to an increase in poverty in rural Vietnam. In addition, the authors found that rates of poverty reduction among the landless are as same as (or even greater than) those with land. Therefore, they suggest that the rise in the number of landless rural households has been a positive factor in the process of overall poverty alleviation, as farm households have seized new job opportunities, especially paid jobs.

The relationship between farmland and rural livelihood has been mentioned in some studies of the role of rural non-farm activities in Vietnam's poverty reduction (e.g., Pham, Bui, & Dao, 2010; Van de Walle & Cratty, 2004). Both studies provide econometric evidence for the negative effect of farmland on participation in non-farm activities, meaning that households with more farmland tend to less actively engage in non-farm activities. Van de Walle and Cratty (2004) found that although access to land tends to considerably increase household wellbeing, the probability of falling into poverty is substantially higher among households who do not participate in non-farm self-employment activities. The authors indicate that there is a relationship between diversification out of agriculture and poverty reduction, which could lead to a substantial expectation that the emerging non-farm sector will be a motive power for rural poverty

alleviation. Therefore, promoting rural non-farm activities, together with support for improving the poor's access to these, are important factors in rural poverty alleviation in Vietnam (Pham et al., 2010; Van de Walle & Cratty, 2004).

In the context of the rising loss of agricultural land due to urbanisation and industrialisation in many peripheries of large cities, Vietnamese researchers have attempted to seek an answer to how farmland loss has affected rural household livelihoods, mostly using either qualitative or descriptive statistics methods. Some case studies in peri-urban areas of Ho Chi Minh City and Hanoi reveal mixed impacts of farmland acquisition on local people's livelihoods. When investigating a case study in a peri-urban village of Hanoi where two thirds of agricultural land was lost due to urbanisation between 1998 and 2007, Nguyen (2009b) found that many households have benefited from their proximity to universities and urban centres. Income from renting out boarding houses to students and migrant workers has emerged as the most important income source for the majority of households. However, a number of households faced insecure livelihoods because they did not have rooms for renting out and many landless farmers became jobless, particularly elderly and less well educated farmers. Another case study in a village of Hanoi by Do (2006) indicates that farmland acquisition caused a loss of arable land, food supply and agricultural income sources. Many land-losing households actively adapted to the new circumstance by diversifying their labour in manual labour jobs. Consequently, a high but unstable income from casual wage work became the main income source for many households.

In the case of a peri-urban commune in Ho Chi Minh City where most agrarian land was taken for non-agricultural land uses such as industrial zones or residential land, Vo (2006) found that farmers there actively switched from rice cultivation to animal husbandry and horticulture. Moreover, non-farm job opportunities also increased with rapid urbanisation and industrialisation, making young rural workers less interested in agricultural jobs. In a study conducted by Nguyen et al. (2005), mixed effects of farmland acquisition on local rural households were also mentioned. While a number of land-losing farmers who resided close to newly urbanised areas earned higher cash income than farm work;

other land-losing farmers, particularly those with low levels of education, became jobless and impoverished.

Some evidence based on other survey results indicates that farmland acquisition exerts different effects on households. It was estimated that about two thirds of land-losing households benefited from higher job opportunities and upgraded infrastructure; for the rest, land acquisition resulted in serious economic interruption, particularly if all productive land was acquired or family members did not attain suitable education or vocational skills to switch to new jobs (ADB, 2007). Moreover, the results from a large-scale survey in eight developed cities and provinces with the highest level of farmland loss provides a quite detailed picture of both positive and negative effects of farmland acquisition on household livelihood outcomes. On average, while about half of land-losing households reported suffering from a significant decline in farm income, a large proportion among them earned a higher income from other non-farm sources after losing land. Specifically, about 45 percent of land-losing households obtained a higher income from small scale industry and only around 10 percent reported a decrease in this income source. Around 35 percent derived a greater level of income from services whereas about 25 percent earned a lower level of income from this source. In addition, about 30 percent of them received a higher level of income from wage employment while only about 13 percent suffered from a decline in this income source. Finally, regarding the total income that households earned after farmland loss, 25 percent obtained a higher level, while 44.5 percent maintained the same level and 30.5 percent experienced a decline (Le, 2007).

T. D. Nguyen et al. (2011) investigated livelihood adaptation and social differentiation among land-losing households in some communes of Hung Yen, a neighbouring province of Hanoi where the farmland of communes in the study declined by 70 percent due to farmland conversion for industrial zones and clusters in the period 2001-2006. They found that diversification in both farm and non-farm activities emerged as the most common livelihood strategy among land-losing households. It was followed a livelihood strategy based on non-farm paid work and self-employment and finally by an agricultural intensification strategy. Despite the low return from agriculture and more opportunities for lucrative non-

farm jobs, households maintained farming activities not only for their basic and secure livelihood but also for cultural identity. In addition, among land-losing households, those with a farming background tend to be at a disadvantage in taking up high-return activities. Finally, the difference in returns with different livelihood strategies was one of the main causes of increasing social stratification.

2.3 Summary and concluding remarks

In sum, the topic of land and rural livelihoods remains highly controversial, meaning that the importance of land to rural livelihoods is very different between countries. In some countries, land is essential for rural livelihoods because of the limited opportunities for farmers to engage in non-farm activities. In such countries, farming is the only opportunity open to farmers and thus land shrinking severely threatens rural livelihoods. In other countries, land is becoming less important in terms of determining rural livelihood because people there have more chances to participate in non-farm economic activities. Therefore, Griffin et al. (2002) suggest that it should be recognised that land is not an equally important determinant of rural livelihoods in all agrarian countries.

Regarding the relationship between farmland loss (due to urbanisation and industrialisation) and rural livelihoods, the literature review for both Vietnam and other countries indicates that although there has been much discussion about the mixed impacts of farmland loss on rural household livelihoods, no econometric evidence of these impacts has been provided thus far. These gaps in the current literature inspired me to implement this study, which is the first attempt to use an econometric approach to quantify various impacts of farmland loss on household livelihood strategy and outcomes in the context of Hanoi's peri-urban areas.

CHAPTER THREE: LIVELIHOOD ASSETS AND STRATEGIES OF HOUSEHOLDS IN PERI-URBAN AREAS OF HANOI

This chapter begins with a specific description of data collection and a brief description of data analysis methods that were used in the following chapters. In the subsequent section, descriptive statistical methods and cluster analysis techniques are used to provide a detailed picture of households' livelihood assets and strategies. Some concluding remarks are provided at the end of the chapter.

3.1 Data collection and analysis

3.1.1 Data collection

Adapted from General Statistical Office (GSO) (2006), De Silva et al. (2006), and Doan (2011), I designed a household questionnaire to gather quantitative data on livelihood assets (human, social, financial, physical and natural capitals), economic activities (time allocation data), and livelihood outcomes (income and consumption expenditure) (see Appendix 19). A sample size set at 480 households from 6 communes, consisting of 80 households (40 with land loss and 40 without land loss) from each commune, was randomly selected for research purposes. Therefore, 600 households were selected, including 120 reserves, to obtain the target sample size of 480 households. A disproportionate stratified sampling method was used with two steps as follows: First, 12 communes with farmland acquisition were partitioned into 3 groups based on their employment structure. The first group included purely agricultural communes; the second one was characterised by communes with a combination of both agricultural and non-agricultural production while the third one represented purely non-agricultural communes (see Appendix 1). From each group, 2 communes were randomly chosen. Then, from each commune, 100 households (50 with land loss and 50 without land loss) including 20 reserves (10 with land loss and 10 without land loss) were randomly selected using Circular Systematic Sampling (Groves, Fowler, Couper, Lepkowski, & Singer, 2009).

In order to investigate the changes in households' farmland and livelihood strategies before and after farmland acquisition, data on farmland and labour time allocation at two points in time were required - i.e. before the farmland acquisition, and after the farmland acquisition - and for two groups: those who lost their farmland by acquisition (land-losing households (LLHHs)), and those who did not lose their farmland by acquisition (non-land-losing households (NLLHHs)). For LLHHs, the two points in time for which data were collected were before the farmland acquisition (either the first half of 2008 or early 2009), and at the time of the survey (April to June 2010). Data for the labour time allocation and farmland before the farmland acquisition were collected retrospectively at the time of the survey. For NLLHHs, the corresponding two points in time for which data were collected were the first half of 2008 and at the time of the survey (see more in Appendix 19).

Sixteen sociology students from Vietnam National University were carefully selected and trained to become potential members of a fieldwork team. These students were very competent and experienced in fieldwork in Vietnam's rural areas. After the training courses, 12 out of 16 trainees were officially employed, forming a fieldwork team of 10 interviewers and 2 survey supervisors. Two training courses (one week before and one week after the pilot survey) were held to provide trainees with a thorough understanding of the survey context and purposes; contents of all questions in the questionnaire; and requirements and expectations of interviewers. In addition, the training courses provided trainees with further necessary skills for the survey and included practice, using the questionnaire, in interviewing actual households. A pilot test was conducted, including a test of questionnaire design, fieldwork and data entry plans. It involved interviewing 30 households from 6 communes (5 households from each commune). For each interviewer, at least one of their pilot interviews was performed in the presence of a survey supervisor. After the pilot test, a meeting was held over two days in which the interviewers, survey supervisors and author discussed any problems identified during the pilot test. Based on the results from the pilot test, some final edits were made to the questionnaire. Useful and valuable experiences regarding interview practice or techniques that were performed well during the pilot interviews were imparted to all other interviewers. Three survey

supervisors (including the author) were employed to check for mistakes and to maximise the accuracy and quality of survey data and data entry (data entry was checked and any mistakes were corrected on the day of the interview by one of three supervisors).

The survey was carried out from the beginning of April to the end of June 2010, and the data were collected by means of face-to-face interviews with the head of a household in the presence of other household members. In total, 477 households were successfully interviewed, among which 237 households lost their farmland at different levels. Some lost little, some lost part of their land and others lost most or all of their land. Their farmland was compulsorily acquired by the State for a number of projects relating to the enlargement and improvement of Thang Long highway, the construction of industrial clusters, new urban areas and other non-farm use purposes (Ha Tay Province People's Committee, 2008b). Due to some delays in the implementation of the farmland acquisition, of the 237 land-losing households, 124 households had farmland acquired in the first half of 2008 and 113 households had farmland acquired in early 2009.

3.1.2 Data analysis

This section provides a brief introduction to the data analysis, but a fuller and more specific description of data analysis methods will be given in each chapter. In Chapter 3, descriptive statistical methods were used to provide an overview of household livelihood assets. To identify the distinct livelihood strategies that households pursued before and after the farmland acquisition, cluster analysis techniques were used to group households into distinct livelihood categories using SPSS software (version 17). In addition, regression analysis using Analysis of Variance (ANOVA) models were employed to examine the differences in the mean values of two or more groups of households.

Once the whole sample was clustered into various groups of livelihood strategies, in Chapter 4 a multinomial logit (MNL) regression model of livelihood strategy (discrete choice variable) was used to quantify the impact of farmland loss on households' livelihood strategy choice. Households' current livelihood choices can be interpreted using a set of past livelihood strategy variables and pre-

determined asset-related variables that include natural and human capital and other exogenous variables such as land loss and geographical location. Livelihood strategy variables are a crucial part of the wider set of variables that determine livelihood outcomes, including physical capital, financial capital and social capital. This suggests that the livelihood choice variables are likely to be endogenous. Consequently, in Chapter 5, the instrumental variable (IV) estimator was applied to investigate the impact of land loss, livelihood strategy choices and other asset-related variables on households' livelihood outcomes. Chapter 6 utilised fractional logit and fractional multinomial logit models for examining the relationship between the loss of farmland and household income shares by source. Finally, a Gini decomposition analysis of income inequality by source was used to analyse the relationship between income sources and inequality.

As mentioned, several econometric models were applied in this thesis, using STATA software (version 11). The number of households surveyed in 6 communes was not proportional to the commune share of the population. This chapter and subsequent chapters (Chapters 4, 5 and 6) therefore required sampling weights in descriptive as well as econometric analysis, with the aim of generalising results from the sample to the population of the land-losing communes (see Appendix 1).

3.2 Livelihood assets and strategies of households

This section first describes characteristics of sample households according to their livelihood asset endowment. It is followed by statistical procedures related to the classification of household livelihood strategies and then some key features of the household livelihood choices. Differences in asset endowments across these strategies will be discussed.

3.2.1 Livelihood assets of households

In this section, analysis of descriptive statistics was performed to provide a detailed picture of household livelihood assets. In addition, statistical analyses were used to compare the mean values of two or more groups of households. As indicated by Gujarati and Porter (2009), there is a variety of statistical techniques

for investigating the differences in two or more mean values, which commonly have the name of analysis of variance. However, a similar purpose can be achieved within the framework of regression analysis. Therefore, regression analysis using Analysis of Variance (ANOVA) models were employed to examine the differences in the mean values of two or more groups of households[7].

3.2.1.1 Natural capital

3.2.1.1.1 Farmland

Table 3.1 and Table 3.2 describe the decline in farmland size of the LLHHs. Before losing land, the average size of farmland per household was about 4 sào and was reduced by the acquisition of more than 2 sào, suggesting a reduction to less than half the original size[8]. After losing land, the average amount of farmland owned by the LLHHs dramatically declined, from around 4 sào (prior to the farmland acquisition) to less than 2 sào. Consquently, this process produced a large number of households with very small farm sizes. Before the farmland acquisition, only 13.5 percent of these households owned less than or equal to 2 sào. This increased to about 63.7 percent after losing land. At the same time, the number of households holding large farms (>4 sào) dropped sharply from 44.7 percent to 7.6 percent.

Table 3.1: Loss of and decline in farmland size among land-losing households

	Mean	SD	Min	Max	**Mean**	**SD**
Acquired farmland area (m^2)	755.08	412.95	24	2520	737.11	393.95
Proportion of farmland loss (%)	55.02	24.43	1.96	100	55.97	24.66
Farmland size before losing land (m^2)	1,484.22	706.52	280	4,860	1,430.26	657.80
Current farmland size (m^2)	729.14	598.70	0	3,600	693.15	555.86

Note: N=237. SD: standard deviation. Estimates in the last two columns are adjusted for sampling weights.
Source*:* Own calculation from author's survey.

[7] "ANOVA models are used to assess the statistical significance of the relationship between a quantitative regressand and qualitative or dummy regressors. They are often used to compare the differences in the mean values of two or more groups or categories…" (Gujarati & Porter, 2009, p. 298).
[8] Sào (The unit measuring the farmland size in the North Vietnam, ***1 sào=360 square metres***).

Table 3.2: Changes in farmland size of the land-losing households

Before losing land			After losing land		
Owned farmland size per household (m^2)	Number of households	Share (%)	Owned farmland size per household (m^2)	Number of households	Share (%)
≤360 (≤sào)	9	3.80	≤360(≤sào)	80	33.76
360-720 (1-2 sào)	23	9.70	360-720 (1-2 sào)	71	29.96
720-1,080 (2-3 sào)	53	22.36	720-1,080 (2-3 sào)	41	17.30
1,080-1,440 (3-4 sào)	46	19.41	1,080-1,440 (3-4 sào)	27	11.39
1,440-1,800 (4-5 sào)	39	16.46	1,440-1,800 (4-5 sào)	9	3.80
1,800-2,160 (5-6 sào)	38	16.03	1,800-2,160 (5-6 sào)	4	1.69
2,160-2,520 (6-7 sào)	15	6.33	2,160-2,520 (6-7 sào)	2	0.84
2,520-2,880(7-8 sào)	8	3.38	2,520-2,880 (7-8 sào)	1	0.42
>2,880 (> 8 sào)	6	2.53	>2,880 (> 8 sào)	2	0.84
Total	237		Total	237	

Source*:* Own calculation from author's survey.

Table 3.3 provides some basic information about farmland size of the total sample households before and after farmland acquisition. According to the survey data, only 15 households (around 4 percent of total households) reported hiring farmland from other households. Before the farmland acquisition, the average size of farmland owned by the surveyed households was around 1,470 m^2. This was smaller than the average size in the Ha Tay province (1,975 m^2) and much smaller than that of other provinces (7,600 m^2) in 2008 (Central Institute for Economic Management (CIEM), 2009). After farmland acquisition, this size significantly decreased to 1,195 m^2 (Table 3.3). The farmland acquisition increased the number of landless households from 10 to 36, equivalent to 7.6 percent of the total households and produced a huge proportion of households who owned very small farms. Prior to the farmland acquisition, about 24 percent of the total sample households owned less than or equal to 2 sào of farmland. This increased to around 49 percent after the farmland acquisition. The number of households holding larger farms (>4 sào) also significantly declined, from about 37 percent to around 18.7 percent of total sample households.

Table 3.3: Owned farmland size of all sample households before and after farmland acquisition

Before farmland acquisition			After farmland acquisition		
Owned farmland size per household (m^2)	Number of households	Share (%)	Owned farmland size per household (m^2)	Number of households	Share (%)
≤360(≤sào)	44	9.22	≤360(≤sào)	115	24.11
360-720 (1-2 sào)	72	15.09	360-720 (1-2 sào)	120	25.16
720-1,080 (2-3 sào)	93	19.50	720-1,080 (2-3 sào)	81	16.98
1,080-1,440 (3-4 sào)	91	19.08	1,080-1,440 (3-4 sào)	72	15.09
1,440-1,800 (4-5 sào)	66	13.84	1,440-1,800 (4-5 sào)	36	7.55
1,800-2,160 (5-6 sào)	51	10.69	1,800-2,160 (5-6 sào)	17	3.56
2,160-2,520 (6-7 sào)	22	4.61	2,160-2,520 (6-7 sào)	9	1.89
2,520-2,880 (7-8 sào)	14	2.94	2,520-2,880 (7-8 sào)	7	1.47
>2,880 (> 8 sào)	24	5.03	>2,880 (> 8 sào)	20	4.19
Average farm size 1,467.91(1,007.48)	477	100	Average farm size 1,194.63 (1,056.83)	477	100

Note: Means and standard deviations (in parentheses in the bottom row of the table) are adjusted for sampling weights.
Source: Own calculation from author's survey.

Table 3.4: Owned farmland size and comparison of means between the two groups of households after farmland acquisition

Owned farm size holding	All households		LLHHs		NLLHHs		t-value
	Mean	SD	Mean	SD	Mean	SD	
Farmland size per household	**1,194.63**	1,056.83	**693.15**	555.86	**1,490.09**	1,166.26	-8.49***
Farmland size per capita	**266.20**	230.37	**155.40**	129.71	**330.85**	251.01	-8.12***
Farmland size per adult[9]	**336.72**	269.13	**190.04**	147.38	**427.07**	287.06	-9.61***

Note: Means and standard deviations (SD) are adjusted for sampling weights.
*, **, ** * mean statistically significant at 10%, 5 % and 1 %, respectively.
Source*:* Own calculation from author's survey.

Table 3.4 compares farmland holdings between the LLHHs and NLLHHs after farmland acquisition (see more in Appendix 2). The figure indicates that the distribution of farmland was quite unequal between the two groups. On average, the NLLHHs owned approximately 2.1 times as much farmland as the LLHHs did**.** Similar differences between the two groups were also recorded for farmland per capita and farmland per adult. Furthermore, Table 3.5 shows that, among the

[9] Farmland size per household member who aged 15 and over.

LLHHs, the number of households who held small farms (≤2 sào) accounted for nearly two thirds of the total. The number of households owning large farms (>4 sào) made up only 7.6 percent of the total number of LLHHs, while the corresponding figure for NLLHHs was about 30 percent.

Table 3.5: Owned farmland size of land-losing households and non-land-losing households

LLHHs			NLLHHs		
Owned farm size per household (m^2)	Number of households	Share %	Owned farm size per household (m^2)	Number of households	Share %
≤360(≤sào)	80	33.76	≤360(≤sào)	35	14.58
360-720 (1-2 sào)	71	29.96	360-720 (1-2 sào)	49	20.42
720-1,080 (2-3 sào)	41	17.30	720-1,080 (2-3 sào)	40	16.67
1,080-1,440 (3-4 sào)	27	11.39	1,080-1,440 (3-4 sào)	45	18.75
1,440-1,800 (4-5 sào)	9	3.80	1,440-1,800 (4-5 sào)	27	11.25
1,800-2,160 (5-6 sào)	4	1.69	1,800-2,160 (5-6 sào)	13	5.42
2,160-2,520 (6-7 sào)	2	0.84	2,160-2,520 (6-7 sào)	7	2.92
2,520-2,880 (7-8 sào)	1	0.42	2,520-2,880 (7-8 sào)	6	2.50
>2,880 (> 8 sào)	2	0.84	>2,880 (> 8 sào)	18	7.50
Average farm size 693.15 (555.86)	237	100	Average farm size 1,490.09 (1,166.26)	240	100

Note: Means and standard deviations (in parentheses in the bottom row of the table) are adjusted for sampling weights.
Source*:* Own calculation from author's survey.

The results in Table 3.6 provide information about farmland holdings and wellbeing by quintile. There is no apparent relationship between farmland endowments and wellbeing. Regression analyses were used to investigate whether current farmland holdings are statistically associated with household welfare. The results confirm that farmland size is not related to any indicators of household wellbeing (see more in Appendix 3)[10]. This finding is not new and is in line with the result reported from the 2008 Vietnam Access to Resources Household Survey in 12 Provinces of Vietnam (the 2008 VARHS) by CIEM (2009), which found that there is no relationship between farmland size and the wellbeing of households. In addition, households belonging to the richest consumption quintile

[10] Monthly food consumption, consumption expenditure and income per capita were regressed on a set of 4 dummy regressors, including the second lowest, middle, second highest and highest quintile of farmland holding, omitting the lowest quintile of farmland holding as the constant or the reference group.

owned smaller farms than households in the poorest quintile. The main reason for income disparities between rich and poor households originated from variation in income from non-farm income sources rather than from differences in farm income (CIEM, 2009). This issue will be further discussed in the following chapters.

Table 3.6: Owned farmland size and the wellbeing of households

Quintile	Lowest	2nd lowest	Middle	2nd highest	Highest
Farmland holding by quintile (m^2 / household)	**183.22** (153.95)	**634.62** (107.82)	**963.60** (121.95)	**1,377.74** (94.84)	**2,646.03** (1,123.57)
Wellbeing* by farmland quintile					
Food consumption	**475.46** (155.14)	**481.27** (143.84)	**477.77** (134.15)	**486.27** (135.46)	**494.45** (174.32)
Expenditure	**897.76** (288.51)	**936.28** (290.94)	**969.96** (288.63)	**925.40** (239.50)	**957.53** (320.87)
Income	**1,087.85** (576.00)	**1,117.17** (533.50)	**1,047.59** (487.17)	**1,152.42** (578.30)	**1,187.72** (696.52)
Farmland holding by wellbeing quintile (m^2 / household)					
Food consumption	**1,264.46** (1,195.51)	**1,091.10** (745.54)	**1,152.17** (1,129.67)	**1,183.70** (941.83)	**1,280.31** (1,217.13)
Expenditure	**994.09** (910.80)	**1,143.25** (1,003.76)	**1,326.80** (1,086.80)	**1,161.01** (1,085.30)	**1,328.60** (1,150.06)
Income	**1,156.66** (892.60)	**1,027.09** (1,040.91)	**1,198.07** (1,056.53)	**1,283.00** (1,217.72)	**1,286.64** (1,046.35)

Note: Means and standard deviations (in parentheses) are adjusted for sampling weights.
*Monthly food consumption, consumption expenditure and income per capita in 1,000 VND.
(1 USD equated to about 18,000 VND in 2009)
Source*:* Own calculation from author's survey.

3.2.1.1.2 Residential land

A striking feature of residential land of Hanoi peri-urban areas is that its value has been escalating in recent years. In fact, since 2006 a real estate market has boomed all over Hanoi's peri-urban territories (Labbé, 2010). Specifically, the residential land prices in the western part of Hanoi have been rising at a dizzying rate. A square metre of residential land was offered at some VND 45 million in Ha Dong, followed by Hoai Duc District at VND 30-35 million, and Quoc Oai District at VND 25 million in 2009 (VCCI, 2010)[11]. Consequently, residential land in such areas has turned into an extremely valuable asset. The households

[11] 1 USD equated to about 18,000 VND in 2009.

dwelling there suddenly have become wealthier and the level of their wealth is now determined by the location and the size of their residential land.

As revealed in Table 3.7, natural capital, in the form of residential land, seems to be unevenly distributed between the two groups of households but this difference is not statistically significant (see Appendix 4). The residential land size per household for the whole sample was around 219 m^2. However the figure was slightly higher for the LLHHs, at around 230 m^2, while the corresponding figures for the NLLHHs about 212 m^2. Consequently, the residential land size per capita among the LLHHs was approximately 4.5 m^2 greater than that among the NLLHHs.

Table 3.7: Residential land size and t-values for equal means for the two groups of households after farmland acquisition

Residential land holding	All households		LLHHs		NLLHHs		t-value
	Mean	SD	Mean	SD	Mean	SD	
Residential land per household	**218.76**	146.16	**230.34**	151.52	**211.94**	142.71	1.19
Residential land per capita	**48.75**	40.47	**51.64**	41.26	**47.06**	39.97	1.19

Note: Means and standard deviations (SD) are adjusted for sampling weights.
*, **, ** * mean statistically significant at 10%, 5 % and 1 %, respectively.
Source*:* Own calculation from author's survey.

Labbé (2010) indicates that the combination of rapid urbanisation and urban growth has had a wide range of impacts on the local population in the peri-urban communes of Hanoi. On the one hand, this process has been causing negative effects such as rising population densities, environmental pollution and social evils. On the other hand, it has been creating a lot of opportunities for households to participate in non-farm activities. These activities include the provision of new local services, operation of small craft industries and wage-employment (Labbé, 2010). Among these non-farm activities, household enterprises have been emerging as a popular choice for households in Hanoi's recently expanded areas. According to the result of the VARHS 2008, household enterprises were most

widespread in Ha Tay Province[12]. The result shows that the proportion of households engaging in household businesses totaled 43 percent and about half of these activities were located in the family home (CIEM, 2009).

Within the context of urban and peri-urban areas in developing countries, a house or a plot of residential land has become an important resource, as households use them as productive assets (Baharoglu & Kessides, 2002). A house or a plot of residential land is considered one of the most important assets for urban poor residents. Such a resource is used for two purposes: production (renting out a room, running a shop or using the space as a workshop area), and for reproduction and shelter (Moser, 1998). A recent case study on household livelihoods in a peri-urban village of Hanoi by Nguyen (2009b) revealed that residential land has become the most important livelihood asset. Such natural capital was not only extremely valuable but also a means to make a better livelihood. An area of several tens of square meters of residential land can be enough for a household to build a house for rent. In addition, a house or a residential land plot in a prime location such as the main road of the village can be used for opening a shop.

Table 3.8: Proportion of households owning a house or a plot of residential land in a prime location and household businesses

	Share of households with a conveniently situated house (or a plot of residential land) (%)	Share of households participating in non-farm household businesses (%)	Share of non-farm household businesses located in family home (%)
All sample households	31.90	43.28	60.68
LLHHs	25.50	39.40	53.37
NLLHHs	35.67	45.57	64.41

Note: Units of observation are businesses in the last column.
Estimates are adjusted for sampling weights.
Source*:* Own calculation from author's survey.

Table 3.8 shows that about 32 percent of the surveyed households owned a house or a plot of residential land with a favourable location for doing business. This proportion was about 10 percent higher among the NLLHHs than the LLHHs. As shown in Table 3.8, about 43 percent of all sample households reported

[12] Note that the study district used to belong to Ha Tay, a province is located very close to Hanoi, which has been merged into Hanoi since 1st August 2008.

engagement in non-farm household businesses. However, a higher participation proportion was observed for the NLLHHs. The most common activities of household businesses found in the survey related to retail trade and provision of local services, including grocery stores and trade in local farm products, small restaurants, motorbike washing and repairing workshops, hairdressing salons, etc. The majority of these activities were located in the family home of the households who had a house or a plot of residential land in a prime location (Table 3.8)[13]. Therefore, a house or plot of residential land in a prime location should be considered a proxy for the natural capital endowment of peri-urban households.

3.2.1.2 Human capital

Table 3.9 presents information about the household characteristics, by demographic composition, age and education of household members of the survey sample. In comparison with the result from VHLSS 2008 reported by GSO (2008a), on average, the household size of my surveyed households was somewhat greater than that in Vietnam rural areas (4.14 persons) and in the Ha Tay province (4.1 persons) but quite higher than that in the Red river delta (3.79 persons). The total number of dependents in all households, on average, was 1.40 persons and this number was slightly different between the two groups (1.30 versus 1.50). It can be noted that the number of members aged 15-59 per household in the survey sample is 3.07, higher than that in both Vietnam rural and urban areas (2.6 and 2.5, respectively). As a result, the proportion of economically active members accounted for 68.18 percent of all surveyed households. This proportion was similar to that in urban areas (68.5 percent) and higher than that in rural areas (65.4 percent).

On average, the age of the household heads for all surveyed households was 51 and the corresponding age among the LLHH group was approximately 4 years older than that among the counterpart NLLHH group. Moreover, the number of formal schooling years of household heads in the NLLHH group was approximately 1 year greater than that in the LLHH group. For the whole sample,

[13] A prime location is defined as: the location of house or the location of a plot of residential land situated on the main road of the village or at the crossroads or very close to local markets or to industrial zones, and to a high way or new urban areas. Such locations enable households to use their house for opening a shop, or a workshop or for renting.

the proportion of household heads without schooling year was 5.45 percent. This rate in LLHHs, however, was much higher than that in NLLHHs (7.59 percent versus 3.33 percent). In terms of the educational level of economically active household members, the difference was found to be not statistically significant between the two groups. In addition, the average age of these members was quite similar between the two groups (see more in Appendix 5).

Table 3.9: Descriptive statistics of educational and demographic characteristics of households and comparisons of means of the two groups of households

Human capital	All households		LLHHs		NLLHHs		t-value
	Mean	SD	Mean	SD	Mean	SD	
Household size	**4.49**	1.61	**4.46**	1.73	**4.50**	1.55	-0.25
Young dependents	**0.94**	1.00	**0.81**	1.06	**1.01**	0.95	-1.87*
Old dependents	**0.48**	0.75	**0.48**	0.70	**0.48**	0.78	0.05
Total number of dependents	**1.42**	1.21	**1.30**	1.25	**1.50**	1.18	-1.53
Gender of household head (1=male; 0= female)	**0.77**	0.42	**0.77**	0.42	**0.77**	0.42	
Age of household head	**51.21**	12.34	**53.95**	12.04	**49.60**	12.24	3.44***
Formal schooling years of household head	**6.95**	3.45	**6.30**	3.68	**7.33**	3.26	-2.84***
Economically active members[14]	**3.07**	1.43	**3.16**	1.55	**3.01**	1.36	1.00
Proportion of economically active members [15] (%)	**68.18**	0.26	**69.06**	0.30	**67.66**	0.24	0.48
Average age of economically active members	**34.70**	5.53	**35.01**	5.04	**34.51**	5.82	1.23
Average formal schooling years of economically active members	**9.16**	2.40	**9.32**	2.20	**9.03**	2.62	0.38

Note: Means and standard deviations (SD) are adjusted for sampling weights.
*, **, ** * mean statistically significant at 10%, 5 % and 1 %, respectively.
Source: Own calculation from author's survey.

[14] Economically active members or working age members are those who aged from 15 to 59.
[15] Proportion of members aged 15-59 to the total of household members.

Table 3.10 compares the number of working members and the employment to household member ratio between the two groups (see more in Appendix 6). On average, surveyed households had 2.5 adult members who were employed in the last 12 months and the corresponding figure for each group is slightly different. In comparison with the recent result from the Vietnamese Household Business and Informal Sector Survey (VHB & ISS) conducted by Cling et al. (2010), the average age of working members of my household survey was about 2.5 years older than those in Hanoi urban areas (40.46 versus 38.0), while their average number of schooling years was lower than those in Hanoi urban areas (8.37 as compared to 10.20).

Table 3.10: Working members, employment to household member ratio and comparisons of mean for the two groups of households

Human capital	All sample households		LLHHs		NLLHHs		t-value
	Mean	SD	Mean	SD	Mean	SD	
Adult members	**3.55**	1.55	**3.65**	1.33	**3.49**	1.33	1.13
Working members[16]	**2.54**	1.11	**2.44**	1.06	**2.60**	1.14	-1.35
Average age of working members	**40.46**	8.25	**42.24**	8.51	**39.48**	7.95	3.88***
Average schooling years of working members	**8.37**	2.90	**8.24**	2.58	**8.44**	3.07	-1.87*
Employment to household members ratio[17](%)	**74.71**	23.32	**70.20**	23.38	**77.40**	22.90	-2.96***

Note: Means and standard deviations (SD) are adjusted for sampling weights.
*, **, ** * mean statistically significant at 10%, 5 % and 1 %, respectively.
Source*:* Own calculation from author's survey.

The average age of working members among the group of LLHHs was about 3 years older than those in the NLLHH group, while the disparity in average years of schooling was negligible between the two groups. Both the number of adult members and the number of working members in the group of LLHHs were similar to those in the NLLHHs. Finally there was a considerable differential in

[16] Adult members who were employed in the last 12 months.
[17] The employment to household member ratio is defined as the proportion of household members who were employed in the last 12 months. This definition was adapted from the definition of the employment to population ratio (GSO, 2009a).

the employment to household member ratio between the two groups. This ratio for the NLLHHs was approximately 7 percent higher than that for the LLHHs. Possibly this implies that land loss had a negative effect on the employment of the LLHHs. However, the dummy variable of land loss simply indicates the difference in the employment rate, if it exists, but it does not suggest the causes of this difference. Differences in educational levels, access to credit, and non-farm background of households before the farmland acquisition may all have a considerable effect on the employment difference. Therefore, other variables that potentially affect household livelihoods will be taken into account in regression models in the following chapters.

Table 3.11: Educational levels and wellbeing by quintile of education of working members

Education quintile of working members (years)	**Lowest**	**2nd lowest**	**Middle**	**2nd highest**	**Highest**
Average years of formal schooling per working member (years)	**4.45** (1.62)	**6.81** (0.27)	**8.26** (0.56)	**9.90** (0.42)	**12.50** (1.30)
Wellbeing* by education quintile of working member					
Food consumption	**437.76** (152.57)	**423.77** (122.00)	**476.10** (97.18)	**511.80** (145.66)	**571.01** (180.00)
Consumption expenditure	**798.74** (242.60)	**820.52** (246.57)	**929.53** (219.60)	**1,018.20** (254.32)	**1,109.77** (344.22)
Income	**925.00** (504.22)	**885.42** (444.70)	**1,073.36** (422.80)	**1,250.00** (474.00)	**1,461.70** (782.45)

Note: *Monthly food consumption, consumption expenditure and income per capita in 1,000 VND. Means and standard deviations (in parentheses) are adjusted for sampling weights.
Source: Own calculation from author's survey.

Table 3.11 shows that there was a remarkable differential in the educational level of working members among quintile groups. Furthermore, the figures suggest that wellbeing tends to increase with educational level. In order to check the statistical significance of the relationship between human capital and welfare, several regression models were performed and the results in Table 3.12 indicate that human capital as the average education of working members is highly related to household wellbeing. Households in the highest education strata achieved a higher level of wellbeing than those in the lowest stratum. In addition, the proportion of household heads without schooling years among the poorest group (by per capita

income, expenditure and food consumption) was 10.42 percent, 13.54 percent and 8.25 percent, respectively, while the corresponding figures for the richest group were 2.11 percent, 1.05 percent and 1.05 percent.

Table 3.12: Relationship between educational levels and wellbeing

Explanatory variable (Education quintile of working members)	**Wellbeing per capita** (unit: 1,000 VND)		
	Food consumption	**Consumption expenditure**	**Income**
Highest	126.45***	309.36***	527.96***
	(28.952)	(51.305)	(123.018)
2nd highest	68.90**	215.46***	279.72***
	(26.776)	(42.128)	(86.785)
Middle	25.09	126.53***	114.02
	(21.786)	(37.918)	(76.585)
2nd lowest	-1.03	58.12	-26.52
	(25.639)	(49.603)	(85.974)
Constant	449.71***	821.40***	1,022.30***
	(18.754)	(28.414)	(61.701)
Observations	473	473	473
R-squared	0.105	0.138	0.111
Prob > F	0.0000	0.0000	0.0000

Note: Means and robust standard errors (in parentheses) are adjusted for sampling weights.
*, **, ** * mean statistically significant at 10%, 5 % and 1 %, respectively.
Source*:* Own calculation from author's survey.

3.2.1.3 Social capital

According to the 2008 VARHS reported by CIEM (2009), about 85 percent of Vietnamese households had at least one member who belonged to an informal or a formal group. Furthermore, a dominant proportion of group membership was distributed among groups which were closely related to the state such as the Women's Union, the Farmer's Union, the Youth Union, the Veterans Union and the Communist Party (CIEM, 2009). As indicated by Dalton, Pham, Pham, and Ong (2002), in terms of the numbers of group memberships, the Vietnamese had a higher stock of social capital than other Asian countries.

Figure 3.1 presents the proportion of surveyed households who reported having at least one member who was a member of a group. The last bar of Figure 3.1 shows that 93 percent of households had at least one member who participated in any group. The highest participation proportions were recorded for three formal groups, namely the Women's Union, the Youth Union and the Farmer's Union. About 60 percent of all surveyed households had at least one member belonging to the Women's Union. This was followed by a similar proportion of around 50

percent for both the Youth Union and the Farmer‘s Union. These results are similar to those from the VARHS 2008. In terms of informal group membership, 35 percent and 20 percent of households reported that they had at least one member engaging in alumni groups and religious groups, respectively. The other informal groups such as cultural groups, sports groups, credit groups and professional groups attracted a very limited participation as a proportion of households.

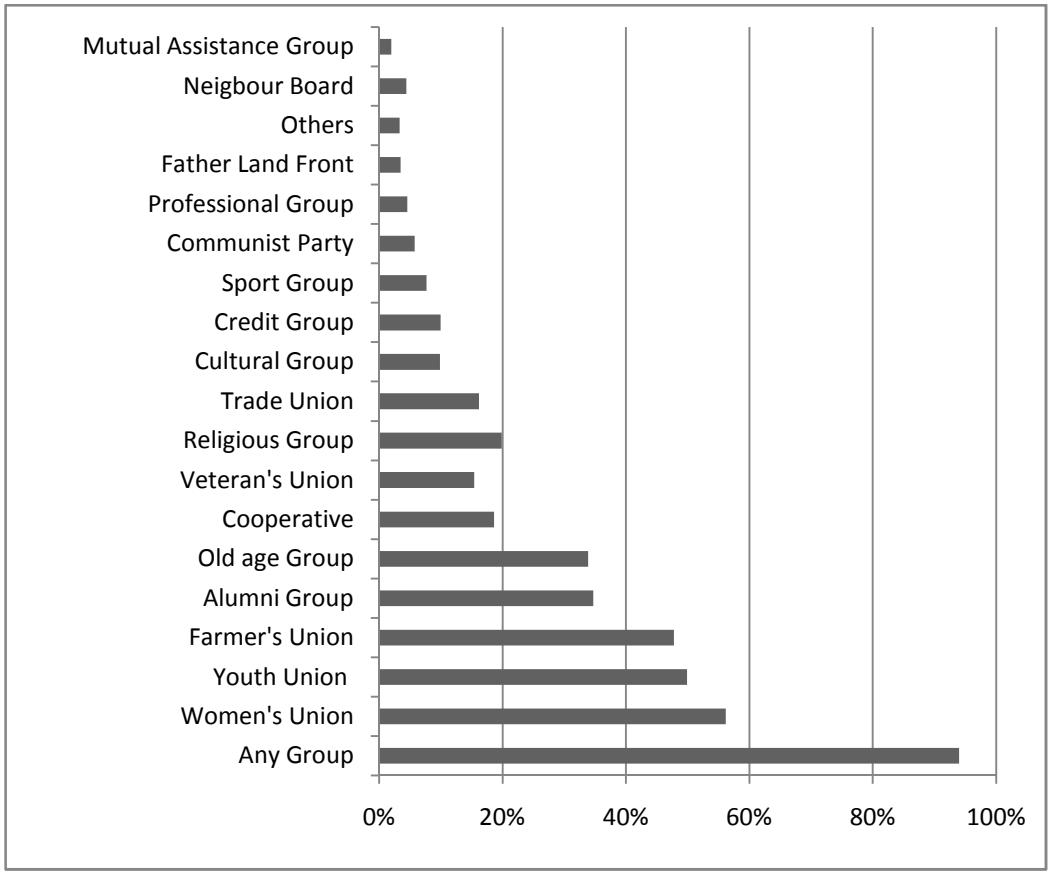

Figure 3.1: Proportion of households with at least one member participating in associations/groups

Estimates are adjusted for sampling weights.
Source: Own calculation from author’s survey.

Table 3.13 shows that on average, each household had 3.43 group memberships and the corresponding figures among LLHHs were as same as that among NLLHHs. However, the LLHHs had a slightly larger number of formal group memberships and a smaller number of informal group memberships than the NLLHHs (see more in Appendix 7). As shown in Table 3.14, the number of households with 3-4 group memberships accounted for the highest proportion in

the whole sample as well as in each group, while the number of households who participated in 7 groups or more made up a much smaller proportion. Finally, the share of households without group membership was markedly higher among the NLLHHs than that among the LLHHs.

Table 3.13: Social capital of households and comparisons of means for the two groups of households

Social capital	All sample households		LLHHs		NLLHHs		t-value
	Mean	SD	Mean	SD	Mean	SD	
Total number of formal group memberships	**2.47**	1.56	**2.70**	1.47	**2.34**	1.60	2.16**
Total number of informal group memberships	**0.96**	1.03	**0.75**	0.88	**1.09**	1.09	-3.34***
Total number of group memberships	**3.43**	2.09	**3.44**	1.82	**3.43**	2.23	0.03

Note: Means and standard deviations (SD) are adjusted for sampling weights.
*, **, ** * mean statistically significant at 10%, 5 % and 1 %, respectively.
Source*:* Own calculation from author's survey.

Table 3.14: Number of group memberships of sample households

Number of group memberships	All sample households		LLHHs		NLLHHs	
	Number of households	Share (%)	Number of households	Share (%)	Number of households	Share (%)
0	32	6.71	7	2.95	25	10.42
From 1-2	133	27.88	62	26.16	71	29.58
From 3-4	180	37.74	98	41.35	82	34.17
From 5-6	99	20.75	56	23.63	43	17.92
From 7-8	24	5.03	13	5.49	11	4.58
> 8	9	1.89	1	0.42	8	3.33
Total	477		237		240	

Source: Own calculation from author's survey.

It would be interesting to investigate the difference in social capital between poor and rich households. Table 3.15 compares the number of group memberships among households by income, consumption expenditure and food consumption quintiles. Membership tended to gradually increase from the lowest quintile group to the highest quintile group. The regression results show that those in the higher wellbeing strata had a higher number of group memberships than the base group (the lowest stratum) (see more in Appendix 8). This may reflect the fact that richer

households are more likely to hold more group memberships than poorer households. However, caution is needed in interpreting this result in terms of causality. As noted by CIEM (2009), the direction of causality here is uncertain and therefore it requires a further in-depth analysis to identify this relationship.

Table 3.15: Social capital and the wellbeing of households

Wellbeing	The number of group memberships of households by wellbeing quintiles				
	Poorest	2nd poorest	Middle	2nd richest	Richest
Food consumption	**2.90**	**3.21**	**3.27**	**3.48**	**4.23**
	(1.85)	(1.73)	(1.80)	(2.19)	(2.51)
Consumption expenditure	**2.88**	**2.81**	**3.09**	**3.73**	**4.54**
	(1.77)	(1.68)	(1.75)	(2.09)	(2.48)
Income	**2.91**	**2.71**	**3.81**	**3.46**	**4.17**
	(1.65)	(1.83)	(1.90)	(2.24)	(2.38)

Note: Means and standard deviations (in parentheses) are adjusted for sampling weights.
Source*:* Own calculation from author's survey.

3.2.1.4 Financial capital

According to the sustainable rural livelihood framework proposed by Scoones (1998), financial capital includes cash, savings, credit/debts and other economic assets which are indispensable for the choice of any livelihood strategy. Among different components of financial capital, households' access to credit has been widely used as a proxy for financial capital in a series of empirical studies on household livelihoods (e.g., Ansoms, 2008; Babulo et al., 2008; Pender & Gebremedhin, 2007; Tefera, Perret, & Kirsten, 2004). Following this approach, I defined financial capital as households' access to and value of loans received from different sources.

Table 3.16 illustrates some statistical descriptions of the sources and total value of loans borrowed by households in the last two years. About 40 percent of the total sample households reported having at least one loan from the rural credit markets (formal and informal). The participation rate in formal credit was higher than that in informal credit. Among the formal credit sources, Vietnam Bank for Social Policies (VBSP) and commercial banks were the most important lenders. As in many developing countries, credit for rural households in Vietnam is also

provided by a large informal sector including money lenders, Rotating Saving and Credit Associations (ROSCAs), relatives, friends, and so on. This sector provided rural households in Vietnam with about 30 percent of all loans (CIEM, 2009). As reported in Column 4, Table 3.16, about one fifth of the total sample households borrowed from from relatives, friends and neighbours. Table 3.17 shows that, on average, the total value of loans borrowed by a household in the last two years was about 33,000,000 VND and that of formal loans and informal loans was around 31,600,000 and 25,150,000 VND, respectively. NLLHHs seem to receive more loans from both informal and formal credit markets than LLHHs did.

Table 3.16: Sources and total value of loans for households

Sources of loans	Number of households with at least one loan by source	Credit participation (%)	Total value of loans	
			Mean	SD
Formal credit	**122**	**25.58**	29,543	55,153
VBSP [a]	60	12.58	19,662	38,332
Commercial Banks [b]	26	5.45	60,792	95,768
People's Credit Fund [c]	18	3.77	21,278	15,725
Credit Co-operatives [d]	8	1.68	39,000	34,591
Others [e]	14	2.94	10,643	5,443
Informal credit	**95**	**19.92**	25,200	28,455
Relatives, friends, neighbours [f]	89	18.66	25,393	28,559
Money lenders, ROSCAs, others [g]	7	1.47	19,143	27,425
Any of the sources above	**190**	**39.83**	31,570	48,486

Note: Formal credit includes a, b, c, d end e. Informal credit includes f and g. [e] includes loans received from socio-political organisations, job supporting funds, and poor assistance funds.
Means and standard deviations (SD) are computed for households that borrowed only. Unit: 1,000 VND. (1 USD equated to about 18,000 VND in 2009).
Source: Own calculation from author's survey.

Table 3.17: Total value of loans taken by the two groups of households

	All sample		LLHHs		NLLHHs	
	Mean	SD	Mean	SD	Mean	SD
Total value of formal loans	31,570	58,332	23,135	30,410	36,511	69,496
Total value of Informal loans	25,152	25,915	20,059	18,554	27,982	28,995
Total value of loans	32,986	50,927	24,758	28,192	37,765	59,968

Note: Means and standard deviations (SD) are adjusted for sampling weights and computed for households that received loans only. Unit: 1,000 VND.
Source: Own calculation from author's survey.

Table 3.18 presents the access to and total value of loans received from credit markets by the two groups of households as well as the whole sample in the last two years. It is noteworthy that means were calculated for all households (borrowers and non-borrowers). It seems that while credit participation was similar between the two groups, the total value of loans was unevenly distributed between the two groups. When considering household savings, only the formal savings of households were investigated in the survey[18]. According to the survey data, around 20 percent of the total surveyed households reported having formal savings but this proportion was considerably higher among the LLHHs (29 percent). The corresponding figure for the NLLHHs was around 14 percent. This difference may be partially explained by the fact that many LLHHs deposited their compensation money in banks and other credit institutions to gain interest earnings.

Table 3.18: Participation in and total value of loans made from informal and formal credit markets by the two groups of households

Financial capital	All sample		LLHHs		NLLHHs	
	Mean	SD	Mean	SD	Mean	SD
Access to any formal loan (%)	**27.03**	44.46	**27.00**	44.45	**27.08**	44.45
Total value of formal loans (1,000 VND)	**8,533**	33,332	**6,230**	18,752	**9,889**	39,461
Access to any informal loan (%)	**18.63**	38.97	**17.95**	38.46	**19.02**	39.33
Total value of informal loans (1,000 VND)	**4,685**	14,836	**3,601**	10,960	**5,323**	16,693
Access to any loan (%)	**40.07**	49.00	**39.71**	49.00	**40.28**	49.15
Total value of loans	**13,218**	36,025	**9,381**	21,468	**15,213**	42,242

Note: Means and standard deviations (SD) are adjusted for sampling weights and computed for all households, including households with and without borrowing.
Source: Own calculation from author's survey.

Another considerable source of financial capital owned by land-losing households is the compensation money for farmland loss. As revealed by these households, each household on average received a total compensation of 98,412,000 VND. The minimum and maximum amounts were 4,000,000 VND and 326,000,000 VND. This might be a considerable source of financial capital with which land-losing households can improve their livelihoods. However, most of them used this

[18] Formal savings include postal savings, bank savings and other credit organizations.

valuable source for non-production purposes rather than production purposes. This trend is also similar to that described by Do (2006) and Nguyen (2009b). According to Figure 3.2, about 60 percent of land-losing households used the compensation for daily living expenses, and about a quarter of them purchased furniture and appliances, while a similar proportion of land-losing households spent this money in repairing or building houses. By contrast, only 9 percent and 1 percent among them used this resource for investing in farm and non-farm production, respectively.

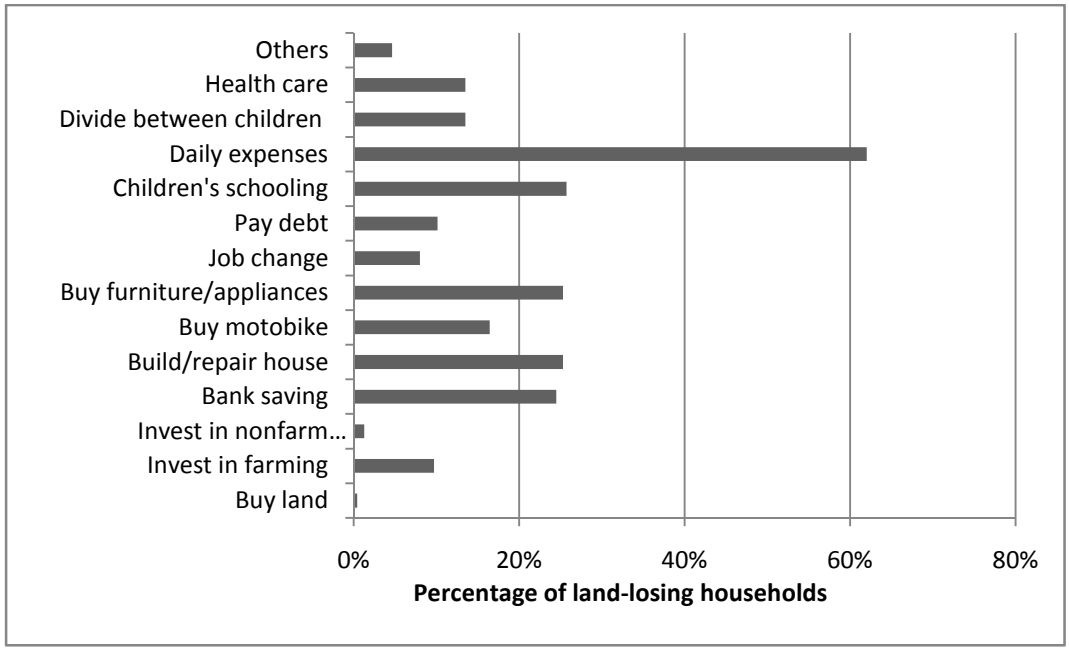

Figure 3.2: Proportion of sampled land-losing households who used compensation for different purposes

Source*:* Own calculation from author's survey.

3.2.1.5 Physical capital

Physical capital of households includes two main components: productive assets and durable goods. Productive assets include a range of assets such as livestock, perennial crop gardens, equipment and machinery, vehicles, stores, shops, workshops and other production facilities. As presented in Table 3.19, households owned on average about 22,000,000 VND in productive assets[19]. The NLLHHs

[19] The values of physical assets were estimated at the current values at the time of the interview by the surveyed households. 1 USD equated to about 18,000 VND in 2009.

held a higher value of productive assets than their counterpart and this difference was statistically significant. The values of productive assets per household and per working member among the NLLHHs were approximately 5,800,000 and 2,600,000 VND higher than those among the LLHHs. A statistically significant difference was also observed in the value of durable goods between the two groups. One average, the LLHHs owned a higher value (2,430,000 VND) of durable assets than the NLLHHs (see more in Appendix 9). Possibly this disparity is partially due to the fact that many LLHHs spent their compensation money on purchasing durable goods in recent years.

Table 3.19: Physical capital and comparisons of means for the LLHHs and NLLHHs

Physical capital (1,000 VND)	**All sample households**		**LLHHs**		**NLLHHs**		**t-value**
	Mean	SD	Mean	SD	Mean	SD	
Total value of productive assets	**22,081**	20,089	**18,397**	17,377	**24,252**	21,261	-2.87***
Total value of productive assets per working members	**8,687**	8,592	**7,523**	7,373	**9,331**	9,147	-2.24**
Total value of durable goods	**13,836**	13,126	**15,365**	14,320	**12,936**	12,302	1.72*

Note: Means and standard deviations (SD) are adjusted for sampling weights.
*, **, *** * mean statistically significant at 10%, 5 % and 1 %, respectively.
Source*:* Own calculation from author's survey.

Table 3.20: Productive assets and wellbeing levels by quintile of productive asset values

Quintile of productive assets	**Lowest**	**2nd lowest**	**Middle**	**2nd highest**	**Highest**
Value of productive assets (1,000 VND)	**2,625** (1,840)	**8,586** (1,591)	**15,189** (2,200)	**24,986** (3,794)	**53,801** (14,461)
Wellbeing* by quintile of productive asset values					
Food consumption	**390.04** (120.55)	**449.80** (106.00)	**476.10** (130.03)	**508.60** (127.30)	**555.01** (190.86)
Consumption expenditure	**751.80** (223.31)	**852.00** (210.32)	**927.04** (242.70)	**1,003.00** (255.83)	**1,076.23** (351.82)
Income	**903.30** (438.00)	**943.42** (402.30)	**1,068.52** (534.36)	**1,137.88** (487.42)	**1,440.47** (764.72)

Note: * Monthly food consumption, consumption expenditure and income per capita in 1,000 VND. Means and standard deviations (in parentheses) are adjusted for sampling weights.
Source*:* Own calculation from author's survey.

As reported in Table 3.21, differences in the values of productive assets were found to be highly related to the wellbeing of households, which means that the

higher the value of productive assets the households possess, the wealthier they are. For example, looking at the wellbeing in terms of monthly per capita income, households in the highest and second highest quintile on average earned a considerably higher amount (507,360 and 194,510 VND) than those in the lowest quintile. Such disparities were also recorded in the case of food consumption and consumption expenditure per capita.

Table 3.21: Productive assets and wellbeing

Explanatory variable (Values of productive assets by quintile)	**Monthly wellbeing per capita** (unit: 1,000 VND)		
	Food consumption	**Consumption expenditure**	**Income**
Highest	152.27***	319.26***	507.36***
	(27.989)	(52.289)	(111.429)
2nd highest	95.26***	228.38***	194.51**
	(21.099)	(40.483)	(82.676)
Middle	75.43***	161.98***	146.95*
	(21.438)	(40.692)	(87.545)
2nd lowest	44.19**	77.60**	-9.62
	(19.151)	(39.320)	(73.862)
Constant	416.51***	795.70***	1,017.24***
	(14.995)	(28.381)	(58.404)
Observations	477	477	477
R-squared	0.122	0.148	0.100
Prob > F	0.0000	0.0000	0.0000

Note: Robust standard errors (in parentheses) and estimates are adjusted for sampling weights.
*, **, ** * mean statistically significant at 10%, 5 % and 1 %, respectively.
Source*:* Own calculation from author's survey.

3.2.2 Livelihood strategies of households

This section first provides some information about income activities at individual levels. It is followed by a statistical analysis conducted to classify different livelihood strategies pursed by households before and after farmland acquisition. Finally it describes some typical characteristics of the livelihood strategies that households have adopted after the farmland acquisition.

3.2.2.1 Employment and income generating activities of households

In developing countries, households and individuals can engage in a portfolio of livelihoods in various ways. Therefore, numerous classifications of livelihood activities can be seen in a series of studies on livelihood choices and diversification in both conceptual and empirical studies. For instance, Scoones (1998) proposed a classification of rural livelihoods in which farm production is

split into categories that include agricultural intensification versus extensification, and other activities namely diversification and migration. Other scholars, however, introduced a classification of rural livelihood activities based on the difference between "farm versus non-farm", "self-employment versus wage work", and "migrant versus non-migrant" (Ellis, 2000). Furthermore, a quite diversified picture of livelihood classification can be found in many empirical studies. Such studies often used quantitative criteria for classifying distinct livelihood strategies. In fact, due to the context of empirical studies being quite variable between countries as well as localities, many rural livelihood choices have been classified in a large number of empirical studies (e.g., Ansoms, 2008; Barrett, Brown, Stephens, Ouma, & Murithi, 2006; Dercon & Krishnan, 1996; Jansen, Pender, Damon, Wielemaker, et al., 2006; Maxwell et al., 2000; Woldenhanna & Oskam, 2001).

Based on my own fieldwork experience and survey data, combined with the definition of the Vietnam informal sector introduced by Cling et al. (2010), and the informal and formal sector by Nguyen (2010), six main types of income earning activities are identified at the individual level: *farmers* (crop and livestock production); *non-farm self-employees* (those who work in their owned household businesses); *informal wage workers* (working for individuals, households without labour contract); *formal wage workers* (formal wage workers in business sectors such as enterprises, factories, industrial zone); *state officers* (formal wage workers in state sector); and *other formal wage workers* (formal wage workers in other organizations).

The total number of surveyed households included 2149 people, about 80 percent of whom were adults. However, the number of adults who were employed in the last 12 months was much smaller, accounting for 57 percent of the total people. The unemployment rate of those aged 15-59 reached 2.8 percent, which was higher than in the Red River Delta Rural (2.01 percent) but much lower than in the Red River Delta Urban (4.59 percent) in 2008 (GSO, 2009b, p. 73). According to my surveyed households, about three fourths of working members reported engagement in one activity only and one fourth reported participating in two

income-earning activities. These proportions are negligibly different between the time before and the time after farmland acquisition.

Figure 3.3 describes the employment share of the main income-earning activities before and after farmland acquisition. It shows that there was a dramatic change in the share of employment across six types of activities. After the farmland acquisition, agricultural employment dramatically decreased, while the employment share of the informal wage sector and of non-farm household businesses considerably increased. There was an approximately 20 percentage point decline in the employment share of the agricultural sector after the farmland acquisition. At the same time, the corresponding figure for the informal wage sector rose by 10 percentage points, from 14 percent to 24 percent of the total employment. The proportion of individuals with their main job in their own household businesses also increased sharply, from around 13 percent to 20.5 percent of the total employment. The employment share of the formal wage sector grew moderately, while the employment share of the state sector and other organisations was almost unchanged.

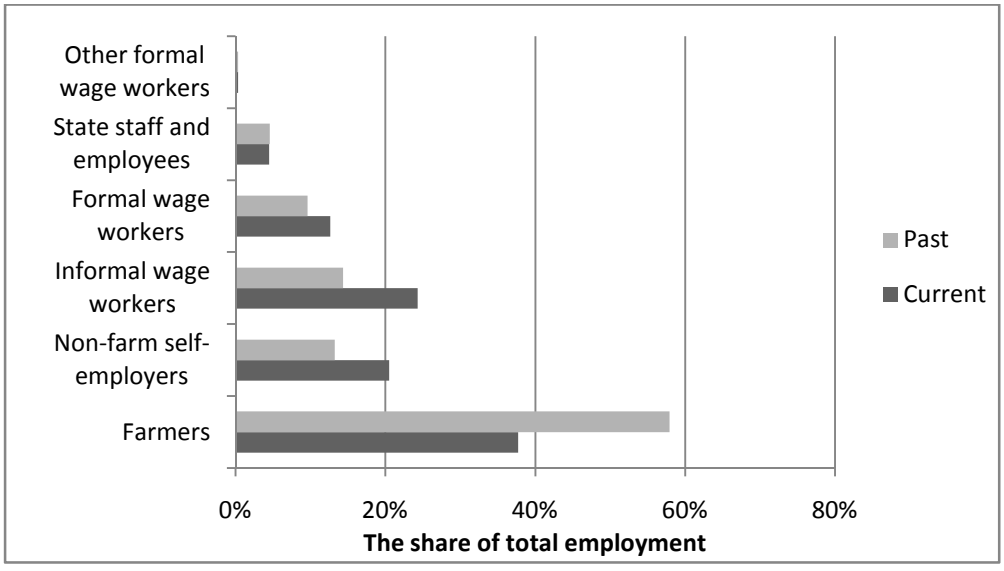

Figure 3.3: Employment share by different jobs

Source: Own calculation from author's survey.

Table 3.22 provides information about the age and education of individuals who were employed in the last year. Unsurprisingly, farmers were much older and their

level of education was much lower than those in other sectors. Despite being older than formal wage workers, those working in the state sector had the highest education level. Those who worked for their own-non-farm household businesses were older and had a lower education level compared to those in the formal wage sector. Formal wage workers were the youngest and had the second highest level of education. The informal wage sector occupied the second biggest share of total employment and the education level of it workers was much lower than those in the formal wage sector, state sector and other organisations.

Table 3.22: Some descriptive statistics on age and education of working individuals

	All	Farmers	Non-farm Self-employees	Informal wage workers	Formal wage workers	State officers	Others
Age	**40.05**	**45.81**	**40.08**	**36.98**	**30.69**	**34.55**	**43.25**
	(13.05)	(12.73)	(10.97)	(12.94)	(9.36)	(10.84)	(13.07)
Education	**8.33**	**6.68**	**7.91**	**8.05**	**12.66**	**13.26**	**10.00**
	(3.63)	(2.84)	(3.12)	(3.15)	(2.55)	(2.86)	(1.41)
Percent in total	**100**	**37.91**	**20.15**	**24.42**	**13.16**	**4.03**	**0.33**

Note: Standard deviations in parentheses.
Source: Own calculation from author's survey.

3.2.2.2 Livelihood strategies of households

Looking at the main income earning activity that individuals pursued seems to be simple way to identify various types of livelihoods at the individual level. However, it is more difficult to distinguish different types of livelihoods at the household level. This is because each household member is likely to engage in one or more income earning activities and furthermore different members in each household often participate in various activities. The data from the VARHS 2008 show that, only about 20 percent of Vietnamese rural households engage in a single activity, while the vast majority of households diversify their labour resources into different activities, with approximately 50 percent engaging in two activities, and around 25 percent participating in three activities (CIEM, 2009).

Based on the detailed information about different types of income earning activities that each household member engages in, I distinguished four major types of labour income-generating activities at the household level (Table 3.23). Unlike the individual livelihood categories that previously identified in Section 3.2.2.1, in this household livelihood classification, both *formal wage earners* and *state officers* are incorporated into one category named *formal wage work*. This is because they have a lot of characteristics in common as defined in Table 3.23.

Table 3.23: Labour-based income generating categories

Categories	Definitions
1. Farm work	Self-employment in household agriculture, including crop and livestock production and other related activities.
2. Non-farm Self-employment	Self-employment in non-farm activities (non-farm household businesses)
3. Informal wage work	Wage work that is often casual, low paid and often requires no education or low education levels. Informal wage earners are often manual workers who work for other individuals or households without a formal labour contract.
4. Formal wage work	Wage work that is regular and relatively stable in factories, enterprises, state offices and other organizations with a formal labour contract and often requires skills and higher levels of education

Source: survey data and author's compilation from Becker (2004), Maxwell et al. (2000), Cling et al. (2010), and Nguyen (2010).

Table 3.24 shows that, on average, each household engaged in approximately two activities, and the corresponding figure was similar between the two groups. Households who reported engagement in one activity accounted for around 22 percent of the total households, while those with two activities made up 62.5 percent. The proportion of households engaging in more than two activities was the smallest sector (about 14 percent). Finally, households without activities constituted a negligible part in the total households (1 percent).

Table 3.24: Number of income earning activities at household level

Number of activities	Average	No	One	Two	Three	Four
LLHHs	1.88	1.3%	20.3%	62.9%	13.9%	1.7%
NLLHHs	1.94	0.4%	24.2%	62.1%	12.9%	0.4%
All sample	**1.92**	**1.0%**	**22.2%**	**62.5%**	**13.4%**	**1.1%**

Source: Own calculation form author's survey.

Table 3.25 shows the changes in households' labour time allocation before and after farmland acquisition. Prior to farmland acquisition, half of households' working time was allocated for farm work. This share, however, dramatically dropped to 30 percent after the farmland acquisition. At the same time, an approximately 9 and 10 percentage point increase in the labour time share was recorded for non-farm self-employment and informal wage work respectively, while the share of time used for formal wage work just rose slightly by 1 percentage point. Looking at land-losing households, their share of time allocated for different activities changed considerably after losing land. The labour time share for farm production accounted for nearly two thirds of the total time of these households before losing land. This proportion, however, declined from around 64 percent to around 25 percent after losing land. Concurrently, the proportion of time allocation for non-farm self-employment and informal wage employment increased from 10.6 percent and 17 percent to 25 percent and about 37 percent, respectively. The labour time share for formal wage work among the LLHHs also increased more than that among the NLLHHs.

Table 3.25: Changes in time allocation for different income earning activities at household level (%)

Types of activities	All sample		LLHHs		NLLHHs	
	Before	After	Before	After	Before	After
Farm work	50.37 (34.06)	30.20 (30.60)	63.68 (28.54)	25.12 (28.00)	42.68 (34.66)	33.18 (31.72)
Non-farm self-employment	17.53 (29.00)	26.75 (35.22)	10.61 (20.46)	25.01 (35.40)	21.52 (32.20)	27.76 (35.13)
Informal wage work	16.53 (26.32)	26.12 (35.44)	17.11 (24.23)	36.88 (39.70)	16.20 (27.50)	19.80 (31.03)
Formal wage work	15.57 (30.00)	16.93 (34.51)	8.60 (21.02)	12.99 (27.85)	19.60 (33.53)	19.26 (33.30)
Total	100	100	100	100	100	100

Note: Means and standard deviations (in parentheses) are adjusted for sampling weights.
Source: Own calculation from author's survey.

In order to gain an insight into the changes in household livelihoods, the past and current household livelihood strategies must be identified[20]. In fact, income sources are the result of working time and livelihood assets that are allocated to different economic activities. For this reason, many empirical studies on household livelihoods used income sources as the main criterion to classify

[20] Past livelihood choices mean the livelihood strategies that households pursued before the farmland acquisition; current livelihood choices are the livelihood strategies that households pursued in the 12 months preceding the survey.

household livelihood strategies (e.g., Alwang, Jansen, Siegel, & Pichon, 2005; Birch-Thomsen, Frederiksen, & Sano, 2001; Bird & Shepherd, 2003; Carter & May, 1999; Ellis & Bahiigwa, 2003; Ellis et al., 2003; Stampini & Davis, 2009; WB, 2008). As a result, data on various income sources in the last 12 months were used for clustering the current livelihood strategies.

However, income data before the farmland acquisition, for classifying past household livelihood strategies, were not collected. This is because retrospective income data are quite unreliable (Stier & Tienda, 2001) and therefore the longer the recall period is, the less reliable retrospective income data tend to be (Ruspini, 2002). For this reason, data on the time that households allocated for different income earning activities for 12 months before the farmland acquisition were gathered for classifying past livelihood strategies instead. In practice, time use data have been increasingly considered as vital for discovering social and economic characteristics of different groups (United Nations, 2003).

There are several methods of cluster analysis. Of these, hierarchical methods and optimising methods are often combined together to provide a better result (Cox, 2005). Following suggestions by Punj and Stewart (1983), a two-stage procedure was applied for cluster analysis. First, data on income shares of each household were used as input variables for performing a hierarchical method using the Euclidean distance and Ward's method to identify possible numbers of clusters. At this stage, the values of coefficients from the agglomeration schedule were used to seek the elbow criterion for defining the optimal numbers of clusters (Egloff, Schmukle, Burns, Kohlmann, & Hock, 2003; Simonson, Gordo, & Titova, 2011) (see Appendix 10 and Appendix 11). Then, the cluster analysis was rerun with the optimal cluster number which had been identified using k-mean clustering. Such procedures were also applied for classifying previous household livelihood choices using labour time allocation data. One problem that may arise is that time-use data do not reflect other income sources such as private transfer (gift and remittances) and public transfer (pension and social assistances), rental income and interest income, and so on. Therefore, an added question in the questionnaire was designed to solve this shortcoming by asking households about their main source of income before farmland acquisition. This information was

combined with time allocation data to identify 10 households who pursued a livelihood strategy that largely or totally relied on non-labour income sources. Accordingly, these households were excluded from cluster analysis using time-use data.

Table 3.26 and Table 3.27 provide basic information about input variables for cluster analysis. As revealed by the surveyed households, about 83 percent among them engaged in farm work on a commercial and/or subsistence basis and about half of households reported that farm production was their main income source before farmland acquisition. Table 3.27, however, indicates that after farmland acquisition, the role of farming as the main income generating activity dramatically decreased. Only 27 percent of households' total income was contributed by farm production. Nonetheless, farm production was maintained as the main income-earning work for many households. Table 3.27 shows that the mean size of farm income per household was lower than non-farm self-employment income but higher than informal wage income and somewhat lower than formal wage income.

Table 3.26: Some descriptive statistics on time allocation data for cluster analysis of past livelihood strategies

Time use (hours)	Farm work	Non-farm self-employment	Informal wage work	Formal wage work	Total time
Annual labour time by activities per household	**1,694** (1,352)	**566** (1,154)	**651** (1,268)	**827** (1,787)	**3,738** (2,061)
Time share by activity per household (%)	**53.31** (34.61)	**14.98** (26.72)	**16.09** (26.37)	**15.62** (30.12)	**100**

Note: N=467. Standard deviations in parentheses.
Source: Own calculation from author's survey.

Table 3.27: Some descriptive statistics on income share data for cluster analysis of current livelihood strategies

Income mean and shares by source	Farm work	Non-farm self-employment	Informal wage work	Formal wage work	Other income	Total income
Annual income per household (1,000 VND)	**14,046** (16,502)	**15,561** (26,478)	**12,035** (18,399)	**14,555** (28,973)	**3,491** (8,849)	**59,688** (31,156)
Income share by source (%)	**27.14** (30.40)	**24.13** (34.13)	**24.04** (34.06)	**17.89** (31.81)	**6.80** (17.16)	**100**

Note: N=477. Standard deviations in parentheses. 1 USD equated to about 18,000 VND in 2009.
Source: Own calculation from author's survey.

Table 3.28 and Table 3.29 show some statistical description of past and current livelihood strategies that were identified via cluster analysis techniques. As shown in these tables, four main labour income-based livelihoods were classified before and after the farmland acquisition (strategies A-D). Cluster analysis also identified 21 households that pursued a non-labour income-based strategy (strategy E) after farmland acquisition as compared to 10 households that followed this strategy before the farmland acquisition.

Table 3.28: Livelihood strategies of households before farmland acquisition

Past livelihood strategies	**A** Informal wage work-based Livelihood	**B** Formal wage work-based livelihood	**C** Non-farm Self-employment-based livelihood	**D** Farm work-based livelihood
Number of households	**99**	**84**	**73**	**211**
% of total households	21	18	16	45
Mean % time allocation by activity per household				
Farm work	**33.63** (19.21)	**19.08** (17.30)	**24.72** (19.72)	**84.63** (16.33)
Non-farm self-employment	**4.73** (11.00)	**2.76** (8.80)	**71.35** (19.03)	**6.63** (12.67)
Informal wage work	**59.58** (18.10)	**3.02** (9.45)	**0.62** (4.10)	**6.04** (11.94)
Formal wage work	**2.06** (8.00)	**75.14** (18.54)	**3.31** (10.60)	**2.70** (9.14)

Note: N= 467 (10 non-labour income based households are excluded).
Means and standard deviations (in parentheses) are adjusted for sampling weights.
Source: Own calculation from author's survey.

Household livelihood strategies dramatically changed after farmland acquisition. Prior to farmland acquisition, the proportion of households pursuing Livelihood D was predominant, accounting for nearly half of the total households. This proportion dropped to around one fifth of total households, after farmland acquisition. Simultaneously, an increase was recorded in all other types of livelihoods. In terms of numbers of households, Livelihood C showed the largest increase, followed by Livelihoods A, B and E, respectively. Looking at the changes in households' activity choice before and after the farmland acquisition, Table 3.29 reveals that for each group of non-farm-based livelihoods (A, B and C), a large proportion of households continued to pursue the livelihood strategy they had adopted prior to the farmland acquisition. The figures for groups A, B and C are 60, 70 and 54 percent, respectively.

Table 3.29: Livelihood strategies of households after farmland acquisition

Current Livelihood Strategies	**A** Informal wage work-based livelihood	**B** Formal wage work-based livelihood	**C** Non-farm Self-employment-based livelihood	**D** Farm work-based livelihood	**E** Non-labour - based livelihood
Number of households	**125**	**100**	**128**	**103**	**21**
Proportion of total households	26%	21%	27%	22%	4%
Number and proportion of households in each strategy who had adopted this strategy prior to the farmland acquisition	**75** 60%	**70** 70%	**69** 54%	**91** 88%	**10** 48%
	Mean income share by source per household (%)				
Farm work	**17.28** (15.10)	**11.77** (13.43)	**13.67** (14.31)	**77.68** (18.80)	**7.55** (12.28)
Non-farm self-employment	**3.72** (8.57)	**3.61** (8.91)	**76.34** (16.10)	**9.15** (15.20)	**2.55** (7.92)
Informal wage work	**74.78** (16.40)	**2.95** (8.40)	**3.83** (10.78)	**6.98** (13.21)	**18.21** (18.84)
Formal wage work	**0.82** (5.66)	**75.47** (16.29)	**2.72** (9.28)	**4.50** (11.33)	**1.24** (5.57)
Other income	**3.40** (8.13)	**6.20** (11.90)	**3.44** (7.56)	**1.70** (5.66)	**70.45** (18.46)

Note: N=477. Means and standard deviations (in parentheses) are adjusted for sampling weights.
Source: Own calculation from author's survey.

3.2.2.3 Description of current household livelihood strategies

Based on the figures in Table 3.29 and Table 3.30, this section provides the main features of different livelihood strategies that households pursued after farmland acquisition. As indicated in Table 3.29, around 26 percent of the total households pursued Livelihood A, with their main income derived from manual labour. Household members in this livelihood group were commonly employed as carpenters, painters, construction workers, and in other casual jobs. However, they still relied on farm production for subsistence or cash income to some extent. These households were characterised by their relatively low human capital as compared to those in other labour income-based livelihoods. In addition, their natural capital in the form of owned farm size was rather smaller than that of households in other livelihoods, except for Livelihood E. The proportion of households in this livelihood group owning a conveniently situated house was also lower than that of households in other livelihoods. In addition, their level of

productive assets was quite low, equivalent to half of a household's in Livelihood C.

Table 3.30: Mean household livelihood assets by livelihood strategy

Livelihood assets	Types of livelihood strategies					
	Total	**A**	**B**	**C**	**D**	**E**
Human capital						
Household size	**4.49** (1.61)	**4.64** (1.60)	**5.03** (1.28)	**4.21** (1.40)	**4.67** (1.80)	**1.96** (1.03)
Dependency ratio	**60.58** (66.78)	**58.41** (55.68)	**62.56** (78.85)	**60.29** (64.43)	**59.82** (71.60)	**87.30** (119.52)
Gender of household head	**77.63** (41.71)	**75.00** (43.50)	**75.85** (43.01)	**77.45** (42.00)	**90.25** (30.00)	**39.35** (50.06)
Age of household head	**51.21** (12.34)	**51.54** (13.24)	**52.94** (12.56)	**47.44** (10.65)	**51.45** (11.36)	**65.57** (8.57)
Education of household head	**6.95** (3.45)	**6.28** (3.34)	**8.61** (3.46)	**7.29** (3.43)	**6.10** (2.60)	**5.25** (4.82)
Average age of working members	**40.46** (8.25)	**39.21** (6.25)	**37.25** (5.82)	**40.70** (7.50)	**42.97** (8.80)	**63.38** (9.72)
Average education of working members	**8.37** (2.90)	**7.70** (2.17)	**11.05** (2.24)	**8.07** (2.84)	**6.98** (2.36)	**5.28** (4.05)
Social capital						
Number of formal group memberships	**2.47** (1.56)	**2.21** (1.44)	**3.70** (1.63)	**1.91** (1.47)	**2.42** (1.20)	**2.37** (1.25)
Number of informal group memberships	**0.96** (1.03)	**0.73** (0.86)	**1.72** (1.32)	**0.97** (0.94)	**0.63** (0.66)	**0.48** (0.84)
Total number of group memberships	**3.43** (2.09)	**2.95** (1.75)	**5.43** (2.44)	**2.88** (1.73)	**3.04** (1.42)	**2.85** (1.84)
Natural capital						
Farmland size (m^2)	**1,194.63** (1,056.83)	**874.72** (666.38)	**1,317.68** (1,147.39)	**960.21** (715.15)	**1,946.61** (1,363.56)	**346.75** (374.18)
Residential land (m^2)	**218.76** (146.16)	**208.78** (136.40)	**261.84** (182.67)	**195.32** (136.50)	**223.25** (128.81)	**214.83** (124.30)
Households with a conveniently situated house (%)	**31.90** (46.65)	**15.38** (36.22)	**18.56** (39.07)	**63.42** (48.36)	**24.74** (43.36)	**16.17** (37.73)
Physical capital						
Total value of productive assets	**22,081** (20,089)	**14,038** (12,701)	**26,962** (20,677)	**27,287** (22,866)	**23,843** (19,699)	**3,667** (6,633)
Total value of durable goods	**13,836** (13,126)	**9,930** (8,775)	**15,530** (13,210)	**18,200** (15,807)	**11,622** (10,973)	**11,144** (15,574)
Financial capital						
Access to formal loans (%)	**27.03** (44.46)	**27.90** (45.02)	**15.33** (36.21)	**36.26** (48.26)	**25.47** (43.78)	**21.48** (42.08)
Total value of formal loans	**8,533** (33,332)	**5,518** (15,224)	**5,604** (30,788)	**15,895** (52,430)	**5,121** (14,143)	**7,714** (18,024)
Access to informal loans (%)	**18.63** (39.00)	**19.18** (39.53)	**15.52** (36.40)	**17.90** (38.49)	**24.46** (43.20)	**5.04** (22.41)
Total value of informal loans	**4,685** (14,836)	**3,676** (10,819)	**5,073** (15,879)	**5,188** (17,566)	**5,640** (15,419)	**715** (3,207)
Total value of loans	**13,218** (36,025)	**9,193** (18,477)	**10,677** (34,085)	**21,083** (54,093)	**10,761** (22,235)	**8,428** (17,988)
Observations	477	125	100	128	103	21

Note: Means and standard deviations (in parentheses) are adjusted for sampling weights.
Source*:* Own calculation from author's survey.

Livelihood B (about 21 percent of the sample) consisted of households who derived income mainly from formal wage work. Similar to those in Livelihood A, many households in this livelihood still maintained farming activities for their food consumption or cash income. However, unlike those in Livelihood A, households in this livelihood group owned a much higher level of human and social capitals than those in other livelihoods. The working members in this group had the highest level of schooling years and were the youngest. Surprisingly, while households in this livelihood group owned the second largest of farmland size, farm income contributed only a small proportion to the total household income.

Livelihood C (27 percent of the sample) represents households who earned their living mainly by non-farm self-employment activities. Such businesses included small-scale trade or production units, using family labour, with an average size of 1.7 jobs. Households' business premises were mainly located at their own homes or on residential land plots, which were prime locations for opening a shop, workshop or small restaurant. However, many among them still continued to maintain farm work as a source of food supply or an extra income. The household heads in this livelihood were younger than those in other livelihoods. In addition, households in this livelihood had the second highest level of education of working members. Although livelihood C did not have the largest farm size or residential land size, it had an advantage over other livelihoods in owning a house or a plot of residential land in a prime location for doing business. In addition, households following this strategy owned a relatively high level of physical capital.

Households in Livelihood D accounted for 22 percent of the sample and were characterised by those who based their living primarily on crops and livestock production. Common crops included cabbages, tomatoes, water morning glory, various kinds of beans, oranges, grapefruits, and guavas, etc. Animal husbandry mainly involved pig or poultry breeding on small-farms or grazing of cows. These activities have significantly declined due to the spread of cattle diseases in recent years. Besides farm work, many of them also engaged in activities related to wage work or non-farm self-employment. Households falling into this livelihood group

had the largest size of farmland but their working members were older and had a lower level of education than those in other livelihoods (excluding Livelihood E).

Livelihood E was a very small group (21 households), representing about 4 percent of the sample. Households following this livelihood depended mainly on non-labour income sources. They were households with a very small size and higher dependency ratio, consisting mainly of very old and poorly educated members. Most of them were land-losing farmers, living separately from their children, with income derived mainly from rental income or interest earnings, remittances and gifts from their children, and other social assistance. Half of them pursued this livelihood before farmland acquisition and the other half adopted this livelihood after farmland acquisition.

3.3 Summary and concluding remarks

This chapter describes the data collection and provides a brief introduction to data analysis methods used in subsequent chapters. In particular, the chapter addresses the first research aim of the thesis. It provides a detailed picture of household livelihood assets and strategies in Hanoi's peri-urban areas.

Findings regarding changes in natural capital of households indicated that households' owned farmland size was dramatically reduced by farmland acquisition. This has led to a more unequal farmland distribution among households, especially between LLHHs and NLLHHs. It is noteworthy that the natural capital of households, in the form of farmland, is not related to per capita food consumption, consumption expenditure or income of households. Farmland conversion for industrialisation and urbanisation has inflated residential land prices in Hanoi's peripheries, resulting in a large increase in households' natural capital in terms of residential land value. In addition, many households have utilised their convenient locations of houses or residential land plots for non-farm businesses such as opening a shop, small restaurant or workshop. This may suggest that residential land has been increasingly important to livelihoods of peri-urban households.

Regarding human capital of households, the survey data revealed that in the surveyed households, the average educational level of working members was lower than in Hanoi's urban areas. However, the surveyed households owned a rather high proportion of economically active members, which possibly enabled them to enter the labour market more actively. Looking at the disparity in human capital between the two groups, the LLHHs had an advantage over their counterparts in that the household heads were younger and had a higher level of education. Nonetheless, there was no difference in the average number of schooling years for working members between the two groups. Finally, human capital is highly related to the wellbeing of households. Households with higher levels of education tended to fall into groups having a higher level of per capita food consumption, consumption expenditure and income.

As reported in previous studies on social capital in Vietnam, an extremely high proportion of the surveyed households reported having at least one member participating in a formal or informal group. Furthermore, the majority of households participated in formal groups that are closely related to the state. Social capital was somewhat different between the two groups, with the number of formal group memberships among the LLHHs being slightly higher than that of the NLLHHs. This disparity, however, was not found for the total number of group memberships as well as for the number of informal group memberships. Lastly, social capital is highly associated with the wellbeing of households. Households with higher numbers of group memberships tended to belong to richer groups.

In this study, the financial capital of households was mainly addressed in the form of access to and the total value of loans received from informal and formal credit markets. Banks are the most important lenders among formal credit sources. However, informal credit providers such as relatives, friends, and neighbours still play an integral role in the peri-urban credit market. The NLLHHs seemed to receive, on average, a much higher total value of loans than the LLHHs did. With respect to formal savings of households, a surprisingly high number among the LLHHs reported having formal savings, which is likely to be explained by the fact that many of them deposited their compensation money for interest earnings.

Finally, the cash compensation for land loss was mainly used by land-losing households for non-production purposes rather than production purposes.

Physical capital of households was addressed in terms of productive assets and durable goods. The regression models indicate that the NLLHHs held a larger value of productive assets as well as a higher value of productive assets per working member than their counterparts did. Nevertheless, the LLHHs owned more durable assets than the NLLHHs. As mentioned earlier, this disparity is partially explained by the fact that land-losing households used their compensation money for purchasing durable goods. Finally, physical capital in terms of the total value of productive assets is highly related to the wellbeing of households. Households owning a higher value of productive assets tended to fall into richer groups.

With regard to the livelihood strategies of households, this chapter identified four main types of labour-based livelihoods: Livelihood A (informal wage work-based livelihood); Livelihood B (formal wage work-based livelihood); Livelihood C (non-farm self-employment-based livelihood); and Livelihood C (farm work-based livelihood). One further livelihood strategy that was not based on labour income sources was detected: Livelihood E (non-labour income-based livelihood). This latter strategy, however, consisted of a small group of households (21 households). Therefore, they were excluded from the regression analyses in the remainder of this thesis. However, they will be mentioned in the following chapters because the change in this livelihood group may reveal some important policy implications.

Household livelihood strategies dramatically changed after farmland acquisition. Prior to farmland acquisition, households pursuing Livelihood D were predominant, accounting for nearly half of the total households. This share dropped to around one fifth of total households, after farmland acquisition. Simultaneously, a proportionate increase was recorded in all other types of livelihoods. However, many households maintained farming for commercial and /or subsistence purposes. Noticeable differences in livelihood assets were found across livelihood strategies. Such differences are expected to be closely linked with household activity choice and wellbeing. These interesting issues will be mentioned in sequent chapters.

CHAPTER FOUR: FARMLAND ACQUISITION AND HOUSEHOLD LIVELIHOOD CHOICES IN HANOI'S PERI-URBAN AREAS

4.1 Introduction

Up to now, there have been a growing number of livelihood studies using "the sustainable livelihood approach" as a framework of analysis (Alwang et al., 2005; Babulo et al., 2008; Ellis & Bahiigwa, 2003; Gilling, Jones, & Duncan, 2001; Maxwell et al., 2000; Siegel, 2005; Soini, 2005; Van den Berg, 2010). The sustainable livelihood framework concentrates on households' ownership of or access to various types of livelihood assets; namely human, social, natural, physical and financial capitals (Bebbington, 1999; DFID, 1999b; Reardon & Vosti, 1995; Scoones, 1998). As a result, households' ability to engage in different livelihood strategies depends on their possession of or access to these livelihood assets from which various livelihood strategies are pursued and livelihood outcomes are derived. Many theoretical and empirical studies on livelihood choices have pursued this causal relationship (Babulo et al., 2008).

Figure 4.1 displays the analytical framework that was adapted to the specific context of the study. In this chapter, I focus on Box B: *the determinants of household livelihood choices*. As shown in Figure 4.1, households' activity choices are determined by their endowments of or access to five types of livelihood assets (arrow (1)). However, other exogenous factors such as shocks (farmland loss) or locations (households in communes that are close to towns, urban areas and industrial zones) may directly affect livelihood choices of households (arrows (3, 6)). Accordingly, such factors must be taken into account in the model of household livelihood choices. Arrows 4 and 5 show that such exogenous factors may indirectly influence livelihood choices of households through their impacts on household livelihood assets. Similarly, an interdependent relationship is observed between livelihood assets and outcomes in the framework. Consequently, livelihood assets themselves are endogenously affected by other elements such as livelihood outcomes or shocks, and policies. A household's livelihood outcomes in turn can affect its future livelihood capitals.

For instance, better-off households tend to invest more in education and will therefore have a higher level of human capital in the future. Accordingly, livelihood capitals themselves are endogenously determined by outcome influences. The sustainable livelihood framework is constituted by dynamic and interdependent elements that together influence household livelihood over time. Given the limitations of cross-sectional data, one cannot fully address the influence of institutional and policy processes on other elements in this framework (Jansen, Pender, Damon, & Schipper, 2006).

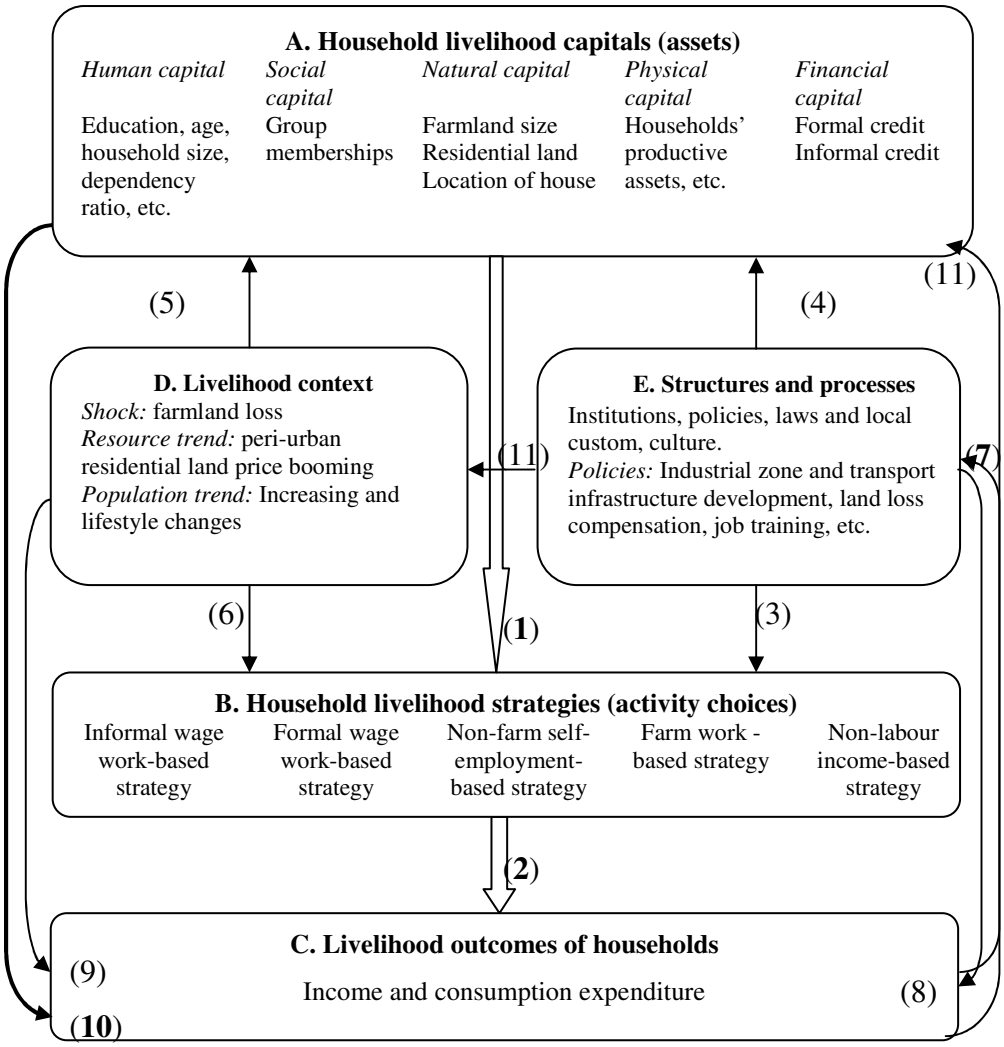

Figure 4.1: Conceptual framework for analysis of Hanoi peri-urban household livelihoods

Source: Adapted from DFID's sustainable livelihoods framework (DFID, 1999b), IDS's sustainable rural livelihood framework (Scoones, 1998) and Babulo et al. (2008).

Given data limitations, many empirical studies only undertake static analysis of the determinants of household livelihood choices and outcomes (Alwang et al., 2005; Barrett, Bezuneh, & Aboud, 2001; Barrett et al., 2006; Jansen, Pender, Damon, Wielemaker, et al., 2006; Mutenje, Ortmann, Ferrer, & Darroch, 2010). Following this approach, my study only examines the static determinants of households' livelihood strategies and outcomes, with a particular interest in the context of farmland acquisition and rapid urbanisation in Hanoi peri-urban areas.

4.2 Specification of econometric model

Once livelihood strategies were identified in Section 3.2.2.2, a multinomial logit model (MLM) was used to quantify the determinants of the livelihood strategy choice of households. This model assumes that the decision-makers make their choice on the basis of maximising their utility and therefore it is called a "random utility model" (RUM) (Train, 2003). As indicated by Cheng and Long (2007), the multinomial logit model (MLM) is probably the most frequently used model for nominal outcomes because of its easy estimation and straightforward interpretation. However, this model requires the independence of irrelevant alternatives (IIA), which implies that, holding all else equal, a decision maker's option between two alternative outcomes is not influenced by other available options (Hausman & McFadden, 1984). Unfortunately, Cheng and Long (2007) proved that the tests of the IIA assumption may provide conflicting and inconsistent results. The authors, therefore, recommend that researchers should refer to the best advice on IIA by going back to an early suggestion by McFadden (1974), who stated that the multinomial logit model should only be applied to cases where the outcomes can be reasonably hypothesised to be dissimilar. Similarly, Amemiya (1981) suggested that the MLM operates well when the outcomes are distinct. As indicated in Chapter 3, households' livelihood choices are distinct because the cluster analysis classified four livelihood strategies that are mutually exclusive. The above discussion, therefore, implies that the choice of the MLM for quantifying factors affecting household activity choice is plausible.

Following Van den Berg (2010), and Jansen, Pender, Damon, Wielemaker, et al. (2006), I assumed that households' current livelihood choices are determined by

slowly changing factors, including human capital, natural capital, and location variables. In addition, other factors, in this case land loss and past livelihood strategies, were included as regressors in the model. As mentioned by Van den Berg (2010), human, natural and location variables are fairly stable over time and thus likely to be predetermined. Other variables, including physical, financial and social capitals are not considered as determinants of current livelihood strategies because such types of capitals may be jointly determined with, or even determined by, the livelihood choices (Jansen, Pender, Damon, & Schipper, 2006). For instance, a household that opens a motorbike repair workshop as their livelihood strategy will invest in and therefore accumulate productive assets such as tools, equipment and facilities. Accordingly, it would be not appropriate to consider these accumulated productive assets as a determinant of their current livelihood choice. Therefore, these productive assets are more likely to be the result of livelihood strategy choice than the cause of livelihood choice. A similar argument that could be laid down concerning financial capital is that a household's decision on taking loans is often the result of its pursuit of livelihood strategies based on self-employment in farm or non-farm activities.

Although social capital plays a crucial role in livelihood choices as it can be translated into access to job opportunities, market information, credit, skills and other productive resources, few studies have tried to quantify the impact of social capital on rural livelihood choices. Possibly, this is because data on social capital are rarely available and not easily collected (Davis, 2003; Siegel, 2005). My data on social capital were merely measured in the form of the number of group memberships, so they cannot adequately reflect all the contents and dimensions of social capital. In addition, households may choose to participate in groups and organisations as a result of their livelihood strategy choices (Jansen, Pender, Damon, & Schipper, 2006). For example, a higher number of formal group memberships for a household is often the result of their choice of paid jobs in the state sector, enterprises or other organisations. Once a household member is recruited as a formal wage worker in these organisations, he or she will soon become a member of several formal groups such as the communist party or trade unions. For this reason, social capital is not included in the model.

The same argument could be made for households' endowment of human and natural capitals. However, these capitals are more slowly changing than other types of capital and therefore more likely to be the determinants of livelihood strategy choices than the results of such choices (Jansen, Pender, Damon, & Schipper, 2006). While households pursuing lucrative livelihood strategies tend to have a greater investment in education and higher schooling attainment, this mainly influences the education level of younger household members and not that of the working members, which I use as a proxy for human capital. Also, the inclusion of the average education of working members as an explanatory variable instead of all household members (including children) helps avoid "reverse causality" (WB, 1998).

One can argue that reverse causality is more likely for natural capital, including farmland, the location of houses or residential land plots, and the size of residential land. For example, some households following a farm work-based strategy have higher demands for farmland and larger sizes of farmland; whereas others intending to take up a non-farm self-employment-based strategy, opening a shop or a workshop, for example, will purchase a house or plot of residential land that is located on a prime location or has a larger size. However, data from the 2008 VARHS indicate that in Ha Tay, the province to which my studied district used to belong, in 2008, 93 percent of agricultural land plots owned by households were allocated by the State while only 1.8 and 1.9 percent of plots were purchased and exchanged, respectively (CIEM, 2009). In addition, according to my surveyed data, none of households bought either farmland or houses in the last 12 months and only one bought residential land in the last 24 months. This implies that these assets are relatively illiquid and stable over time, which is more likely to be the determinant than the result of livelihood strategy choices. Therefore, having more farmland is more likely to be the cause than the result of the choice of a farm work-based strategy. The same conclusion can be drawn for other components of natural capital in that the location of houses or residential land plots, and the size of residential land, are more likely to be the determinants of than determined by the choice of the non-farm self-employment-based strategy.

The discussions suggest that social, physical and financial capitals are more likely to be determined by, rather than the determinants of, the livelihood strategy choices. As suggested by Jansen, Pender, Damon, Wielemaker, et al. (2006), by excluding these capitals from the model of household activity choice, the potential endogeneity problem the will be minimised. This also implies that the possibility of omitted variable bias is less likely to be present because these variables are less likely to be the determinants of the livelihood strategy choices.

4.3 Description of the explanatory variables

Table 4.1 provides information about the definition and measurement of variables in the analysis. This shows that households' current livelihood strategies depend on human and natural capitals, farmland loss, past livelihood strategies, and commune dummy variables. As farmland is the main input in agricultural production, the owned farmland size per adult was expected to have a positive association with taking up farm work. In most studies on rural livelihood strategies, residential land or location of houses has not been regarded as a crucial asset having a close link with household livelihood choices. Within the context of urban or peri-urban livelihoods, a house as well as a plot of residential land is of much importance to urban and peri-urban households (Baharoglu & Kessides, 2002; Moser, 1998; Nguyen, 2009b). A house (or a residential land plot) in a prime location[21] can be used for opening a shop or for renting, while a large size residential plot can be utilised for building boarding houses (T. D. Nguyen et al., 2011; Nguyen, 2009b). Therefore, I included the size of residential land and the location of houses (or of residential land plots) as explanatory variables in the model of peri-urban households' livelihood strategies.

When investigating human capital, both household size and dependency ratio were included in the model. Larger households tend to have more family labour while a low dependency ratio may be indicative of labour endowment. As a result, both these indicators were expected to influence livelihood strategy choices of

[21] *A prime location* is defined as*:* the location of a house or of a plot of residential land is situated on the main roads of the village or at the crossroads or very close to local markets or to industrial zones, and to a highway or new urban areas. Such locations enable households to use their houses or residential land plots for opening a shop, a workshop or for renting.

households. Gender and age of household head were included but the education of household head was not included in the model. This is because a high multicollinearity existed between the education of household heads and the education of working members. As expected, the average education of working household members would have a positive relationship with non-farm-based livelihood choices, which implies that households whose working members have higher education levels are more likely to engage in better remunerated occupations or more profitable non-farm self-employment activities. In addition, households with younger working members were expected to have more chance to take up paid jobs than those with elderly working members.

As mentioned in Section 3.2.2.2, a number of households did not change their livelihood strategies after farmland acquisition and therefore their current livelihood choices had been determined prior to the farmland acquisition. In such cases, current outcomes may be affected by past decisions; current behaviours may be explained by inertia or habit persistence (Cameron & Trivedi, 2005). Accordingly, past livelihood strategies should be included as regressors in the analysis model of households' strategy choice. These included three dummy variables: (i) the informal wage work-based strategy; (ii) the formal wage work-based strategy; (iii) the non-farm self-employment-based strategy; and the reference group was the farm work-based strategy. As suggested in Wooldridge (2009), given the context of cross section data, using the lagged dependent variables provide a simple method to account for historical factors that result in present changes of the dependent variables that are hard to account for using other methods.

Farmland loss was considered as the variable of interest. Households' farmland was compulsorily acquired by the State at different times; therefore, land-losing households were divided into two groups: (i) those that lost their farmland in 2008 and (ii) those that lost their farmland in 2009. The reason for this division is that the length of time since losing land was expected to be highly related to the probability of livelihood change. In addition, the level of farmland loss was quite different between households. Some lost little, some lost part of their land while others lost all their land. As a consequence, the land loss in 2008 and land loss in

2009, as measured by the proportion of farmland that was compulsorily acquired by the State in 2008 and 2009, was expected to reflect the influence of the farmland acquisition on households' activity choices.

Table 4.1: Definition and measurement of variables in the model of activity choice

Explanatory variables	Definition	Measurement
Farmland loss		
Land loss 2009	Proportion of farmland compulsorily acquired by the State in 2009	Ratio
Land loss 2008	Proportion of farmland compulsorily acquired by the State in 2008	Ratio
Natural capital		
Farmland per adult	Owned farmland per member aged 15 and over	100 m^2
Residential land	Residential land size owned by households	10 m^2
House location	Whether or not households have a house or a plot of residential land in a prime location.	Dummy (=1 if yes)
Human capital		
Household size	Number of household members	Number
Dependency ratio	This ratio is calculated by the number of household members aged under 15 and over 59, divided by the number of household members aged 15-59	Ratio
Number of male working members	Number of male adult members who were employed in the last 12 months	Number
Age of household head	Age of household head	Years
Gender of household head	Whether or not the household head is male	Dummy (=1 if yes)
Age of working members	Average age of adult members who were employed in the last 12 months.	Years
Education of working members	Average years of schooling of adult members who were employed in the last 12 months	Years
Commune	The commune in which the households live	Dummy
Song Phuong	Whether or not households reside in Song Phuong	(=1 if yes)
Kim Chung	Whether or not households reside in Kim Chung	(=1 if yes)
An Thuong	Whether or not households reside in An Thuong	(=1 if yes)
Duc Thuong	Whether or not households reside in Duc Thuong	(=1 if yes)
Van Con	Whether or not households reside in Van Con	(=1 if yes)
Past livelihood strategy	The livelihood strategy that households followed before the farmland acquisition.	Dummy
Past livelihood A	Whether or not households followed the informal wage work strategy before the farmland acquisition	(=1 if yes)
Past livelihood B	Whether or not households followed the formal wage work strategy before the farmland acquisition	(=1 if yes)
Past livelihood C	Whether or not households followed the non-farm self-employment strategy before the farmland acquisition	(=1 if yes)

Finally, rural livelihood strategies may be affected by many factors at village-level such as the quality of land, access to markets, population density and opportunities for non-farm employment (Pender, Jagger, Nkonya, & Sserunkuuma, 2004; Siegel, 2005). Hence, I included commune dummy variables in the model to control for the commune fixed effects. Such communal variables were expected to capture differences between communes in terms of farmland fertility, educational tradition, local infrastructure development and geographic attributes, and other community-level factors that may affect households' livelihood choices.

Table 4.2: Summary statistics of explanatory variables for the model of household activity choice

Explanatory variables	**Current Livelihood Strategies**									
	Total		**A**		**B**		**C**		**D**	
	M	SD	M	SD	M	SD	M	SD	M	SD
Land loss 2009	10.27	*24.50*	12.28	*27.00*	8.44	*21.97*	8.80	*22.11*	6.54	*18.96*
Land loss 2008	10.50	*24.00*	16.53	*29.06*	7.20	*18.91*	10.22	*23.60*	5.38	*16.40*
Household size	4.49	*1.61*	4.64	*1.60*	5.03	*1.28*	4.21	*1.40*	4.67	*1.80*
Dependency ratio	60.58	*66.78*	58.41	*55.68*	62.56	*78.85*	60.29	*64.43*	59.82	*71.60*
Number of male working members	1.25	*0.69*	1.38	*0.71*	1.50	*0.77*	1.10	*0.52*	1.24	*0.66*
Gender of household head	0.78	*0.48*	0.75	*0.43*	0.76	*0.43*	0.77	*0.42*	0.90	*0.30*
Age of household head	51.21	*13.24*	51.54	*13.24*	52.94	*12.56*	47.44	*10.65*	51.45	*11.36*
Age of working members	40.46	*8.25*	39.21	*6.25*	37.25	*5.82*	40.70	*7.50*	42.97	*8.80*
Education of working members	8.37	*2.90*	7.70	*2.17*	11.05	*2.24*	8.07	*2.84*	6.98	*2.36*
Farmland/adult	3.37	*2.70*	2.48	*1.80*	3.16	*2.71*	3.01	*2.10*	5.11	*3.30*
Residential land	21.88	*14.62*	20.88	*13.64*	26.18	*18.27*	19.53	*13.65*	22.32	*12.88*
House location	0.32	*0.47*	0.15	*0.36*	0.19	*0.39*	0.63	*0.48*	0.25	*0.43*
Past livelihood A	0.22	*0.42*	0.64	*0.48*	0.13	*0.34*	0.06	*0.24*	0.06	*0.25*
Past livelihood B	0.18	*0.38*	0.03	*0.18*	0.73	*0.44*	0.01	*0.10*	0.07	*0.25*
Past livelihood C	0.19	*0.39*	0.01	*0.10*	0.01	*0.10*	0.61	*0.49*	0.005	*0.07*
Song Phuong	0.13	*0.33*	0.05	*0.22*	0.10	*0.31*	0.15	*0.36*	0.22	*0.41*
Kim Chung	0.14	*0.35*	0.14	*0.35*	0.33	*0.47*	0.11	*0.32*	0.02	*0.13*
An Thuong	0.20	*0.40*	0.14	*0.35*	0.27	*0.45*	0.15	*0.36*	0.27	*0.48*
Duc Thuong	0.12	*0.32*	0.16	*0.37*	0.07	*0.25*	0.12	*0.32*	0.12	*0.32*
Van Con	0.22	*0.41*	0.24	*0.43*	0.03	*0.18*	0.33	*0.47*	0.26	*0.44*
Observations	477		125		100		128		103	

Note: Means (M) and standard deviations (SD) are adjusted for sampling weights.
Refer to Table 4.1 for definitions and measurements of variables. The averages for dummy variables in all strategies as well as the whole sample serve as percentages; for example in Livelihood A, a mean of 0.75 for the variable "Gender of household head" means that 75 percent of the households in this category are male headed and only 25 percent are female headed.
A: Informal wage work; **B**: formal wage work; **C**: Non-farm self-employment; **D**: Farm work.

Table 4.2 provides summary statistics of explanatory variables in the model of household activity choice. On average, households that followed the non-farm-based strategies, including paid jobs and self-employed jobs, had higher levels of land loss as compared to those pursuing a farm work-based strategy. Households in group D had an advantage over other groups in terms of farmland endowment. However, their working members had a lower level of education and a higher age relative to those in other livelihood groups. In addition, the average age of working members in group A and B were younger than those in the other groups and those in group B had the highest level of education. The highest proportion of households who were endowed with a conveniently located house was observed in group C and working members in this group also had the second highest level of education.

Table 4.3: Households' past and current livelihood strategies

Livelihood Strategy	**Changes in livelihood strategies of households**					
	Whole sample		Land-losing households		Non-land-losing households	
	Past	Current	Past	Current	Past	Current
Informal wage work (A)	99	125	46	77	53	48
Formal wage work (B)	84	100	26	42	58	58
Non-farm self-employment (C)	73	128	27	62	46	67
Farm work (D)	211	103	131	41	80	62
Non-labour income (E)	10	21	7	15	3	6
Total	477	477	237	237	240	240

Note: Refer to Section 3.2.2.3 for the definition and detailed description of livelihood strategies. Non-farm-based livelihoods include A, B and C.

Table 4.3 describes the number of households in various livelihood groups before and after farmland acquisition. As discussed in Section 3.2.2.2, the number of households that followed a farm work-based strategy approximately halved. Concurrently, the number of households who pursue non-farm-based livelihood strategies considerably increased. A comparative look at two groups of households suggests that there was a more profound transition from the farm work-based strategy to the non-farm-based strategies among the land-losing households than that among the non-land-losing households. This suggests that the loss of farmland may have a considerable effect on the choice of household livelihood strategy. Finally, the number of households who were entirely or largely dependent on non-labour income sources doubled after the farmland

acquisition. This figure, however, accounted for a negligible proportion (4 percent) of the sample. Therefore, these households were excluded from econometric analyses because of their small numbers. Such exclusion, however, is a limitation since changes in this group may reveal some important policy implications. Thus some discussion on this issue will be presented in the conclusion section.

Table 4.4: Mean household income and percentage composition by livelihood strategy

Variables	Livelihood strategies					
	Total	**A**	**B**	**C**	**D**	**E**
Total annual household income	60,642	49,245	84,179	66,254	51,357	28,414
SD	*33,034*	*17,088*	*37,934*	*36,783*	*23,509*	*18,542*
Monthly per capita income	1,126	885	1,395	1,310	916	1,210
SD	*591*	*345*	*681*	*676*	*400*	*606*
Percentage income by source						
Farm work	27.69	17.28	11.77	13.67	77.68	7.55
SD	*30.37*	*15.10*	*13.43*	*14.31*	*18.80*	*12.28*
Informal wage work	23.20	74.78	2.95	3.83	6.98	18.21
SD	*33.18*	*16.40*	*8.40*	*10.78*	*13.21*	*18.84*
Formal wage work	16.95	0.83	75.47	2.71	4.50	1.24
SD	*31.02*	*5.66*	*16.29*	*9.28*	*11.33*	*5.57*
Non-farm self-employment	25.74	3.72	3.61	76.34	9.15	2.55
SD	*34.70*	*8.57*	*8.91*	*16.10*	*15.20*	*7.92*
Other income	6.41	3.40	6.20	3.44	1.70	70.45
SD	*16.25*	*8.13*	*11.90*	*7.56*	*5.66*	*18.46*
Number of poor households	14	2	0	5	4	3
Number of households	**477**	**125**	**100**	**128**	**103**	**21**

Note: Means and standard deviations (SD) are adjusted for sampling weights.
Income and its components in 1,000 VND (1 USD equated to about 18,000 VND in 2009).
A: Informal wage work; **B**: formal wage work; **C**: Non-farm self-employment; **D**: Farm work; **E**: Non-labour.

Table 4.4 illustrates income distribution under various types of livelihood strategies. The per capita incomes for agriculture-based and informal wage work-based strategies were lower than for other strategies, as was the mean income. This suggests that there are some significant disparities in wellbeing between different livelihood strategies and that household businesses and formal wage work are more lucrative livelihood strategies. Monthly per capita income was estimated at 1,126,000 VND for the whole sample but a considerable disparity among groups is shown in the table. Those who relied mainly on informal wage work and farming reached incomes of only 885,000 and 916,000 VND, respectively, which were much lower than that of those pursuing strategies based on formal wage work and non-farm self-employment (1,395,000 and 1,310,000).

4.4 Results and discussion

Table 4.5: Multinomial Logit estimation with relative risk ratios for households' livelihood strategy choices

Explanatory variables	MODEL 1			MODEL 2		
	A vs D	**B vs D**	**C vs D**	**A vs D**	**B vs D**	**C vs D**
Land loss 2009	1.47	0.60	0.80	6.98	4.12	3.49
	(1.641)	(0.653)	(0.854)	(11.142)	(6.266)	(4.935)
Land loss 2008	25.16***	4.02	8.35**	147.58***	19.55**	16.16**
	(27.102)	(4.568)	(8.661)	(203.876)	(27.415)	(21.981)
Household size	0.64***	0.75*	0.74*	0.69**	0.77	0.73*
	(0.098)	(0.111)	(0.115)	(0.101)	(0.124)	(0.128)
Dependency ratio	0.95	1.00	1.02	1.05	0.89	1.25
	(0.328)	(0.383)	(0.308)	(0.348)	(0.420)	(0.421)
Number of male working members	1.95*	2.02**	0.75	2.20**	1.74	0.85
	(0.735)	(0.687)	(0.216)	(0.787)	(0.725)	(0.296)
Household head's gender	0.50	0.41	0.44	0.53	0.36	0.34
	(0.301)	(0.289)	(0.252)	(0.407)	(0.301)	(0.224)
Household head's age	1.03	1.02	1.00	1.02	1.03	0.99
	(0.020)	(0.022)	(0.019)	(0.026)	(0.028)	(0.025)
Age of working members	0.88***	0.91***	0.98	0.91**	0.93**	0.97
	(0.030)	(0.028)	(0.028)	(0.035)	(0.034)	(0.035)
Education of working members	0.90	1.62***	1.18**	0.97	1.36***	1.12
	(0.076)	(0.163)	(0.092)	(0.100)	(0.139)	(0.113)
Farmland per adult	0.67***	0.73***	0.71***	0.79*	0.78**	0.74**
	(0.076)	(0.069)	(0.067)	(0.099)	(0.081)	(0.115)
Residential land size	1.01	1.02	1.01	1.00	1.03	1.01
	(0.013)	(0.014)	(0.013)	(0.014)	(0.019)	(0.018)
Location of house	0.41*	0.68	4.90***	0.28**	0.97	2.92**
	(0.196)	(0.352)	(2.017)	(0.167)	(0.556)	(1.454)
Song Phuong	0.03***	0.33	0.60	0.05***	0.24	0.68
	(0.024)	(0.230)	(0.388)	(0.039)	(0.244)	(0.556)
Kim Chung	2.80	3.93	2.82	1.20	1.04	2.14
	(2.967)	(4.237)	(2.861)	(1.362)	(1.238)	(2.476)
An Thuong	0.40	0.82	1.15	0.27	0.32	0.45
	(0.276)	(0.561)	(0.783)	(0.232)	(0.265)	(0.381)
Duc Thuong	0.22**	0.27*	0.54	0.20*	0.17*	0.49
	(0.146)	(0.209)	(0.357)	(0.182)	(0.183)	(0.442)
Van Con	0.74	0.09*	1.80	0.39	0.08*	1.05
	(0.510)	(0.131)	(1.249)	(0.346)	(0.109)	(1.019)
Past livelihood A				32.42***	18.71***	1.67
				(27.440)	(16.668)	(1.297)
Past livelihood B				1.55	53.58***	0.44
				(1.709)	(45.382)	(0.464)
Past livelihood C				9.55*	15.85**	360.38***
				(12.254)	(22.178)	(329.755)
Intercept	6,557.91***	2.39	17.10	131.54**	0.54	21.13
	(13,874.336)	(6.041)	(33.106)	(311.206)	(1.412)	(47.160)
BIC'	-26366.477			-45339.250		
Wald chi2	207.99			355.93		
Prob > chi2	0.0000			0.0000		
Pseudo R2	0.3324			0.5695		
Observations	451			451		

Note: Estimates are adjusted for sampling weights and robust standard errors in parentheses.
*, **, *** mean statistically significant at 10%, 5 % and 1%, respectively.
A: Informal wage work; **B**: formal wage work; **C**: Non-farm self-employment; **D**: Farm work (base group).

Table 4.5 presents the estimation results with relative risk ratios (RRRs) from the Multinomial Logit Model, with and without the past livelihood strategies. Model 2 has a much more negative BIC' than Model 1, suggesting that Model 2 is preferred (see more in Appendix 12). In addition, the estimation results from Model 2 show that many explanatory variables are statistically significant at the 10 percent or lower level, with their signs as expected. Finally, the Pseudo-R^2 =0.57 and is highly significant, indicating that this model has a strong explanatory power[22].

Farmland loss

Land loss in both years is hypothesised to have a positive association with participation in non-farm activities. However, only the land loss in 2008 is positively linked with the choice of non-farm-based strategies, including both non-farm self-employed and paid jobs. Households who lost their farmland in 2008 may have had more time to respond to the shock of losing land than those with farmland loss in 2009 and therefore they had a higher chance of taking up an alternative livelihood based on non-farm activities. As indicated in Nkonya et al. (2004), changes in livelihood strategies usually require time and investment, such as time for learning new skills and attempts at developing market connections.

The results reveal some typical patterns of livelihood choices under the impact of farmland acquisition. A first pattern shows that holding all other variables constant, households with more land loss in 2008 are much more likely to purse a strategy based on informal wage work. Under the impact of land loss, the most common livelihood choice was informal wage work (casual and manual labour jobs). This trend is similar to that in a case study in a peri-urban village of Hanoi by Do (2006), who found that the majority of households engaged in casual and manual labour jobs soon after losing land. On the one hand, this is indicative of the high availability of these jobs in Hanoi's peri-urban areas. On the other hand, for a number of land-losing households, the switch-over from farming to casual and manual labour jobs suggests that such nonfarm jobs are relatively easily

[22] An extremely good fit of the model is confirmed if the value of the Pseudo-R^2 ranges from 0.2 to 0.4 (Louviere, Hensher, & Swait, 2000; Scarpa et al., 2003a).

accessed. According to the recent survey by Cling et al. (2010), the informal sector in Hanoi offers the most job opportunities for unskilled workers. Such job opportunities are also often found in Hanoi's rural and peri-urban areas and those working in this sector have much a lower level of education than those in other sectors apart from the agricultural sector (Cling, Razafindrakoto, & Roubaud, 2011).

A second pattern of activity choice is the income-earning strategy that was dependent on self-employment in nonfarm activities. The probability of pursuing this strategy increases with the level of land loss in 2008. Unlike casual and manual labour jobs, nonfarm self-employment may require more capital, managerial skills and other conditions. Consequently, for land-losing households, their probability of choosing this strategy is lower as compared to that of pursuing the informal wage work-based strategy, with the corresponding relative risk ratios being 1.32 and 1.65, given a 10 percentage point-increase in land loss in 2008[23]. Hence, this may imply that land-losing households face a relatively high barrier to entry for this strategy.

With respect to the third pattern of livelihood choice, households with more land loss in 2008 are more likely to undertake a strategy based on formal wage work, holding all other variables constant. However, the probability of adopting this strategy is much less than that of pursuing the informal wage work-based strategy. This phenomenon may stem from several main reasons. First, the farmland has been largely converted for the construction of highways, urban areas and housing developments rather than industrial zones and factories. Therefore, few jobs have been generated by these projects. As revealed by the survey, of 237 land-losing households, only 10 percent of them reported having at least one member being recruited by these projects. Second, most land-losing farmers were older and did not have appropriate educational background or vocational skills to engage in more well-paid jobs. According to the survey, about half of the land-losing

[23] Relative Risk Ratios (RRRs) are exponentiated coefficients $=e^{(\beta)} = \exp(\beta)$, where β is the estimated outcome of the standard multinomial logit model in Appendix 13. Given a 10 percentage-point increase in land loss 2008, the relative risk of choosing the nonfarm self-employment-based strategy relative to the farm work-based strategy = exp (2.78×0.1) = 1.320486 ≈ 1.32, and the relative risk of choosing the informal work-based strategy relative to the farm work-based strategy = exp (4.99×0.1) = 1.647073 ≈ 1.65.

households reported that old age and lack of education and skills were the main barriers that hindered them from being recruited in industrial zones, factories and offices. Finally, it normally takes investors a few years or longer to complete the construction of an industrial zone, a factory or an office. Hence, local people may only be recruited after the completion of construction, which suggests that the impacts of farmland acquisition on local labour may be insignificant in the short-term but more significant in the long-term.

Natural capital

The results show a negative relationship between farmland per adult and the likelihood of adopting non-farm-based livelihood strategies. This finding is partly in accordance with the previous findings in rural Vietnam by Van de Walle and Cratty (2004) and Pham et al. (2010), who found that farmland has a negative effect on non-farm diversification. While the size of residential land is not related to any household activity choice, the prime location of a house or a residential land has a positive link with the probability of choosing a non-farm self-employment-based strategy. Conveniently situated houses (or residential land plots) have been optimised by their owners for business purposes. This shows that many households have seized actively emerging market opportunities in a rapidly urbanising area. A similar trend was also observed in some urbanising areas in Hanoi by Nguyen (2009b) and in Hung Yen, a neighbouring province of Hanoi, by T. D. Nguyen et al. (2011) where houses in a prime location were utilised for non-farm activities such as opening shops, restaurants, bars, coffee shops or for rent. However, while such a livelihood strategy was relatively easily adopted by households who were endowed with a conveniently located house, it may be impossible for households without this endowment. Consequently, such differences in access to emerging livelihood opportunities may result in social differentials between households.

Human capital

With respect to the role of human capital in activity choice, the results indicate that keeping all other variables constant, households with more family labour are more likely to be involved in farming as their main income generation. This

indicates that farming is a more labour-intensive strategy than other strategies. Possibly, this reflects the fact that having more family labour allows many households to intensively cultivate vegetables that are more profitable than rice but also require a greater labour input[24]. A similar picture was also observed in Thanh Tri, a peri-urban district of Hanoi (Van den Berg, Van Wijk, & Van Hoi, 2003), and on the peripheries of Ho Chi Minh City (Jansen, Midmore, Binh, Valasayya, & Tru, 1996).

As shown by the results, the farm work-based strategy was often pursued by working household members who were older than those undertaking the wage work-based strategies. This may imply that emerging non-farm jobs make rural young generations less interested in farming activities. Young rural workers have benefited from losing farmland to urbanisation, because they are better-educated than their parents, and young enough to utilise new non-farm opportunities. A similar trend was also found in Hanoi's peri-urban areas in Do (2006), Lee, Binns, and Dixon (2010) and Ho Chi Minh City by Vo (2006). In many rural areas, young workers abandoned their rice fields to migrate to big cities in search of urban and industrial jobs, leaving farm work to the elderly (Paris et al., 2009). Accordingly, it is estimated that about 44 percent of elderly Vietnamese are still working, mostly in farming activities (UNFPA, 2010).

The education of working members has a positive association with taking up a strategy based on formal wage work, suggesting that households with low educational levels may be hindered from adopting this strategy. This also explains why a large number of land-losing households without appropriate educational background or vocational skills were unable to engage in well-paid jobs. The same phenomenon was also found in several localities where land-losing farmers with poor human capital had limited access to highly paid jobs (Nguyen et al., 2005; Nguyen, 2009b). Nonetheless, education was found to be unrelated to non-farm self-employment and manual labour jobs, implying that in terms of formal education, there has been relative ease of entry into these activities. Non-farm

[24] In some places of Hoai Duc District, the mean net return per year per hectare for fresh vegetable production is between 3-4 times higher than for rice. The vegetable cultivation has short durations; about 40-60 days (depending on types of vegetables), which allows farmers to harvest 5-6 crops per year (Son Tung, 2010). Therefore, vegetable production requires a higher labour input than rice.

household businesses may not require a high level of formal education and investment because the majority of non-farm activities were very small-scale units, using family labour and specialising in small trade or service provision. In addition, a wide range of manual labour jobs has been available within the district as well as in Hanoi city, which offers local people a diversified portfolio of livelihood choices.

Past livelihood strategy

As reported in the estimation results, the inclusion of the past livelihood strategy resulted in a remarkable improvement in the explanatory power of the model, which indicates that past livelihood strategy is an important predictor of current activity choice. In fact, a number of households did not change their livelihood strategy after the farmland acquisition. For instance, households that derived their main income from wage work or non-farm self-employment might not have been negatively affected by farmland loss and therefore they continued the pursuit of these lucrative strategies. As indicated by Mattingly (2009), households were differently influenced and also responded differently to the loss of land because they pursued different livelihood strategies and had different opportunities and needs. Moreover, livelihood strategies may change annually but always at a slow pace because of irreversible investments in human and social capital that are requirements for switching to a new income-generating strategy. Due to path dependence, past livelihood choices are thought to considerably influence present livelihood choices (Pender & Gebremedhin, 2007). Finally, the inclusion of past livelihood choice variables among other explanatory variables not only directly reflects the changes in livelihood strategies over time but also captures unobservable household characteristics affecting activity choice such as land quality, skills, social networks or occupational preferences (Barrett, Bezuneh, et al., 2001).

Commune fixed effects

With respect to the communal level factors that affect household activity choice, the study shows that holding all other variables constants, households will have a probability of adopting a strategy based on paid jobs, including both informal and

formal wage work, which is lower in Duc Thuong than in Lai Yen. Households in Lai Yen are also more likely to specialise in manual labour jobs as their livelihood strategy than those in Song Phuong. Lai Yen has a longstanding history of employment in certain jobs such as building workers, painters, carpenters and incense workers. Such workers are often hired by villagers and contracted to build or paint a house or a workshop. Thanks to interpersonal trust and close relationships among villagers, dwellers in this commune can be easily hired for these jobs.

4.5 Conclusion and policy implications

The combination of rapid urbanisation and farmland acquisition has a wide range of impacts on households' livelihoods in Hoai Duc District. Redundant rural workers and idle manpower have found a diversified portfolio of job opportunities such as small traders, industrial or casual workers or semi-permanent or permanent workers. As a result, a number of land-losing households have actively adapted to the new context by pursuing non-farm-based livelihood strategies as ways to mitigate their dependence on farmland. Among choices of non-farm activities, informal wage work appears to be the most popular livelihood choice. The availability of job opportunities in the informal sector not only helps land-losing households to mitigate the negative consequences of land loss but also opens up new opportunities for them to change and diversify their livelihoods. However, as previously discussed, the land loss in 2009 is not associated with any choice of non-farm-based livelihood strategies. Possibly, one year was not time enough for a number of land-losing households to switch to alternative livelihoods. Consequently, the short-term effect of farmland acquisition may be detrimental to land-losing households, especially to those whose main income was derived from farming.

It is necessary to distinguish the overall influences of farmland acquisition at the commune level and its specific impacts on land-losing households. On the one hand, at the household level, farmland loss functions as a push factor that forces land-losing households to find alternative livelihoods. As a result, farmland acquisition is a shock for households whose livelihood largely or entirely

depended on farming. On the other hand, at the commune level, farmland acquisition has resulted in the construction of industrial zones, new urban areas and improved local infrastructure, which in turn has benefited local dwellers by creating a wide range of non-farm job opportunities. Therefore farmland acquisition has both negative and positive effects on local people. New lucrative occupations will be available for households with better educational backgrounds or vocational skills, while such opportunities may not be accessible to those with limited endowments of human capital. As indicated in ADB (2007), a survey in several provinces shows that about two thirds of land-losing households benefit from greater job opportunities. For the rest, farmland acquisition causes severe economic disruption, particularly if households lose all their productive land and family members are not well-educated or lack vocational skills. This implies that investment in education and vocational training is essential to allow younger rural generations to take up highly remunerative paid jobs. For elderly land-losing farmers, a job training programme that is appropriately designed may give them a higher chance for decent jobs.

As previously mentioned, houses (or residential land plots) in a prime location were utilised by their owners to seize emerging non-farm opportunities such as opening a shop or a workshop. This suggests that government policy can support the household livelihood transition by providing land-losing households with a plot of land in a prime location for doing business. As indicated in Section 1.5.2, Ha Tay Province People's Committee promulgated a new compensation policy for households where more than 30 percent of their farmland was acquired by the State, which states that each household receives a plot of nonagricultural land called *"land for services"* equivalent to 10 percent of the area of acquired farmland. Such a policy has been piloted in Vinh Phuc Province since 2004 where land-losing households utilised *"land for services"* to open shops or provide accommodation leases for workers in industrial zones (ADB, 2007). As noted by ADB (2007), this initially successful experience should be worth considering by other localities. Consequently, *"land for services"* is likely to be a golden opportunity for land-losing households, particularly elderly family members, to switch from agricultural production to lucrative non-farm activities in Hanoi's peri-urban areas. In fact, this policy has been slowly implemented while all land-

losing households desire to receive *"land for services"* in order to undertake business activities and stabilise their lives (Huu Hoa, 2011; LH, 2010). Therefore, speeding up the implementation of this policy may be one of the prerequisites to facilitate livelihood transitions in land-losing households in Hanoi's peri-urban areas.

The experiences from Tu Liem District, a peri-urban district of Hanoi, indicate that improvements in local infrastructure have connected and shortened the distance from this area to Hanoi's central areas. As a result, this stimulated the flow of students, migrant workers and small business people coming to villages to hire accommodation, or as a prime location for doing business. In this area, accommodation rental fees were emerging as the most important and stable income for the majority of households (Nguyen, 2009b). Besides, setting up new commercial centres and markets by the local government has proved to be the most suitable way to create more non-farm job opportunities for older land-losing farmers (Bich Ngoc, 2004). A possible policy implication for the study district is that more new roads should be made, old roads should be enlarged and upgraded and some new commercial centres or markets should be set up. Accordingly, this will result in more chances for households to take full advantage of their own houses, residential land plots, and *"land for services"*.

Despite the fact that the number of households whose livelihoods are entirely or largely dependent on non-labour income sources doubled after the farmland acquisition, this number currently accounted for a small proportion. This figure, however, is projected to rapidly rise as a result of the massive agricultural conversion for urban expansion in the near future. Therefore, income from renting out common boarding houses and small business premises is expected to be a pathway out of economic hardship not only for elderly landless farmers but also for many other households. As in Tu Liem, a trend has already been experienced in some communes in Hoai Duc District, where a number of households have taken advantage of their proximity to universities and new urban centres to earn more income by renting out rooms to students and migrant workers. In An Khanh commune, for example, hundreds of households utilised their gardens and grounds for the construction of common boarding houses. Some among them earned from

5 to 7 million VND per month from accommodation rental fees, which is a very high income source relative to other income sources (Nguyen, 2007). However, to make this trend more popular in the whole district, a useful lesson to be learned from Tu Liem is that local infrastructure should be upgraded and improved, especially road systems, which in turn connects the communes closer to universities, newly opened industrial zones and urban areas.

There remain some limitations in this chapter. The determinants of household activity choice may come from access to credit, social networks and endowment of productive assets which were excluded from the activity choice model. Consequently, while the exclusion of these capitals helps minimise the potential endogeneity problem, it can omit the role of these assets in household livelihood strategies. This in turn does not provide policy implications for the importance of these capitals to rural household livelihoods. Given the limitation of using cross-sectional data in this study, this suggests that further advances on the current topic should include social, financial and physical capitals using panel data. The role of these livelihood capitals in household livelihood outcomes will be dealt with in more depth in Chapters 5 and 6, and further policy implications will be drawn about them.

CHAPTER FIVE: FARMLAND ACQUISITION AND LIVELIHOOD OUTCOMES OF HOUSEHOLDS IN HANOI'S PERI-URBAN AREAS

5.1 Introduction

Many authors have used income as a proxy for livelihood outcome (Barrett, Bezuneh, et al., 2001; Jansen, Pender, Damon, Wielemaker, et al., 2006; Kamanga, Vedeld, & Sjaastad, 2009; Radeny, Nkedianye, Kristjanson, & Herrero, 2007). This approach is appropriate because household income results from utilising a portfolio of assets for pursuing various economic activities. As noted by Ellis (2000), income at a certain point in time is widely viewed as the most direct and measurable indicator of livelihood outcome. However, household consumption expenditure is commonly regarded as a better proxy for household wellbeing (Deaton, 1997; Van den Berg & Nguyen, 2011). As indicated by Coudouel, Hentschel, and Wodon (2002), consumption may be a better reflection of households' actual living standard and ability to meet basic needs. A household's consumption is not only conditional on its current income, but also affected by access to or availability of credit markets or household savings when encountering economic hardships such as seasonal variation, harvest failure, or other situations that cause income to be negative, decreased or significantly fluctuating. In addition, in developing countries, income data tend to be less reliable due to income fluctuations in harvest cycles in rural areas or irregular income flows from the large informal sector in urban areas and difficulty in calculating income for self-employment activities.

Nevertheless, even though consumption data are commonly preferred to income data, income has its own merits. For example, income indicators enable identification of different income sources and livelihood strategies pursued by households (Assefa, Alemu, Bewket, Zeleke, & Trutmann, 2011). Moreover, as indicated in Deaton (1997), both income and consumption are considered as the standard measures of household economic welfare. Many studies have used either income or consumption expenditure as welfare indicators for Vietnamese households (Nghiem, Coelli, & Rao, 2012; Nguyen, Van den Berg, & Lensink,

2011; Nguyen, Kant, & MacLaren, 2004; Van de Walle & Cratty, 2004; Van den Berg & Nguyen, 2011). Accordingly, both consumption expenditure and income were used as measures of household livelihood outcomes in this study. Total annual income is derived from different income sources (i.e., planting, animal husbandry, non-farm self-employment, wage work, and other income), whereas household consumption expenditure (hereafter called household expenditure) comprises food and nonfood, health care, education, housing, electricity, water, travel and communication, entertainment and other items. Note that both income and expenditure were measured accounting for own consumption of products produced by households (see more details in Appendix 19).

Table 5.1: Mean and composition of household income and consumption expenditure, by livelihood strategy

Variables	Livelihood strategies					
	Total	**A**	**B**	**C**	**D**	**E**
Total annual household income	60,642	49,245	84,179	66,254	51,357	28,414
SD	*33,034*	*17,088*	*37,934*	*36,783*	*23,509*	*18,542*
Monthly per capita income	1,126	885	1,395	1,310	916	1,210
SD	*591*	*345*	*681*	*676*	*400*	*606*
Income per household by income sources						
Farm work	14,432	8,167	8,743	8,304	37,816	2,372
SD	*16,169*	*7,888*	*10,803*	*9,542*	*14,504*	*4,415*
Informal wage work	11,559	36,672	2,690	2,376	3,420	4,007
SD	*17,703*	*15,048*	*7,605*	*7,051*	*6,563*	*5,843*
Formal wage work	14,431	435	60,036	2,896	3,632	608
SD	*29,762*	*3,017*	*33,508*	*10,542*	*9,787*	*2,772*
Non-farm self-employment	16,811	2,300	2,407	50,260	5,625	1,227
SD	*27,803*	*5,433*	*6,183*	*31,368*	*9,610*	*3,906*
Non-labour income	3,409	1,671	6,303	2,418	864	20,200
SD	*8,676*	*4,337*	*12,944*	*5,828*	*2,911*	*15,817*
Total annual household expenditure	50,530	45,797	64,760	51,972	47,081	20,155
SD	*22,097*	*16,156*	*21,597*	*23,427*	*19,417*	*10,488*
Monthly per capita expenditure	938	823	1,073	1,028	840	858
SD	*290*	*230*	*296*	*311*	*230*	*253*
Monthly per capita food expenditure	484	443	541	523	431	470
SD	*152*	*117*	*155*	*182*	*104*	*175*
Monthly per capita non-food expenditure [a]	*454*	*380*	*532*	*505*	*409*	*388*
SD	*187*	*151*	*208*	*181*	*167*	*140*
Number of poor households	14	2	0	5	4	3
Number of households	477	125	100	128	103	21

Note: Means and standard deviations (SD) are adjusted for sampling weights.
Income, expenditure and their components in 1,000 VND (1 USD equated to about 18,000 VND in 2009). [a] This includes daily and yearly non-food expenditure, health, education, electricity, water and housing expenditure. **A**: Informal wage work; **B**: Formal wage work; **C**: Non-farm self-employment; **D**: Farm work; **E**: Non-labour-based income.

Table 5.1 provides some information about household income and consumption expenditure for the whole sample as well as for households using each livelihood strategy. According to the survey data, annual income per capita reached around 13,513,000 VND, which was lower than that of the whole district in 2009 (Hoai Duc District People's Committee, 2010b)[25]. As presented in Table 5.1, on average, households that followed the formal wage work strategy gained the highest income and expenditure per capita. This was followed by those pursuing the non-farm self-employment strategy. Those whose living was dependent on farm work had a slightly higher level of income and expenditure per capita than those whose livelihood depended on manual labour jobs. Finally, households in group E had considerably higher levels of income and expenditure per capita. However, the majority of this group's income was derived from non-labour income sources and this group constituted a small proportion of the sample. Therefore, this group was excluded from the econometric analyses of livelihood outcome models.

5.2 Specification of econometric models

Figure 4.1 in Chapter 4 indicates that households' livelihood outcomes are dependent on their livelihood strategy choice and assets. In this chapter, I focus on Box C: *the determinants of household livelihood outcomes*. Table 5.2 describes the explanatory variables in the model of livelihood outcomes (see more in Appendix 14). As compared to the explanatory variables in the MLM of activity choice, I added some more asset-related explanatory variables that potentially affect livelihood outcomes. In the context of a simple conceptual framework, social capital can be treated as one type of the available assets of households which generate income or make consumption possible (Grootaet, Narayan, Jones, & Woolcock, 2004). Many studies have used group memberships as a proxy for social capital and evaluated their relationship with household wellbeing such as income or expenditure (Haddad & Maluccio, 2003). Therefore, I included social capital in the form of group memberships as an exogenous capital like other capitals that potentially affects household income and expenditure. I also included the value of productive assets per working member or "*capital-labour ratio*" as a proxy for physical capital in the outcome model. Households with higher "*capital-*

[25] According to this document, the annual per capita income in 2009 reached 15,000,000 VND.

labour ratio" were expected to have higher wellbeing. Finally, I included dummy variables for financial capital in the form of access to formal and informal loan. Households that received formal or informal loans could use this resource for generating income or making consumption possible.

Table 5.2: Definition and measurement of explanatory variables in the model of household livelihood outcomes

Explanatory variables	Definition	Measurement
Livelihood strategy	Households' current livelihood strategy	
Informal wage work	Whether or not households followed this livelihood	(=1 if yes)
Formal wage work	Whether or not households followed this livelihood	(=1 if yes)
Non-farm self-employment	Whether or not households followed this livelihood	(=1 if yes)
Farmland loss		
Land loss 2009	Proportion of farmland compulsorily acquired by the State in 2009	Ratio
Land loss 2008	Proportion of farmland compulsorily acquired by the State in 2008	Ratio
Natural capital		
Farmland per adult	Owned farm size per member aged 15 and over	100 m^2
Residential land size	Total size of residential land	10^2
Human capital		
Household size	Number of household members	Number
Dependency ratio	This ratio is calculated by the number of household members aged under 15 and over 59, divided by the total members aged 15-59	Ratio
Number of male working members	Number of male adult members who were employed in the last 12 month	Number
Household head's gender	Whether or not the household head is male	Dummy (=1 if yes)
Household head's age	Age of household head	Years
Education of working members	Average years of formal schooling of adult members who were employed in the last 12 months	Years
Social capital		
Group memberships	Number of memberships in formal and informal groups and organisations	Number
Financial capital		Dummy
Formal credit	Receiving any loan from banks or credit institutions in the last 24 months	(=1 if yes)
Informal credit	Receiving any loan from friends, relatives or neighbours in the last 24 months	(=1 if yes)
Physical capital		
Productive assets	Value of all productive assets per working member	Natural logarithms
Commune dummies (included)	The commune in which the households live	Dummy

Livelihood outcomes =

$$\boldsymbol{\beta_1 Livelihood\ choices} + \boldsymbol{\beta_2 Farmland\ loss} + \boldsymbol{\beta_3} Natural\ capital + \boldsymbol{\beta_4} Human\ capital + \boldsymbol{\beta_5} Social\ capital + \boldsymbol{\beta_6} Physical\ capital + \boldsymbol{\beta_7} Financial\ capital + \boldsymbol{\beta_7} communal\ dummies + \boldsymbol{\varepsilon}$$

Since three dummy variables of current livelihood choice (informal wage work, formal wage work and non-farm self-employment, with farm work as the base group) in the outcome equations were suspected to be endogenous, ordinary least square (OLS) estimation of these models would be biased and inconsistent if these explanatory variables were correlated with the error term in the livelihood outcome models (Cameron & Trivedi, 2005). To control for this endogeneity, I employed the instrumental variable method (IV) estimator.

I needed to search for a set of good instrumental variables ($\boldsymbol{Z_i}$) that affect the current livelihood choice but not the livelihood outcomes. First, the IV method estimates the impact of instrumental variables ($\boldsymbol{Z_i}$) on livelihood choice. Second, the IV method estimates the impact of livelihood choice on livelihood outcomes. By following this procedure, instruments affect livelihood outcomes only through their impact on livelihood choice. The relevance assumption of instruments requires that the instruments should be strongly correlated with the endogenous explanatory variable (livelihood choice variable) (Hoogerheide, Block, & Thurik, 2012). If the instruments are weakly correlated with this endogenous explanatory variable, then one suffers from a weak instrument problem that will not get over the bias of OLS estimates and will produce misleading estimates of statistical significance even with a very big sample size (Murray, 2006). In addition, the exogeneity assumption of instruments requires that the instruments should be uncorrelated with the error term of the structural equations, which implies that the instruments should have no direct impact on livelihood outcomes; they should only affect livelihood outcomes via their impact on livelihood choice (Hoogerheide et al., 2012). If the instruments do not meet this condition, the IV method will provide inconsistent and biased estimates that can be even more biased than the corresponding OLS estimates (Murray, 2006).

Firstly, following Pender and Gebremedhin (2007), I selected the livelihood strategy choice that households pursued prior to farmland acquisition as a potential instrumental variable for the current livelihood strategy variable. As

previously indicated, the past livelihood choice is the important predictor of current livelihood choice and therefore possibly satisfies the relevance assumption of the instruments. Secondly, I included the location of a house or residential land and the average age of working household members as additional instruments. As previously discussed, households owning a house or residential land plot in a prime location are more likely to open a shop as their livelihood strategy while households with younger working age members have greater opportunities to participate in highly remunerative jobs. However, using the past livelihood strategy as an instrument may fail to meet the assumption of instrument exogeneity because the lags, from 1 to 2 years after farmland acquisition may be less distant lags that will increase any correlation between these instruments and the error term of the livelihood outcomes equations. In addition, the other instruments are likely to violate this assumption because these instruments may directly affect household livelihood outcomes. For instance, households that are endowed with a conveniently located house (or a residential land plot) may gain greater income from lucrative non-farm activities. Similarly, households with younger workers may get higher income from their highly paid jobs. The above discussions imply that several necessary IV tests must be conducted to determine whether both requirements of the instruments (relevance and exogeneity) are satisfied, or at least the use of a set of invalid and weak instruments that generates imprecise estimates and misleading conclusions can be avoided.

Despite the fact that the potentially endogenous variables are dummy variables I did not employ nonlinear models for the first-stage estimation. Kelejian (1971) formally demonstrated that the two stage least square (2SLS) procedure generates consistent estimates of econometric models with structural equations being linear in parameters but containing a non-linear endogenous regressor. Moreover, as noted by Angrist and Pischke (2008), it is unnecessary and probably harmful if one attempts to use probit or logit to generate the first-stage predicted probabilities in an application with a dummy endogenous regressor. The authors affirm that using a linear regression for the first-stage estimation generates consistent estimates of the second-stage estimation even with a dummy endogenous variable. As a result, in the first-stage of estimation, three least squares regressions were run of the three dummy variables of livelihood choice

(the farm work category was excluded) on instrumental variables and all other explanatory variables in the system. In the second stage, livelihood outcomes were regressed on all other explanatory variables except for the excluded instrumental variables.

A series of specification tests were applied to the models. Heteroscedasticity was addressed in the IV models by transforming outcome variables (monthly income and consumption expenditure per capita) and the physical capital variable into their natural logarithms. The models were regressed with 2SLS and LIML (limited information maximum likelihood) estimation[26].

I used the formal weak instrument test proposed by Stock and Yogo (2005) using the value for the test statistic that is the F-statistic form of the Cragg-Donald Wald F statistic (cited in Cameron & Trivedi, 2009).[27] In both expenditure and income models, the values of the Cragg-Donald Wald F statistic were 28.615, which greatly exceeds the reported critical value of 9.53, so I can say that the instruments are not weak and satisfy the relevance requirement. The validity requirement of the instruments was checked using a test of overidentifying restrictions with both 2SLS and LIML estimates and the results came out similar[28]. The Hansen J-statistics were not statistically significant in both income and expenditure models and thus confirmed the validity of the instrumental variables. Combined, the above specification tests indicated that the selected instruments are in fact good instruments (see Appendix 15 and Appendix 16).

Since the livelihood choice variables in both expenditure and income models were potentially endogenous, an endogeneity test of these variables was conducted. In both models, the results showed that the null hypothesis of exogenous regressors

[26]In fact if heteroscedasticity is not present, then the 2SLS estimation may be preferred. If heteroscedasticity is present, the generalized method of moments (GMM) should be used (Baum, Schaffer, & Stillman, 2003). However, as noted by Bascle (2008, p. 288):" GMM estimation should not be used if the sample size is smaller than 700". Our sample size is much below the 700 threshold; therefore the models were regressed using 2SLS estimation.

[27]This is also the minimum eigenvalue of the matrix analog of the F-statistic that is reported in the IV first-stage regression (Cameron & Trivedi, 2009, p. 190). As suggested by Cameron and Trivedi (2005, p. 112), " Given that there are three endogenous variables it is actually better to use the method of Stock, Wright, and Yogo (2002)".

[28]Angrist and Pischke (2008, p. 213) suggest that: "Check overidentified 2SLS estimates with LIML. LIML is less precise than 2SLS but also less biased. If the results come out similar, be happy. If not, worry, and try to find stronger instruments or reduce the degree of overindentification".

was rejected at the conventional level (5%), confirming that livelihood choice variables are endogenous (see more in Appendix 15 and Appendix 16). This result, therefore, indicated that the IV model is preferred to the OLS model[29].

5.3 Results and discussion

Table 5.3: Determinants of household livelihood outcomes

Explanatory variables	Income (IV regression)		Expenditure (IV regression)	
	Coefficient	SE	Coefficient	SE
Livelihood strategy				
Informal wage work	0.2011*	(0.120)	0.2925***	(0.094)
Formal wage work	0.4526***	(0.126)	0.3983***	(0.094)
Non-farm self-employment	0.2899**	(0.113)	0.3283***	(0.075)
Farmland loss				
Land loss 2009	0.1397	(0.085)	0.1842***	(0.070)
Land loss 2008	0.0560	(0.091)	0.0011	(0.057)
Human capital				
Household size	-0.1452***	(0.015)	-0.0508***	(0.012)
Dependency ratio	-0.0802**	(0.034)	-0.0989***	(0.029)
Number of male working members	0.0630**	(0.030)	0.0095	(0.026)
Household head's gender	0.0199	(0.049)	0.0604*	(0.034)
Household head's age	0.0010	(0.002)	0.0012	(0.001)
Education of working members	0.0338***	(0.011)	0.0140*	(0.008)
Natural capital				
Farmland per adult	0.0368***	(0.010)	0.0278***	(0.007)
Size of residential land	0.0004	(0.001)	0.0011	(0.001)
Physical capital				
Productive assets	0.1123***	(0.020)	0.0982***	(0.015)
Social capital				
Number of group memberships	0.0149	(0.012)	0.0124	(0.009)
Financial capital				
Formal credit	0.1043**	(0.048)	0.0625**	(0.031)
Informal credit	-0.0541	(0.047)	0.0245	(0.030)
Commune				
Song Phuong	0.1774**	(0.076)	0.1678***	(0.045)
Kim Chung	0.2194***	(0.068)	0.1875***	(0.043)
An Thuong	0.0451	(0.072)	0.0645	(0.042)
Duc Thuong	0.1291**	(0.063)	0.0920**	(0.043)
Van Con	0.1874***	(0.072)	0.1349***	(0.050)
Intercept	5.6921***	(0.237)	5.4576***	(0.174)
Centred R2	0.528		0.456	
Uncentred R2	0.997		0.999	
Observations	451		451	

Note: SE: Robust standard errors in parentheses. Coefficients and standard errors are adjusted for sampling weights. *, **, *** mean statistically significant at 10 %, 5 % and 1 %, respectively.

[29] See the OLS estimations results in Appendix 17.

Livelihood strategy choice

Table 5.3 reports the estimation results from the IV regression of the livelihood outcomes (livelihood outcomes are natural logarithms of monthly income and expenditure per capita). Both sets of results confirm that household wellbeing is greatly affected by the choice of livelihood strategy. In general, households that follow non-farm-based livelihoods have higher wellbeing than farm households. More specifically, households with 'formal wage work' achieve the highest income level, followed first by 'non-farm self-employment' and then by 'informal wage work', and lastly by 'farm work'. In addition, this ranking is also similar to the choice of consumption expenditure per capita as an indicator of household welfare. Such wellbeing disparities across various livelihood strategies imply that livelihood choice is a crucial factor affecting household livelihood outcomes. Also, it suggests that moving out of agriculture may be a way to raise household welfare. The result is partly consistent with previous findings in rural Vietnam. For instance, Van de Walle and Cratty (2004) found that households that farm only are poorer than all those that combine farming with some type of non-farm employment. Moreover, as estimated in Pham et al. (2010), on average and ceteris paribus, the shift of a household from pure agriculture to pure non-agriculture raises expenditure per capita, and this outcome tends to steadily increase over time.

Farmland loss

Land loss in 2009 has a positive association with household expenditure. The coefficient of this variable, however, seems to be quite small: a 10 percentage-point increase in the area of farmland loss corresponds with a 1.8 percent higher expenditure per capita. Nevertheless, a similar impact is not statistically significant for the case of land loss in 2008. This may be because households with land loss in 2009 partly used their compensation money for household expenses while households with land loss in 2008 might have used up their compensation money in 2008. As shown by the survey, 61 percent of land-losing households reported using part of their compensation money for daily expenses. For some households, the compensation money for farmland loss might be used to deal with

the shock of farmland loss while other households might use this for additional expenditure to improve their wellbeing.

A surprising result was that farmland loss in both years has no negative impact on household income. Possibly, this implies that only a small amount of income that was contributed by agricultural production was lost due to the area of acquired farmland[30]. However, it should be noted that there are also some strong and indirect effects of farmland loss on household welfare (through its effect on livelihood choice). As discussed in Section 4.5, farmland acquisition has acted as both a push and a pull factor that promotes households to supplement a shortage of farm income with non-farm income sources from self-employment and paid jobs. As a consequence, households may derive more income from paid jobs or self-employment in non-farm activities, which may offset or even exceed the amount of farm income lost by farmland loss[31]. This explanation is also supported by the survey results obtained by Le (2007), who found that different components of household income were differently affected by farmland acquisition. After losing farmland, households' income from agriculture significantly declined but their income from various non-farm sources considerably increased. In fact, complementing farm incomes with casual wage income is a process through which a number of the poorest farming households obtain greater living standards in Vietnam (Van de Walle & Cratty, 2004). Moreover, even in some rural areas of Vietnam where farmland has not been encroached by urbanisation and is possibly sufficient for agricultural production, the poor returns from farming, especially rice cultivation, have driven young rural workers to quit farm jobs to search for urban jobs in developed provinces and big cities as a path towards improving household wellbeing, leaving farm work for the elderly (Paris et al., 2009).

[30] According to the survey data, on average, annual crop income per 1 sào (360 m^2) reached around 3.7 million VND (1USD equated to about 18,000 VND in 2009). Moreover, the corresponding figures for income from rice cultivation were extremely low; around 1.5 million VND.

[31] As reported by surveyed households, on average a manual worker earned about 2.1 million VND per month. Accordingly, suppose one family member moves out of farming activities to engage as a wage earner in the informal sector in 6 months, he or she would earn 12.6 million VND - a greater amount than the annual crop income from 3 sào of agricultural land.

Natural capital

More owned farmland per adult is linked with higher wellbeing. Holding all other variables constant, an additional 100 m^2 of farmland per adult is associated with around 3.7 percent and 2.8 percent greater income and expenditure per capita, respectively. However, residential land size is not related to both income and expenditure. Possibly this implies that in this area, residential land has not been utilised for income-generating activities such as building boarding houses for students and migrant workers or shops for rent. Also this may partly reflect the fact that the demand for rental boarding houses and business locations has been low, possibly due to certain limitations in the local infrastructure, or the geographic location of this area being less favourable than some other peri-urban districts of Hanoi such as Tu Liem, for instance. This district has a favourable location and recently improved infrastructure. Therefore, households there have benefited from their proximity to many factories, universities and new urban centres, which in turn has resulted in a significant increase in the demand for rental boarding houses and small business premises in this area. Consequently, this profitable opportunity has been seized by a large number of households and accommodation rental fees have become their major income source (Nguyen, 2009b).

Human capital

Both household size and dependency ratio are negatively associated with income and expenditure per capita. Looking at the case of income per capita, the finding is consistent with Jansen, Pender, Damon, Wielemaker, et al. (2006), who found that having more dependent members, and more family members in general, seems to reduce per capita income. However, the negative association between household size and expenditure per capita suggests that larger households may benefit from economies of scale in expenditure because the spending per capita to provide a given living standard may decrease as household size increases (Abdulai, 2003). Thus for smaller households, higher levels of income per capita are required to maintain a given standard of living (Kleiman, 1966). Although having more male working members is not related to the probability of adopting non-farm-based livelihood strategies, it is associated with a higher income level

but not with a higher expenditure level. In addition, the age of the household head has no statistically significant association with wellbeing, but male-headed households have a higher household expenditure. Finally, the education of working members has both a direct and indirect positive association with household wellbeing. A higher level of education is linked with a higher probability of a household adopting the formal wage work-based strategy, which has an association with a higher income and expenditure level.

Social capital

The membership variable that represents associational activity has no statistically significant association with either household expenditure or income. This is in line with the findings in rural Vietnam by Nguyen et al. (2004). The authors explained that in rural Vietnam, people are often encouraged to join many organisations or associations involuntarily. Such types of groups generate little or no economic benefit for their members. In addition, a recent survey in rural Vietnam by CIEM (2009) revealed that significant proportions of group members reported that the main benefits that they get from group memberships are entertainment, social status, relationships, and knowledge rather than economic benefit.

Financial and physical capital

There was statistical evidence for a significantly positive association between access to formal credit and household income and expenditure. Similar evidence was not found in the case of informal credit. This phenomenon may be partly explained by the fact that the purpose of informal loans is mainly for non-production rather than production, which may generate little or no economic return. According to the survey, 46 percent of households said that one of the purposes of taking informal loans was for consumption; around 30 percent reported that one of the informal loan's purposes was for building or repairing their houses and about 42 percent answered that one of the informal loan's purposes was for production. Conversely, about 55 percent of surveyed households reported that one of their formal loans' purposes was for production, and only around 10 percent and 8 percent of them said that one of the purposes of

taking formal loans was for consumption and building or repairing houses, respectively. This explanation is partly in accordance with that of Pham and Izumida (2002) who found that in rural Vietnam, one of the purposes of borrowing informal loans was for consumption (mainly for smoothing consumption at critical times). Finally, the "*capital-labour ratio*" is also positively associated with household wellbeing. The elasticity of household income and expenditure to higher values of "*capital-labour ratio*" is around 0.11 and 0.10, respectively.

Commune fixed effects

All most coefficients of the communal dummy variables in both income and expenditure models have the same signs and statistical significance. These variables indicate that households with equal livelihood assets and other characteristics will on average have expenditure and income per capita levels that are higher in Song Phuong, Kim Chung, Duc Thuong and Van Con than in Lai Yen. The disparities in wellbeing across communes suggest that livelihood outcomes are considerably affected by communal factors.

5.4 Conclusion and policy implications

This study found no econometric evidence for negative effects of farmland loss on either household expenditure or income. For many land-losing households whose income mainly derived from farming, compensation money was used to cover daily household expenses, suggesting this financial resource enabled them to temporarily smooth consumption when facing income shortfalls caused by the loss of farmland. However, having no farmland or farmland shortage should not be seen as a negative phenomenon, given the context of farmland conversion for urbanisation and industrialisation. Higher levels of farmland loss are closely linked to more participation in non-farm activities. The non-farm based-income strategies are not only less dependent on farmland but also are potentially more lucrative than farming activities. As discussed in the previous chapter, under the impact of farmland loss, some households might be 'pushed' into casual wage work or non-farm self-employment in response to income shortfalls. For other households, they might be 'pulled' into non-farm activities because of attractive

income sources from these activities. Thus there is an implication that the rise in landlessness due to urbanisation should be regarded as a positive factor that enables farm households to improve their welfare by intensively engaging in non-farm activities. Such a trend seems similar to that in several developing countries where farmland scarcity is highly related to more engagement in both agricultural and non-agricultural paid jobs and therefore leads rural households to pursue this way of enhancing their wellbeing (Winters et al., 2009).

As previously discussed, a household's welfare is closely linked with its livelihood choice and the non-farm-based strategies were found to be far more lucrative than the farm work-based strategy. This implies changes in livelihood choice towards non-farm activities may be a way to raise rural household welfare. As mentioned in Section 4.5, changes in livelihood strategies, nevertheless, are determined by asset-related variables and other exogenous conditions. In particular, land (farmland and the location of the house), and education are crucial factors that are closely associated with participation in non-farm activities. The accumulation, value, usefulness of and access to these factors can be greatly affected by institutions and state policies. As a result, State intervention in these factors can improve household wellbeing through providing favourable conditions for livelihood transition and diversification. Some policy implications that may help land-losing households to intensively engage in non-farm activities were proposed in the previous chapter. For instance, a better transportation and road system will result in a closer connection between land-losing communes and urban centres, which in turn generates more opportunities in non-farm activities for local people. Moreover, hastening the implementation of granting *"land for services"* allows land-losing households to have a prime location that can be used for doing businesses, such as opening a shop or a workshop, or for rental purposes. Finally, investing in children's education is likely to give the next generation a better chance to engage in formal wage work.

Farmland size is positively related to household wellbeing, indicating the important role of this asset in determining household wellbeing. Despite the fact that the number of households that pursued the farm work-based strategy greatly declined after the farmland acquisition, a number of households continued their

engagement in agriculture for subsistence or cash income. Possibly, this suggests that in some urbanising areas of Hanoi, agriculture has maintained its importance to the food security of many households and particularly to the livelihood of households who are unable to take up non-farm-based livelihoods. For households whose living largely relies on farming, their income may be considerably decreased because the remaining farmland size may be insufficient for cultivating the traditional types of crops. Thus, it may be useful for them to learn successful experiences in farming transitions from some localities in Hanoi. For instance, in the Tu Liem peri-urban area, Tay Ho and Hoang Mai urban districts, farm households have gained much benefit by shifting from cultivation of staples to higher value products such as fresh vegetables, flowers and ornamental plants (Lee et al., 2010). Consequently, agricultural extension polices that assist farmers to change to more profitable crop plants is likely to be of practical use.

Finally, some may worry that farmland is the most important asset for rural livelihoods and therefore losing farmland means losing everything. Fortunately, as mentioned in the previous chapter, *"land for services"* may become a very important livelihood asset that can be expected to bring an alternative source of livelihood to land-losing households, notably to elderly and less well-educated landless farmers. *"Land for services"* not only can be used as premises for non-farm self-employment activities or renting out, but also becomes an extremely valuable asset[32]. In this sense, *"land for services"* has multiple functions, including as a resource and an asset and, particularly plays a role as insurance for unemployed farmers and elderly landless farmers. The above discussion implies that the rising acquisition of farmland for urbanisation and industrialisation, coupled with the compensation with land as mentioned above, can be seen as a positive factor that enables land-losing households to change their livelihoods and improve their welfare.

[32] The price of *"land for services"* in some places of Hoai Duc District was offered at about 24-35 million VND per m^2 in the first quarter of 2011 (see more in Minh Tuan, 2011) and 1 USD equated to about 20,000 VND at that time.

CHAPTER SIX: FARMLAND ACQUISITION, HOUSEHOLD INCOME SHARES AND INEQUALITY IN HANOI'S PERI-URBAN AREAS

6.1 Introduction

In Chapter 4, the multinomial logit model (MLM) was used to examine the relationship between farmland loss and households' livelihood choices. The results indicate that households with more land loss in 2008 are more likely to adopt livelihood strategies based on wage and non-farm self-employment. Similar evidence was not found in the case of those with land loss in 2009. Using the MLM, however, does not capture the impact of land loss on changes in households' income shares by source. In fact, some land-losing households might not change their livelihood strategy but they might diversify into non-farm activities, leading to some changes in their income components. For instance, some land-losing households might maintain farming as their main income earning activity, possibly because only a small or moderate area of their farmland was acquired by the State. In addition, some household members among land-losing households might participate in non-farm activities as a way to supplement their income with non-farm income sources. For this reason, it is necessary to investigate the impact of land loss on household income shares by source. This approach is expected to adequately capture the relation between land loss and livelihood diversification in non-farm activities.

As indicated in the previous chapters, even though farmland has retained an important role in determining household livelihoods in peri-urban areas, non-farm based-livelihoods have gained increasing importance, given the context of escalated farmland acquisition. Non-farm-based livelihood strategies have several advantages, especially for land-losing households. The availability of non-farm job opportunities in Hanoi's peri-urban areas allows many households to utilise all household labour, and income from non-farm employment may enable the households to supplement an income shortfall caused by land loss and thus

improve household welfare. The findings in Chapter 5 show that different income generating strategies offer different income levels. In general, the non-farm-based strategies offer higher income levels than the farm work-based strategy. Specifically, households pursuing the formal wage work-based strategy have the highest income level, followed first by those with the non-farm self-employment-based strategy and then those with the informal wage work-based strategy, and lastly by households with the farm work-based strategy. The findings in Chapter 4 indicate that there is a very low barrier to take up the informal wage work-based strategy but this is not the case of other lucrative non-farm-based strategies. For example, households with low education levels are less likely to adopt the formal wage work-based strategy while others without a house in a prime location have a lower opportunity to undertake the non-farm self-employment-based strategy. Combined together, these suggest that *ceteris paribus*, the income from a livelihood strategy is higher the more difficult the entry is into this strategy. Consequently, high entry barriers and unequal incomes from different activities may result in income inequality among households. This chapter, therefore, investigates whether non-farm income sources are associated with income inequality.

This chapter is structured as follows: the next section discusses the econometric models used to estimate the impact of land loss on household income shares by source. In order to analyse the relationship between income sources and inequality, a Gini decomposition analysis of income inequality by source is presented in Section 6.3. Finally, the conclusion and policy implications are made in Section 6.4.

6.2 Analyzing the relationship between farmland acquisition and household income shares by source

6.2.1 Specification of econometric models

Because farm income share is a proportion that is bounded between zero and one, the determinants of farm income share were modeled using a fractional regression model proposed by Papke and Wooldridge (1996). This approach was developed to deal with models containing fractional dependent variables bounded between

zero and one. The fractional logit model (FLM), as introduced by these authors, has similarities with the common logit model, with the difference that the response variable is a continuous variable bounded between zero and one instead of being a binomial variable, and this model is estimated using a quasi-maximum likelihood procedure (Jonasson, 2011). As demonstrated by Wagner (2001), the fractional logit approach, is the most appropriate approach because this model overcomes a lot of difficulties related to other more commonly used estimators such as OLS and TOBIT[33]. In addition, Cardoso, Fontainha, and Monfardini (2010) indicate that the fractional logit model has a crucial advantage over the TOBIT specification because it is based on a quasi-maximum likelihood estimator, which does not require an assumption of full normal distribution for consistent estimates.

In order to quantify factors affecting nonfarm income shares by source, a set of simultaneous equations was estimated with the share of farm, informal wage, formal wage, non-farm self-employment and other income as dependent variables. Because each of these dependent variables is a fraction between zero and one and the shares from this set of dependent variables for each observation add up to one, the fractional multinomial logit model (FMLM) proposed by Buis (2008) was employed. As Buis (2008) notes, the FMLM is a multivariate generalisation of the fractional logit model developed by Papke and Wooldridge (1996) to deal with the case where the shares add up to one. Similar to the fractional logit model, the FMLM is estimated by using a quasi-maximum likelihood method, which in this case always implies robust standard errors (Buis, 2008). In fact, there are a growing number of studies applying the FMLM to handle models containing a set of fractional response variables with shares that add up to one (Barth, Lin, & Yost, 2011; Choi, Gulati, & Posner, 2012; Kala, Kurukulasuriya, & Mendelsohn, 2012; Mu & McCarl, 2011; Winters, Essam, Zezza, Davis, & Carletto, 2010).

[33] One may argue that the two-limit variant of the Tobit estimator is suitable. Nonetheless, Wagner (2001, p. 231) noted that: "TOBIT is simply not made for a situation when the endogenous variable is bounded to be zero or positive by definition." It is appropriately applied to situations where the values of variable are outside of the limits because of censoring.

Table 6.1: Definition and measurement of variables in the models of farm income and non-farm income shares

Explanatory variables	Definition	Measurement
Farmland loss		
Land loss 2009	Proportion of farmland compulsorily acquired by the State in 2009	Ratio
Land loss 2008	Proportion of farmland compulsorily acquired by the State in 2008	Ratio
Natural capital		
Farmland per adult	Owned farmland size per member aged 15 and over	100 m^2
Residential land size	Total size of residential land	10^2
House location	Whether or not households have a house a plot of residential land with a prime location.	Dummy (=1 if yes)
Human capital		
Household size	Number of household members	Number
Dependency ratio	This ratio is calculated by the number of household members aged under 15 and over 59, divided by the total members aged 15-59	Ratio
Number of male working members	Number of male adult members who were employed in the last 12 month	Number
Household head's gender	Whether or not the household head is male	Dummy (=1 if yes)
Household head's age	Age of household head	Years
Education of working members	Average years of formal schooling of adult members who were employed in the last 12 months	Years
Age of working members	Average age of adult members who were employed in the last 12 months	Years
Social capital		
Group memberships	Number of memberships in formal and informal groups and organisations	Number
Financial capital		Dummy
Formal credit	Received any loan from banks or credit institutions in the last 24 months	(=1 if yes)
Informal credit	Received any loan from friends, relatives or neighbours in the last 24 months	(=1 if yes)
Physical capital		
Productive assets	Value of all productive assets per working member	Natural logarithms
Past livelihood strategy (Included)	The livelihood strategy that households followed before farmland acquisition	Dummy
Commune dummies (Included)	The commune in which the households live	Dummy

Table 6.1 describes the name, definition and measurements of explanatory variables of the regression models (see more in Appendix 18). Following the framework for micro policy analysis of rural livelihoods proposed by Ellis (2000), I assumed that income shares by various sources are determined by household

livelihood assets (including natural, physical, human, financial and social capital), and other factors such as the loss of farmland and commune dummies. As compared to the explanatory variables in the model of household activity choice in Chapter 4, some more asset-related explanatory variables were included that potentially affect household income shares, namely social capital, financial capital and physical capital. Farmland loss was the variable of interest, which was expected to significantly affect all components of household income. Households with a higher proportion of farmland loss are hypothesized to have a lower share of farm income and conversely, were expected to raise the proportion of all other non-farm incomes.

Regarding human capital, large household size was expected to raise the share of farm income because as mentioned in Section 4.4, peri-urban agricultural production is a labour intensive activity. In addition, a higher dependency ratio is hypothesised to lead to a higher percentage of non-farm income, as having more dependents may put more pressure on adults to search for income-earning activities. In rural Vietnam, men are more likely than women to participate in non-agricultural wage work (Pham et al., 2010), so having more male working members is more likely to achieve a higher wage income share. Finally, households with better human capital were expected to gain a higher percentage of formal wage income. Older working members tend to be involved in farming as their main income earning activity. Therefore, age of household heads and of working members were also expected to be positively linked with the share of farm income.

As revealed in Section 4.4, farmland has a positive association with participation in farming and thus farmland per adult is hypothesised to be positively linked with the share of farm income. As indicated in Section 3.2.1.1.2, in Hanoi peri-urban areas, residential land has become an extremely valuable asset and therefore it can be used as collateral for formal credit. This implies that households with a larger amount of residential land were expected to have greater financial resources for production. Consequently, a larger area of residential land is hypothesised to correlate with a higher share of farm income and of non-farm self-employment income. Finally, a higher percentage of income from non-farm household

businesses was also expected for households with a house or a residential land plot in a prime location.

Households with more group memberships may obtain more benefit from larger networks such as access to information, technology, and credit for production. Therefore, better social capital was expected to positively correlate with farm and non-farm self-employment income shares. With respect to the role of financial capital, access to both formal and informal credit is hypothesised to have a positive association with the share of farm income and that of non-farm self-employment income. In addition, a higher share of these income sources was also expected for households with more physical capital. As revealed in Chapter 4, households' current activity choices are largely determined by their past livelihood strategy. Hence, I included the past livelihood strategy variable as an important explanatory that was expected to considerably affect income sources. Finally, commune dummies were also included to control for the fixed commune effects.

Table 6.2 provides background information about household and per capita income by source. In addition it also indicates how much various income sources contribute to total household income in the sample. The results show that the overwhelming majority of surveyed households (around 83 percent) derived income from farming, which, however, only accounted for about 28 percent of total income on average. This suggests farming has remained important in terms of food security and cash income to some extent. Many households have continued rice cultivation as a source of food supply while others produced vegetables and fruits to supply Hanoi's urban markets. The common types of crop plants consisted of cabbages, tomatoes, water morning glory and various kinds of beans, and fruit trees including oranges, grapefruits and guavas, among others. Animal husbandry was mainly undertaken as pig or poultry breeding on small-size farms or cow grazing. These activities, however, have declined considerably due to the spread of cattle diseases in recent years.

Table 6.2: Composition of household income and non-farm participation rate

	Annual income per household	Annual income per capita	Share of total Household income (percent)	Participation rate (percent)
Total income	60,642	13,513		
SD	*33,034*	*7,091*		
Farm income	14,432	3,216	27.69	83.04
SD	*16,169*	*3,621*		
Non-farm income	42,801	9,537	65.90	90.00
SD	*33,571*	*7,140*		
A. Informal wage income	11,559	2,576	23.20	40.35
SD	*17,703*	*3,973*		
B. Formal wage income	14,431	3,216	16.95	27.30
SD	*29,762*	*6,232*		
C. Non-farm self-employment	16,811	3,746	25.74	43.28
SD	*27,803*	*6,231*		
Other income	3,409	760	6.41	31.88
SD	*8,676*	*2,410*		

Note: Means and standard deviations (SD) are adjusted for sampling weights. N= 477. Unit: 1,000 VND. Non-farm income = (A+B+C).

Almost all surveyed households (90 percent) participated in non-farm activities and income from these sources contributed about two thirds of total income on average. Among these activities, informal wage income accounted for about one fourth of total income with a participation rate of around 40 percent. This income source was often earned from manual labour jobs. The occupations most commonly found included carpenters, painters, building workers and various kinds of casual jobs. Such workers were often hired by individuals or households, providing low and unstable incomes, with no formal labour contracts. Those who undertook these jobs had below-average education and were younger than farmers. Similar figures were observed for non-farm self-employment income. About 43 percent of the household sample reported engaging in non-farm household businesses, and on average around 26 percent of total income was contributed by this activity. Such businesses tended to be small-scale trade or production units, using family labour. The households' business premises were mainly located at their own houses or residential land plots that had a prime location for opening a shop, a workshop or a small restaurant. About 27 percent of sample households received income from formal wage work, accounting for 17 percent of total income on average. Formal wage earners were often employees who worked in enterprises and factories, state offices or other organisations. Such jobs were often highly paid with stable incomes and formal labour contracts.

Those undertaking these jobs tended to have a much higher education level and were younger. Finally, about one third of surveyed households received other income, but this source only contributed 6.4 percent of total income on average.

6.2.2 Results and discussion

Table 6.3: Fractional logit estimates for determinants of farm income share

Explanatory variables	Farm income share			
	RPRs	SE	Coefficients	SE
Land loss 2009	0.2780**	(0.147)	-1.278**	(0.530)
Land loss 2008	0.132***	(0.055)	-2.024***	(0.419)
Household size	1.172***	(0.067)	0.159***	(0.058)
Dependency ratio	0.816	(0.108)	-0.204	(0.132)
Number of male working members	0.939	(0.101)	-0.063	(0.108)
Household head's gender	1.580**	(0.309)	0.457**	(0.195)
Household head's age	0.995	(0.008)	-0.005	(0.008)
Age of working members	1.036***	(0.012)	0.035***	(0.012)
Education of working members	0.876***	(0.031)	-0.133***	(0.035)
Social capital	0.965	(0.050)	-0.036	(0.052)
Farmland per adult	1.149***	(0.047)	0.139***	(0.041)
Residential land size	1.001	(0.005)	0.001	(0.005)
House location	0.627***	(0.100)	-0.468***	(0.160)
Formal credit	0.943	(0.163)	-0.059	(0.173)
Informal credit	1.470**	(0.286)	0.385**	(0.195)
Productive assets/working members	1.180**	(0.084)	0.165**	(0.071)
Past livelihood A	0.303***	(0.069)	-1.193***	(0.227)
Past livelihood B	0.283***	(0.072)	-1.261***	(0.254)
Past livelihood C	0.174***	(0.042)	-1.751***	(0.243)
Song Phuong	1.492*	(0.355)	0.400*	(0.238)
Kim Chung	0.625*	(0.175)	-0.471*	(0.280)
An Thuong	1.416	(0.384)	0.348	(0.271)
Duc Thuong	1.813*	(0.551)	0.595*	(0.304)
Van Con	1.389	(0.375)	0.329	(0.270)
Intercept	0.053***	(0.050)	-2.930***	(0.942)
Observations	457			
Log pseudo likelihood	-10,409.86357			

Note: Estimates are adjusted for sampling weights. RPRs are Relative Proportion Ratios. SE: robust standard errors. *, **, *** mean statistically significant at 10%, 5 % and 1 %, respectively.

Table 6.4: Fractional multinomial logit estimates for determinants of non-farm income shares

Explanatory variables	Informal wage income		Formal wage income	
	RPRs	Coefficients	RPRs	Coefficients
Land loss 2009	4.984**	1.606**	4.309*	1.461*
	(3.177)	(0.638)	(3.365)	(0.781)
Land loss 2008	15.937***	2.769***	5.400***	1.686***
	(8.778)	(0.551)	(3.299)	(0.611)
Household size	0.788***	-0.238***	0.920	-0.084
	(0.059)	(0.075)	(0.087)	(0.095)
Dependency ratio	1.134	0.125	1.007	0.006
	(0.194)	(0.171)	(0.302)	(0.300)
Number of male working members	1.486***	0.396***	1.259	0.231
	(0.214)	(0.144)	(0.264)	(0.210)
Household head's gender	0.831	-0.185	0.714	-0.338
	(0.251)	(0.301)	(0.266)	(0.372)
Household head's age	0.999	-0.001	0.998	-0.002
	(0.011)	(0.011)	(0.015)	(0.015)
Age of working members	0.948***	-0.054***	0.949***	-0.052***
	(0.016)	(0.017)	(0.017)	(0.018)
Education of working members	1.009	0.009	1.339***	0.292***
	(0.064)	(0.063)	(0.090)	(0.067)
Social capital	1.034	0.033	1.148*	0.138*
	(0.081)	(0.078)	(0.092)	(0.080)
Farmland/adult	0.866***	-0.144***	0.879***	-0.128***
	(0.046)	(0.053)	(0.043)	(0.049)
Residential land size	1.002	0.002	1.006	0.006
	(0.006)	(0.006)	(0.011)	(0.011)
House location	0.805	-0.217	1.147	0.137
	(0.198)	(0.246)	(0.373)	(0.326)
Formal credit	0.906	-0.099	0.688	-0.373
	(0.214)	(0.236)	(0.211)	(0.306)
Informal credit	0.794	-0.231	0.598	-0.515
	(0.215)	(0.270)	(0.197)	(0.330)
Productive assets/working members	0.697***	-0.361***	0.711***	-0.341***
	(0.063)	(0.091)	(0.084)	(0.118)
Past livelihood A	6.605***	1.888***	2.812**	1.034**
	(1.819)	(0.275)	(1.360)	(0.483)
Past livelihood B	0.858	-0.153	13.329***	2.590***
	(0.499)	(0.582)	(4.959)	(0.372)
Past livelihood C	0.656	-0.422	1.994	0.690
	(0.301)	(0.460)	(1.105)	(0.554)
Song Phuong	0.224***	-1.497***	0.583	-0.539
	(0.078)	(0.350)	(0.297)	(0.509)
Kim Chung	1.324	0.281	1.204	0.186
	(0.478)	(0.361)	(0.517)	(0.429)
Anh Thuong	0.696	-0.362	0.589	-0.529
	(0.276)	(0.396)	(0.258)	(0.439)
Duc Thuong	0.455**	-0.788**	0.420	-0.866
	(0.174)	(0.382)	(0.227)	(0.541)
Van Con	0.581	-0.543	0.519	-0.655
	(0.221)	(0.380)	(0.315)	(0.608)
Intercept	263.401***	5.574***	3.743	1.320
	(349.737)	(1.328)	(6.578)	(1.757)
Observations	457		457	
Wald chi2(96)	1185.30			
Prob > chi2	0.0000			

Note: Robust standard errors in parentheses. RPRs are Relative Proportion Ratios. Estimates are adjusted for sampling weights. *, **, *** mean statistically significant at 10%, 5 % and 1 %, respectively. The farm income share is the excluded category.

Table 6.4 (continued)

Explanatory variables	Non-farm self-employment income		Other income	
	RPRs	Coefficients	RPRs	Coefficients
Land loss 2009	1.889	0.636	8.283***	2.114***
	(1.251)	(0.662)	(6.688)	(0.807)
Land loss 2008	3.874***	1.354***	6.776**	1.913**
	(2.025)	(0.523)	(5.391)	(0.796)
Household size	0.937	-0.065	0.702***	-0.354***
	(0.086)	(0.092)	(0.075)	(0.107)
Dependency ratio	1.269	0.239	1.926***	0.655***
	(0.201)	(0.159)	(0.365)	(0.190)
Number of male working members	0.671**	-0.400**	0.416***	-0.876***
	(0.123)	(0.183)	(0.122)	(0.293)
Household head's gender	0.510**	-0.673**	0.592*	-0.524*
	(0.140)	(0.274)	(0.179)	(0.303)
Household head's age	1.002	0.002	1.036***	0.036***
	(0.012)	(0.012)	(0.012)	(0.011)
Age of working members	0.984	-0.016	1.013	0.013
	(0.015)	(0.015)	(0.021)	(0.021)
Education of working members	1.110**	0.104**	1.332***	0.287***
	(0.056)	(0.050)	(0.087)	(0.065)
Social capital	0.966	-0.035	1.062	0.060
	(0.075)	(0.078)	(0.108)	(0.102)
Farmland/adult	0.839***	-0.176***	0.923	-0.080
	(0.050)	(0.060)	(0.109)	(0.118)
Residential land size	0.987	-0.013	0.998	-0.002
	(0.009)	(0.009)	(0.007)	(0.007)
House location	2.936***	1.077***	0.980	-0.020
	(0.649)	(0.221)	(0.281)	(0.287)
Formal credit	1.524*	0.421*	1.211	0.191
	(0.372)	(0.244)	(0.381)	(0.315)
Informal credit	0.542**	-0.613**	0.587	-0.532
	(0.131)	(0.241)	(0.232)	(0.395)
Productive assets/working members	1.107	0.102	0.792**	-0.233**
	(0.114)	(0.103)	(0.094)	(0.118)
Past livelihood A	0.639	-0.448	2.149*	0.765*
	(0.221)	(0.346)	(0.939)	(0.437)
Past livelihood B	0.443**	-0.815**	5.965***	1.786***
	(0.179)	(0.403)	(2.624)	(0.440)
Past livelihood C	7.408***	2.002***	5.741***	1.748***
	(2.088)	(0.282)	(2.372)	(0.413)
Song Phuong	1.527	0.423	0.715	-0.336
	(0.541)	(0.354)	(0.311)	(0.435)
Kim Chung	2.411**	0.880**	2.258*	0.815*
	(0.948)	(0.393)	(1.041)	(0.461)
Anh Thuong	1.011	0.011	0.556	-0.587
	(0.387)	(0.383)	(0.281)	(0.504)
Duc Thuong	0.975	-0.025	0.810	-0.210
	(0.389)	(0.399)	(0.435)	(0.536)
Van Con	1.260	0.231	0.978	-0.022
	(0.509)	(0.404)	(0.430)	(0.439)
Intercept	0.757	-0.279	0.039*	-3.248*
	(1.006)	(1.329)	(0.076)	(1.962)
Observations	457		457	
Wald chi2(96)	1185.30			
Prob > chi2	0.0000			

Note: Robust standard errors in parentheses. RPRs are Relative Proportion Ratios. Estimates are adjusted for sampling weights. *, **, *** mean statistically significant at 10%, 5 % and 1 %, respectively. The farm income share is the excluded category.

Table 6.3 and Table 6.4 report the estimation results from the fractional logit and fractional multinomial logit models. Note that RPRs (Relative Proportion Ratios) are the exponentials of coefficients to measure the change in the relative proportion of income shares due to a unit increase in the explanatory variable, while keeping all other variables constant. In the fractional logit model, the relative proportion is the proportion of farm income divided by (1- the proportion of farm income), i.e., the proportion of farm income divided by the proportion of all other incomes. In the fractional multinomial logit model, the relative proportion is the proportion of non-farm income (informal wage income, formal wage income, non-farm self-employment income, and other income) divided by the proportion of farm income (the reference group).

Both sets of results show that many coefficients are statistically different from zero (sig. <0.10) with their pattern of signs as expected. As shown in Table 6.3, the coefficients of land loss variables in both years are highly statistically significant and negative, suggesting that a higher level of land loss is closely linked with a lower percentage of farm income in the total household income. Holding all other variables constant, if the land loss in 2009 and land loss in 2008 rises by 10 percentage-points the relative proportion of farm income share decreases by 12 percent and 18 percent, respectively[34]. In addition, as indicated in Table 6.4, the coefficients of land loss in both years are statistically significant and positive, suggesting that land loss is positively associated with every share of all non-farm incomes except in the case of non-farm self-employment income in 2009. The finding is quite different from that of the model of household activity choice in Chapter 4, which indicates that land loss in 2009 is not related to any choice of non-farm-based livelihood strategies. This, therefore, suggests that the impact of land loss in both years on the changes in income source was captured by the FML model while this was not the case for the ML model. Combined together, these findings therefore show that even though a number of land-losing

[34] The percentage change in the relative proportion of farm income share, given a 10 percentage-point increase in the land loss in 2009 and 2008, is calculated by RPR-1: exp (-1.278×0.1)-1=0.880029-1 = -0.119971≈ - 0.12. Similarly, exp (-2.024×0.1) - 1 =0.816768 - 1 = - 0.183232 ≈ - 0.18.

households did not change their livelihood strategy, their income shares by source considerably changed, raising the share of non-farm income sources.

Land loss was found to be most positively related to the share of informal wage income among non-farm income sources. Holding all other variables constant, a 10 percentage-point increase in land loss in 2009 and in 2008 corresponds with an approximately 17 percent and 32 percent increase in the relative proportion of the informal wage income share. The corresponding figures for the share of formal wage income are 16 and 18 percent increases. Considering the share of non-farm self-employment income, only the land loss in 2008 is statistically significant, with a 14 percent increase in the relative proportion. This implies that there are some potentially high entry barriers to these income-generating activities. This finding is partly in accordance with that of the model of livelihood choice in Chapter 4, which shows that manual labour jobs become the most popular choice of land-losing households. A similar trend was also observed in a peri-urban village of Hanoi by Do (2006) and in Hung Yen, a neighboring province of Hanoi by T. D. Nguyen et al. (2011). Land loss is also positively associated with the share of other income. These observations imply that a number of land-losing households actually supplemented their income with income from other sources, which may offset the amount of farm income lost by land loss. This, therefore, supports the conclusion in Chapter 5, which found no statistical evidence for the negative effects of land loss on household wellbeing, controlling for other factors.

Schooling of working members is negatively associated with the share of farm income but positively correlated with that of non-farm self-employment income and formal wage income. As indicated by Reardon, Taylor, Stamoulis, Lanjouw, and Balisacan (2000), better education may shift households away from farming and the most lucrative non-farm opportunities often require higher educational qualifications. Having more working members who are male is more likely to raise the percentage of informal wage income but to reduce the percentage of non-farm self-employment income and other income. This implies that manual labour jobs appear to be more suitable for men than non-farm self-employed jobs. Male-headed households tend to reduce the share of non-farm self-employment income, suggesting that female-headed households are likely to be more active than male-

headed households in non-farm self-employment activities. This is because the majority of non-farm self-employment activities were small trades and the provision of local services which were possibly more suitable for women. The finding is also consistent with that of Pham et al. (2010), who found that in rural Vietnam women are more likely than men to engage in non-farm self-employed jobs but men are more likely to be wage earners in non-farm activities.

The result shows that more farmland per adult has a negative association with every share of non-farm incomes. This finding complements an earlier study which indicated there is a negative relationship between farmland holdings and non-farm income shares in Vietnam and some other developing countries (Carletto et al., 2007). While the size of residential land is not related to any income share by source, the house location is positively associated with the percentage of non-farm self-employment income. The relative proportion of the share of non-farm self-employment income is around 3 times higher for households with a conveniently situated house than those without it, holding all other variables constant. This finding is consistent with those in Chapter 4 and together; these confirm that owning a house or residential land plot in a prime location is closely linked with doing non-farm household businesses. A similar phenomenon was also observed in a peri-urban Hanoi village by Nguyen (2009b) and in some rapidly urbanising areas of Hung Yen, a neighbouring province of Hanoi, by T. D. Nguyen et al. (2011) where houses with a suitable location are utilised for non-farm businesses such as restaurants, small shops, bars, coffee shops, beauty salons, etc.

Access to financial capital was found to be related to the share of farm income and non-farm self-employment income, whereas each share of other income sources was found to be unrelated to financial capital. However, there are some interesting points to note. Access to formal credit has a positive association with the percentage of non-farm self-employment income but a similar relationship was not observed for the case of farm income share. In addition, while access to informal credit is positively linked with farm income share, it is negatively correlated with non-farm self-employment income share. Possibly this is because formal loans tend to be used for non-farm production rather than farm production,

whereas informal loans are more used for farm production than non-farm production. About 45 percent of borrowing households surveyed said that one of their purposes of taking formal loans was for non-farm production while the corresponding figure for farm production was only about 10 percent. By contrast, 40 percent of them answered that one of the purposes of taking informal loans was for farm production and the corresponding figure for non-farm production was only around 12 percent.

Physical capital has a positive relationship with farm income share but that is not the case for non-farm self-employment income share. This may be because the majority of non-farm self-employment activities were made up of small-scale units, specialising in small trades and provision of local services, which possibly did not require a large amount of productive assets for higher returns. Interestingly, social capital, as measured by the number of group memberships, is positively associated with the formal wage income share but a similar association was not found for other income shares. Possibly, a higher share of formal wage income was often contributed by formal wage workers who tended to have more memberships in groups and associations. Finally, the inclusion of past livelihood strategies as explanatory variables in the model helps explain that each type of current income share is closely correlated with its corresponding past livelihood strategy. For example, households that followed Livelihood A in the past (informal wage work) are likely to have a higher share of informal wage income than those with the past livelihood strategy D (farm work).

6.3 Analyzing the relationship between income sources and income inequality

6.3.1 Measuring income inequality

Income inequality can be measured in various ways (Babatunde, 2008). Among the different types of inequality measurement, the Gini coefficient is popularly used to measure the disparity in the distribution of income, consumption, and other welfare indicators (López-Feldman, 2006). Following Van Den Berg and Kumbi (2006), I examined the relationship between income sources and income inequality using Gini decomposition analysis by income source (Lerman &

Yitzhaki, 1985; Shorrocks, 1982). According to López-Feldman (2006), Lerman and Yitzhaki (1985) extended the results of Shorrocks (1982) and indicated that the Gini coefficient of total income inequality (G) can be denoted as:

$$G = \sum_{k=1}^{K} S_k \, G_k \, R_k \qquad (1)$$

where S_k represents for the share of income source k in total income; G_k is the Gini coefficient of the income distribution from source k; and R_k is the correlation coefficient between income from source k and total income Y. Babatunde (2008) showed that $G_k R_k$ is known as the pseudo-Gini coefficient of income source k, while the share or contribution of income source k to total income inequality is expressed as:

$$S_k \, G_k R_k / G \qquad (2)$$

As shown in Stark, Taylor, and Yitzhaki (1986), the income source elasticity of inequality indicates the percentage change in the overall Gini coefficient resulting from a 1 percent change in income from source k , and is expressed as:

$$(S_k \, G_k R_k / G) - S_k \qquad (3)$$

where G is the overall Gini coefficient prior to the income change. As noted by Van Den Berg and Kumbi (2006), equation (3) is the difference between the share of source k in the overall Gini coefficient and its share in the total income (Y). It should be noted that the sum of income source elasticities of inequality should be zero, which means that if all the income sources changed by the same percentages, the overall Gini coefficient (G) would remained unchanged.

6.3.2 Gini coefficients for income inequality

Figure 6.1 presents the distribution of income sources over income quintiles. As compared to households in the higher income quintiles (4 and 5), the lower income quintile households (1 and 2) had a higher share of farm income, whereas those in the richer groups had a higher share of non-farm self-employment income and formal wage income. This suggests that income shares by source are closely associated with the income distribution; specifically there is a positive association

between the non-farm self-employment income share, formal wage income share and per capita income, but a negative correlation between the farm and informal wage income shares and per capita income.

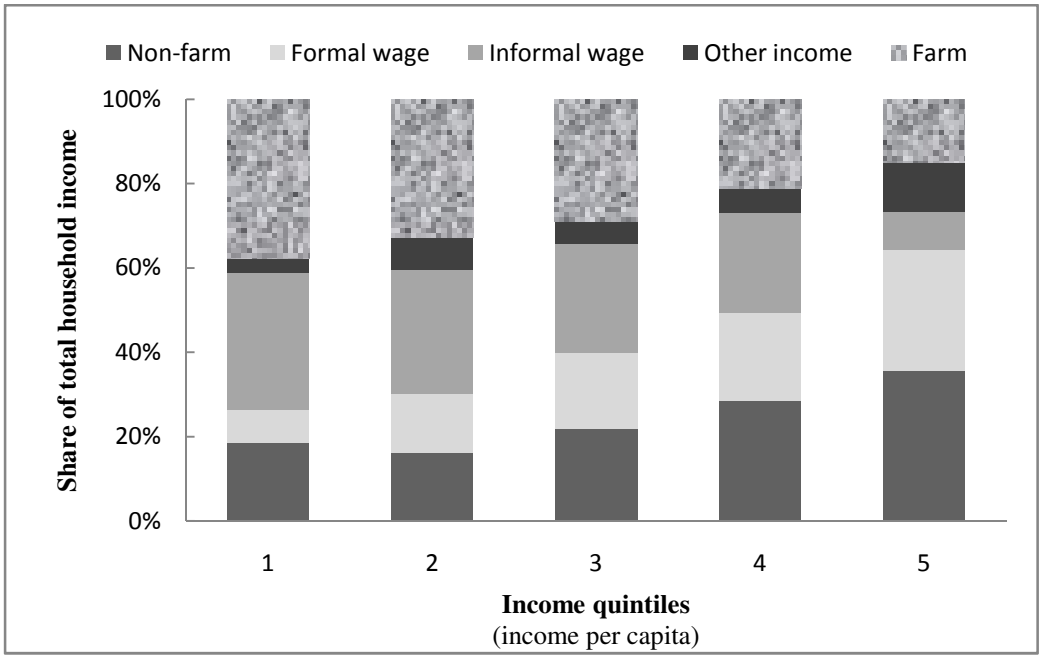

Figure 6.1: Income shares by source and income quintiles

Figure 6.2 shows the distribution of income source over farmland holdings. As revealed in this figure, households in the higher landholding strata had a much higher share of farm income but a lower share of non-farm self-employment income, formal wage income and other income. By contrast, the lower landholding stratum households received more income from non-farm self-employment and manual labour jobs, which implies that households with limited farmland might be pushed into these activities as a way to supplement their income. Finally, the share of formal wage income appeared not to be correlated with the distribution of farmland, suggesting that this income source may be associated with other factors, such as education, rather than farmland holdings.

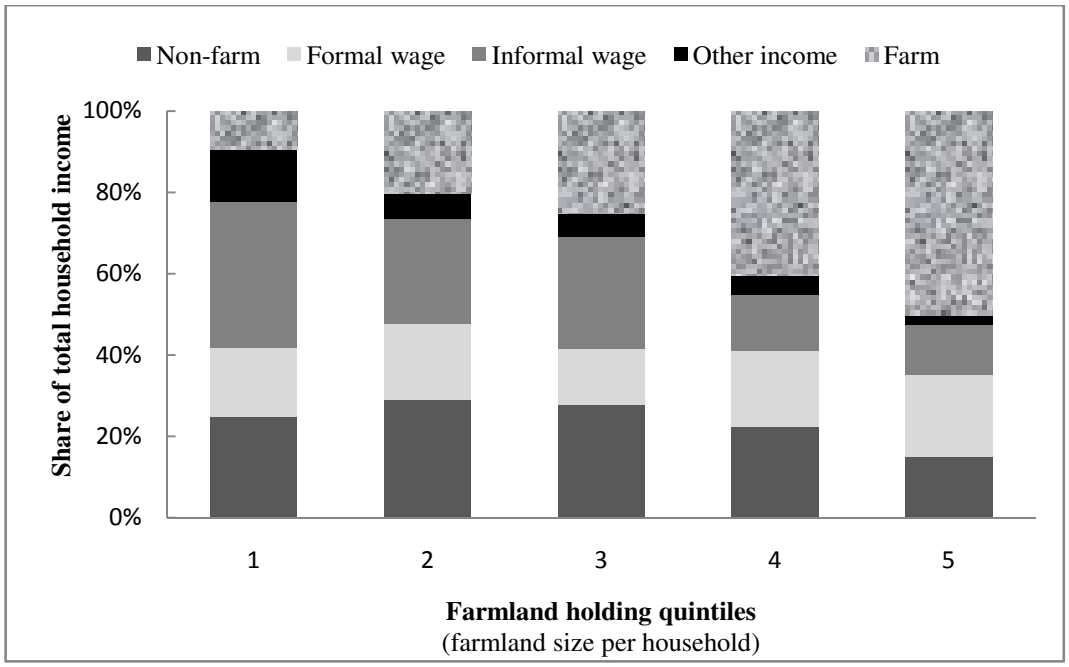

Figure 6.2: Income shares by source and farmland holding quintiles

Table 6.5 presents the Gini decomposition of income inequality by income source. The overall Gini coefficient for the sample households was 0.267, which is much lower than the Gini coefficient of 0.434 for the whole country and 0.411 for the Red River Delta reported by GSO (2008b). This indicates a quite low degree of income inequality among the sample households. This reduced inequality at the district level compared to larger areas was also found in Vietnam by Minot, Baulch, and Epprecht (2006), who explained that, similar to other measurements of inequality, there is a trend toward smaller Gini coefficients for smaller regions, such as provinces or districts, than for the country as a whole. This is due to the fact that households in a small region are likely to have more similarities than households across the whole country.

In previous studies on the decomposition of income inequality in Vietnam, household income was often disaggregated into various sources, including wage income, non-farm self-employment income, agricultural income and other income (Adger, 1999; Cam & Akita, 2008; Gallup, 2002). The current study was the first to further break down wage income into two sub-categories, namely informal wage income and formal wage income. By decomposing the total household income inequality into various income sources, the results reveal that non-farm self-employment, formal wage income and other income become the major

contributors to the overall income inequality among sample households. Taken together, they accounted for 93 percent of the total income inequality. By contrast, farm and informal wage income reduced the inequality: the pseudo-Gini coefficients of these income sources are much lower than the total Gini coefficient, whereas the pseudo-Gini coefficients for non-farm self-employment income, formal wage income and other income are much higher. Specifically, a 10 percent increase in income from farm and informal wage activities will lead to a 1.7 percent and 1.9 percent decline in the overall income inequality, respectively. The same increase in non-farm self-employment, formal wage income and other income will result in a 1.4 percent, 1.6 percent and 0.57 percent increase in the overall income inequality, respectively.

Table 6.5: Gini decomposition of income inequality by income source

Income source	Income share	Gini	Correlation with the distribution of total income	Pseudo-Gini	Share to total income inequality	Source elasticity of total inequality
	Sk	Gk	Rk	GkRk	(RkGkSk)/G	(RkGkSk)/G-Sk
Farm	0.232	0.606	0.121	0.073	0.064	-0.168
Non-farm Self-employment	0.271	0.757	0.534	0.404	0.409	0.138
Informal wage	0.197	0.727	0.012	0.009	0.007	-0.191
Formal wage	0.219	0.818	0.572	0.468	0.383	0.164
Other income	0.082	0.876	0.518	0.454	0.138	0.057
Total	1.000	**0.267**			1.000	

Note: Estimates are based on annual per capita incomes. N=477.

Looking at the third and fourth column in Table 6.5, the results show that the inequality of farm and informal wage incomes among households is lower than the inequality of non-farm self-employment, formal wage income and other income among households. In addition, as compared to non-farm self-employment income, formal wage incomes and other income, farm and informal wage incomes each has a much lower correlation with the distribution of total income. Consequently, the incomes from farm and informal wage work had an equalising effect on income distribution. This finding is partly in accordance with Gallup (2002) and Cam and Akita (2008), who found that while agricultural income actually reduced the inequality of income distribution, non-farm self-

employment income and other income sources contributed significantly to inequality in Vietnam.

6.4 Conclusion and policy implications

According to the conclusion in Chapter 4, none of the non-farm-based livelihood choices was found to be correlated with land loss in 2009, which implies that households with land loss in 2009 might not have had enough time to find alternative livelihoods. Using the FL and FML models, however, this chapter provides additional important evidence that the livelihoods of those with land loss in 2009 and those with land loss in 2008 actually diversified toward non-farm activities. Among non-farm income sources, the income share from casual and manual labour jobs appears to be most positively related with land loss, which confirms again that such low-skilled paid jobs have been emerging as the most common choice of land-losing households in Hanoi's peri-urban areas[35]. Consequently, such job opportunities might allow many land-losing households to supplement a shortfall of income with informal wage income, which in turn might mitigate the negative effects of land loss and further improve household welfare.

Consistent with the previous findings in Chapter 4, Chapter 6 re-affirms that farmland has retained its relative importance in peri-urban livelihoods. Farmland is positively associated with participation in farming but negatively related to non-farm participation. There are some important household-level factors that have a close link with lucrative non-farm activities. First, a house or a plot of residential land in a prime location is emerging as a crucial asset that allows many households to take up non-farm household businesses. Second, it is evident that access to formal credit has a positive link with the share of non-farm self-employment income. Third, regarding the role of human capital in non-farm diversification, better education is positively related to shifting away from farming and diversifying toward highly remunerative jobs. These suggest some policy implications that may enhance households' access to lucrative non-farm activities. First, as in Section 4.5, hastening the implementation of granting *"land for*

[35] As mentioned in Chapter 4, low skilled paid jobs are relatively easily accessible because of their availability in Hanoi's urban and peri-urban areas and they do not require a higher level of formal education.

services" will provide land-losing households with a prime location that can be used for non-farm household businesses such as opening a shop or a workshop or for rental purposes. In addition, government assistance with access to formal credit may help households to diversify into more lucrative non-farm activities. Finally, investment in children's education may be a way to obtain well-paid jobs for the next generation. Some commune dummies are highly statistically significant, indicating that there may be variables which were not specified in the models but were captured by the dummy variables for each commune. This suggests that non-farm participation is also dependent on the difference in non-farm employment opportunities across communes.

As discussed earlier, while farm and informal wage incomes are inequality-decreasing, other income sources are inequality-increasing. Given the context of shrinking farmland due to rapid urbanisation in Hanoi's peri-urban areas, the declining share of farm income will be unavoidable. Consequently, increasing inequality due to the shrinking share of farm income may be unavoidable without stopping farmland acquisition for industrialisation and urbanisation. However, the conversion of agricultural to non-agricultural land uses for urbanisation and industrialisation is an almost inevitable tendency during phases of economic development and population growth (Tan et al., 2009). Moreover, as noted by Gallup (2002), while maintaining a large share of the Vietnamese population in agriculture would prevent inequality from continuing to increase over time, it would keep a large share of the Vietnamese population at very low incomes. This is because there are not bright scenarios for considerable increases in farm income without a major shift of labour out of agriculture in Vietnam. This implies that the decreasing share of farm income due to farmland conversion may have a positive effect on household wellbeing but on average a negative effect on the equality of income distribution.

The finding in Chapter 5 indicates that the non-farm income-based livelihood strategies offer greater wellbeing than strategies based on farming. Among non-farm income sources, only informal wage income has an equalising effect on income distribution, whereas other remaining sources widen income inequality. Consequently, while income from informal wage work has a positive effect on

both wellbeing and income distribution, diversification towards other non-farm activities exerts a positive effect on welfare but a negative effect on income distribution. The inequality-decreasing effect of the informal wage income implies that there is no or a low entry barrier to casual and manual labour jobs and thus many people can undertake these jobs. In contrast, the rising inequality effect of other non-farm income sources, namely non-farm self-employment and formal wage incomes, suggests that there are some relatively high entry barriers that hinder everyone from participating in these high return activities. This is also supported by econometric evidence in Chapter 4 and 5. The findings, therefore, support the hypothesis stated by Adger (1999) that income diversification into non-farm activities results in either greater income inequality if opportunities for these activities are skewed towards the better-off, or in less income inequality if such opportunities are accessible to the poorer parts of the population. Hence, the aforementioned policy implications for improving households' access to lucrative non-farm activities are expected not only to have a positive effect on welfare but also to have an equalising effect on income distribution.

CHAPTER SEVEN: CONCLUSION

7.1 Summary of main results

This thesis examined the impact of farmland loss (due to urbanisation and industrialisation) on households' livelihoods in Hanoi's peri-urban areas. The main results and contributions of the thesis are summarised as follows:

First, in Chapter 4, the impact of land loss on household activity choice was examined econometrically, unlike previous studies that were based on either qualitative or descriptive statistics methods. This thesis provided the first econometric evidence of a positive association between land loss and participation in non-farm based livelihood strategies, notably in informal wage work. However, while such an impact was recorded for households with land loss in 2008, this was not the case for those with land loss in 2009. Possibly, this suggests that one year was not time enough for those with land loss in 2009 to change their livelihood strategies. This implies that the short-term impact of land loss might be negative for land-losing households. In addition, the empirical results indicate that there are other asset-related variables that have a close link with the choice of household livelihood strategies. Human capital, as defined by the education of working adult members, has a positive association with pursuing a formal wage work strategy. Natural capital in terms of farmland size and the location of houses is also closely related to household livelihood choice. Households with more farmland per adult are positively associated with specialising in farming as their main livelihood while those owning a household in a prime location are much more likely to adopt non-farm household businesses such as opening a shop, or a workshop at their family home. Based on the empirical results, this chapter suggests that that an improvement in households' access to some livelihood assets (human capital and *"land for services"),* and investment in local infrastructure can give land-losing households more chance to pursue better livelihood choices.

Secondly, as mentioned in the literature review, although mixed impacts of land loss on household welfare have been discussed in several studies in both Vietnam

and other countries, no econometric evidence of these impacts has been provided thus far. Chapter 5 provided the first econometric evidence that land loss has no negative impact on either income or consumption expenditure per capita. This may be because many households partly used their compensation money for household expenses. Furthermore, the results indicate that land loss can have an indirect positive effect on household livelihood outcomes through its positive effect on non-farm-based livelihood choices. This chapter's findings confirm that household wellbeing, including both income and consumption expenditure per capita, are closely linked with livelihood strategy choices. In general, households adopting a farm work-based strategy tend to achieve a lower level of wellbeing than those following non-farm work-based strategies. A combination of the findings in Chapters 4 and 5 suggest that with better education, and access to a prime location for doing non-farm businesses, a household's welfare can be considerably improved by switching from a farm work-based strategy to other non-farm-based strategies. In addition, the results reveal that other livelihood asset-related variables are closely linked with household wellbeing. Better education, access to formal credit, more productive assets and farmland has a positive relationship with household livelihood outcomes. Based on the empirical results, this chapter proposes some useful policy recommendations for improving household wellbeing. Such policy recommendations focus on providing land-losing households with favourable conditions for changing livelihood strategies through improving their access to livelihood assets and upgrading the local infrastructure.

Thirdly, in Chapter 6, the impact of land loss on households' livelihood was further investigated by quantifying the impact of land loss on household income shares by source. This chapter provided the first econometric evidence that land loss has a positive impact on the share of non-farm income sources but a negative impact on that of agricultural income. Furthermore, such impacts were observed for both groups of land-losing households (those with land loss in 2009 and those with land loss in 2008). This is different from the finding in Chapter 5, which shows that only the land loss in 2008 has an association with the livelihood choice of households. This chapter, therefore, provides additional evidence that although land-losing households in 2009 had not changed their livelihood strategies, their

income shares by source actually diversified into non-farm sources. This result implies that a number of land-losing households complemented their income with income from other non-farm sources, which possibly offset the amount of farm income lost due to the loss of farmland. This finding supports the conclusion of Chapter 5, which found no econometric evidence for the negative impact of land loss on household wellbeing. Furthermore, the results show that there is a close relationship between households' livelihood assets and income shares by source. The education of working members has a positive association with the share of formal wage income; farmland per adult is positively related to the income share from farming but negatively associated with that from non-farm incomes. Access to formal credit, and owning a house in a prime location both have a positive association with the income share from non-farm household business. Some useful policy implications can be drawn from the aforementioned findings. Encouraging land-losing households to invest in children's education, improving their access to formal credit, and providing them with a plot of nonagricultural land in a prime location or *"land for services"* can help them diversify toward lucrative non-farm activities.

The relationship between income shares by source and inequality is an additional interesting topic that was investigated in Chapter 6. Using a Gini decomposition analysis of income inequality by source, the results indicate that income from farming and informal wage work have a decreasing effect on income inequality, whereas a converse effect was found for other non-farm sources. Especially, income from formal wage and non-farm household business became the major contributors to inequality. My study differs from all previous studies on the decomposition of income inequality in Vietnam in which wage income has not been further broken down into sub-categories. The study was the first attempt to disaggregate wage income into two sub-categories: informal wage and formal wage income sources. I thus provided the first evidence that informal wage income decreases income inequality. Possibly, this implies that there are no or low entry barriers to informal wage work and thus many people can undertake this work in Hanoi's peri-urban areas. In contrast, the rising-inequality effect of other non-farm income sources, namely non-farm self-employment income and formal

wage income, suggests that there are some relatively high entry barriers that hinder everyone from participating in these high-return activities.

Combined with the findings from the previous chapters, some valuable conclusions can be drawn on this topic. First, increasing inequality due to the shrinking share of farm income will be unavoidable without stopping farmland conversion for industrialisation and urbanisation. Second, while land loss might have an indirect positive effect on household welfare (through its effect on livelihood choice), it might exert indirect mixed effects on income distribution. Land loss may exert an indirect negative effect on income inequality (through its negative effect on the share of farm income) but an indirect positive effect on income inequality (through its positive effect on the share of informal wage income). Finally, the aforementioned policy implications for improving households' access to lucrative non-farm activities, namely formal wage work and non-farm household businesses, are expected to not only improve household welfare but also reduce income distribution gaps.

Lastly, it is worth noting that in analysing the impact of land loss on household livelihoods, not only econometric evidence but also other information, namely money compensation and "*land for services*" for land-losing households, was used to provide a fuller picture of various impacts of land loss. Econometric evidence shows that although land loss has a negative impact on the share of farm income, it has a positive effect on non-farm participation, which in turn can have a positive effect on household wellbeing. In addition, while compensation with money can enable households to mitigate the shock of land loss in the short-term, compensation with "*land for services*" is expected to give them a better chance to change their livelihoods and improve their livelihood outcome in the long-term. This suggests that land loss due to urbanisation and industrialisation, coupled with appropriate compensation policies, can be considered as a factor positively affecting households' livelihood transition in peri-urban areas.

7.2 Recommendations for further research

There is some future research that should be done to address the limitations of the thesis.

First, as indicated in Chapter 3, income shares by source and working time shares by activity were used as input variables for classifying the past and current livelihood strategies, respectively. However, income data may be influenced by random events such as seasonal jobs, and market vagaries (Jansen, Pender, Damon, & Schipper, 2006). As suggested in Ansoms (2008) and Barrett et al (2001), several other indicators should be used in combination to achieve a better classification of livelihood strategies. This suggests that future research should use a set of other indicators for classifying household livelihood strategies, including income sources, demographic characteristics of households, and livelihood assets.

Second, in this thesis, social capital was measured only in the form of group membership. Such an indicator does not reflect other aspects and contents of social capital such as trust, social relations (information sharing) and norms of reciprocity (mutual help), etc. This implies that future studies should contain questions to cover all other aspects of social capital.

Third, in the model of household activity choice, past livelihood strategies were used as important explanatory variables that might capture some unobservable household attributes affecting the current choice of livelihood strategies such as such as land quality, skills, social networks or occupational preferences. However, these variables may not satisfactorily capture all other unobservable attributes of households; thus future research should further develop indicators to better represent these attributes.

Finally, because of using cross-sectional data, the current thesis was unable to capture unobservable factors that may affect household livelihoods. Consequently, it would be helpful to conduct a study using a panel data on this topic with data (at two points of time) before and after farmland acquisition. In addition, the results of similar research would be better generalised to Hanoi's peri-urban areas if the sampling is extended and conducted in all other peri-urban districts of Hanoi.

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APPENDICES

Appendix 1: Sampling statistics of the surveyed households in Hoai Duc

Group	Commune (1)	Employment in agriculture (percent) (2)	Number of households (3)	Households with land loss (4)	Households without land loss (5)	Selected communes (6)	Surveyed households in each commune (7)	Among surveyed households in each commune(8)		SFC (9)	SFL (10)	SFN (11)	**SWL** (12)	**SWN** (13)
								Households with land loss (8a)	Households without land loss (8b)					
1	Tram Troi	82.34	1,165	736	429									
	Duc Thuong	78.23	2,402	1800	602	*Duc Thuong*	80	40	40	0.67	0.02	0.07	**67.50**	**22.58**
	Song Phuong	68.03	2,619	1161	1,458	*Song Phuong*	79	39	40	0.67	0.03	0.03	**44.65**	**54.68**
2	Van Con	56.56	2,720	172	2,548	*Van Con*	80	40	40	0.40	0.23	0.02	**10.75**	**159.25**
	Dac so	51.23	1,087	104	983									
	Lai Yen	46.92	2,421	1461	960	*Lai Yen*	80	40	40	0.40	0.03	0.04	**91.31**	**60.00**
	Di Trach	40.33	1,715	1570	145									
	An Khanh	35.47	4,265	4095	170									
3	La Phu	30.48	2,334	383	1,951									
	Van Canh	21.54	2,259	2136	123									
	Kim Chung	9.03	2,225	429	1,796	*Kim Chung*	79	39	40	0.50	0.09	0.02	**22.00**	**89.80**
	An Thuong	4.12	3,033	1,037	1,996	*An Thuong*	79	39	40	0.50	0.04	0.02	**53.18**	**99.80**

Source: Author's calculation from Hoai Duc District People's Committee (2009).

Note: Figures presented in the last five columns were rounded to two decimal places.

SFC (Sampling fraction of selected communes) = the number of selected communes divided by the total number of communes in the corresponding group.

SFL (Sampling fraction of land-losing households) = the number of surveyed land-losing households divided by the total number of land-losing households in the corresponding commune.

SFN (Sampling fraction of households without land loss) = the number of surveyed households without land loss divided by the total number of households without land loss in the corresponding commune.

SWL (Sampling weights of land-losing households) =1/ (SFC*SFL). **SWN** (Sampling weights of households without land loss) =1/ (SFC*SFN).

E.g.: the sampling weight of the land-losing households in Đức Thượng =1/ (0.66667*0.02222) =67.50000 ≈67.50. Respectively, the sampling weights of the households without land loss in this commune =1/ (0.66667*0.06645) =22.57500 ≈22.58.

Appendix 2: OLS regression of farmland size on LLHH and NLLHH groups

	Farmland holding		
Explanatory variable	**Farmland size**	**Farmland per capita**	**Farmland per adult**
Land loss (1=yes)	-796.9450***	-181.5767***	-237.0084***
	(93.835)	(22.357)	(24.672)
Constant	1,490.0935***	346.7193***	430.9008***
	(84.236)	(19.278)	(21.130)
Observations	477	477	477
R-squared	0.133	0.125	0.169
Prob > F	0.0000	0.0000	0.0000

Note: *, **, *** mean statistically significant at 10%, 5 % and 1%, respectively.
Robust standard errors are in parentheses. Estimates are adjusted for sampling weights.

Appendix 3: OLS regression of household wellbeing on the farmland size by quintile

	Well-being per capita		
Explanatory variable (Farmland size by quintile)	**Food consumption**	**Expenditure**	**Income**
The second lowest	11.7287	48.8533	67.3912
	(23.590)	(46.719)	(83.804)
The middle	6.7946	80.0577*	-6.5588
	(23.370)	(48.219)	(88.287)
The second highest	12.4992	26.1954	83.2083
	(25.314)	(44.520)	(110.008)
The highest	25.5704	78.1637	119.4463
	(27.148)	(49.474)	(103.667)
Constant	480.4495***	911.6254***	1,139.9165***
	(16.785)	(30.013)	(59.125)
Observations	477	477	477
R-squared	0.004	0.011	0.006
Prob > F	0.9164	0.3964	0.6882

Note: *, **, *** mean statistically significant at 10%, 5 % and 1%, respectively.
Robust standard errors are in parentheses. Estimates are adjusted for sampling weights.

Appendix 4: OLS regression of residential land size on LLHH and NLLHH groups

	Residential land	
Explanatory variable	**Residential land per household**	**Residential land per capita**
Land loss (1=yes)	1.8391	7.0407
	(1.543)	(5.908)
Constant	21.1945***	54.7818***
	(1.102)	(4.176)
Observations	477	477
R-squared	0.004	0.004
Prob > F	0.2339	0.2339

Note: *, **, *** mean statistically significant at 10%, 5 % and 1%, respectively.
Robust standard errors are in parentheses. Estimates are adjusted for sampling weights.

Appendix 5: OLS regression of demographic characteristics on LLHHs and NLLHHs

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Explanatory variable	**Household size**	**Young dependants**	**Old dependants**	**Total dependants**	**Age of household head**	**Education of household head**	**Number of working age members**	**Proportion of working age members**	**Average age of members at working age**	**Average education of members at working age**
Landloss (1=yes)	-0.04	-0.20*	0.00	-0.20	4.37***	-1.03***	0.15	0.01	0.85	0.10
	(0.176)	(0.108)	(0.078)	(0.129)	(1.271)	(0.365)	(0.154)	(0.029)	(0.691)	(0.261)
Constant	4.50***	1.01***	0.48***	1.49***	49.59***	7.34***	3.01***	0.68***	34.69***	9.04***
	(0.116)	(0.071)	(0.058)	(0.090)	(0.868)	(0.234)	(0.099)	(0.018)	(0.506)	(0.205)
Obs	477	477	477	477	477	477	477	477	460	460
R-squared	0.000	0.010	0.000	0.006	0.029	0.021	0.003	0.001	0.004	0.000
Prob > F	0.8060	0.0621	0.9634	0.1266	0.0006	0.0048	0.3165	0.6325	0.2183	0.7023

Note: *, **, *** mean statistically significant at 10%, 5 % and 1%, respectively. Robust standard errors are in parentheses. Estimates are adjusted for sampling weights.

Appendix 6: OLS regression of numbers of adult, working members, age and education of working members and employment rate on LLHH and NLLHH groups

	(1)	(2)	(3)	(4)	(5)
Explanatory variable	**Number of adult**	**Number of working members**	**Age of working members**	**Education of working members**	**Employment rate**
Landloss (1=yes)	0.16	-0.15	3.94***	-0.60*	-0.07***
	(0.140)	(0.115)	(1.016)	(0.320)	(0.024)
Constant	3.49***	2.60***	39.82***	8.46***	0.77***
	(0.098)	(0.085)	(0.645)	(0.231)	(0.017)
Observations	477	477	473	473	477
R-squared	0.003	0.005	0.041	0.009	0.022
Prob > F	0.2601	0.1786	0.0001	0.0621	0.0033

Note: *, **, *** mean statistically significant at 10%, 5 % and 1%, respectively.
Robust standard errors are in parentheses. Estimates are adjusted for sampling weights.

Appendix 7: OLS regression of social capital on LLHH and NLLHH groups

	Social capital		
Explanatory variable	**Total number of group memberships**	**Total number of formal group memberships**	**Total number of informal group memberships**
Landloss (1=yes)	0.01	0.35**	-0.34***
	(0.208)	(0.160)	(0.102)
Constant	3.43***	2.34***	1.09***
	(0.156)	(0.116)	(0.077)
Observations	477	477	477
R-squared	0.000	0.011	0.025
Prob > F	0.9759	0.0313	0.0009

Note: *, **, *** mean statistically significant at 10%, 5 % and 1%, respectively.
Robust standard errors are in parentheses. Estimates are adjusted for sampling weights.

Appendix 8: OLS regression of social capital on household wellbeing by quintile

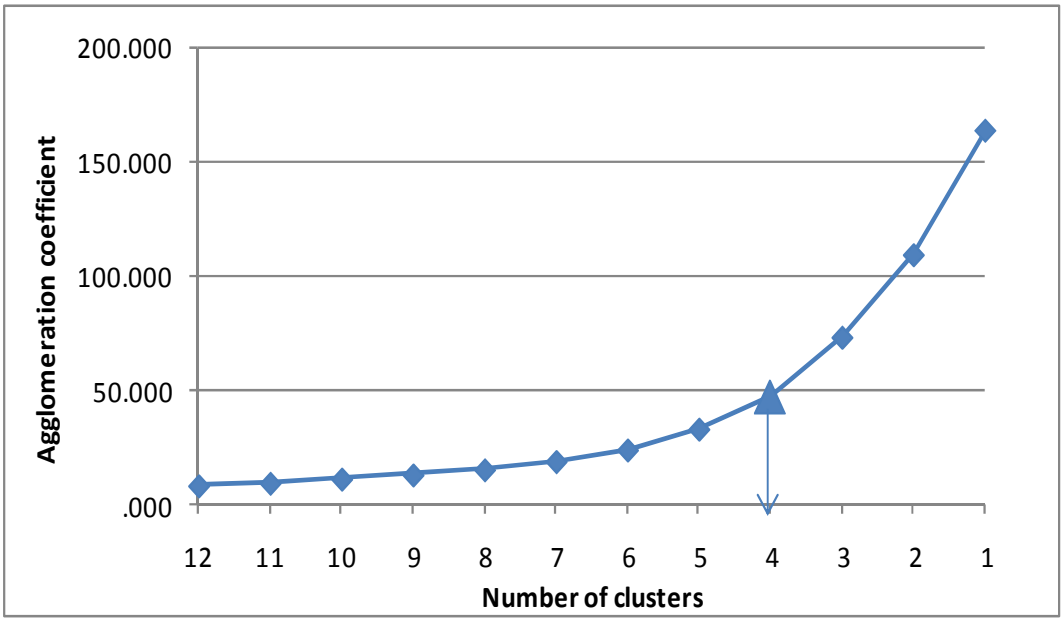
Food consumption		Expenditure		Income	
Explanatory Variable (quintile)	**Memberships**	**Explanatory Variable (quintile)**	**Memberships**	**Explanatory Variable (quintile)**	**Memberships**
2nd lowest	0.32	2nd lowest	-0.07	2nd lowest	-0.20
	(0.296)		(0.292)		(0.288)
Middle	0.38	Middle	0.21	Middle	0.89***
	(0.303)		(0.289)		(0.286)
2nd highest	0.59*	2nd highest	0.85***	2nd highest	0.55
	(0.339)		(0.318)		(0.334)
Highest	1.34***	Highest	1.66***	Highest	1.26***
	(0.376)		(0.376)		(0.336)
Constant	2.89***	Constant	2.88***	Constant	2.92***
	(0.219)		(0.209)		(0.191)
Obs	477	Obs	477	Obs	477
R-squared	0.047	R-squared	0.098	R-squared	0.066
Prob > F	0.0000	Prob > F	0.0000	Prob > F	0.0000

Note: *, **, *** mean statistically significant at 10%, 5 % and 1%, respectively.
Robust standard errors are in parentheses. Estimates are adjusted for sampling weights.

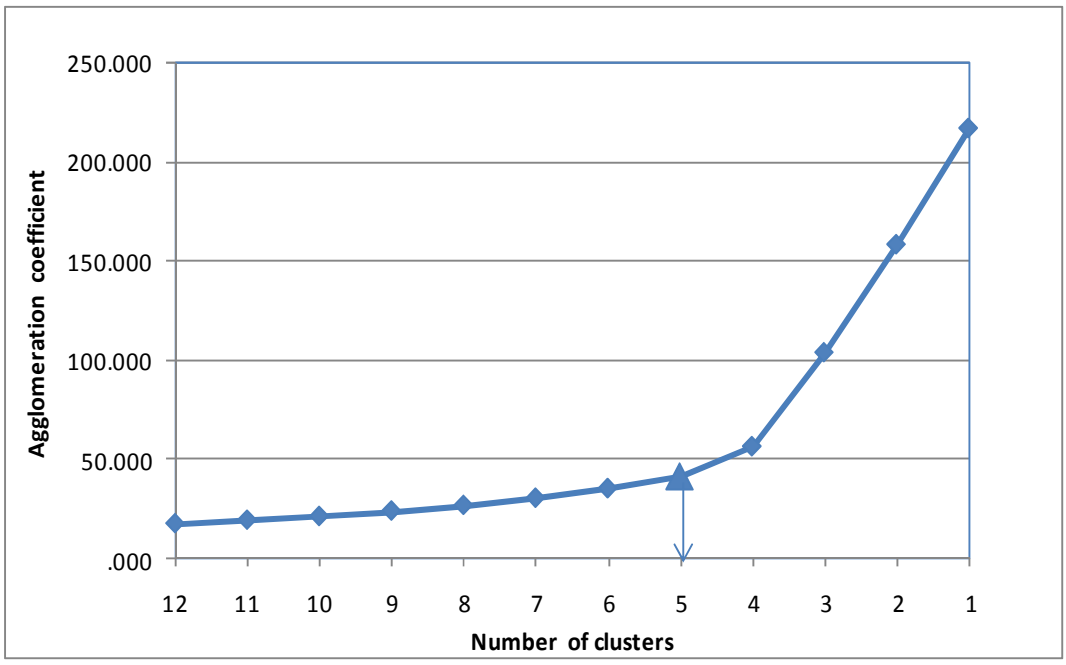
Appendix 9: OLS regression of physical capital on LLHH and NLLHH groups

Explanatory variable	Physical capital (unit: 1,000 VND)		
	Total productive assets	**Productive assets per working members**	**Durable assets**
Landloss (1=yes)	-5,855.90***	-2,612.56**	2,429.09*
	(2,038.146)	(1,164.081)	(1,414.524)
Constant	24,252.45***	10,551.14***	12,935.59***
	(1,594.853)	(972.653)	(905.509)
Observations	477	473	477
R-squared	0.020	0.014	0.008
Prob > F	0.0042	0.0253	0.0866

Note: *, **, *** mean statistically significant at 10%, 5 % and 1%, respectively.
Robust standard errors are in parentheses. Estimates are adjusted for sampling weights.



Appendix 10: Elbow-Criterion: Decision about the number of clusters of past livelihood strategies



Appendix 11: Elbow-Criterion: Decision about the number of clusters of current livelihood strategies

Appendix 12: Measures of Fit for the Multinomial Logit Model

Model	Model 2 (with past livelihoods)	Model 1 (without past livelihoods)	Difference
Observations	451	451	0
Log-Lik Intercept Only	-40130.127	-40130.127	0.000
Log-Lik Full Model	-17277.158	-26791.046	9513.889
D	34554.316(367)	53582.093(379)	19027.777(12)
LR	45705.939(60)	26678.162(51)	19027.777(9)
Prob > LR	0.000	0.000	0.000
McFadden's R2	0.569	0.332	0.237
McFadden's Adj R2	0.567	0.331	0.237
ML (Cox-Snell) R2	1.000	1.000	0.000
Cragg-Uhler(Nagelkerke) R2	1.000	1.000	0.000
Count R2	.	.	.
Adj Count R2	.	.	.
AIC	76.990	119.127	-42.137
AIC*n	34722.316	53726.093	-19003.777
BIC	32311.407	51265.847	-18954.439
BIC'	-45339.250	-26366.477	-18972.774
BIC used by Stata	34939.338	53912.112	-18972.774
AIC used by Stata	34680.316	53690.093	-19009.777

Note: Count R2 and Adj Count R2 not calculated if pweight used.
Difference of -18972.774 in BIC' provides very strong support for Model 2.
The model with the more negative BIC or BIC' is preferred and the strength of Evidence based on the Absolute Value of the Difference in BIC or BIC'. (0-2: Weak; 2-6: Positive; 6-10: Strong; >10: Very strong) (Long, 1997).

Appendix 13: Multinomial Logit estimation for households' livelihood strategy choices

Explanatory variables	Model 1			Model 2		
	A vs D	B vs D	C vs D	A vs D	B vs D	C vs D
Land loss 2009	0.39	-0.51	-0.22	1.94	1.42	1.25
	(1.116)	(1.088)	(1.068)	(1.596)	(1.520)	(1.416)
Land loss 2008	3.23***	1.39	2.12**	4.99***	2.97**	2.78**
	(1.077)	(1.136)	(1.038)	(1.381)	(1.402)	(1.360)
Household size	-0.45***	-0.29*	-0.30*	-0.38**	-0.26	-0.31*
	(0.154)	(0.149)	(0.155)	(0.147)	(0.161)	(0.174)
Dependency ratio	-0.05	-0.00	0.02	0.05	-0.12	0.23
	(0.346)	(0.384)	(0.303)	(0.330)	(0.474)	(0.336)
Number of male working members	0.67*	0.70**	-0.28	0.79**	0.55	-0.17
	(0.376)	(0.341)	(0.287)	(0.358)	(0.417)	(0.349)
Household head's gender	-0.70	-0.90	-0.82	-0.63	-1.02	-1.08
	(0.606)	(0.712)	(0.574)	(0.763)	(0.832)	(0.663)
Household head's age	0.03	0.02	-0.00	0.02	0.03	-0.01
	(0.020)	(0.022)	(0.019)	(0.026)	(0.027)	(0.025)
Age of working members	-0.13***	-0.09***	-0.02	-0.09**	-0.08**	-0.03
	(0.034)	(0.031)	(0.029)	(0.038)	(0.037)	(0.036)
Education of working members	-0.10	0.48***	0.17**	-0.03	0.31***	0.11
	(0.084)	(0.100)	(0.078)	(0.103)	(0.102)	(0.101)
Farmland per adult	-0.41***	-0.32***	-0.34***	-0.24*	-0.25**	-0.31**
	(0.114)	(0.095)	(0.094)	(0.126)	(0.105)	(0.156)
Size of residential land	0.01	0.02	0.01	0.00	0.03	0.01
	(0.013)	(0.014)	(0.013)	(0.013)	(0.018)	(0.017)
Location of house (or of residential land)	-0.90*	-0.39	1.59***	-1.27**	-0.03	1.07**
	(0.483)	(0.520)	(0.411)	(0.591)	(0.572)	(0.498)
Song Phuong	-3.42***	-1.10	-0.50	-3.09***	-1.41	-0.39
	(0.732)	(0.692)	(0.642)	(0.858)	(1.005)	(0.822)
Kim Chung	1.03	1.37	1.04	0.18	0.04	0.76
	(1.058)	(1.078)	(1.013)	(1.140)	(1.193)	(1.159)
An Thuong	-0.92	-0.19	0.14	-1.29	-1.14	-0.79
	(0.691)	(0.681)	(0.678)	(0.842)	(0.828)	(0.842)
Duc Thuong	-1.53**	-1.31*	-0.61	-1.62*	-1.76*	-0.72
	(0.674)	(0.775)	(0.660)	(0.916)	(1.064)	(0.911)
Van Con	-0.30	-2.38*	0.59	-0.93	-2.56*	0.05
	(0.686)	(1.412)	(0.692)	(0.879)	(1.416)	(0.971)
Past livelihood A				3.48***	2.93***	0.51
				(0.846)	(0.891)	(0.776)
Past livelihood A				0.44	3.98***	-0.82
				(1.105)	(0.847)	(1.051)
Past livelihood A				2.26*	2.76**	5.89***
				(1.283)	(1.399)	(0.915)
Intercept	8.79***	0.87	2.84	4.88**	-0.62	3.05
	(2.116)	(2.526)	(1.936)	(2.366)	(2.620)	(2.232)
Wald chi2		207.99			355.93	
Prob > chi2		0.000			0.000	
Observations		451			451	

Note: *, **, *** mean statistically significant at 10 %, 5 % and 1 %, respectively. Coefficients and standard errors are adjusted for sampling weights and robust standard errors in parentheses.
A: Informal wage work; B: formal wage work; **C**: Non-farm self-employment; **D**: Farm work (base group).

Appendix 14: Summary statistics of explanatory and instrumental variables for the models of livelihood outcomes

Explanatory variables	Current Livelihood Strategies									
	The whole sample		**A**		**B**		**C**		**D**	
	M	SD	M	SD	M	SD	M	SD	M	SD
Farmland loss										
Land loss 2009	10.27	*24.50*	12.28	*27.00*	8.44	*21.97*	8.80	*22.11*	6.54	*18.96*
Land loss 2008	10.50	*24.00*	16.53	*29.06*	7.20	*18.91*	10.22	*23.60*	5.38	*16.40*
Human capital										
Household size	4.49	*1.61*	4.64	*1.60*	5.03	*1.28*	4.21	*1.40*	4.67	*1.80*
Dependency ratio	60.58	*66.78*	58.41	*55.68*	62.56	*78.85*	60.29	*64.43*	59.82	*71.60*
Number of male working members	1.25	*0.69*	1.38	*0.71*	1.50	*0.77*	1.10	*0.52*	1.24	*0.66*
Gender of household head	0.78	*0.48*	0.75	*0.43*	0.76	*0.43*	0.77	*0.42*	0.90	*0.30*
Age of household head	51.21	*13.24*	51.54	*13.24*	52.94	*12.56*	47.44	*10.65*	51.45	*11.36*
Education of working members	8.37	*2.90*	7.70	*2.17*	11.05	*2.24*	8.07	*2.84*	6.98	*2.36*
Natural capital										
Farmland per adult	3.37	*2.70*	2.48	*1.80*	3.16	*2.71*	3.01	*2.10*	5.11	*3.30*
Residential land size	21.88	*14.62*	20.88	*13.64*	26.18	*18.27*	19.53	*13.65*	22.32	*12.88*
Physical capital	8.61	*1.10*	8.03	*1.21*	8.84	*0.80*	9.02	*0.98*	8.73	*0.97*
Social capital	3.43	*2.09*	2.95	*1.75*	5.43	*2.43*	2.88	*1.73*	3.04	*1.42*
Financial capital										
Formal credit	0.27	*0.44*	0.28	*0.45*	0.15	*0.36*	0.36	*0.48*	0.25	*0.44*
Informal credit	0.19	*0.39*	0.19	*0.39*	0.15	*0.36*	0.18	*0.38*	0.24	*0.43*
Commune										
Song Phuong	0.13	*0.33*	0.05	*0.22*	0.10	*0.31*	0.15	*0.36*	0.22	*0.41*
Kim Chung	0.14	*0.35*	0.14	*0.35*	0.33	*0.47*	0.11	*0.32*	0.02	*0.13*
An Thuong	0.20	*0.40*	0.14	*0.35*	0.27	*0.45*	0.15	*0.36*	0.27	*0.48*
Duc Thuong	0.12	*0.32*	0.16	*0.37*	0.07	*0.25*	0.12	*0.32*	0.12	*0.32*
Van Con	0.22	*0.41*	0.24	*0.43*	0.03	*0.18*	0.33	*0.47*	0.26	*0.44*
Excluded instruments										
Age of working members	40.46	*8.25*	39.21	*6.25*	37.25	*5.82*	40.70	*7.50*	42.97	*8.80*
House location	0.32	*0.47*	0.15	*0.36*	0.19	*0.39*	0.63	*0.48*	0.25	*0.43*
Past livelihood A	0.22	*0.42*	0.64	*0.48*	0.13	*0.34*	0.06	*0.24*	0.06	*0.25*
Past livelihood B	0.18	*0.38*	0.03	*0.18*	0.73	*0.44*	0.01	*0.10*	0.07	*0.25*
Past livelihood C	0.19	*0.39*	0.01	*0.10*	0.01	*0.10*	0.61	*0.49*	0.005	*0.07*
Total	477		125		100		128		103	

Note: Means (M) and standard deviations (SD) are adjusted for sampling weights.
A: Informal wage work; **B**: Formal wage work; **C**: Non-farm self-employment; **D**: Farm work
Refer to Table 5.2 for definitions and measurements of variables. The averages for dummy variables in all strategies as well as the whole sample serve as percentages.

Appendix 15: Weak instrument, over-identification and endogeneity tests of the income model

Weak instrument test	
Weak identification test (Cragg-Donald Wald F statistic)	28.615
Stock-Yogo weak ID test critical values: 5 percent maximal IV relative bias	9.53
F test of excluded instruments for each regression in the first stage	
Dependent variable: Informal wage work	
F-value	31.14
(P-value in parentheses)	(0.0000)
Dependent variable: Formal wage work	
F-value	22.06
(P-value in parentheses)	(0.0000)
Dependent variable: Non-farm self-employment	
F-value	128.94
(P-value in parentheses)	(0.0000)
Over-identification test	
Hansen J statistic with 2SLS estimates	1.114
(p-value in parentheses)	(0.5731)
Hansen J statistic with LIML estimates	1.113
(p-value in parentheses	(0.5733)
Endogeneity test of livelihood strategy choice	9.150
(p-value in parentheses)	(0.0274)

Appendix 16: Weak instrument, over-identification and endogeneity tests of the consumption expenditure model

Weak instrument test	
Weak identification test (Cragg-Donald Wald F statistic)	28.615
Stock-Yogo weak ID test critical values: 5 percent maximal IV relative bias	9.53
F test of excluded instruments for each regression in the first stage	
Dependent variable: Informal wage work	
F-value	31.14
(P-value in parentheses)	(0.0000)
Dependent variable: Formal wage work	
F-value	22.06
(P-value in parentheses)	(0.0000)
Dependent variable: Non-farm self-employment	
F-value	128.94
(P-value in parentheses)	(0.0000)
Over-identification test	
Hansen J statistic with 2SLS estimates	0.834
(p-value in parentheses)	(0.6592)
Hansen J statistic with LIML estimates	0.832
(p-value in bracket)	(0.6597)
Endogeneity test of livelihood strategy choice	16.877
(p-value in parentheses)	(0.0007)

Appendix 17: Determinants of household livelihood outcomes (OLS models)

(Monthly income and consumption expenditure per capita in natural logarithms)

Explanatory variables	Income (OLS regression)		Expenditure (OLS regression)	
	Coefficient	SE	Coefficient	SE
Livelihood strategy				
Informal wage work	0.0723	(0.061)	0.0728	(0.046)
Formal wage work	0.2356***	(0.073)	0.1414***	(0.048)
Non-farm self-employment	0.2109***	(0.065)	0.1417***	(0.045)
Farmland loss				
Land loss 2009	0.1207	(0.089)	0.1704***	(0.065)
Land loss 2008	0.0557	(0.089)	0.0207	(0.055)
Human capital				
Household size	-0.1487***	(0.014)	-0.0590***	(0.010)
Dependency ratio	-0.0772**	(0.035)	-0.0919***	(0.027)
Number of male working members	0.0796***	(0.029)	0.0307	(0.022)
Household head's gender	-0.0026	(0.050)	0.0297	(0.032)
Household head's age	0.0006	(0.002)	0.0005	(0.001)
Education of working members	0.0419***	(0.011)	0.0223***	(0.007)
Natural capital				
Farmland per adult	0.0307***	(0.010)	0.0170**	(0.007)
Size of residential land	0.0008	(0.001)	0.0014	(0.001)
Physical capital				
Productive assets per working members (Ln)	0.1006***	(0.019)	0.0867***	(0.013)
Social capital				
Number of group memberships	0.0209*	(0.012)	0.0158*	(0.008)
Financial capital				
Access to formal credit	0.0876*	(0.046)	0.0587**	(0.028)
Access to informal credit	-0.0677	(0.046)	0.0047	(0.027)
Commune				
Song Phuong	0.1456**	(0.073)	0.1230***	(0.040)
Kim Chung	0.2198***	(0.069)	0.1932***	(0.042)
An Thuong	0.0351	(0.072)	0.0543	(0.042)
Duc Thuong	0.1011	(0.063)	0.0626	(0.039)
Van Con	0.1602**	(0.073)	0.1205**	(0.048)
Constant	5.8786***	(0.210)	5.7584***	(0.143)
R-squared	0.542		0.520	
Observations	451		451	

Note: SE: Robust standard errors in parentheses. Coefficients and standard errors are adjusted for sampling weights. *, **, *** mean statistically significant at 10 %, 5 % and 1 %, respectively.

Appendix 18: Summary statistics of explanatory variables of the fractional logit and fractional multinomial logit models

Explanatory variables	**M**	**SD**	Mean	SD	Min	Max
Farmland acquisition						
Land loss 2009	10.27	*24.50*	0.13	*0.27*	0.00	1.00
Land loss 2008	10.50	*24.00*	0.14	*0.26*	0.00	1.00
Human capital						
Household size	4.49	*1.61*	4.50	*1.61*	1	11
Dependency ratio	60.58	*66.78*	0.60	*0.65*	0.00	3.00
Number of male working members	1.25	*0.69*	1.26	*0.72*	0.00	4
Gender of household head*	0.78	*0.48*	0.78	*0.41*	0	1
Age of household head	51.21	*13.24*	51.35	*12.60*	21	96
Age of working members	40.46	*8.25*	40.04	*8.07*	21.50	78.00
Education of working members	8.37	*2.90*	8.32	*2.80*	0	16
Natural capital						
Owned farmland size per adult	3.43	*2.80*	2.92	*2.41*	0	18.13
Residential land size	21.88	*14.62*	22.43	*15.24*	0	125
House location*	0.32	*0.47*	0.30	*0.46*	0	1
Physical capital	8.61	*1.10*	8.55	*1.10*	4.94	11.25
Social capital	3.43	*2.09*	3.42	*2.06*	0	11
Financial capital						
Formal credit*	0.27	*0.44*	0.26	*0.44*	0	1
Informal credit*	0.19	*0.39*	0.20	*0.40*	0	1
Past livelihood						
Livelihood A*	0.22	*0.42*	0.21	*0.41*	0	1
Livelihood B*	0.18	*0.38*	0.18	*0.38*	0	1
Livelihood C*	0.19	*0.39*	0.16	*0.36*	0	1
Commune						
Song Phuong*	0.13	*0.33*	0.17	*0.37*	0	1
Kim Chung*	0.14	*0.35*	0.17	*0.37*	0	1
An Thuong*	0.20	*0.40*	0.17	*0.37*	0	1
Duc Thuong*	0.12	*0.32*	0.17	*0.37*	0	1
Van Con*	0.22	*0.41*	017	*0.37*	0	1

Note: Estimates in the first and second columns, including Means (**M**) and standard deviations (**SD**), are adjusted for sampling weights. * dummy variables.

Appendix 19: Questionnaire for household survey

Confidential

THE UNIVERSITY OF WAIKATO

Waikato Management School

Department of Economics

QUESTIONNAIRE FOR HOUSEHOLD SURVEY

Household number……

Household head (name)…….....Gender……. (Male=1; Female=0)

Number of people in the household……

Address……..Commune

Loss of farmland: ……Yes=1; No=0

Date of interview: Day…….Month…….2010

Survey supervisor
(Sign)

Interviewer
(Sign)

Note: Survey supervisor only sign after checking all the sections of the questionnaire and visiting households in order to confirm that they were interviewed on the day indicated.

SECTION 1: HOUSEHOLD ROSTER
(GENERAL INFORMATION ON HOUSEHOLD MEMBERS)

MEMBER CODE	**1. Name** Please tell me the full names of each person who has been having meals, sleeping, and sharing expenditure and income in your household for *at least 6 months out of the last 12 months* *Note:* Write in order and in capital letters , **beginning with household head**	**2. Sex** Male**……1** Female**...0**	**3. Relationship to the household head** *1…Head* *2…Wife/husband* *3…Child* *4…Child in law* *5…Parents* *6…Sister/brother* *7…Grand mother (or father)* *8…Grand child* *9…Other relationship*	**4. Age of [NAME]** If age is less than or equal to 05 years, both months and years should be recorded		**5. Residency status of [NAME]** *1…Permanent* *2…Semi-permanent (KT3* *3…Others*
				Record 2 digits YEARS	Record 2 digits MONTHS	
1						
2						
3						
4						
5						
6						
7						
8						

SECTION 2: LIVELIHOOD ASSETS AND ACTIVITIES OF HOUSEHOLD

2A. HUMAN CAPITAL AND LIVELIHOOD ACTIVITIES

Member Code	**1.** **Name** Note: *To copy the NAME and the exact same code of HH member in the household roster* ***Starting with household head***	**2.** Can [NAME] read & write? 1.YES 2.NO	**3.** The highest education that [NAME] obtained? *0. No grade* *1-12. School years* *13. Technical worker* *14. Vocational* *15. College* *16. Bachelor* *18. Master* *22. Doctor*	**4.** Did [NAME] work **BEFORE** the time of farmland acquisition**?** Ask members aged 6 and older at that time **NOTE:** **If you are in a land losing household, the time of farmland acquisition was the time when your farmland was acquired by the State** **If you are in a non-land-losing household, the time of farmland acquisition was the time when the State acquired farmland in 2008 in your commune** YES….1 N0……0**>>6**	**5.** What was [NAME]'s **main job BEFORE** the farmland acquisition? *1. Farmer (self-employed in planting, breeding, aquaculture)* *2. Self-employment in nonfarm activities* *3. Wage worker for other households, individuals* *4. Wage worker in the public sector* *5. Wage worker in companies/factories* *6. Wage worker in other organisations*	**6.** Has [NAME] worked for the last 12 months? ***Note:*** ask members aged 6 and older YES…1 NO….0**>>8**	**7.** What was [NAME]'s **main job** for the last 12 months? *1. Farmer (self-employed in planting, breeding, aquaculture)* *2. Self-employment in nonfarm activities* *3. Wage worker for other households, individuals* *4. Wage worker in the public sector* *5. Wage worker in companies/factories* *6. Wage worker in other organizations*	**8.** Why hasn't [NAME] worked for the last 12 months? *1. Unable to find a job due to lack of skills, qualification* *2. Don't want to work* *3. Too old, retired* *4. Disabled* *5. Sick* *6. Do housework* *7. Small/studying* *8. Others (Specify it)……*

2 B LABOUR TIME ALLOCATION AND INCOME ACTIVITIES

2B.1 LABOUR TIME ALLOCATION AND WAGE INCOME IN THE LAST 12 MONTHS

1. Member Code	2. Interviewer must record the **surnames of WORKING MEMBERS** in this column before asking **Note:** **Working members** are those who worked in the last 12 months	3 A. Has [NAME] participated in **INFORMAL WAGE WORK** in the last 12 months?				3E. Total amount of **wage/ salary** [NAME] earned from **informal wage work** in the last 12 months? 1000 VND	3F. Total of other income **apart from wage/ salary** in the last 12 months? 1000 VND	3G. Total income from informal wage work in the last 12 months **=3E+3F** 1000 VND	4 A. Has [NAME] participated in **FORMAL WAGE WORK** in the last 12 months?				4E. Total amount of **wage/ salary** [NAME] earned from **formal wage work** in the last 12 months? 1000 VND	4F. Total of other income **apart from wage/ salary** in the last 12 months? 1000 VND	4G. Total income from informal wage work in the last 12 months **=4E+4F** 1000 VND	5 A. Has [NAME] participated in **AGRICULTURAL SELF-EMPLOYMENT** in the last 12 months?				6 A. Has [NAME] participated in **NONAGRICULTURAL SELF-EMPLOYMENT** in the last 12 months?			
		MARK X IF YES, IF NO>>**4A**	**3B** How many **months** for the last 12 months?	**3C** How many **days** per month on average?	**3D** How many **hours** per day on average?				MARK X IF YES, IF NO>>**5A**	**4B** How many **months** for the last 12 months?	**4C** How many **days** per month on average?	**4D** How many **hours** per day on average?				MARK X IF YES, IF NO>>**6A**	**5B** How many **months** for the last 12 months?	**5C** How many **days** per month on average?	**5D** How many **hours** per day on average?	MARK X IF YES, IF NO>>**2B2**	**6B** How many **months** for the last 12 months?	**6C** How many **days** per month on average?	**6D** How many **hours** per day on average?

2 B.2 LABOUR TIME ALLOCATION **BEFORE** THE TIME OF FARMLAND ACQUISITION

1. Member Code	**2.** Interviewer must record the **surnames of WORKING MEMBERS before the farmland acquisition** in this column before asking	**3 A.** Did [NAME] participate in **INFORMAL WAGE WORK** in the last 12 months **before the farmland acquisition?**				**4 A.** Did [NAME] participate in **FORMAL WAGE WORK** in the last 12 months **before the farmland acquisition**?				**5 A.** Did [NAME] participate in **AGRICULTURAL SELF-EMPLOYMENT** in the last 12 months **before the farmland acquisition**?				**6 A.** Did [NAME] participate in **NONAGRICULTURAL SELF-EMPLOYMENT** in the last 12 months **before the farmland acquisition**?				**7.** What was your household's major income before the farmland acquisition? Ask household head (or her or his spouse) (Circle the answer) *1. Income from informal wage work* *2. Income from formal wage work* *3. Income from agricultural self-employment* *4. Income from nonagricultural self-employment* *5. Other income (Specify)……*
		MARK X IF YES, IFNO>>**4A**	**3B** How many **months** for the last 12 months?	**3C** How many **days** per month on average?	**3D** How many **hours** per day on average?	MARK X IF YES, IF NO>>**5A**	**4B** How many **months** for the last 12 months?	**4C** How many **days** per month on average?	**4D** How many **hours** per day on average?	MARK X IF YES, IF NO>>**6A**	**5B** How many **months** for the last 12 months?	**5C** How many **days** per month on average?	**5D** How many **hours** per day on average?	MARK X IF YES, IF NO>>**2B3**	**6B** How many **months** for the last 12 months?	**6C** How many **days** per month on average?	**6D** How many **hours** per day on average?	

2B 3 AGRICULTURAL PRODUCTION ACTIVITIES
2B3.1 PLANTING

1. What crops has your household cultivated for the last 12 months?	**2.** What is the area that has been cultivated? Area (m^2)	**3.** How much output has your household harvested in the last 12 months? KGs	**4.** How many KGs have been used as food for your household ? KGs	**5.** The total value of the produce harvested for the last 12 months? ***Note***: Incl. the total value of crop by-products 1,000 VND	**6.** How much has your household spent on the following items for producing crops for the last 12 months? **NOTE:** *(Including those bought, bartered, self-produced, given, excluding those collected and picked...*) IF NONE, RECORD 0; IF DON'T REMEMBER DETAILS, RECORD "KB", FILL THE TOTAL AMOUNT IN THE TOTAL COLUMN **Unit: 1000 VND**								
					a. Seeds?	**b.** Fertiliser, pesticide ?	**c.** Hired labour?	**d.** Fuel, oils, petrol.. ?	**e.** Renting of machines, means of transport..?	**f.** Land rental, irrigation fees, other fees, taxes?	**g.** Loan interest ?	**h.** Other costs?	**i.** Total = **a+b+ c+d+ e+f+g +f+g+ h**
1													
2													
3													
4													
5													
6													

7. TOTAL INCOME = TOTAL OF Q 5	**8. TOTAL COST FOR PLANTING = TOTAL OF 6i**
9. TOTAL NET INCOME FROM CROP PRODUCTION= Q7-Q8	

2B 3.2 LIVESTOCK BREEDING/ AQUACULTURE

1. What type of livestock or aquaculture ?	**2.** What are the areas of breeding facilities? Area (m^2)	**3.** How much output has your household obtained in the last 12 months? KGs	**4.** How many KGs have been used as food for your household in the last 12 months? KGs	**5.** The total value of the output has been sold, consumed as food and used for other purposes for the last 12 months? ***Note*****:** *Incl. the value of livestock by-products* 1000 VND	**6.** Could you please tell us about your expenditure on breeding livestock for the last 12 months? ***Note:*** *Including those bought, bartered, self-produced, given* IF NONE, WRITE 0, IF CAN'T REMEMBER DETAILS, WRITE "KB", IF REMEMBER THE TOTAL AMOUNT, WRITE IN THE TOTAL COLUMN **(6i)** **Unit: 1000 VND**								
					a. Livestock breeds	**b.** Feeds and veterinary medicines services?	**c.** Hired labour?	**d.** Energy, fuel, (electricity, oil, petrol, water..?	**e.** Rentals of machines, means of transport.. ?	**f.** Land rental, other fees, taxes?	**g.** Fixed asset appreciation, repair and maintenance?	**h.** Loan interest and other costs?	**i**. Total= **a+b+c+ d+e+f+ g+h**
1													
2													
3													
4													

7. TOTAL INCOME = TOTAL OF Q 5	**8. TOTAL COST FOR FARM PRODUCTION = TOTAL OF Q6i**
9. TOTAL NET INCOME FROM LIVESTOCK BREEDING= Q7-Q8	

2B 3.3 AGRICULTURAL SERVICES

2B 3.3.1 INCOME FROM AGRICULTURAL SERVICES (Unit: 1000 VND)

Order of activity	1. Has your household used machines, equipment or tools for earning income from [….] during the last 12 months? IF NO ACTIVITY>>**2B4** **MARK X IF YES**		2. For how many months was this activity under operation during the last 12 months?	3. What is the monthly average income?	4. **Total income from [….]?** **Q2*Q3**
	Irrigation				
	Ploughing, soil preparation				
	Rice plucking, semi-processing				
	Artificial insemination, castration				
	Pet and disease control				

2B 3.3.2 EXPENDITURE FOR AGRICULTURAL SERVICES (Unit: 1000 VND)

Order o activity	Could you provide us with information about your expenditure on agricultural services in the last 12 months? **MARK X IF YES**		5. Expenses for materials,	6. Small non-durable items	7. Energy fuel (Electricity , petrol, oil...)	8. Minor repair, maintenance	9. Fixed assets depreciation	10. Rental of houses, workshops, machines, transportation means	11. Cost of hired labour	12. Payment for loan interest	13. Business taxes	14 Other expenditure.	15 **TOTAL COSTS**
	Irrigation												
	Ploughing, soil preparation												
	Rice plucking, semi-processing												
	Artificial insemination, castration												
	Pet and disease control												

16. TOTAL NET INCOME FROM AGRICULTURAL SERVICES= TOTAL OF Q4- TOTAL OF Q15

2B 4 NON FARM SELF-EMPLOYMENT ACTIVITIES
2B 4.1 INCOME FROM NON FARM SELF-EMPLOYMENT ACTIVITIES (UNIT: 1000 VND)

Order of activity	**1.** What activities has your household done in the last 12 months?	**2.** Where has this activity mainly taken place? *1. At home* *2. Within the commune* *3. Within the district* *4. Within the province/city* *5. In other province*	**3.** Is this activity solely owned by your household or shared with others? **1***: solely owned* **2***: shared with others***>>4**	**4.** What is your equity share? **%**	**5.** What is the total number of workers doing this activity? (Incl. workers as HH-members) NUMBERS	**6.** How many workers are hired? NUMBERS	**7.** How many months has this activity operated in the last 12 months? MONTHS	**8.** Does this activity have a business license? **If it is trading activity>>10** *Yes, enterprise…1* *Yes, private trading……..2* *No……3*	**9.** Is the product of this activity for bartering, selling or supplying services? Yes……1 No……..0**>>14**	**10.** What is the average revenue per month for the past 12 months?
1										
2										
3										

Order of activity	**11.** What is the total revenue for the last 12 months? **if it is trading activity>>14** **=q7*q10**	**12.** Over the past 12 months, have any goods and services produced by this activity been exchanged for other goods and services? YES….1 NO….0**>>14**	**13.** What is the total value of exchanged goods, services for the last 12 months?	**14.** Over the past 12 months, have any goods and services produced by this activity been consumed by your household? YES….1 NO….0**>>16**	**15.** What is the value of goods and services consumed by your household for the last 12 months?	**16.** Over the past 12 months, have any by-products been consumed or sold by your household? YES….1 NO….0**>>18**	**17.** What is the value of by-products consumed or sold by your household for the last 12 months?	**18.** TOTAL INCOME **=Q11 +Q13 +Q15 +Q17**	**19.** TOTAL INCOME ALLOCATED FOR HOUSEHOLD **Q4* Q18**
1									
2									
3									

Note: Revenue of trading activities do not include the original value of goods capital.

2B 4.2 EXPENDITURE FOR NON FARM SELF-EMPLOYMENT ACTIVITIES (UNIT: 1000 VND)						
Could you please provide me with information about expenditure on each of the following items for the last 12 months? *(Including self-supply, purchase, bartering, receiving…)* Just count generated expenditure for products which were sold, consumed, bartered, supplied for services	**20. 1st Activity**		**21. 2nd Activity**		**22. 3rd Activity**	
	a. For the months this activity was under operation in the past 12 months, what was the monthly average cost for this activity?	**b.** What was the total cost for this activity for the past 12 months? **=Q7* Q20a**	**a.** For the months this activity was under operation in the past 12 months, what was the monthly average cost for this activity?	**b.** What was the total cost for this activity for the past 12 months? **=Q7* Q21a**	**a.** For the months this activity was under operation in the past 12 months, what was the monthly average cost for this activity?	**b.** What was the total cost for this activity for the past 12 months? **=Q7* Q22a**
1. Materials, sub-materials						
2. Electricity						
3. Gasoline, petrol, oil…						
4. Labour cost						
5. Rent of land, workshop, machines, equipments…						
6. Loan interest, taxes, fees						
7. Transportation fees						
8. Water, and waste collection						
9. Fixed assets appreciation, small repairs and maintenance						
10. Other tools						
11. Postage, insurance, others…						
23. TOTAL COST FOR NON-FARM ACTIVITIES = Q20b + Q21b+Q22b **24. TOTAL COST FOR NON-FARM ACTIVITIES ALLOCATED FOR HOUSEHOLD =Q23*Q4/100** **15. TOTAL NET INCOME FROM NON-FARM ACTIVITIES ALLOCATED FOR HOUSEHOLD = Q 19- Q24**						

NOTE: Expenditure of trading activities does not include the original value of goods capital.

2B 5 OTHER INCOME

	1. In the past 12 months, has anyone in your household received the following sources?	Mark X if answer is yes	2. What is the amount your household has received in the past 12 months? 1000 VND
1	Overseas remittance and value of in-kind presents from people who are not members of your household		
2	Domestic remittance and value of in-kind presents from people overseas who are not members of your household		
3	Pension, one-time sickness and job loss allowance		
4	Social welfare allowance		
5	Lump sum retirement allowance		
6	Other social welfare allowance (Invalids, relatives of revolutionary martyr,..)		
7	Allowance for recovery from disasters (fire, flood, diseases…)		
8	From different types of insurance		
9	From charity organisations, association, or companies…		
10	Interest on savings, shares, bonds, loans		
11	Renting out of land/houses/shops/workshops/ equipments, assets, machines…that is not yet counted in trade and business production parts		
12	Others (specify them…….)		
	3. TOTAL OTHER INCOME=		**TOTAL OF Q2**

2C. SOCIAL CAPITAL

1. *Has anyone in your household been a member of the following groups/associations?*

(1=Yes ,0: No)

List	Name of groups/ organisations		List	Name of groups/ organisations	
1	Communist party		11	Sports group.	
2	Vietnamese Fatherland Front		12	Cultural activity group	
3	Youth union		13	Co-operative	
4	Women's association		14	Mutual assistance groups/clubs	
5	Farmer association		15	Neighbourhood board	
6	Work related/trade union		16	Alumni association	
7	War veteran association		17	Retirement/old age club	
8	Religious group		18	Red Cross	
9	Informal credit group		19	Others (specify)…….	
10	Professional groups				

Note: This question is applied to land-losing households only

2. *After losing farmland, has your household received any support for job finding or job conversion from the following groups/associations?*

(1=Yes 0:No)

List	Name of groups/ organisations		List	Name of groups/ organisations	
1	Communist party		11	Sports group.	
2	Vietnamese Fatherland Front		12	Cultural activity group	
3	Youth union		13	Co-operative	
4	Women's association		14	Mutual assistance groups/clubs	
5	Farmer association		15	Neighbourhood board	
6	Work related/trade union		16	Alumni association	
7	War veteran association		17	Retirement/old age club	
8	Religious group		18	Red Cross	
9	Informal credit group		19	Others (specify)…….	
10	Professional groups				

Note: This question is applied to land-losing households only

3. *After losing farmland, has your household received any support for agricultural production from the following groups/associations?*

(1=Yes ,0 :No)

List	Name of groups/ organisations		List	Name of groups/ organisations	
1	Communist party		11	Sports group.	
2	Vietnamese Fatherland Front		12	Cultural activity group	
3	Youth union		13	Co-operative	
4	Women's association		14	Mutual assistance groups/clubs	
5	Farmer association		15	Neighbourhood board	
6	Work related/trade union		16	Alumni association	
7	War veteran association		17	Retirement/old age club	
8	Religious group		18	Red Cross	
9	Informal credit group		19	Others (specify)…….	
10	Professional groups				

2 D NATURAL CAPITAL
2 D 1 RESIDENTIAL LAND

1. Do you have a house or residential land plot in a prime location? YES…1 NO….0	**2.** Total Area (m^2)	**3.** Estimated price/ m^2 1000 VND	**4.** The estimated value 1000 VND	**5.** Area (m^2) by use purposes						
				a. For housing Area (m^2)	b. For production/ business Area (m^2)	c. For garden/ ground Area (m^2)	For letting			Unused
							d. Area (m^2)	e. Rental/ m^2 1000 VND	f. Rental per month 1000 VND	g. Area (m^2)

6. Has your residential land been acquired by the State? YES…..1 NO…....0 **>> 2.D.2**	**7.** What area has been acquired? **(m^2)**	**8.** What is the compensation price/ (m^2)? 1000 VND	**9.** What is the total amount of compensation 1000 VND	**10.** For what purposes, has this amount of money been used? **Please circle the answer:** *1. Bank saving* *2. House repairing or building* *3. Buying motorbike* *4. Buying appliances/furniture* *5. Investing in nonfarm production* *6. Investing in farm production* *7 Buying land.* *8. Debt repayment* *9. Children's schooling* *10. Health care* *11. Job change* *12. Daily expenses* *13. Divided between children* *14. Others (specify……..)*

Note: *A prime location is defined as*: the location of a house or of a plot of residential land situated on the main roads of the village or at the crossroads or very close to local markets or to industrial zones, and to a highway or new urban areas. Such locations enable households to use their houses or residential land plots for opening a shop, a workshop or for renting.

2D2 FARM LAND AND FARMLAND LOSS DUE TO THE FARMLAND ACQUISITION

1. What was the total of farmland used by your household **before the last farmland acquisition**?		**2.** Could you please provide us with detailed information on the farmland area by use purposes **before the last farmland acquisition**? **(m²)**						**3.** What is the total of farmland area **currently used** by your household?		**4.** Could you please provide us with detailed information on the farmland area by **the current use purposes?** **(m²)**					
a. The owned area **(m²)**	b. The rented or borrowed area **(m²)**	a. Planting	b Breeding	c. Aquaculture	d. For rent	e. Fallowed	f. Others	a. The owned area **(m²)**	b. The rented or borrowed area **(m²)**	a. Planting	b Breeding	c. Aquaculture	d. For rent	e. Fallowed	f. Others

5. Has your household lost any farmland due to the last farmland acquisition? YES…1 NO…..0**>>2E**	**6.** When did your household receive the decision on the farmland acquisition? Month/ Year	**7**. When was your farmland acquired? Month/ Year	**8.** What is the total farmland area that has been acquired? **(m²)**	**9**. What is the total amount of compensation for the farmland loss? 1000 VND	**10.** For what purposes, has your household used this amount of compensation? **Please circle the answers:** *1. Bank saving* *2. House repairing or building* *3. Buying motorbike* *4. Buying appliances/furniture* *5. Investing in nonfarm production* *6. Investing in farm production* *7 Buying land.* *8. Debt repayment* *9. Children's schooling* *10. Health care* *11. Job change* *12. Daily expenses* *13. Dividing between children* *14. Others (specify……..)*	**11.** Of your household members, is there anyone who has worked for the project of farmland acquisition? *1..YES* *0…NO**>>13***	**12.** How many household members? …….	**13.** Reasons for not being recruited by or not working for the projects of farmland acquisition. **Please circle the answers:** *1. Industrial zones/projects had no recruitment demand for employees* *2. Lack of skills, qualification* *3. Old age* *4. No information about recruitment* *5. Low wage/hard work* *6. Others (Specify……)*

2E PHYSICAL CAPITAL

2E.1 PRODUCTIVE ASSETS

Code	Types of assets	1. Does your household have this/these [Asset]? (Mark x if yes)	2. When did your household buy or receive this/these [asset(s)]? Note: *fully fill in the year with 4 digits. If bought within the last 12 months, record both month and year*		3. What was the value of this/these [asset(s)] when purchased or received? (1000 VND)	4. What is the value of this/these [asset(s)] at the current price? (1000 VND)
			Month	***Year***		
1	Perennial crop gardens					
2	Drawing, ploughing and breeding cattle					
3	Breeding pigs					
4	Basic herds of poultry and cattle					
5	Breeding facility					
6	Feed grinding machines					
7	Rice milling machines					
8	Grain harvesting machines					
9	Sewing, weaving, embroidering machines					
10	Pesticide sprayers					
11	Stores and workshops					
12	shops					
13	Other production facilities					
14	Cars/trucks					
15	Tractors of all kinds					
16	Trailers					
17	Tractor ploughs					
18	Motorbikes					
19	Bicycles					
20	Carts					
21	Motor boats, ferries…					
22	Rowing boats, ferries…					
23	Other means of transportation					
24	Lathes and welding and milling machines					
25	Punchers					
26	Wooden sawing machines					
27	Pumps for production					
28	Power generators for business					
29	Printers, photocopiers for business					
30	Fax machines					
31	Computers for business (internet services, games...)					

32	Other assets for business……..					
	5. The total value of productive assets at present =					**TOTAL of Q4**

2E.1 DURABLE ASSETS

Code	Types of assets	1. Does your household have this/these [Asset]? **(Mark x if yes)**	2. When did your household buy or receive this/these [asset(s)]? **Note:** *fully fill in the year with 4 digits. If bought within the last 12 months, record both month and year*		3. What was the value of this/these [asset(s)] when purchased or received? (1000 VND)	4. What is the value of this/these [asset(s)] at the current price? (1000 VND)
			Month	***Year***		
33	Telephone sets					
34	Computers and printers used for children's study					
35	Mobile phones					
36	Televisions					
37	DVD/VCD players					
38	Video cassette players					
39	Radio/cassette players					
40	Recorders					
41	Cameras, camcorders					
42	Refrigerator, freezers					
43	Air conditioners, power generators					
44	Washing machines and driers					
45	Electric fans					
46	Water heaters					
47	Gas cookers					
48	Electric cookers, rice cookers, pressure cookers					
49	Wardrobes of all kinds					
50	Beds					
51	Tables, chairs, sofas…					
52	Vacuum cleaners					
53	Water filters					
54	Microwaves, baking stoves					
55	Fruit blenders, juicers					
56	Other valuable things(Specify…)					
	5. Total value of durable assets at present (33+34+…56)					**TOTAL of Q4**

2F FINANCIAL CAPITAL **2F2. CREDIT**				
1. Has any member of your household had an account (saving or loan), or used ATM at any bank or other financial institutions within the last 24 months?	***2.*** After farmland acquisition, has your household needed to borrow?	**3.** Has the demand been satisfied?	**4.** For the last 12 months, have your household members received any loan (in cash or in kind) from relatives, friends, banks, political-social organisations, credit fund, rotating credit and saving association, private money lender?	**5.** For the last 24 months, have your household members received any loan (in cash or in kind) from relatives, friends, banks, political-social organisations, credit fund, rotating credit and saving association, private money lender?
Yes...1 No….0	Yes...1 No….0	1…Totally 2…Partially 3…Not at all	Yes...1 No….0	Yes...1**>>6** No….0**>>** **section 3**

O D E R	**6.** From what sources of loans has your household borrowed in the last 24 months?	**Mark X if Yes** ↓	**7.** What is the total value of the loans? 1000 VND	**8.** When did you get the loans? (only for last 24 months bank) **Month /Year**	**9.** For what purposes has your household used the loan? *1…Production/ job conversion* *2…Farm production investment* *3…Consumption* *4…House purchase or upgrading* *5…Land purchase* *6…Non-economic events: funeral/ wedding, worship, party…* *7…Children's schooling* *8…Health expenditure* *9…Paying debt* *10…Others (specify*)	**10.** What is the term of loans? **Months**
1	*Commercial banks*					
2	*Social policy bank*					
3	*Job placement and conversion support fund*					
4	*Credit co-operatives*					
5	*People credit fund*					
6	*Political social organisations*					
7	*Private money lenders*					
8	*Rotating credit & saving associations*					
9	*Hunger eradication & poverty reduction fund*					
10	NGO (Non-government organisations)					
11	Relatives					
12	Neighbours					
13	Friends					
14	Others (specify….)					

SECTION 3: HOUSEHOLD EXPENDITURE

3A. EXPENDITURE FOR FOOD AND DRINKS

Code	Items	**1.** Within the past 7 days, did your household members eat or drink any of the following food and drinks? ***Note:*** *Only list items consumed within household. Food and drinks consumed outside the household must be recorded in item 10. Ask all questions for each item before moving to the next item*	**2.** Within the past 7 days did any household member **buy** any […]?	**3.** Within the past 7 days did any household member consume any […] from a **stock** in your house?	**4.** Within the past 7 days did any household member consume any […] from **gifts/assistance** or any other sources?	**5.** Within the past 7 days did any household member consume any […] that were **produced by your household?**	**6.** CHECK FROM QUESTION 2 TO 5 **Is at least one answer** "YES"?	**7.** How much would it have cost your household to buy the same amount of these food and drinks?
		YES …1 NO…..0 **>>next**	YES…1 NO…..0	YES…1 NO…..0	YES…1 NO…..0	YES…1 NO…..0	YES…1 NO…..0 **>>next item**	1000 VND
1	Cereals and cereal products							
2	Noodles/rice noodle							
3	Meat, meat products, eggs, fish…							
4	Vegetables							
5	Fruits							
6	Cooking mixed spices							
7	Sugar, milk and milk products							
8	Beverages, alcohol, beer…							
9	Coffee, tea, cigarettes							
10	Outdoor eating/party							
8. TOTAL OF QUESTION 7= TOTAL FOOD AND DRINK EXPENDITURE FOR ONE WEEK								
9. TOTAL FOOD AND DRINK EXPENDITURE FOR THE LAST 12 MONTHS= (TOTAL OF QUESTION 7*52 WEEKS)								

3B. DAILY NON-FOOD EXPENDITURES

			1. In the last 12 months, which of the following items did your household consume or purchase? *Note*: Ask all items for question 1 before moving to question 2	**2.** How much did your household buy […] per month? (1000VND)	**3.** How many months did your household buy […] for the last 12 months?
Code	**Item**	**Mark X if Yes**			
1	Pocket money for children				
2	Coal, wood, sawdust, chaff				
3	Gas				
4	Kerosene for cooking or light				
5	Gasoline, lubricant and grease for motor, car…				
6	Bicycle, motorcycle or car parking fee				
7	Matches, candles, flint				
8	Washing powder				
9	Softening liquid				
10	Dish washing liquid				
11	House cleaning liquid				
12	Shampoo, conditioner				
13	Bath soap, liquid soap				
14	Lotion, powder & lipsticks				
15	Toothpaste, tooth brush				
16	Toilet paper, razorblades				
17	Books, newspapers, magazines				
18	Flowers				
19	Entertainment (cinema, video, sports, TV cable)				
20	Lottery tickets				
21	Regular worship items				
22	Haircut, hairdressing				
23	Other daily expenses				
4. TOTAL EXPENDITURE FOR DAILY NON-FOOD CONSUMPTION =					**Total of Q2*Q3**

3C: ANNUAL NON-FOOD EXPENDITURE

Code	1. Which of the following items did your household consume or purchase in the last 12 months?		2.a Value of[…] bought or consumed in the last 12 months	Code	1. Which of the following items did your household consume or purchase in the last 12 months?		2.a Value of[…] bought or consumed in the last 12 months
	Item	**Mark X if Yes**	1000 VND		**Item**	**Mark X if Yes**	1000 VND
1.	Fabric			**22.**	Pictures, photos, houseplants		
2.	Ready-made clothing…			**23.**	Sports instruments		
3.	Mosquito net and netting			**24.**	Toys for children		
4.	Face towel, scarves			**25.**	Envelopes, stamps, telephone, postage fees		
5.	Rush mats, blankets, pillows			**26.**	Internet charge		
6.	Other sewing materials and garments (Needles, thread, socks…)			**27.**	Cosmetic surgery, body building		
7.	Tailoring or laundry services			**28.**	Excursion, holiday		
8.	Shoes, sandals, wooden clogs			**29.**	Jewelry, watches, makeup		
9.	Nylon sheeting, hats, umbrellas			**30.**	Other cultural activities		
10.	Light bulbs, electric wire, plugs, fuses			**31.**	Hiring domestic services		
11.	Porcelain and glass bowls, plates, teapots and cups…			**32.**	Other annual expenses		
12.	Pans, pots, bins, buckets, basins				**A. Sub-total**		=(1+2+…32)
13.	Vacuum thermos and liner			**33.**	Contributions to social funds (natural disaster relief, poverty alleviation, education fund…)		

14.	Bags and baskets			**34.**	Public labour contribution		
15.	Lighter, flashlight, battery			**35.**	All kinds of taxes (not including production taxes)		
16.	Cradle, hammock, pram			**36.**	Wedding, birthday, and other events		
17.	Other household items (excluding durable goods)			**37.**	Funeral and worship on special occasions for family		
18.	Bike tires, tubes, bicycle spare parts			**38.**	Arranged parties for family		
19.	Motorbike, car tires, tubes, motorcycle, car spare parts			**39.**	Gifts, donations, support, assistance…		
20.	Maintenance and household repair tools			**40.**	Other expenses		
21.	Boat, bus, train, taxi, car, transportation fees				**B. Sub-total**		= (33+34+…40)
					3. TOTAL EXPENDITURE FOR ANNUALLY NON-FOOD EXPENDITURE		**= A. Sub-total+ B. Sub-total**

3 D: EXPENDITURE FOR EDUCATION

List of member	1. **Please tell us the full names of member who have attended schools in the last 12 months?** ***Note:*** Starting with the lowest education level *1… Nursery school* *2…Kindergarten* *3…Primary* *4…Secondary / high school* *5…Technical worker* *6…Vocational* *7…College* *8…Bachelor* *9…Master* *10…Doctor*		5. **Expenditure for [NAME]'s education for the last 12 months according to the school regulations** IF no expenditure, record 0 If remembers the total amount and detailed expenditure items, fill in the corresponding columns 1000 VND								6. **Expensesfor other courses** (Homework, tutorial, language, computer skills and other studies) 1000 VND
	Full names	**Level**	**a.** Tuition and registration fees	**b.** contribution to school and class (building, raising funds)	**c.** Uniform, and other clothing	**d.** Text and reference books	**e.** Other stationery (paper, pens, school bag...)	**f.** Extra classes, including language and computer)	**g.** Other expenditure (transport, accommodation, other)	**h.** Total amount =a+b+c +d+,…g	
1											
2											
3											
4											
7. TOTAL EXPENDITURE FOR EDUCATION =Q5h+Q6											

3E: HEALTH EXPENDITURE

1. Has any household member gone to hospitals or care services centres in the last 12 months? **IF NO PERSON>>4** IF YES>> Please give their full names			2. What was the total out-patient treatment cost of [NAME]? 1000 VND			3. What was the total in-patient treatment cost of [NAME]? 1000 VND		
List	**NAMES**	**Member Code**	**a. Times**	**b. Amount/once** *Including:* consultation, feeding-up allowance for patient, medicine, health tools and other items related to time of treatment	**c. Amount**	**a. Times**	**b. Amount/once** *Including:* consultation, feeding-up allowance for patient, medicine, health tools and other items related to time of treatment	**c. Amount**
1.								
2.								
3.								

=>Continuing to health expenditure

4. In the last 12 months, how much did your household spend on medicine for self-treatment or prevention of diseases without consultations?	5. In the last 12 months, how much did your household spend on health appliances? *E.g. hearing aid apparatus, blood pressure meter…*	6. In the last 12 months, how much did your household contributed to public health cares? *E.g. public health fund, constructions of health centres, preventative programs*	7. How much did your household pay for health insurance in the last 12 months?	8. **TOTAL AMOUNT SPENT ON HEALTH**
				= Q2C+Q3C+Q4+Q5+Q6+Q7

3 F: EXPENDITURE FOR HOUSING, ELECTRICITY, WATER, AND GARBAGE COLLECTION

1. What type of house did you own **before the last farmland acquisition**? *1…villas* *2…permanent house with private kitchen and bathroom/toilet* *3…permanent house with a shared kitchen or bathroom/toilet* *4…semi-permanent house* *5…temporary house/thatched house*	**12.** Of the land plots/ houses your household is living in, is there any that your household has purchased? 1…Yes 0…No**>>15** **13.** When was your latest purchase? (Month/ year)……. (Before the last 12 months)**>>15** **14.** How much did you pay for it in the last 12 months? ……..1000 VND
2. What type of house is your **household living in?** *1…villas* *2…permanent house with private kitchen and bathroom/toilet* *3…permanent house with a shared kitchen or bathroom/toilet* *4…semi-permanent house* *5…temporary house/thatched house*	**15.** Of the houses your household has been building, have any been finalised for the last 12 months? 1…Yes 0…No**>>17** **16**. What is the cost for the last 12 months alone? ……..1000 VND
3. What is the total usable area of this house …….Area (m´)	**17.** How much did you spend on major house repairs or upgrades in the last 12 months? ……1000 VND **If there is no big repair or upgrading>>18**
4. Is this house totally owned by your household? *1…Yes**>>5*** *2…No, partially**>>6*** *3…No, it is rented by your household**>>7*** *4…No, It is borrowed without paying**>>8***	**18.** How much did you spend on minor house repairs, upgrades during the last 12 months? ……..1000 VND **If there is no minor repair or upgrading>>19**
5. What is the total value of this house? ……1000 VND	**19.** Has your household paid for water of daily life use in the last 12 months? 1…Yes 0…No**>>21**
6. What is the value of this house that belongs to your household? ……1000 VND	**20.** How much did you pay in the last 12 months …….(1000 VND)
7. How much did your household pay for rental in the last 12 months? …….(1,000 VND)	**21.** Did you pay for garbage disposal in the last 12 months? 1…Yes 0…No**>>23**
8. Do you have other houses/flats? 1…Yes 0….No	**22**. How much did you pay for garbage disposal in the last 12 months? ……(1000VND)
9. Is that house/flat solely owned by your household 1…Yes**>>10** 2…No, partially**>>11**	**23.** H**o**w much did you pay for electricity in the last 12 months? 01 **month** bill*12 months =……(1000 VND)
10. What is the value of that house/flat? ……1000 VND	**24. TOTAL EXPENDITURE FOR HOUSING, ELECTRICITY, WATER, AND GARBAGE COLLECTION** **=Q7+Q14+Q16+Q17+Q18+Q20+Q22+Q23**
11. What is the value of that house/flat that belongs to you ……..(1000 VND)	