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# Farmland acquisition and livelihood choices of households in Hanoi's peri-urban areas

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**Abstract**

The relation between land and rural livelihood has been a topic of interest for many researchers and development practitioners. In the context of rising farmland loss due to the escalated urbanization and industrialization in Vietnam's developed provinces, several researchers have tried to address how farm households respond to farmland loss in peri-urban areas (e.g., Do, 2006; Ngo, 2009; S. V. Nguyen, 2009; Phong, 2007; Vo, 2006). However, no studies have quantified the impacts of farmland loss on peri-urban households' livelihood choices. Using a dataset collected by the lead author from Hanoi's peri-urban areas in 2008, this paper is the first attempt to apply econometric methods to quantify effects of farmland loss on households' activity choices in Hanoi's peri-urban areas. The results reveal that households have actively adapted to the new context by adopting livelihood strategies based on manual jobs and non-farm self-employment activities. In addition, although larger owned farmland per adult stimulates households to specialize in farming, emerging non-farm job opportunities make rural young workers less interested in farming activities. The paper concludes with some proposed policy implications that may help peri-urban households to effectively change and diversify their livelihoods.

## 1. Introduction

International experience suggests that rapid urbanization pace and economic growth coincide with conversion of land from agricultural sector to industry, infrastructure and residential uses (Ramankutty, Foley & Olejniczak, 2002). Azadi, Ho & Hasfiati (2010) discuss the debate on whether farmland should be maintained or converted to other uses. Such a debate can be viewed from both pro-rural and the pro-urban perspectives. According to the pro-rural view, farmland acquisition has detrimental impacts in terms of loss of fertile farmland, which threatens traditional agricultural livelihoods and food security. As a result, pro-ruralists conclude that farmland should be maintained. Conversely, pro-urbanists argue that farmland conversion is an indispensable corollary of urban growth. In addition, they argue that the decline of agricultural production can be solved by applying advanced technology and farming intensification.

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Farmland shrinkage due to urbanization has negative impacts on livelihood strategies that largely or partially depend on farmland or other natural resources. In China, an immense area of farmland has been encroached by urbanization and such encroachment raises special concerns about rural livelihoods.(J. Chen, 2007; Deng, Huang, Rozelle & Uchida, 2006; Xie, Mei, Guangjin & Xuerong, 2005). Consequently, farmland shrinkage has significantly affected livelihoods of rural dwellers. It is estimated that in China 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. Every year, this process has induced 1.5 million farmers who live in the populous suburban areas to lose their traditional agricultural livelihoods (Tan, Li, Xie & Lu, 2005).

Indian rural households' livelihoods have 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 livelihood in this country. Nevertheless, the scenario seems to be more severe because India's large population puts great pressure on food supply. To cope with this hardship, technological advances are likely to push up agriculture productivity; such an increase, however, may be offset by cropland shrinking and increasing population. In addition, due to cultivated land decline, job generation for rural labour could be a great challenge for the country with around 67% of its total workforce engaging in the agriculture sector and about two thirds of the total population living in rural areas (Fazal, 2001).

A large scale study on many African countries suggests that over the past decades, urbanization and the underperforming industrial sector has been unable to absorb a huge number of rural surplus workers. Meanwhile the increasing population density in rural areas has led to a rapid decrease in farmland size per household, posing severe challenges on rural livelihoods (D. F. Bryceson, 1996). A study in South Africa indicates that arable land 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 (Shackleton, Shackleton & Cousins, 2001). Furthermore various studies point out the role of land in rural poverty eradication and the small and declining farm size is one of the severe constraints that the majority of rural households have already confronted in Malawi (F. Ellis, Kutengule & Nyasulu, 2003), in Tanzania (F. Ellis & Mdoe, 2003) and in Uganda (F. Ellis & Bahiigwa, 2003). A similar reality could be seen in Central America where households with small landholdings or landless farm workers have become the most vulnerable group among the rural poor (Siegel, 2005).

Nevertheless, the negative consequences of farmland acquisition are likely to be offset by a host of opportunities triggered by urbanization. For instance, shrinking farmland offers landless farmers wide choices of non-farm employment. Such opportunities can be seized by farmers to improve their livelihoods. In China, for example, farmland revocation for township expansion and village enterprise development resulted in new

non-farm livelihood opportunities for farmers (W. Chen, 1998; Parish, Zhe & Li, 1995). In addition, improved infrastructures facilitate productivity growth and farm product diversification. The evidence in China shows that a large share of high value farm production is made in urban and peri-urban areas (Xie et al., 2005). In the event of land shortage, infrastructure improvement and better transportation facilitated rural-urban migration in the Philippines (Kelly, 1999) and Sub-Saharan Africa (Tacoli, 2004). Especially in some parts of Africa and Southeast Asia, farmers abandoned their farmland to take up more lucrative non-farm employment in urban areas (D. Bryceson, 1997; F Ellis, 2000; Kabeer & Tran, 2000; Kato, 1994). Therefore, farmland has lost its crucial role in shaping rural livelihood and its role has been gradually replaced by non-farm activities that require education, skills, and networks, rather than farmland endowment.

In Vietnam, the escalating urbanization and industrialization have encroached on enormous areas of agricultural land over the past decade. Nationally, around 500,000 hectares of farmland have been taken for urban expansion, construction of industrial zones and infrastructure, which has affected around 630,000 farm households between 2000 and 2007 (Ministry of Natural Resources and Environment [Monre], 2009). Such a phenomenon has been widespread and intense in Vietnam's developed cities, especially in Hanoi and Ho Chi Minh City. Over the past ten years in Hanoi's peri-urban areas, urbanization and industrialization encroached on a huge area of agriculture land. According to the land use plan for the city from 2000 to 2010, 11,000 hectares of land, mainly farmland, have been converted for industrial and urban development, which caused approximately 150,000 farmers to lose their job (S. V. Nguyen, 2009). In addition, a plan of massive farmland revocation has been making thousands of farm households concerned about their future livelihoods. From now to 2020, Hanoi will be expanded to both banks of the Red river. It is estimated that approximately 12,000 households will be relocated and nearly 6,700 farms will be removed (Hoang, 2009).

Within the context of farmland loss due to urbanization and industrialization in many peri-urban areas of big cities, several studies by Vietnamese researchers tried to answer how peri-urban households respond to the shock of landloss. A large scale survey in 8 provinces having the greatest farmland loss presented a quite pessimistic picture of rural livelihoods; about 18% households lost their agricultural livelihood, with approximately a 2.8 % and 2.7% employment increase in the industrial and trade sectors, respectively (Phong, 2007). However, other case studies in the peripheries of Hanoi and Ho Chi Minh City show mixed impacts of farmland acquisition on local people. A case study in a peri-urban village of Hanoi showed that after land loss, some rural households combined their land loss compensation money with their natural capital in the form of residential land assets to not only overcome distress but to engage successfully in non-farm activities. Unfortunately not all farmers succeeded in finding suitable livelihoods, many became jobless because they did not have an appropriate educational background or vocational skills, and there were indications of social differentiation rising among rural households (S. V. Nguyen, 2009). Another case study by Do (2006) investigated the livelihoods of land losing farmers in a

village of Hanoi. Her findings indicate the land loss has resulted in the loss of natural capital in the form of arable land, traditional on-farm skills, food supply and agricultural income resources. In addition, to adapt to the new context, some households diversified their livelihood strategies by utilizing the livelihood resources such as compensation money, residential land, human capital, and other assets. Besides, the high but unstable income from wage-employment is becoming the main income resource for many households. Her research reveals that compensation money of agrarian loss was emerging as a big financial capital which helps land losing households cope with shocks and engage in profitable non-farm activities.

Results from other related studies (e.g., D. M. Nguyen, 2008; Q. V. Nguyen, Nguyen, Nguyen, Pham & Nguyen, 2005) indicate that farmland conversion for urban expansion has been bringing about positive changes in rural livelihoods. A recent report on the impact of urbanization on agriculture in Hanoi indicates that beside the negative influences, urbanization creates economic favorable conditions for peri-urban households. Many farmers who live near in some newly urbanized areas have been receiving better living conditions thanks to improved infrastructures, and chances for higher cash-income jobs. Many land losing households engage in non-farm jobs in industrial zones and urban areas, earning higher and more stable incomes (Q. V. Nguyen et al., 2005). During the past decade in Hanoi, farmland shrinkage has been accompanied by urban expansion to peripheral zones of the city, bringing about a host of opportunities for peri-urban households to improve their livelihoods. In a study on the rural-urban linkages in a Hanoi village, Nguyen (2008) found that the majority of households took full advantage of urbanization to improve their livelihood and reduce their dependence on farmland. Many households pursued livelihood strategies based on nonagricultural activities or diversification. Such livelihood strategies allow households to utilize their assets in non-farm activities with higher incomes than agricultural activities. Another case study of household livelihoods in a peri-urban commune of Ho Chi Minh City (Vo, 2006) shows that most agrarian land was converted into non-farm use purposes, especially for industrial zones and residential land. Farmers there changed their mode of cultivation to adapt to the new context. A popular feature of the conversion, which can be easily observable, is a switch-over from the paddy cultivation to husbandry and horticulture. In addition, the non-farm activities were increasing in company with accelerated urbanization and industrialization. Accordingly, such lucrative non-farm jobs in industrial and commercial sectors no longer make the young rural generation interested in farming activities.

The above discussion suggests that farmland acquisition has caused mixed impacts on rural livelihoods. So far, although there have been a few studies that investigate farmland loss and its impacts on peri-urban households in Vietnam, no study has quantified the various impacts of farmland revocation on household livelihood choice. This gap in the current literature has motivated us to conduct a study to answer the following questions: First, what are the current livelihood strategies of households in Hanoi's peri-urban areas? Second, what are the impacts of the farmland acquisition on households' livelihood strategy choices?

The paper is organized as follows: the next

section presents the research design which describes the conceptual framework for analysis, the background to the research site and data collection, statistical procedures for cluster analysis, and the specification of the econometric model. Section 3 reports empirical results from the econometric analyses. A discussion is presented in Section 4, and the final section concludes with some policy implications.

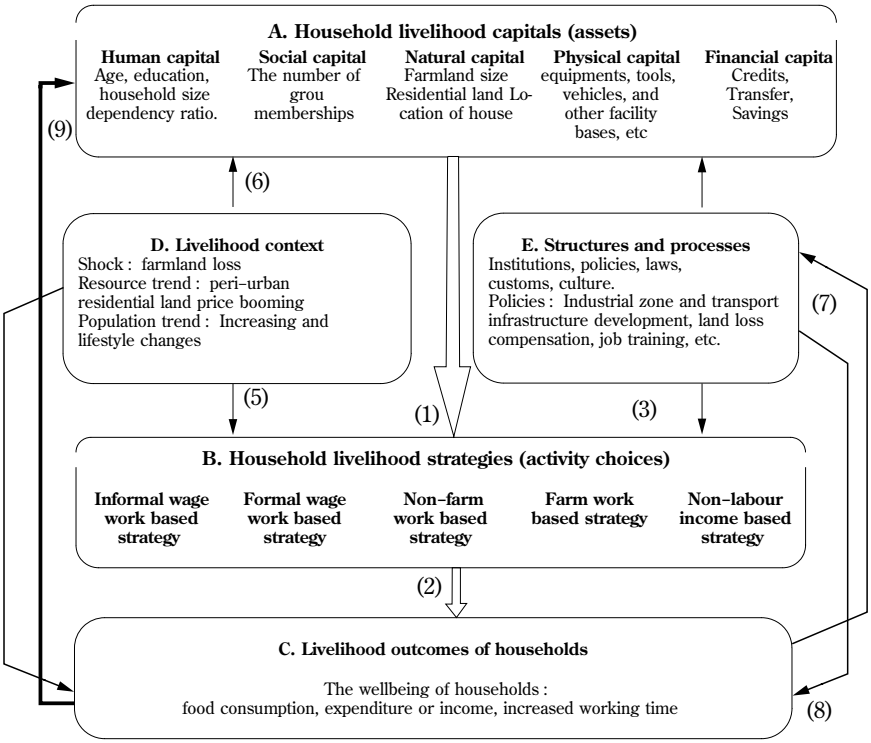
## 2. Research design

### 2.1. Analytical framework

Up to now, there have been a growing number of livelihood studies using "the sustainable livelihood approach" as a framework of analysis (e.g., Alwang, Jansen, Siegel & Pichon, 2005 ; Babulo et al., 2008 ; F Ellis & Bahiigwa, 2003 ; IFPRI, 2006 ; International Food Policy Research Institute [IFPRI], 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, 1999 ; Hussein & Nelson, 1998 ; Reardon Stephen, 1995 ; Scoones, 1998 ; Siegel, 2005). 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. In fact, many theoretical and empirical studies on livelihood choices have pursued this causal relationship (Babulo et al., 2008).

**Figure 1** displays the analytical framework

Figure 1 : Conceptual framework for analysis of Hanoi peri-urban household livelihoods




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

that is adapted to the specific context of the study. In this paper, we focus on box B : the determinants of household livelihood choices. As shown in Figure 5, 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 that are located close to towns and industrial zones) may directly affect livelihood choices of households (arrows (2,3)). Accordingly, such factors must be taken into account in the model of household livelihood choices. Besides, arrows (4,6) 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. The sustainable livelihood framework is constituted by dynamic and interdependent elements that together influence household livelihood over time. Therefore, given the limitations of cross–sectional data, one cannot address fully the influence of institutional and policy processes on other elements in this framework (IFPRI, 2006). Furthermore, based on such data, empirical analyses only examine the static impacts of household livelihood assets on livelihood choices (Babulo et al., 2008).

In fact, such static models have often been employed for quantifying factors affecting households' livelihood choices and outcomes by many studies (e.g., Alwang, et al., 2005 ; C. Barrett, Brown, Stephens, Ouma, & Murithi, 2006 ; C.B. Barrett, Bezuneh, & Aboud, 2001 ; International Food Policy Research Institute [IFPRI], 2000 ; Jansen, Pender, Damon, Wielemaker, & Schipper, 2006 ; Mutenje, Ortmann, Ferrer, & Darroch, 2010 ; Simtowe, 2010 ; Woldenhanna & Oskam, 2001). Following this approach, our study focuses only on static determinants of households' livelihood strategies and outcomes with a particular interest in the context of farmland revocation and rapid urbanization in Hanoi peri–urban areas.

### 2.2. Empirical implementation

#### 2.2.1. Research site and data collection

The study was conducted in Hoai Duc District – a peri–urban district of Hanoi. Prior to 1st August 2008, Hoai Duc District belonged to Ha Tay province, a neighbouring province of Hanoi Capital, which was merged into Hanoi on 1st August 2008. The district covers 8,247 hectares of land, of which farmland makes up 4,272 hectares and 91 percent of this area are used by households and individuals (Hoai Duc People's Committee, 2010a)[2]. Administratively there are 20 units under the district, consisting of 19 communes and 1 town. Hoai Duc has approximately 50,400 households with a population of 193,600 people. On a district scale, the proportion of employment in agriculture declined by around 23 percent over the past decade. However, a significant share of employment has remained in agriculture, accounting for around 40

2 According to the current constitution of Vietnam, land cannot be privately owned because it is the collective property of the entire people, which is representatively owned and administrated by the State and the land use rights are to be allocated to individuals, households, enterprises and other organizations. (National Assembly of Vietnam, 2003).

percent of the total employment in 2009. The corresponding figures for industrial, services sectors are 33 and 27 percent, respectively (Statistics Department of Hoai Duc District, 2010). Before having been a district of Hanoi, Hoai Duc used to be the richest district in Ha Tay Province (Monre, 2007). In 2009, Hoai Duc GDP per capita reached VND 15 million (Hoai Duc People's Committee, 2010b), which is less than half of Hanoi's average (32 million versus 15 million) (Vietnam Government Web Portal, 2010)[3].

Hoai Duc is located in the western part of Hanoi, 16 km from Hanoi Centre. The district is surrounded by various important roads such as Thang Long highway (the country's longest and most modern highway), National Way 32, and in close proximity to industrial zones, new urban areas and Bao Son Paradise Park (the biggest entertainment and tourism complex in North Vietnam). In such an extremely favourable location, a huge area of farmland in the district has been taken for above projects in recent years. In the period 2006-2010, around 15,600,000 $m^2$ of agricultural land have been revoked for 85 projects (LH, 2010)

A questionnaire is designed to collect quantitative data on livelihood asset holdings (different types of capitals: human, social, financial, physical, natural capitals), economic activities (data on time allocation for activities) and livelihood outcomes (income and expenditure). The survey with a total number of 480 households was conducted in Hoai Duc District from April to June 2010 in 6 communes using the disproportionate stratified random sampling method. First, 12 communes with farmland revocation were clustered into 3 groups based on their main socio-economic characteristic. The first group was represented by purely agricultural communes; the second one was characterized by communes with a combination of both agricultural and non-agricultural production and the third one consists of purely non-agricultural communes. From each group, 2 communes were randomly selected, yielding 6 communes. Then, 80 households in each commune, including 40 households with farmland loss and 40 households without farmland loss, were randomly selected, producing a sample of 480 households.

In fact, 477 households were successfully interviewed, of which 237 households lost their farmland at different levels. Some lost little, some lost partially and others lost totally. Among farmland loss households, 113 households reported that their farmland was revoked in the early 2009 and 124 households reported having farmland loss in the first half of 2008. These households' farmland was revoked according to various decisions issued by Ha Tay People's Committee in 2006, 2007 and 2008. As a result, around 1,636,000 $m^2$ of farmland in Hoai Duc District had been revoked for various projects relating to the construction of highway, new urban areas and other non-farm use purposes in the period 2008-2009 (Ha Tay People's Committee, 2006, 2007b, 2008b). In the remainder of this paper, households who lost their farmland by the farmland acquisition are called affected households (AHs) and households whose farmland was not revoked by the farmland acquisition are called non-affected households (NAHs). In addition, the term "affected households" will be interchangeably used with

3 Exchange rate between VND and USD in 2009: 1 USD = 1,7000 VND.

Table 1 : Households' past and current livelihood strategies

| Livelihood Strategy | Changes in livelihood strategies of households | | | | | |
|---|---|---|---|---|---|---|
| | Whole sample | | Affected households | | Non-affected 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 work (C) | 73 | 129 | 27 | 62 | 46 | 67 |
| Farm work (D) | 211 | 103 | 131 | 41 | 80 | 62 |
| Non-labour income (E) | 10 | 20 | 7 | 15 | 3 | 5 |
| Total | **477** | **477** | **237** | **237** | **240** | **240** |

*Source* : Own calculation from author's survey

the term "landloss households" in this study.

### 2.2.2. Clustering household livelihood strategies

In order to gain an insight into the changes of household livelihoods, the previous and current household livelihood choices were identified via cluster analysis. **Table 1** shows the number of the past and current livelihood strategies that were identified via cluster analysis techniques. As shown in this table, four main types of labour-income based strategies were classified before and after farmland acquisition. The informal wage work-based strategy is characterized by households who largely depend on manual paid jobs as the main income source. The common types of such paid jobs are building workers, carpenters, painters and various kinds of casual paid jobs, which are often hired by individuals, households or sometimes enterprises or other organizations without labour contracts and unstable income. Households pursuing the formal wage work-based strategy are represented by those who derive income mainly from formal wage work. Formal wage earners are those who work for state offices, enterprises or other organizations with labour contract and highly remunerated paid jobs. This implies that such jobs requires employees a high level of education or appropriate vocational skills.

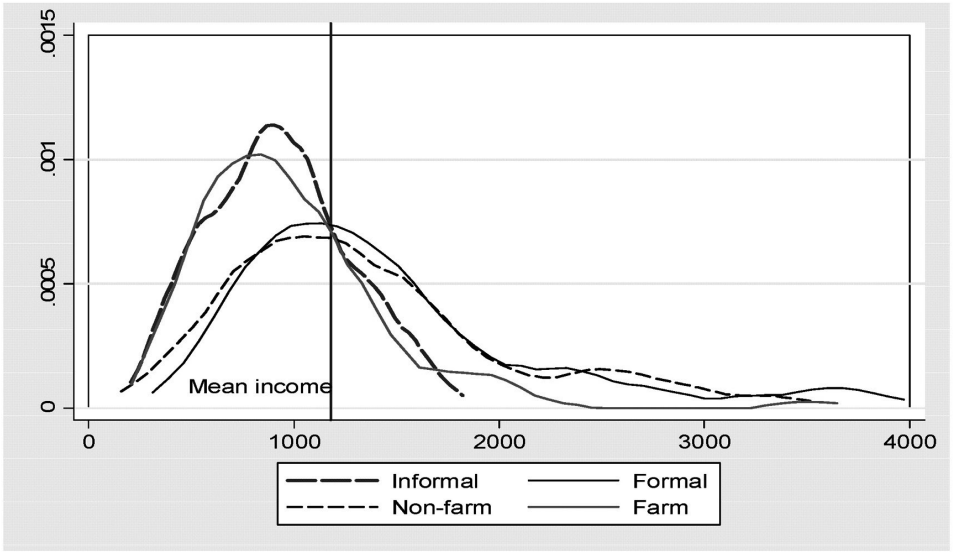
Regarding the non-farm work-based strategy, while about 40 percent of surveyed households reported engaging more or less in non-farm work, 27 percent of them depended on these activities as the dominant livelihood and the vast majority of activities were made up of micro-units with an average size of 1.7 jobs. The majority of business premises are located at households' own houses or residential land plots which are convenient locations for opening a shop, a workshop or a restaurant. Surprisingly, about 80 percent of households still remained farming but only 22 percent among them derived their main income from this work. Among them many households continued rice cultivation as a source of food supply while others grew vegetables and fruits to supply for Hanoi' urban customers. The popular crop plants include cabbages, tomatoes, various kinds of

beans, water morning glory, oranges, grapefruits, guavas, etc. The majority of animal husbandry is undertaken by pig or poultry breeding small-size farms or cow grazing households. However, this activity has been significantly shrunk due to the spreading cattle diseases in recent years.

Finally, the number of households depending on transfers as the dominant livelihood doubled after the farmland acquisition but this number accounts for a negligible proportion (about 4 percent of the sample). Households following this strategy have a very small size and high dependency ratio, consisting of very old and less well-educated members. Majority of them are landloss elderly farmers and live separately from their offsprings with income sources derived from remittances, social welfare allowance and interest earnings, etc. These households are not included in the econometric analysis because of their small number of observations. Such exclusion, however, is a limitation because changes in this strategy may reveal some important policy implications. Hence, some discussion on this issue will be made in the conclusion section.

**Figure 2** illustrates the income distribution by various types of livelihood strategies. The distributions for the agriculture-based the informal wage work-based strategies are clearly shifted to the left of the other strategies and the mean income. This suggests that there are some significant disparities in the well-being among distinct strategies and that household businesses as well as formal wage work are more lucrative livelihood strategies. According to the survey data, monthly per capita income is estimated at around VND 1,176,000 for the whole sample but a considerable disparity among groups can be shown in the figure. Those who rely mainly on manual paid jobs and farming reached at only 930,000 and 980,000, respectively, which are much lower than that of those pursuing strategies that based on formal

Figure 2 : Income distribution by livelihood strategies




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

wage work and non–farm work (1,457,000 and 1,354,000).

### 2.3.3. Specification of the econometric model

Once livelihood strategies are identified, a multinomial logistic model will be used to quantify the determinants of the livelihood strategy selection of households. As indicated by Train (2003), the multinomial logit (MNL) model is the most widely used discrete choice model. This model assumes that the decision makers make their choice on the basis of maximizing their utility and therefore it is called a "random utility model" (RUMs).

Based on the argument in section 2.1, we assume that households' current activity choices are conditioned on asset–related variables and other variables relating to policies or geographic locations. However, a problem that may arise is that in fact, some households might not change their livelihood strategies after farmland acquisition and therefore their current livelihood choices had been determined prior to farmland acquisition. In such cases, current outcomes may be affected by past decisions ; current behaviors may be explained by inertia or habit persistence (Cameron & Trivedi, 2005). Accordingly, the past livelihood strategies should be included as regressors in the analysis model of households' strategy choice. The inclusion of past livelihood choices among other regressors not only directly reflects the changes of livelihood strategy over time but also picks up unobservable households attributes affecting livelihood choices such as skills, social networks, occupational preferences (C. B. Barrett, Reardon & Webb, 2001).

Following van den Berg (2010), H. Jansen et al. (2006) and IFPRI (2004), we also assume that households' current livelihood choices are determined by slowly changing factors, including location variables, farmland size and residential land size owned by the households, and human capital of households. Other variables, including physical, financial and social capitals are not considered as determinants of livelihood strategies because such types of capitals may be jointly determined with, or even determined by, the livelihood choices. By excluding such types of variables, the model will minimize the potential endogeneity problem (Babulo et al., 2008 ; Jansen et al., 2006). For instance, a household that opens a motorbike repair workshop as their livelihood strategy will invest and therefore accumulate an amount of productive assets such as tools, equipment and facility. Accordingly, it would be not appropriate to consider these accumulated productive assets as a determinant of their current livelihood choice. However, one can make a similar argument that the households' endowment of human capital is more likely to be the result than the determinant of livelihood choice. Nonetheless, while households pursuing lucrative livelihood strategies tend to have a greater investment in education and higher schooling attainments, this mainly influences the education level of younger household members and not of the working household members, which we use as proxy for human capital. The inclusion of the average education of working members as an explanatory variable instead of all household members (including children) helps avoid the " reverse causality" (WB, 1998).

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. This is because data on social capital is rarely available and not easily collected (Davis, 2003 ; Siegel, 2005). With our data on social capital merely measured in the form of the number of group memberships, it cannot adequately reflect the content and dimensions of social capital. In addition, in terms of group memberships, social capital is more likely the result of livelihood strategies than the determinant of livelihood choices. For example, households with a higher number of formal group memberships are often the result of their choice of paid jobs in state sector, enterprises or other organizations. Once a household member is recruited as a formal wage worker in these organizations, he or she will soon become a member of several formal groups such as communist party or trade union members. For this reason, social capital is not included in the model.

### 2.3.4. Description of the explanatory variables

**Table 2** provides the information about the definition and measurement of variables in the analysis. As farmland is the main input in agricultural production, the owned farmland size per adult or "the farmland – labour ratio" is used as a predictor of household activity. As a priori expected, households with a higher farmland-labour ratio tend to be more likely to take up farm work. In most studies on determinants of rural livelihood strategies, residential land or location of houses has not been regarded as a determinant of household livelihood choices. In this study, we included the size of residential land and the location of houses (or residential land) in the model as determinants of peri-urban household livelihood strategies. 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 ; S. V. Nguyen, 2009). Households with conveniently situated houses (or residential land plots)[4] can use them for opening a shop or for renting, while other households owning larger sizes of residential land can sell parts or use them as collateral for credit to invest in profitable activities.

Regarding human capital, both household size and dependency ratio were included in the model. Larger household size tends 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 households. Gender and age of household head are included but we did not include the education of household head in the model. This is because a high multicollinearity existed between the education of household heads and the education of working age members. As we expected, the average education of working household members would have a significant impact on livelihood choices, which means that households whose working members have higher education level are more likely to engage in better remunerated occupations or more profitable non-farm self-employment activities.

4 A convenient place 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.

Table 2 : Definition and measurement of variables in the analysis

| Variables | Definition | Measurement |
|---|---|---|
| **Dependent variables** | | |
| Current livelihood strategies | Informal wage work, formal wage work, non-farm self-employment, farm work | Cluster analysis ( income sources) |
| **Independent variables** | | |
| *Natural capital* | | |
| Farmland-labour ratio | Owned farmsize per member aged 15 and over | $100m^2$ |
| Owned residential land size | Area of residential land size owned by households | $100m^2$ |
| Location of house ( or residential land) | Whether households have a conveniently situated house ( or a conveniently situated residential land) | Dummy variable (=1if 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 |
| Age of household head | Age of household head | Years |
| Gender of household head | Whether household head is male | Dummy variables (=1if yes) |
| Age of working household members | Average age of household members who are employed in the last 12 months | Years |
| Education of working household members | Average years of schooling of household members who are employed in the last 12 months | Years |
| *Location* | | |
| Location 1 | Whether households in Lai Yen or Duc Thuong | Dummy variable(=1if yes) |
| Location 2 | Whether households in Kim Chung or An Thuong | Dummy variable(=1if yes) |
| *Past livelihood strategy* | Informal wage work, formal wage work, non-farm self-employment, farm work) | Cluster analysis ( time data use) |
| **Farmland acquisition** | | |
| Farmland loss level in 2009 | Ratio of the revoked farmland of households in 2009, divided by their owned farmsize prior to farmland revocation | Ratio |
| Farmland loss level in 2008 | Ratio of the revoked farmland of households in 2008, divided by their owned farmsize prior to farmland revocation | Ratio |

Rural livelihood strategies may be affected by many factors at village-levels 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, we include dummy variables for the location in which households reside. Communes with similar general characteristics should be combined into groups and then used as location variables. Location 1 consists of two communes named Lai Yen and Duc Thuong. These communes have a longstanding history of traditional careers relating to fields such as mason, painting and worshipping object production. As expected, households in these communes have more chances

to work as wage workers for household enterprises or individuals with careers mentioned above. Location 2 represents two communes namely Kim Chung and An Thuong. These two communes have more comparative advantage over other communes in terms of geographic location. Both these communes are close to the town center, entertainment centers and industrial zones where there have existed a wide range of job opportunities for job seekers. Consequently, households' livelihoods in this location are expected to have a higher likelihood of specializing in both the informal and formal wage sectors. The remaining communes named Song Phuong and Van Con are used as the reference group (or the base group). Households in these communes have a longstanding tradition of trade in local farm products. Such location variables were expected to capture differences in inter-commune in terms of farmland fertility, educational tradition, local infrastructure development and geographic attributes, and other community level factors that affect households' livelihood choices.

Past livelihood strategies are included as independent variables in the model, including three dummy variables: (i) informal wage work based livelihood; (ii) formal wage work based livelihood; (iii) non-farm self-employment based livelihood and the reference group is the farm work based livelihood. As discussed earlier, these variables are of much importance to the prediction of households' activity choices because they indicate dynamics of household livelihood changes over time, and capture other unobservable factors that influence households' livelihood choices (C. B. Barrett et al., 2001).

Lastly, farmland acquisition was considered as the variable of interest. The farmland acquisition took place at different times; therefore, landloss households are divided into two groups namely (i) those who lost their farmland in 2008 and (ii) those who lost their farmland in 2009. The reason for this division is that the length of time since farmland acquisition was expected to be highly related to the probability of livelihood changes. In addition, the level of farmland loss was quite different among households. Some lost little, some lost partially while others lost totally. Hence, it would be appropriate to consider the impact of farmland loss intensity on household livelihood choices at different times of farmland acquisition. As a consequence, the landloss level in 2008 and the landloss level in 2009 are expected to adequately reflect the influence of farmland acquisition on households' activity choices.

## 3. The estimation results

**Table 3** reports the estimation results from the Multinomial Logit Model, with and without the past livelihood strategy. As revealed in Table 4, Model 2 has much more negative BIC' than Model 1, suggesting that Model 2 is much more preferred[5]. In addition, the estimation results from Model 2 show that many explanatory variables are statistically significant at 10 percent or lower, with their signs as expected. Finally, the Pseudo-$R^2$ =0.52 and is highly significant, indicating that this model has a strong explanatory power[6].

*Farmland acquisition*

5 See the detailed test in Table 11 and other tests in Table 9 and Table 10, Appendix 1

6 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)

Table 3 : The Multinomial Logit estimation with relative risk ratio for households' livelihood strategy choices[7]

| | Model1 | | | Model2 | | |
|---|---|---|---|---|---|---|
| **Current livelihood** | **A versus D** | **B versus D** | **C versus D** | **A versus D** | **B versus D** | **C versus D** |
| **Explanatory variables** | | | | | | |
| *Farmland acquisition* | | | | | | |
| Landloss level 2009 | 1.0836 | 0.7196 | 0.6682 | 8.4438* | 6.4366 | 3.0146 |
| | (0.93) | (0.64) | (0.57) | (10.57) | (7.60) | (3.36) |
| Land loss level 2008 | 3.7844* | 0.9736 | 2.4937 | 39.1475*** | 5.7790 | 7.9182** |
| | (3.00) | (0.88) | (2.09) | (39.05) | (6.48) | (8.21) |
| *Human capital* | | | | | | |
| Household size | 0.7687** | 0.7564** | 0.7307** | 0.8085 | 0.7711* | 0.7179** |
| | (0.94) | (0.1030) | (0.09) | (0.11) | (0.12) | (0.11) |
| Dependency ratio | 1.3600 | 1.1981 | 1.5738 | 1.3050 | 1.0097 | 1.7900* |
| | (0.40) | (0.46) | (0.46) | (0.37) | (0.42) | (0.55) |
| Gender of household head | 0.6768 | 0.7775 | 0.4024* | 0.8025 | 0.9174 | 0.4016* |
| | (0.34) | (0.43) | (0.19) | (0.45) | (0.57) | (0.21) |
| Age of household head | 1.0200 | 1.1092 | 0.9766 | 1.0243 | 1.0361 | 0.9850 |
| | (0.19) | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) |
| Average age of working members | 0.9053*** | 0.9127*** | 0.9853 | 0.9126** | 0.9078*** | 0.9762 |
| | (0.25) | (0.02) | (0.02) | (0.03) | (0.03) | (0.03) |
| Average education of working members | 1.0246 | 1.7771*** | 1.1926** | 1.0400 | 1.4235*** | 1.1489 |
| | (0.07) | (0.15) | (0.08) | (0.09) | (0.13) | (0.10) |
| *Natural capital* | | | | | | |
| Owned farmsize per adult | 0.5927*** | 0.6519*** | 0.6550*** | 0.7083*** | 0.7458*** | 0.6410*** |
| | (0.06) | (0.05) | (0.05) | (0.08) | (0.07) | (0.07) |
| Residential land size | 1.0009 | 1.0160 | 0.9956 | 1.0011 | 1.0097 | 0.9901 |
| | (0.01) | (0.01) | (0.01) | (0.00) | (0.01) | (0.01) |
| House location | 0.3788** | 0.5378 | 4.0273*** | 0.2167*** | 0.5689 | 2.903*** |
| | (0.15) | (0.23) | (1.37) | (0.10) | (0.27) | (1.20) |
| *Location* | | | | | | |
| Location 1 | 2.4416** | 1.4986 | 0.8465 | 2.5741* | 2.0458 | 0.9788 |
| | (0.95) | (0.70) | (0.33) | (1.26) | (1.33) | (0.51) |
| Location 2 | 7.1680*** | 6.6290*** | 2.5836** | 4.3968*** | 3.8161** | 1.7990 |
| | (3.44) | (3.24) | (1.22) | (2.22) | (2.28) | (0.92) |
| *Past livelihood* | | | | | | |
| Livelihood A | | | | 48.0940*** | 13.9673*** | 2.2668 |
| | | | | (33.40) | (10.44) | (1.55) |
| Livelihood B | | | | 1.7984 | 38.4438*** | 1.0838 |
| | | | | (1.83) | (30.27) | (0.99) |
| Livelihood C | | | | 2.2847 | 3.5830 | 76.5157*** |
| | | | | (2.93) | (4.83) | (67.95) |
| Wald $\chi^2$ | | 256.83 | | | 312.19 | |
| Prob$>\chi^2$ | | 0.0000 | | | 0.0000 | |
| Pseudo $R^2$ | | 0.2898 | | | 0.5198 | |
| BIC': | | −123.137 | | | −355.023 | |
| *Observations* | | 452 | | | 452 | |

*Note* : Absolute value of z statistics in parentheses.

Statistically significant at 10 %(*), at 5% (**) and at 1% (***)

**A** : Informal wage work ; **B** : Formal wage work ; **C** : Non-farm self-employment ; **D** : Farm work (base group)

The farmland acquisitions in both years influenced significantly households' likelihood of switching to the informal wage work-based strategy. However, those with farmland loss in 2008 have much higher probability of adopting this strategy than those in 2009, with the corresponding relative risk ratios being respectively 39.15 and 8.44. This phenomenon might be explained such that landloss households in 2008 have more time to respond to the shock of landloss and therefore they have a higher chance of taking up an alternative livelihood based on manual paid jobs. In addition, while the farmland acquisition in 2008 has a substantial influence on the likelihood of adopting a strategy that is based on household businesses, such an impact is not observed for the farmland acquisition in 2009. This is probably because the time since the farmland acquisition is not long enough for landloss households to change their traditionally farming to household businesses as their dominant livelihood. Finally, the farmland acquisition in both years did not influence the possibility of pursuing the formal wage work-based strategy. Normally, involving in the formal wage sector requires employee's appropriate vocational skills and higher education levels. This may be indicative of the fact that landloss households are faced with a higher entry barrier to this activity.

## 4. Discussion

The results reveal some typical patterns of livelihood transition under the impact of farmland acquisition. A first pattern shows that the farmland acquisition in both years have resulted in a profound transition from a traditionally agricultural strategy to strategies based on manual paid jobs. Under the impact of farmland acquisition, the most common and easily observed conversion is a switch-over from farming to a strategy relied on informal wage work. This is in line with the previous finding by Do (2006) who conducted a case study on a Hanoi's peri-urban village. Her result revealed that, the majority of landloss households engaged in casual and manual paid jobs soon after their farmland was revoked. On the one hand, this is indicative of high availability of manual paid jobs in Hanoi's peri urban areas. On the other hand, the easy switch-over from farming to manual paid jobs reflects a very low entry barrier to these activities. According to a survey on the informal sector in Hanoi, this sector offers the main job opportunity for most of both unskilled self-employed workers and wage workers. Such job opportunities are also more often found in Hanoi's rural and peri-urban areas and those working in this sector have much lower level of education than other sectors (Cling et al., 2010 ; GSO-ISS, 2009).

A second pattern concerns a livelihood transition from principally farming to non-farm self-employment. The probability of pursuing this strategy increases with the farmland loss level in 2008. However, a similar trend is not observed for the farmland loss level in 2009. This is because changes in livelihood strategies usually require time and investments, such as time for learning new skills and attempts at developing market connections (IFPRI, 2004). Furthermore, in comparison with informal wage employment, non-farm self-employment may require more capital and managerial skills. Consequently, while the probability of choosing the

7 See the detailed interpretation in Appendix 2

informal wage work–based strategy increases with the rising farmland loss level in 2009; such an impact is not recorded for the likelihood of choice of the non–farm work–based strategy.

A third pattern as we expected has not occurred. The farmland acquisitions have not resulted in a livelihood transition from farming to highly remunerative jobs in new industrial zones, factories, and recreational centers, etc. This phenomenon stems from some main reasons. First, the farmland has been largely converted for the construction of high way, urban areas and housing development rather than industrial zones and factories. Therefore, few jobs have been generated by these projects. As revealed by the survey, among 237 landloss households, only 10 percent of them reported having at least one member being recruited by these projects. A similar result was also recorded in the whole district. Among 3,700 hectares of farmland that had been converted for projects, about 2,900 hectares were reserved for new urban area and housing projects (Viet, 2009). As consequence, only 300 landlosing farmers have been recruited in industrial zones and factories as compared to 11,445 rural redundant workers due to farmland acquisition (Toquoc.gov.vn, 2009). Second, most landlosing farmers are old and do not have appropriate educational background or vocational skills to engage in more well paid jobs. According to the survey, about half of the landlosing households reported that old age and lack of education and skills are the main barriers that hinder 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 be only 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.

Regarding the role of farmland size in shaping livelihood strategies, the result shows that farmland endowment has still acted as an important factor in determining peri–urban livelihood strategies. Farming has been an appropriate livelihood choice for households with elderly members and those who have been temporarily unable to find alternative strategies. While the size of residential land does not affect households' activity choices, the location of house or residential land has a considerable influence on their livelihood strategy choices. Conveniently situated houses (or residential land) have been optimized by their owners for business purposes. This reflects partially that many households have seized actively emerging market opportunities in a rapidly urbanizing area. However, while such a livelihood strategy seems to be more easily adopted by some households who are endowed with a conveniently located house (or residential land), it may be impossible for households without this endowment. Consequently, such differences in access to emerging livelihood opportunities may result in social differentials among households.

With respect to the role of human capital in livelihood choices, the results indicate that households endowed with family labour tend to be involved more in farming as their main livelihood. This implies that farming is a more labour–intensive strategy relative to other strategies. In addition, this strategy has been often

pursued by more elderly members than those in wage work-based strategies, which implies that emerging non-farm jobs make rural young generations no longer interested in farming activities. Young rural workers have benefited from losing farmland to urbanization, because they are more well-educated relative to their parents, and young enough to utilize new non-farm opportunities. A similar trend is also found in Hanoi's peri-urban areas by Do (2006), Lee, Binns & Dixon (2010), and in Ho Chi Minh City's by Vo (2006). More popularly 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 the Vietnamese elderly are still working, mostly in farming activities (UNFPA, 2010).

The education of working members has a significant impact on taking up a strategy based on more remunerative jobs, meaning that households who are less well-endowed will be hindered from undertaking this strategy. This also helps partially explain that landlosing households without appropriate educational background or vocational skills were unable to engage in more remunerated jobs. The same phenomenon is found in several localities where landlosing farmers with poor human capital had limited access to high-paid jobs (Ngo, 2009 ; Q. V. Nguyen, et al., 2005 ; S. V. Nguyen, 2009). Nonetheless, human capital is found not to be related to non-farm self-employment and manual paid jobs, suggesting that in terms of formal education, there has been relative ease of entry into these activities. Non-farm household businesses may not require a high level of formal education and investment because the majority of non-farm activities are very small-scale units, using family labour and specializing in small trade or service provision. In addition, a wide range of manual paid jobs have been available within the district as well as in Hanoi city, which offer local people a diversified portfolio of livelihood choices.

As reported in the estimation results, geographic location plays a crucial role in household activity choices. The inclusion of Location 1 helps explain how socio-economic factors at the commune-level affect households' probability of choosing a strategy based on informal wage work. As discussed earlier, households dwelling in Lai Yen and Duc Thuong Communes can find it easy to get paid jobs such as masons, carpenters, painters and worshipping-object workers. Employers are often villagers who undertake a contract for building, painting a house, or run a workshop. Thanks to the interpersonal trust and close relationships among villagers, dwellers in these villages can be easily hired for such jobs. The inclusion of Location 2 as the explanatory variable reflects the availability of both manual paid jobs and skill-required paid jobs in this area. Both communes in this area have a greater geographic advantage over the remaining communes ; An Thuong Commune is located close to the newly opened Bao Son Paradise Park, the biggest entertainment and tourism complex in North Vietnam and Kim Chung Commune is situated close to the Hoai Duc District Centre, the National Way 32 and the Lai Xa-Kim Chung Industrial Zone.

## 5. Conclusion and policy implications

The combination of rapid urbanization 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. In addition, under the impacts of farmland acquisition in both years, households have actively adapted to the new context by switching to livelihood strategies that depend less on farmland. Among choices of activities, manual paid jobs and household businesses appear to be the most popular activities. This implies that the informal sector has been emerging as the leading job provider in Hanoi's peripheries ; this conclusion is similar to the recent result by Cling et al. (2010). The availability of job opportunities in the informal sector not only helps farm households mitigate the negative consequences of landloss but also open a new chance for them to change and diversify their livelihoods.

Although the number of households who followed the farm work-based strategy considerably declined after farmland revocation, a large number of households have still maintained agricultural production for their subsistence or cash income to some extent. This implies that farming has still been of much importance for food security for many households as well as to old farmers who are unable to take up new non -farm opportunities. For households who lost part of their farmland, their remaining area of farmland may be insufficient for the cultivation of traditional types of crop plants. Thus, it is necessary for them to learn successful experiences in farming transition from other localities in Hanoi. In some urban and peri-urban districts of Hanoi such as Tay Ho, Tu Liem and Linh Nam, farm households have been benefiting by shifting from the production of staples, to vegetables and then to higher value products such as fresh vegetables, flowers and ornamental plants (Lee et al., 2010). Similarly, such a successful transition is also observed in Binh Chanh District of Ho Chi Minh City, where farmers have changed from rice cultivation to perennial crops, husbandry and horticulture (Vo, 2006). Therefore, policy support for farmers to change their types of traditional crops to higher value crops such as fresh vegetables, flowers and bonsai, should be practical of use.

It is necessary to distinguish the overall influences of farmland acquisition on the commune level and its specific impacts on landlosing households. On the one hand, at the household level, the farmland loss functions as the push factor that forces landlosing households to find alternative livelihoods. As a result, the farmland revocation is a shock for households whose livelihood largely or entirely depends on farming. On the other hand, at the commune level, the farmland conversion has resulted in the rapid urbanization process, which in turn has been benefiting local dwellers by bringing a wide range of non-farm job opportunities. Therefore the farmland acquisition has both negative and positive effects on local people. New lucrative occupations will be awarded for households with better educational background or vocational skills while such opportunities are the reserve of those with limited endowments of this resource. A survey in several provinces conducted by the ADB (2007) shows that about two thirds of landlosing households benefit from greater job opportunities. For the rest, farmland acquisitions cause severe economic disruptions, particularly if households lost their

all productive land and family members are not well-educated or lack vocational skills. This implies that investment in education and vocational training is a successful key for rural young generations to take up highly remunerative paid jobs.

According to Hoai Duc's land use plan, only 600 hectares of farmland have been reserved for agricultural production by 2020 (Landtoday, 2010), which may severely threaten the livelihoods of thousands of farmers, specially elderly landless farmers. Fortunately, on the basis of Decree 17/2006/ND-CP (2007) by The Government of Vietnam, Ha Tay People's Committee issued Decision 1098/2007/QD-UB (2007a) and Decision 371/2008/QD-UB (2008a), which states that "land for services" will be granted to households with more than 30 percent of agricultural land revoked. Each household receives an area of "land for services" equivalent to 10 percent of the area of revoked farmland land. " Land for services" is used as business premises for non-farm activities such as opening a shop, a workshop, rental accommodation, etc. Accordingly, "Land for services" is a golden chance for landloss 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 conducted due to several reasons while all landloss households desire soon to receive "land for services" to undertake business activities (LH, 2010). Therefore, speeding up the implementation of this policy is one of the prerequisites to facilitate livelihood transitions of landloss households in Hanoi's peri-urban areas. Such a policy has been piloted in Vinh Phuc Province since 2004 where landlosing households utilized "land for services" for opening a shop or providing accommodation lease for workers in industrial zones. As noted by the ADB (2007), this initially successful experience, therefore, should be worth considering by other localities.

The experiences from Tu Liem District, a formerly peri-urban district of Hanoi, indicate that improvements in local infrastructures and have connected and shortened the distance from this area to Hanoi's central areas. Consequently, this stimulates the flows of students, migrant workers or small businessmen to come to villages to hire accommodation or a prime location for doing business. In this area, accommodation rental fees are emerging as the most important and stable income for the majority of households (S. V. Nguyen, 2009). Besides, setting up new commercial centers and markets by the local government has proved to be the most suitable way to create more non-farm job opportunities for older landloss farmers (Ngoc, 2004). Therefore, the policy implication is that more new roads should be made, old roads should be enlarged and upgraded and some new commercial centers or markets should be set up. Consequently, this will result in more chances for households to take full advantages of their own houses, residential land plots, and "land for services".

Finally, as mentioned in Section 2.2.2, there is a small number of landlosing households relying on non-labour income sources as their dominant livelihood. This figure, however, is expected to rapidly increase due to the massive farmland conversion for urban expansion in the coming time. Hence, income from renting out houses, residential land plots or "land for services" is highly expected to be a pathway out of economic hardship for not only elderly landless farmers but also for many other households. As

discussed earlier, accommodation rental fees have been becoming the major income source for many households in some former peri-urban areas. In Hoai Duc District, a similar trend has begun in some communes that are in close proximity to universities and industrial zones. In An Khanh Commune, for instance, hundreds of households utilized their gardens and grounds to build common boarding-houses for factory workers and students. Among them, some households earned from 5 to 7 million dong per month from accommodation rental fees, which is a much higher income source as compared to other income sources (Monre, 2007).

**Appendix 1 Table 4 : Some descriptive statistics on time allocation data for clustering the past livelihood strategies**

| Time use | Farm work | Non-farm work | Informal wage work | Formal wage work | Total time |
|---|---|---|---|---|---|
| Annual working time by activities per household (hours) | **1,672** (1,351) | **557** (1,145) | **641** (1,259) | **809** (1,771) | **3,688** (2,078) |
| *Time share by activities per household (percent)* | **54** (35) | **15** (27) | **16** (26) | **15** (30) | **100** |

*Note* : standard deviation in parentheses.
*Source* : Own calculation from author's survey.

**Table 5 : Some descriptive statistics on income share data for clustering the current livelihood strategies**

| Income mean and shares by activities | Farm work | Non-farm work | Informal wage work | Formal wage work | Transfer | Total income |
|---|---|---|---|---|---|---|
| Annual income by activities per household (VND 1,000) | **14,046** (16,502) | **15,561** (26,478) | **12,035** (18,399) | **14,555** (28,973) | **3,490** (8,849) | **56,197** (30,497) |
| *Income share by sources per household (percent)* | **27** (30) | **24.5** (34) | **24** (34) | **18** (32) | **6.5** (14) | **100** |

*Note* : standard deviation in parentheses.
*Source* : Own calculation from author's survey

**Table 6 : Summary statistics of explanatory variables by livelihood strategies**

| *Explanatory variables* | **Current Livelihood Strategies** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **The whole sample** | | **A** | | **B** | | **C** | | **D** | |
| | Mean | Std. Dev | Mean | Std. Dev | Mean | Std. Dev | Mean | Std. Dev | Mean | Std. Dev |
| *Farmland acquisition* | | | | | | | | | | |
| 2009 Landloss level | **0.56** | *0.25* | **0.61** | *0.25* | **0.59** | *0.19* | **0.51** | *0.26* | **0.43** | *0.21* |
| 2008 Landloss level | **0.53** | *0.23* | **0.57** | *0.22* | **0.50** | *0.24* | **0.58** | *0.22* | **0.36** | *0.18* |
| *Human capital* | | | | | | | | | | |
| Household size | **4.50** | *1.61* | **4.70** | *1.72* | **4.92** | *1.35* | **4.26** | *1.38* | **4.64** | *1.64* |
| Dependency ratio | **0.59** | *0.65* | **0.61** | *0.57* | **0.63** | *0.76* | **0.60** | *0.61* | **0.51** | *0.63* |
| Gender of household head | **0.78** | *0.41* | **0.77** | *0.42* | **0.79** | *0.41* | **0.76** | *0.43* | **0.87** | *0.33* |
| Age of household head | **51.35** | *12.60* | **51.94** | *13.85* | **52.57** | *12.83* | **48.08** | *11.47* | **50.80** | *10.77* |
| Age of working members | **40.73** | *9.12* | **38.93** | *7.67* | **36.92** | *6.80* | **41.05** | *8.18* | **43.01** | *8.67* |
| Education of working members | **8.17** | *2.94* | **7.70** | *2.26* | **10.90** | *2.55* | **8.20** | *2.68* | **6.83** | *2.32* |
| *Natural capital* | | | | | | | | | | |
| Owned farmsize per adult | **3.09** | *2.58* | **2.20** | *1.70* | **2.83** | *2.43* | **2.80** | *2.07* | **4.95** | *3.24* |
| Residential land size | **22.43** | *15.24* | **22.17** | *14.82* | **25.98** | *18.45* | **19.67** | *13.39* | **22.48** | *14.33* |
| House location | **0.29** | *0.45* | **0.12** | *0.32* | **0.18** | *0.38* | **0.60** | *0.49* | **0.27** | *0.44* |
| *Location* | | | | | | | | | | |
| Location 1 | **0.33** | *0.47* | **0.42** | *0.49* | **0.29** | *0.45* | **0.28** | *0.45* | **0.30** | *0.46* |
| Location 2 | **0.33** | *0.47* | **0.33** | *0.47* | **0.52** | *0.50* | **0.29** | *0.45* | **0.20** | *0.40* |
| *Past livelihood* | | | | | | | | | | |
| Livelihood A | **0.21** | *0.41* | **0.60** | *0.49* | **0.11** | *0.31* | **0.06** | *0.24* | **0.05** | *0.21* |
| Livelihood B | **0.18** | *0.38* | **0.03** | *0.17* | **0.70** | *0.46* | **0.03** | *0.17* | **0.05** | *0.21* |
| Livelihood C | **0.15** | *0.36* | **0.01** | *0.09* | **0.01** | *0.1* | **0.53** | *0.50* | **0.20** | *0.13* |

*Note* : (Refer to Table 3 for names and definitions 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 0.77 for the variable "Gender of household head" means that 77 percent of the households in this category are male headed and only 23 percent are female headed.

Table 7 : The Multinomial Logit estimation for households' livelihood strategy choices

| | Model1 | | | Model2 | | |
|---|---|---|---|---|---|---|
| *Current livelihood* | **A versus D** | **B versus D** | **C versus D** | **A versus D** | **B versus D** | **C versus D** |
| **Explanatory variables** | | | | | | |
| *Farmland acquisition* | | | | | | |
| Landloss level 2009 | 0.0803 | −0.3290 | −0.4031 | 2.1334* | 1.8620 | 1.1035 |
| | (0.09) | (0.37) | (0.47) | (1.70) | (1.58) | (0.99) |
| Landloss level 208 | 1.3309* | −0.0267 | 0.9138 | 3.6673*** | 1.7542 | 2.0692** |
| | (1.68) | (0.03) | (1.09) | (3.68) | (1.56) | (1.99) |
| *Human capital* | | | | | | |
| Household size | −0.2630** | −0.2791** | −0.3137** | −0.2126 | −0.2599* | −0.3314** |
| | (2.14) | (2.05) | (2.46) | (1.51) | (1.67) | (2.10) |
| Dependency ratio | 0.3075 | 0.1808 | 0.4535 | 0.2661 | 0.0097 | 0.5822* |
| | (1.04) | (0.47) | (1.55) | (0.93) | (0.02) | (1.88) |
| Gender of household | −0.3904 | −0.2517 | −0.9103* | −0.2199 | −0.0862 | −0.9123* |
| head | (0.77) | (0.45) | (1.91) | (0.39) | (0.14) | (1.75) |
| Age of household | 0.0198 | 0.0190 | −0.0236 | 0.0241 | 0.0355 | −0.0151 |
| head | (1.06) | (0.94) | (1.26) | (1.20) | (1.63) | (0.68) |
| Average age of | −0.0995*** | −0.0914*** | −0.0147 | −0.0875** | −0.0966*** | −0.0241 |
| working members | (3.62) | (3.35) | (0.59) | (2.39) | (2.91) | (0.75) |
| Average education | 0.0243 | 0.5750*** | 0.1792** | 0.0392 | 0.3531*** | 0.1388 |
| of working members | (0.33) | (6.76) | (2.52) | (0.43) | (3.74) | (1.54) |
| *Natural capital* | | | | | | |
| Owned farmsize per | −0.5230*** | −0.4277*** | −0.4231*** | −0.3448*** | −0.2932*** | −0.4446*** |
| adult | (5.15) | (4.96) | (5.20) | (3.17) | (3.23) | (4.06) |
| Residential land size | 0.0097 | 0.0158 | −0.0044 | 0.0012 | 0.0097 | −0.0099 |
| | (0.97) | (1.26) | (0.42) | (0.12) | (0.56) | (0.74) |
| House location | −0.9708** | −0.6201 | 1.3931*** | −1.5289*** | −0.5640 | 1.0658*** |
| | (2.41) | (1.42) | (4.09) | (3.07) | (1.17) | (2.60) |
| *Location* | | | | | | |
| Location 1 | 0.8927** | 0.4046 | −0.1666 | 0.9455* | 0.7158 | −0.0214 |
| | (2.28) | (0.86) | (0.42) | (1.92) | (1.10) | (0.04) |
| Location 2 | 1.9696*** | 1.8389*** | 0.9492** | 1.4809*** | 1.3392** | 0.5872 |
| | (4.10) | (3.56) | (2.00) | (2.93) | (2.23) | (1.15) |
| *Past livelihood* | | | | | | |
| Livelihood A | | | | 3.8732*** | 2.6367*** | 0.8184 |
| | | | | (5.58) | (3.53) | (1.19) |
| Livelihood D | | | | 0.5869 | 3.6489*** | 0.0805 |
| | | | | (0.58) | (4.63) | (0.09) |
| Livelihood C | | | | 0.8262 | 1.2762 | 4.3375*** |
| | | | | (0.64) | (0.95) | (4.88) |
| Constant | 5.1857*** | −0.2907 | 3.4335** | 2.1823 | −1.2303 | 2.8290 |
| | (3.54) | (0.17) | (2.56) | (1.21) | (0.62) | (1.60) |
| **Wald $\chi^2$** | | **256.83** | | | **312.19** | |
| **Prob>$\chi^2$** | | **0.0000** | | | **0.0000** | |
| **Pseudo $R^2$** | | **0.2898** | | | **0.5198** | |
| **BIC'**: | | **−123.137** | | | **−355.023** | |
| *Observations* | | 452 | | | 452 | |

*Note* : Absolute value of z statistics in parentheses.

Statistically significant at 10 %(*), at 5% (**) and at 1% (***)

**A**: Informal wage work ; **B**: Formal wage work ; **C**: Non-farm self-employment ; **D**: Farm work (base group)

**Table 8 : Hausman test for Assumption of Independence of Irrelevant Alternatives (IIA)**

| Category | chi2 | df | P>chi2 | Evidence |
|---|---|---|---|---|
| Informal wage work | 1.264 | 34 | 1.0 | For Ho |
| Formal wage work | 2.962 | 34 | 1.0 | For Ho |
| Non-farm work | 1.374 | 34 | 1.0 | For Ho |
| Farm work | -6.353 | 34 | 1.0 | For Ho |

*Note* : Ho : Odds (outcome J vs. outcome K) are independent of other alternatives.
Statistically insignificant values of Hausman test mean that the IIA assumption has not been violated (Long, 1997).

**Table 9 : Collinearity Diagnostics for Variables used in the Multinomial Logit Model**

| Variable | VIF | 1/VIF |
|---|---|---|
| Past formal wage work-based strategy | 1.67 | 0.59 |
| Location 2 | 1.65 | 0.60 |
| Owned farmland size per adult | 1.61 | 0.62 |
| Average education of working members | 1.61 | 0.62 |
| Landloss level in 2009 | 1.58 | 0.63 |
| Average age of working members | 1.52 | 0.65 |
| Household head's age | 1.49 | 0.67 |
| Location 1 | 1.47 | 0.68 |
| Landloss level in 2008 | 1.46 | 0.68 |
| Past non-farm work-based strategy | 1.38 | 0.72 |
| Past informal wage work-based strategy | 1.33 | 0.75 |
| Household size | 1.25 | 0.80 |
| Residential land | 1.15 | 0.86 |
| Location of houses ( or residential land plots) | 1.15 | 0.87 |
| Dependency ratio | 1.14 | 0.87 |
| Household head' gender | 1.11 | 0.90 |
| *Mean VIF* | **1.41** | |

*Note* : A presence of high multicollinearity exist if VIF values are larger than 10 (Gujarati & Porter, 2009, p. 362). As reported in Table 10, all the VIF values are much less than 10, which confirms that this study does not encounter the problem of multicollinearity.

Table 10 : Measures of Fit for the Multinomial Logit Model

| MNL : | Model 2 | Model 1 | Difference |
|---|---|---|---|
| Observations | 452 | 452 | 0 |
| Log-Lik Intercept Only : | -623.813 | -623.813 | 0.000 |
| Log-Lik Full Model : | -299.573 | -443.028 | 143.455 |
| D : | 599.147(401) | 886.057(410) | -286.910 (-9) |
| LR : | 648.480(48) | 361.570(39) | 286.910(9) |
| Prob > LR : | 0.000 | 0.000 | -0.000 |
| McFadden's R2 : | 0.520 | 0.290 | 0.230 |
| McFadden's Adj R2 : | 0.438 | 0.222 | 0.216 |
| Maximum Likelihood R2 : | 0.762 | 0.551 | 0.211 |
| Cragg & Uhler's R2 : | 0.813 | 0.588 | 0.225 |
| Count R2 : | 0.759 | 0.593 | 0.166 |
| Adj Count R2 : | 0.665 | 0.434 | 0.231 |
| AIC : | 1.551 | 2.146 | -0.595 |
| AIC*n : | 701.147 | 970.057 | -268.910 |
| BIC : | -1852.440 | -1620.553 | -231.887 |
| *BIC'* : | *-355.023* | *-123.137* | *-231.887* |

*Note* : Difference of 231.887 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, pp. 111-112).

**REFERENCES**


ADB. (2007). Agricultural land conversion for industrial and commercial use : competing interests of the poor. In ADB (Ed.), *Markets and Development Bulletin* (pp. 85–93). Hanoi : Asian Developmen Bank.

Alwang, J., Jansen, H. G. P., Siegel, P. B., & Pichon, F. (2005). *Geographic Space, Assets, Livelihoods and Well-being in Rural Central America : Evidence from Guatemala, Honduras and Nicaragua.* : (DSGD Discussion Paper No. 26). Retrieved from International Food Policy Research Institute (IFPRI) website : http : //www.ifpri.org/sites/default/files /publications/dsgdp26.pdf.

Anderson, J., & Karel, W. (2010). Population Genetics and Dynamics of Spotted Seatrout in the Estuarine Waters of Texas. *Fish Aquat J.*

Ansoms, A. (2008). *Rural Poverty and Livelihood Profiles in Post-genocide Rwanda* : (Discussion Paper 2008.07). Institute of Development Policy and Management & University of Antwerp. Retrieved from http : //www.ua.ac.be/ objs/00192837.pdf.

Azadi, H., Ho, P., & Hasfiati, L. (2010). Agricultural land conversion drivers : A comparison between less developed, developing and developed countries. *Land Degradation & Development*.

Babulo, B., Muys, B., Nega, F., Tollens, E., Nyssen, J., Deckers, J., et al. (2008). Household livelihood strategies and forest dependence in the highlands of Tigray, Northern Ethiopia. *Agricultural Systems, 98* (2), 147–155.

Baharoglu, D., & Kessides, C. (2002). Urban poverty. In J. Klugman (Ed.), *A Sourcebook for poverty reduction strategies* (pp. 123–159) : The World Bank.

Bakaríc, I. R. (2006). 1 Uncovering Regional Disparities?the Use of Factor and Cluster Analysis. *Croatian Economic Survey*, 11.

Barrett, C., Brown, D., Stephens, E., Ouma, J., & Murithi, F. (2006). Livelihood strategies in the rural Kenyan highlands. *African Journal for Agricultural and Resource Economics, 1* (1).

Barrett, C. B., Bezuneh, M., & Aboud, A. (2001). Income diversification, poverty traps and policy shocks in Cote d'Ivoire and Kenya. *Food Policy*, 26 (4), 367–384.

Barrett, C. B., Clark, M. B., Clay, D. C., & Reardon, T. (2005). Heterogeneous constraints, incentives and income diversification strategies in rural Africa. *Quarterly Journal of International Agriculture, 44* (1), 37–60.

Barrett, C. B., Reardon, T., & Webb, P. (2001). Nonfarm income diversification and household livelihood strategies in rural Africa : concepts, dynamics, and policy implications. *Food Policy*, 26 (4), 315–331.

Bebbington, A. (1999). Capitals and capabilities : A framework for analyzing peasant viability, rural livelihoods and poverty. *World development*, 27 (12), 2021–2044.

Becker, K. F. (2004). *The informal economy* : SIDA : Department for Infrastructure and Economic Co-operation.

Bryceson, D. (1997). De-Agrarianisation in Sub -Saharan Africa : Acknowledging the inevitable. In (DF Bryceson & V. Jamal, eds.) Farewell to Farms : Deagrasianisation and Employment in Africa, pp. -20. *African Studies Center Leiden, Leiden*.

Bryceson, D. F. (1996). Deagrarianization and rural employment in sub-Saharan Africa : A sectoral perspective. *World Development*, 24 (1), 97–111.

Cameron, A. C., & Trivedi, P. K. (2005). *Micro-*

*econometrics : methods and applications* : Cambridge Univ Pr.

Cameron, A. C., & Trivedi, P. K. (2009). *Microeconometrics using stata* (Vol. 5) : Stata Press.

Chen, J. (2007). Rapid urbanization in China : A real challenge to soil protection and food security. *Catena, 69* (1), 1–15.

Chen, W. (1998). The political economy of rural industrialization in China : village conglomerates in Shandong Province. *Modern China, 24* (1), 73–96.

Cling, J. P., Razafindrakoto, M., Rouubaud, F., Nguyen, H. T. T., Nguyen, C. H., & Phan, T. T. N. (2010). *The Informal Sector in Vietnam : A focus on Hanoi and Ho Chi Minh City. Hanoi* : The Gioi Editions.

Cox, T. F. (2005). *An Introduction to Multivarriate Data Analysis*. New York : Oxford University Press

Davis, J. R. (2003). *The Rural–Non–Farm Economy, Livelihoods and their Diversification : Issues and Options* (NRI Report No : 2753). Retrieved from http : //ssrn.com/paper = 691821.

Deng, X., Huang, J., Rozelle, S., & Uchida, E. (2006). Cultivated land conversion and potential agricultural productivity in China. *Land Use Policy, 23* (4), 372–384.

Dercon, S., & Krishnan, P. (1996). Income portfolios in rural Ethiopia and Tanzania : choices and constraints. *Journal of Development Studies, 32* (6), 850–875.

Dercon, S., & Krishnan, P. (1996). Income Portfolios in Rural Ethiopia and Tanzania : Choices and Constraints. *Journal of Development studies, 32.*

DFID. (1999). *Introduction : Sustainable livelihood guidance sheets*. Retrieved from http : // www.eldis.org.

Do, N. T. (2006). *Loss of Land and Farmers' Livelihood : A Case Study in Tho Da Village, Kim No Commune, Dong Anh District, Hanoi, Vietnam*. . Swedish University of Agricultural Sciences, Sweden. Retrieved from http : // www.sol.slu.se/publications/masters_35.pdf.

Ellis, F. (2000). *Rural livelihoods and diversity in developing countries* : Oxford University Press, USA.

Ellis, F., & Bahiigwa, G. (2003). Livelihoods and rural poverty reduction in Uganda. *World Development, 31* (6), 997–1013.

Ellis, F., Kutengule, M., & Nyasulu, A. (2003). Livelihoods and rural poverty reduction in Malawi. *World Development, 31* (9), 1495–1510.

Ellis, F., & Mdoe, N. (2003). Livelihoods and Rural Poverty Reduction in Tanzania. *World Development, 31* (8), 1367–1384.

Fazal, S. (2000). Urban expansion and loss of agricultural land – a GIS based study of Saharanpur City, *India. Environment and Urbanization, 12* (2), 133–149.

Fazal, S. (2001). The need for preserving farmland : A case study from a predominantly agrarian economy (India). *Landscape and Urban Planning, 55* (1), 1–13.

GSO–ISS. (2009). *Shedding light on a huge black hole : the informal sector in Hanoi. Main findings of the Informal sector survey ( IS Survey) 2007*. Hanoi, Vietnam : GSO–ISS/ IRD–DIAL project : Author.

Gujarati, D. N., & Porter, D. C. (2009). *Basis Econometrics* : Mc Graw– Hill International Edition.

Ha Tay People's Committee. (2006). *Decision 2189/QĐ–UBND*.

Ha Tay People's Committee. (2007a). *Decision 1098/2007/QĐ–UBND*.

Ha Tay People's Committee. (2007b). *Decision 1249/QĐ–UBND*.

Ha Tay People's Committee. (2008a). *Decision 371/2008/QĐ-UBND*.

Ha Tay People's Committee. (2008b). *Decision 3201/QĐ-UBND; Decision 3036/QĐ-UBND; Decision 3035/QĐ-UBND; Decision 3264/QĐ-UBND*.

Hair, J., Anderson, R., Tatham, R., & William, B. (1998). Multivariate data analysis. *5th ed. Upper Saddle River, N.J: Prentice Hall*.

Hartmann, D., Pyka, A., & Hanusch, H. (2010). Applying Comprehensive Neo-Schumpeterian Economics to Latin American Economies. *Structural Change and Economic Dynamics, 21*(1), 70-83.

Hoai Duc People's Committee. (2010a). *Bao cao thuyet minh kiem ke dat dai 2010 [2010 land inventory report]*. Hanoi, Vietnam: Author.

Hoai Duc People's Committee. (2010b). *Bao cao tinh hinh thuc hien nhiem vu phat trien KTXH-ANQP nam 2009, phuong huong nhiem vu nam 2010 [The report on the performance of socio-economic, security and defence in 2009, and the directions and tasks for 2010]*.

Hoang. (2009). Thousands of Red River Farmer in Fear of Relocation. *Investnet*. Retrieved from http://www.vietnaminvestment.net/news

Hussein, K., & Nelson, J. (1998). *Sustainable livelihoods and livelihood diversification*: IDS Working Paper 69. Retrieved from http://www.padniger.net/Documents%20and%20Reports/Biblio/sustlivelihood.pdf.

IFPRI. (2004). *Strategies for sustainable land management and poverty reduction in Uganda*. Washington, DC, USA: Author.

IFPRI. (2006). *Rural development policies and sustainable land use in the hillside areas of Honduras: a quantitative livelihoods approach*. Washington, DC, USA: Author.

International Food Policy Research Institute [IFPRI]. (2000). *Urban livelihoods and food and nutrition security in Greater Accra, Ghana* (No. 112). Washington, DC, USA: Author.

Jansen, H., Pender, J., Damon, A., Wielemaker, W., & Schipper, R. (2006). Policies for sustainable development in the hillside areas of Honduras: a quantitative livelihoods approach. *Agricultural Economics, 34*(2), 141-153.

Kabeer, N., & Tran, V. A. T. (2000). *Leaving the rice fields but not the countryside: gender, livelihood diversification and pro-poor growth in rural Viet Nam*: (Occasional Paper 13, Septemebr 2000). Uinited Nations, Research Institution for Social Development.

Kato, T. (1994). The emergence of abandoned paddy fields in Negeri Sembilan, Malaysia. *Southeast Asian Studies, 32*(2), 145-172.

Kelly, P. (1999). Everyday urbanization: the social dynamics of development in Manila's extended metropolitan region. *International Journal of Urban and Regional Research, 23*(2), 283-303.

Landtoday. (2010). *Hoai Duc quy hoach 36 khu do thi va nha o [Hoai Duc planned 36 urban and housing areas]*. Retrived from http://www.landtoday.net/vn.

Lee, B., Binns, T., & Dixon, A. B. (2010). *The Dynamics of Urban Agriculture in Hanoi, Vietnam*: Retrieved from the Field Actions Science Report website: http://eprints.worc.ac.uk/945/1/Lee_et_al_(2010)_Urban_agriculture_in_Hanoi.pdf.

LH. (2010). Giai phong mat bang o Huyen Hoai Duc: Vuong nhat la giao dat dich vu cho dan [Site clearance in Hoai Duc: Granting the "land for services" to people is the biggest dif-

ficulty]. *hanoimoi.com.vn.* Retrieved from http : //www.hanoimoi.com.vn

Long, J. S. (1997). *Regression models for categorical and limited dependent variables* : Sage Publications, Inc.

Louviere, J., Hensher, D., & Swait, J. (2000). *Stated choice methods : analysis and applications* : Cambridge Univ Pr.

Ministry of Natural Resources and Environment [Monre]. (2009). *Industrial Boom Hurts Farmers,Threatens Food Supply : Seminar*. Retrieved from http : //www.monre.gov.vn.

Monre. (2007). *Ha Tay : Khai thac nguon luc dat dai de cong nghiep hoa, hien dai hoa nong nghiep nong thon [Ha Tay : Exploiting land resources for the agricultural and rural industrialization and modernization]*. Retrieved from http : //www.monre.gov.vn.

Moser, C. (1998). The asset vulnerability framework : reassessing urban poverty reduction strategies. *World Development, 26* (1), 1–19.

Mutenje, M. J., Ortmann, G. F., Ferrer, S. R. D., & Darroch, M. A. G. (2010). Rural livelihood diversity to manage economic shocks : Evidence from south–east Zimbabwe. *Agrekon, 49* (3), 338–357.

National Assembly of Vietnam. (2003). *Law on land*. Retrieved from http : //www.vietnamlaws.com / freelaws / Lw13na26Nov03Land%5BX2865%5D.pdf.

Ngo, T. T. (2009). Land loss for industrial zones and rural employment. *Jounral of Science and Development, Hanoi University of Agriculture* (1), 112–122.

Ngoc, B. (2004). Farmers learn to take a new career path. *Vietnam Investment Review Ltd*.

Nguyen, D. M. (2008). Livelihood strategies of peri–urban households in response to rural–urban linkages : A case study in a peri–urban area of Hanoi, Vietnam. *Jounral of Science and Development, Hanoi University of Agriculture, 17* (30), 17–30.

Nguyen, Q. V., Nguyen, M. H., Nguyen, M. X., Pham, H. Q., & Nguyen, T. V. (2005). *The impact of urbanization on agriculture in Hanoi : Results of inteviews with districts and municipality officals*. Hanoi : Retrieved from cares.org.vn website : http : //www.cares.org.vn / webplus / attachments / 2976a896b1e0df4268a563125e416350–03.pdf

Nguyen, S. V. (2009). *Industrialization and Urbanization in Vietnam : How Appropriation of Agricultural Land Use Rights Transformed Farmers' Livelihoodsin a Per–Urban Hanoi Village?* . Hanoi : (EADN working paper No.38). Retrieved from http : //www.eadn.org /eadnwp_38.pdf.

Paris, T. R., Luis, J., Villanueva, D., Rola–Rubzen, M. F., Chi, T. T. N., & Wongsanum, C. (2009). *Labour out migration on rice farming households and gender roles : synthesis of findings in Thailand, the Philippines and Vietnam*. Paper presented at the Gaps, trends and current research in gender dimensions of agricultural and rural development : differentiated pathways out of poverty. Retrieved from http : //www.fao–ilo.org/fileadmin/user_upload/fao_ilo/pdf/Papers/16_march/Paris__Thelma_final_.pdf

Parish, W., Zhe, X., & Li, F. (1995). Nonfarm work and marketization of the Chinese countryside. *The China Quarterly, 143*, 697–730.

Pender, J., Jagger, P., Nkonya, E., & Sserunkuuma, D. (2004). Development Pathways and Land Management in Uganda. *World Development, 32* (5), 767–792.

Phong, L. D. (2007). *The income, living and employment farmers whose land ceded for urbani-*

*zation and construction of industrial zones, infrastructures and for public demand and national benefit purposes*. Hanoi : National Political Publisher.

Punj, G., & Stewart, D. W. (1983). Cluster analysis in marketing research : review and suggestions for application. *Journal of marketing research, 20* (2), 134-148.

Ramankutty, N., Foley, J., & Olejniczak, N. (2002). People on the land : Changes in global population and croplands during the 20 th century. *AMBIO : A Journal of the Human Environment, 31* (3), 251-257.

Reardon Stephen, A. (1995). Links between rural poverty and the environment in developing countries : Asset categories and investment poverty. *World development, 23* (9), 1495 -1506.

Reardon, T., Delgado, C., & Matlon, P. (1992). Determinants and effects of income diversification amongst farm households in Burkina Faso. *Journal of Development Studies (United Kingdom)* .

Ruspini, E. (2002). *Introduction to longitudinal research* : Routledge.

Scarpa, R., Drucker, A., Anderson, S., Ferraes-Ehuan, N., Gomez, V., Risopatron, C., et al. (2003a). Valuing genetic resources in peasant economies : the case of [] hairless' creole pigs in Yucatan. *Ecological Economics, 45* (3), 427-443.

Scoones, I. (1998). *Sustainable rural livelihoods : a framework for analysis*. : (Working Paper 72), Institute of Development Studies, Brighton, UK. Retrieved from http : //www.sarpn.org.za/documents/d0001493/P1833-Sustainable-rural-livelihoods_IDS-paper72.pdf>.

Shackleton, C., Shackleton, S., & Cousins, B. (2001). The role of land-based strategies in rural livelihoods : the contribution of arable production, animal husbandry and natural resource harvesting in communal areas in South Africa. *Development Southern Africa, 18* (5), 581-604.

Sherren, K. (2008). Higher Environmental Education : Core Disciplines and the Transition to Sustainability. *Australasian Journal of Environmental Management, 15* (3), 189.

Siegel, P. (2005). *Using an asset-based approach to identify drivers of sustainable rural growth and poverty reduction in Central America : A conceptual framework* (World Bank Policy Research Working Paper 3475). Retrieved from http : //www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2005/01/19/000160016_20050119144447/Rendered/PDF/WPS3475.pdf.

Simtowe, F. (2010). Livelihoods diversification and gender in Malawi. *African Journal of Agricultural Research, 5* (3), 204-216.

Soini, E. (2005). Land use change patterns and livelihood dynamics on the slopes of Mt. Kilimanjaro, Tanzania. *Agricultural Systems, 85* (3), 306-323.

Statistics Department of Hoai Duc District. (2010). *Statistical Yearbook of Hoai Duc 2009*. Hanoi : Statistics Department of Hoai Duc District.

Tacoli, C. (2004). *Rural-Urban Linkage : Pro-Poor Agricultural Growth : An Overview*. Paper presented at the Agriculture and Pro-Poor Growth Task Team. Hensiki Workshop. Retrieved from http : //www.oecd.org/dataoecd/25/8/36562896.pdf

Tan, M., Li, X., Xie, H., & Lu, C. (2005). Urban land expansion and arable land loss in China--a case study of Beijing-Tianjin-Hebei region. *Land Use Policy, 22* (3), 187-196.

The Government of Vietnam. (2007). *Decree 17 /2006/ND-CP*. Retrieved from http : //www. quan 10. hochiminhcity. gov. vn / Default. aspx ? tabid = 149&ctl = Detail&mid = 570&ArticleID = ARTICLE06090025.

Toquoc.gov.vn. (2009). *Cong nghiep hoa khong co loi [Industrialization has no fault]*. Retrieved from http : //www.toquoc.gov.vn.

Train, K. (2003). *Discrete choice methods with simulation* : Cambridge Univ Pr.

UNFPA. (2010). *How can Vietnam to respond to population ageing?* Hanoi : Hanoi, Vietnam : Author.

United Nations. (2003). *Report of the commitee on poverty reduction on its first session*. Bankok, Thai Land : Author.

Van de Walle, D., & Gunewardena, D. (2001). Sources of ethnic inequality in Viet Nam. *Journal of Development Economics, 65* (1), 177 -207.

Van den Berg, M. (2010). Household income strategies and natural disasters : Dynamic livelihoods in rural Nicaragua. *Ecological Economics, 69* (3), 592-602.

Viet, C. (2009). 38 % ho dan Hoai Duc bi thu hoi dat de lam du an [ 38 percent of Hoai Duc's households' farmland was converted for projects]. *Thanhnienonline*. Retrieved from http : //www.baomoi.com

Vietnam Government Web Portal. (2010). *HN eyes US $12,000 per capita income by 2030*. Retrieved from http : //hanoi1000yrs.vietnam. gov.vn.

Vo, T. N. (2006). *Livelihoods of People Living in a Peri-Urban Area of Ho Chi Minh City : A case study : Hung Long commune, Binh Chanh District, Ho Chi Minh City, Vietnam*. Swedish University of Agricultural Sciences, Sweden. Retrieved from http : //www.sol.slu. se/publications/masters_34.pdf.

WB. (1998). *El Salvador, rural development study*. Washington, DC, USA : The World Bank.

Woldenhanna, T., & Oskam, A. (2001). Income diversification and entry barriers : evidence from the Tigray region of northern Ethiopia. *Food Policy*, 26 (4), 351-365.

Xie, Y., Mei, Y., Guangjin, T., & Xuerong, X. (2005). Socio-economic driving forces of arable land conversion : a case study of Wuxian City, China. *Global Environmental Change Part A, 15* (3), 238-252.