

Livelihood Strategies for Coping with Land Loss among Households in Vietnam's Sub-Urban Areas

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Abstract

Using a novel data set from my household survey in a sub-urban district of Hanoi, Vietnam, this study is the first attempt using an econometric approach to investigate the relationship between farmland loss (due to urbanization and industrialization) and households' livelihood strategies. The results from the multinomial logit model provide the first econometric evidence that land loss increases with the probability of households adopting a strategy specializing in a single nonfarm activity (informal paid jobs or household businesses) or diversifying in many activities. This suggests that many households have actively coped with the shock of losing land. Such adaptation strategies in the new context can help mitigate their dependence on farmland as well as might help improve their welfare. Therefore, a possible implication here is that the rising of land loss should not be seen as an absolutely negative phenomenon because it can improve household welfare by motivating households to change or diversify their livelihoods. Besides, some household asset-related variables such as education, farmland, and the prime location of houses were found to be closely associated with participation in nonfarm activities. Based on evidence from the econometric analyses, the study proposes some policy recommendations that may help households diversify or specialize in lucrative nonfarm activities, given the context of shrinking farmland due to rapid urbanization in Hanoi's sub-urban areas.

Keywords: specialization, diversification, farmland conversion, sub-urban areas

1. Introduction

In the poor world, where most people rely largely on agricultural production, land becomes an important livelihood asset. In almost developing countries, agricultural production plays a crucial role in growth, employment and livelihoods (Department for International Development, 2002). Thus, 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.

International experience shows that the high pace of urbanization and rapid economic growth often take place with conversion of farmland for use in infrastructure development, housing and industrial projects (Ramankutty, Foley & Olejniczak, 2002). Since launching the economic reforms known as "đổi mới" (renovation) in 1986, Vietnam has experienced rapid industrialization and urbanization, which has led to conversions of a huge area of farmland for nonfarm use purposes (Nguyen, 2009). In addition, 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 the period from 1993 to 2008, about half of a million hectares of farmland were converted to urban, industrial or commercial land, especially in sub-urban areas (the World Bank, 2011b). Between 2000 and 2007, it was estimated that about half of a million hectares of farmland were taken for nonfarm uses, accounting for 5 percent of the country's land (VietNamNet/TN, 2009). Agricultural land is of great importance to the livelihood of the majority of the Vietnamese rural population, especially unskilled labourers. By 2011, about 60 percent of the labour force was engaged in agriculture, of which about 90 percent were unskilled workers (the General Statistical Office of Vietnam, 2011). Therefore, farmland conversion has a major effect on poor households in

Vietnam's rural and sub-urban areas (the Asian Development Bank, 2007).

In the context of the rising loss of agricultural land due to urbanization and industrialization in many peripheries of Vietnam's large cities, a number of studies have attempted to find an answer to how farmland loss has affected rural household livelihoods, mostly using qualitative or descriptive statistics methods (Do, 2006; Nguyen, Vu & Philippe, 2011; Nguyen, Nguyen & Ho, 2013; Nguyen, 2009). In general, these studies indicate that on the one hand, farmland conversion for nonfarm uses causes the loss of farm jobs and threats of food security. On the other hand, it can create new opportunities for households to change or diversify their livelihoods. Similar impacts of farmland loss have been also found in other developing countries. For instance, negative effects of farmland loss were reported in China (Chen, 2007; Deng, Huang, Rozelle & Uchida, 2006) and India (Fazal, 2000, 2001). Nevertheless, positive effects were found in China (Chen, 1998; Parish, Zhe & Li, 1995) and Bangladesh (Toufique & Turton, 2002). However, due to the limitation of their (qualitative/descriptive statistic) methods all studies above were unable to provide statically significant evidence of the relationship between farmland loss and households' livelihood strategies. This study, therefore, is the first attempt which fills this methodological gap in the literature by using an econometric approach to answer the key research question: How and to what extent, has farmland loss affected household livelihood strategies in Hanoi's sub-urban areas? This paper is structured as follows: the next section describes the background of the case study. Data and methods are discussed in Section 3. Results are presented in Section 4, followed by discussion and policy implications in Section 5.

2. Background of the Case Study

2.1 Description of the Study Area

This research was conducted in Hoai Duc, a sub-urban district of Hanoi. 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. Hoai Duc is located on the northwest side of Hanoi, 19 km from the Central Business District (the World Bank, 2011c). The district occupies 8,247 hectares of land, of which agricultural land accounts for 4,272 hectares and 91 percent of this area is used by households and individuals (Hoai Duc District People's Committee, 2010). There are 20 administrative units under the district, including 19 communes and one 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 past 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 and 27 percent, respectively (Statistics Department of Hoai Duc District, 2010).

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 (Hoa, 2011). 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 compulsorily acquired by the State for the above projects in recent years. In the period 2006-2010, around 1,560 hectares of farmland were acquired for 85 projects (moi, 2010). The average size of farmland per household in the district was about 840 m² in 2009 (Statistics Department of Hoai Duc District, 2010), which was much lower than that in Ha Tay Province (1,975 m²) and much smaller than that of other provinces (7,600 m²) in 2008 (the Central Institute for Economic Management, 2009). According to Hoai Duc's land use plan, only 600 hectares of farmland has been reserved for agricultural production by 2020 (DiaOonline, 2008), which may severely threaten the livelihoods of thousands of farmers, especially elderly landless farmers in the near future. In the remainder of this paper, households whose farmland was lost partly or totally by the State's compulsory land acquisition will be referred to as "land-losing households".

2.2 Farmland Acquisition and Compensation for Land-Losing Farmers

Similar to the first Land Law of 1987 and 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 (National Assembly of Vietnam, 2003). (Note 1) Therefore, the State can compulsorily acquire land from land-users (individuals, households or organizations) when the land is required for use in socio-economic development, national defense and security and other public purposes. In Vietnam, 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. Land acquisition is the only way to take land for projects in Vietnam (Thu & Perera, 2011). 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 (the World Bank, 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 (the World Bank, 2011a). It should be noted that in the current study, all farmland conversions have been implemented through the State's compulsory land acquisition.

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 acquired land adjacent to Hanoi City, and other support (Ha Tay Province People's Committee, 2006). In general, the compensation for 1 Sào (360 m²) of agricultural land in Ha Tay was about VND (Vietnam Dong) 45,700,000 in 2008 (Giang, 2008). (Note 2) 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, 2008).

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 (*đất dịch vụ*) will be granted to households who lose more than 30 percent of their agricultural land. Each household receives an area of *đất dịch vụ* equivalent to 10 percent of the area of farmland that is taken for each project (Nhan, 2008). *Đất dịch vụ* is often located close to industrial zones or residential land in urban areas (the World Bank, 2009), thus it can be used as a business premise for non-farm activities such as opening a shop or a workshop, or for renting to other users. Thanks to this compensation with "land for land", land-losing households will have not only an extremely valuable asset but also a potential new source of livelihood, particularly for elderly land-losing farmers. (Note 3)

3. Data and Methods

3.1 Data

Adapted from the General Statistical Office of Vietnam (2006), a household questionnaire was designed to gather a set of quantitative data on livelihood assets (human, social, financial, physical & natural capitals), economic activities (time allocation) and livelihood outcomes (income & expenditure). A disproportionate stratified sampling method was used with two steps as follows: First, 12 communes with farmland loss (due to the land acquisition by the State) were partitioned into three groups based on their employment structure. The first group included three agricultural communes; the second one was characterized by five communes with a combination of both agricultural and non-agricultural production while the third one represented four non-agricultural communes. From each group, two communes were randomly selected. Second, from each of these communes, 80 households, including 40 households with farmland loss and 40 households without farmland loss, were randomly selected, for a target sample size of 480. The survey was carried out from April to June 2010. 477 households were successfully interviewed, among which 237 households lost some or all of their farmland. Among them, 113 households lost their farmland in early 2009 and 124 households had farmland loss in the first half of 2008.

3.2 Methods

Based on our own fieldwork experience and survey data, and combined with the definition of the Vietnam informal sector introduced by Cling et al. (2010) and Nguyen (2010), five types of income-earning activities are identified at the household level namely *farmers* (self-employment in household agriculture, including crop and livestock production and other related activities); *business operators* (those who own non-farm household businesses); *informal wage earners* (paid jobs that are often casual, low paid and often require 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); *formal wage earners* (paid jobs that are regular and relatively stable in factories, enterprises, state offices and other organizations with a formal labour contract and often require skills and higher levels of education); and finally *non-labour income earners* (those earn their income from non-labour sources). Following the classification of household activity choice in Vietnam by Stampini and Davis (2009), a household's livelihood strategy is categorized as a specialization if its any single source of income contributes

for at least 75 percent of total income. Conversely, a household's livelihood strategy is categorized as a diversification if it's any source of income accounts for less than 75 percent of total income.

Once households were grouped into various livelihood strategies, analysis of descriptive statistics was performed to provide a detailed picture of household livelihood assets and strategies. In addition, statistical analyses were used to compare the mean income and consumption expenditure across various groups of livelihood strategies. According to 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) model was employed to examine the differences in the mean income and consumption expenditure of various groups of household livelihood strategies. (Note 4)

Because livelihood choice is a categorical variable, a multinomial logit (MNL) model was employed to examine the determinants of the livelihood strategy choice of households. Following Van den Berg (2010) and Jansen, Pender, Damon, Wielemaker, and Schipper (2006), I assumed that a household's livelihood choice is determined by fixed or slowly changing factors, including the household's natural capital and human capital. In addition, other factors, in this case land loss and communal variables, were included as regressors in the model. Other types of livelihood capitals such as social capital, financial capital and physical capital may be jointly determined with, even determined by, the livelihood choice (Jansen, Pender, Damon & Schipper, 2006). Therefore, the exclusion of such capitals in the model may minimize the potential endogeneity problem.

Farmland was hypothesized to be closely linked to agricultural production. Thus households with more farmland per adult or higher "land-labour ratio" were expected to specialize in farm work. Within the context of urban and sub-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). Houses and residential land plots can be used as collateral for credit. Households owning houses or residential land in a prime location can do households businesses such as opening a shop or a workshop or for rent. (Note 5) Therefore I included the size of residential land and the location of houses or residential land plots as explanatory variables in the model of activity choice.

Household characteristic variables including household size and dependency ratio, (this ratio is calculated by the number of household members aged under 15 and over 59, divided by the total members), age and gender of the household head were included in the model. Men are more active than women in nonagricultural paid jobs in Vietnam rural areas (Pham, Bui & Dao, 2010). Therefore, the number of male working members was included as a determinant of household activity choice. Households with more male working members were expected to be more likely to specialize in informal paid jobs or formal paid jobs. Finally, human capital as measured by the average age and education of working members were included in the model. Younger working members were expected to be more likely to work as informal wage earners or formal wage earners while more educated members were expected to have a higher chance of getting remuneratively paid jobs.

Land loss is measured by the proportion of farmland that was compulsorily acquired by the State. This variable of interest was hypothesized to have a significant impact on household livelihood strategies. Households with more land loss were expected to be more likely to adopt a strategy specializing in any single nonfarm activity or diversifying in multiple activities. Finally, I included five dummy variables for the commune in which households reside to control for fixed commune effects. These variables were expected to capture adequately differences across communes in terms of land fertility, development of local infrastructure, cultural, historical and geographic communal level factors that may affect household activity choice.

4. Results

4.1 Livelihood Assets, Strategies and Outcomes

Table 1. Number of households by livelihood strategy

Number of households	Livelihood strategy	Income share from specialized income-earning activities	Mean (SD)
49	1. Farmers	Farming	0.95 (0.09)
70	2. Informal wage earners	Informal paid jobs	0.89 (0.08)
50	3. Formal wage earners	Formal paid jobs	0.90 (0.07)
65	4. Business operators	Business operations	0.90 (0.08)
10	5. Non-labour income earners	Non-labour income	0.89 (0.10)
233	6. Diversifiers	Income shares by source	Mean (SD)
		Farming	0.30 (0.23)
		Informal paid jobs	0.22 (0.26)
		Formal paid jobs	0.16 (0.26)
		Business operations	0.24 (0.27)
		Non-labour income	0.08 (0.16)

Total: 477

Note: Standard deviations (SD) in parentheses and means are adjusted for sampling weights.

Based on the figures in Table 1 and Table 2, this section provides the main features of different livelihood strategies that households pursued in the last 12 months before the time of the survey. As indicated in Table 1, forty nine households specialized in farming activities, accounting for about 10 percent of the sample. This group based their livelihood largely or totally on crop planting and animal husbandry. Common crops included cabbages, tomatoes, water morning glory, various kinds of beans, oranges, grapefruits, and guavas. Livestock production mainly involved pig or poultry breeding on small-farms or grazing of cows. These activities have considerably declined due to the spread of cattle diseases in recent years. Households in this group owned the largest farmland per adult but their working members were quite older and had a lower level of education than those in other groups.

Table 2. Summary statistics regarding household characteristics, livelihood assets and outcomes, by livelihood strategy

	Types of livelihood strategies					
	Whole sample	Informal wage earners	Formal wage earners	Business operators	Farmers	Diversifiers
Number of households	477	70	50	65	49	233
<i>Land loss</i>	0.21 (0.31)	0.36 (0.35)	0.16 (0.30)	0.20 (0.31)	0.10 (0.22)	0.20 (0.30)
<i>Human capital</i>						
Household size	4.49 (1.61)	4.43 (1.60)	5.14 (1.30)	4.15 (1.42)	4.13 (1.60)	4.63 (1.65)
Dependency ratio	0.61 (0.67)	0.55 (0.56)	0.50 (0.63)	0.58 (0.52)	0.55 (0.70)	0.66 (0.73)
Gender of household head (=1 if male)	0.78 (0.42)	0.77 (0.42)	0.79 (0.41)	0.72 (0.45)	0.91 (0.28)	0.77 (0.42)
Age of household head	51.21 (12.34)	51.80 (13.04)	50.30 (13.00)	46.76 (10.35)	53.3 (14.45)	51.60 (12.35)
Average age of working members	40.46 (8.25)	39.22 (7.13)	36.53 (5.65)	40.03 (7.51)	46.40 (10.16)	40.38 (7.72)

	Types of livelihood strategies					
	Whole sample	Informal wage earners	Formal wage earners	Business operators	Farmers	Diversifiers
Average education of working members (years)	8.37 (2.91)	7.97 (2.07)	11.44 (2.21)	7.94 (2.41)	6.25 (2.32)	8.24 (2.92)
<i>Natural capital</i>						
Farmland per adult (100 m ²)	3.54 (2.70)	2.14 (1.38)	2.91 (1.85)	3.14 (2.20)	5.76 (3.40)	3.76 (2.70)
Residential land (10 m ²)	21.90 (14.62)	23.64 (13.61)	25.41 (14.51)	15.81 (10.85)	23.45 (13.95)	21.95 (15.49)
Prime location of houses or residential land plots (=1 if yes)	0.32 (0.47)	0.14 (0.35)	0.12 (0.32)	0.60 (0.50)	0.18 (0.39)	0.36 (0.48)
<i>Livelihood outcomes</i>						
Annual income per capita	13,513 (7,091)	10,976 (3,906)	16,581 (6,952)	15,842 (7,898)	10,135 (4,850)	13,482 (7,353)
Annual consumption expenditure per capita	11,259 (3,484)	10,114 (2,767)	13,229 (3,189)	12,026 (4,040)	9,478 (3,082)	11,261 (3,380)

Note: Means and standard deviations (in parentheses) are adjusted for sampling weights. Income and expenditure were measured in VND 1,000. USD 1 equated to about VND 18,000 in 2009.

Seventy households (about 15 percent of the sample) pursued a livelihood specialization in informal paid jobs. Household working members in this group were commonly hired as carpenters, painters, construction workers, and in other casual jobs. On average, an informal wage worker earned VND 10,170 per hour. (Note 6) Some households in this group still maintained agricultural production for subsistence or cash income to some extent. Household working members in this group attained a much lower level of education as compared to those taking up formal paid jobs. Their owned farmland per adult was also rather smaller than that of households in other groups. The proportion of households in this livelihood group owning a conveniently situated house was also lower than that of households in other groups except for those in group 3.

Fifty households (about 10 percent of the sample) followed a livelihood strategy specializing in formal paid jobs. Similar to those specializing in informal paid jobs, some households in this livelihood still continued to do some farm work for their food consumption. Working members in this group had the highest level of schooling years and were the youngest. Average income per hour earned by a formal wage worker was VND 14,670, which is much higher as compared to that by an informal wage worker. Sixty five households specialized in business operations, accounting for around 14 percent of the sample. These households earned their living mainly by their own household businesses. Such businesses were characterized by small-scale trade or production units, mostly using family labour, with an average size of 1.7 jobs. Households following this strategy had an advantage over other livelihoods in owning a house or a plot of residential land in a prime location for doing businesses. 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, some households in this group them still maintained farm work for their food or an extra income.

Among various livelihood strategies, the diversified strategy emerged as the most popular one. The number of households adopting this strategy accounted for nearly half of the whole sample (233 households). On average, income from farming contributed 30 percent to the total income among diversified households. However, incomes from other labour-based sources constituted the largest share (62 percent). This group had the second biggest farmland per adult and the second highest proportion of households with a house or a parcel of residential land in a prime location. Household working members in this group were younger and had a higher education level than those specializing in farm work. The number of households that specialized in non-labour income sources constituted a negligible proportion (about 2 percent of the sample). Most of them were elderly 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. This group was excluded from the statistic description and econometric analysis due to its small number of observations.

The average proportion of farmland acquired by the State was estimated at 21 percent per household for the whole sample. However, the figures vary greatly across various groups of livelihood strategies. Informal wage earners experienced the highest level, followed first by business operators and diversifiers and then by formal wage earners, and finally by farmers. This suggests that the degrees of land loss may be closely linked to the probability of households adopting various livelihood strategies.

Table 3. Relationship between livelihood strategies and outcomes

Livelihood strategies	Livelihood outcomes	
	Log of annual income per capita	Log of annual consumption expenditure per capita
Informal wage earners	0.0609 (0.090)	0.0613 (0.069)
Formal wage earners	0.4202*** (0.096)	0.3186*** (0.070)
Business operators	0.3655*** (0.100)	0.2285*** (0.075)
Diversifiers	0.2254*** (0.084)	0.1656*** (0.062)
Constant	9.2326*** (0.075)	9.1439*** (0.058)
Observations	467	467
Prob > F	0.000	0.000
R-squared	0.067	0.076

Note: *, **, *** mean statistically significant at 10%, 5% and 1%, respectively. Farmers (base group). Estimates are adjusted for sampling weights and robust standard errors in parentheses.

Regression analysis using ANOVA models was employed to check whether livelihood strategies are statistically associated with livelihood outcomes. Natural logarithms of annual consumption expenditure and income per capita were regressed on a set of 4 dummy livelihood strategy variables, omitting farmers as the reference group. In general, the results in Table 3 indicate that on average, households whose livelihoods are diversified in multiple activities or specialized in formal paid jobs or business operations have higher levels of welfare than those specializing in farm work. Specifically, households with formal paid jobs have the highest per capita income, followed first by those with business operations and then by those with diversification, and lastly by those with farm work. This ranking is also similar to the choice of per capita expenditure as an indicator of household welfare. However, there is no statistical difference in the welfare between households with informal paid jobs and those with farm work. The findings above suggest that moving out of farming may be a way of improving household wellbeing.

4.2 Determinants of Household Livelihood Strategy

Table 4 reports the estimation results from the Multinomial Logit Model. The results show that many explanatory variables are statistically significant at 10 percent or lower, with their signs as expected. Finally, the Pseudo- $R^2 = 0.26$ and is highly significant, indicating that this model has a strong explanatory power. (Note 7)

Table 4. Determinants of livelihood strategies

Explanatory variables	Informal earners	wage earners	wage operators	Diversifiers
Land loss	2.94** (1.142)	1.77 (1.148)	2.38** (1.137)	2.36** (0.977)
Household size	-0.44** (0.198)	-0.11 (0.200)	-0.10 (0.189)	-0.01 (0.162)
Dependency ratio	-0.00 (0.400)	-0.42 (0.666)	-0.17 (0.379)	-0.04 (0.357)
Number of male working members	1.05** (0.495)	1.08** (0.529)	-0.60 (0.457)	0.16 (0.417)
Household head's gender	-1.32 (0.885)	-1.45 (0.951)	-1.56* (0.835)	-1.52* (0.782)
Household head's age	0.03 (0.029)	0.01 (0.031)	0.01 (0.028)	0.03 (0.024)
Age of working members	-0.15*** (0.042)	-0.16*** (0.045)	-0.08** (0.039)	-0.09*** (0.035)
Education of working members	0.08 (0.105)	0.60*** (0.138)	0.24** (0.104)	0.28*** (0.092)
Owned farmland per adult	-0.57*** (0.166)	-0.39*** (0.115)	-0.29** (0.115)	-0.16** (0.079)
Size of residential land	0.03* (0.013)	0.01 (0.019)	-0.03 (0.020)	0.01 (0.012)
House location	-0.34 (0.655)	-0.54 (0.789)	1.86*** (0.578)	0.98** (0.493)
Song Phuong	-2.21** (0.928)	-0.69 (0.960)	0.24 (0.809)	0.27 (0.710)
Kim Chung	1.53 (1.348)	1.43 (1.323)	1.73 (1.341)	1.62 (1.245)
An Thuong	-0.65 (0.964)	-0.88 (1.023)	0.56 (0.944)	-0.71 (0.864)
Duc Thuong	-1.98** (0.840)	-2.80*** (0.992)	-0.85 (0.834)	-1.44* (0.744)
Van Con	-0.62 (0.943)	-3.03*** (1.090)	0.68 (0.919)	0.23 (0.794)
Constant	7.90*** (2.418)	2.66 (2.876)	4.41** (2.198)	3.53* (2.142)
Wald chi2	258.16			
Prob > chi2	0.0000			
Pseudo R2	0.26			
Observations	456	456	456	456

Note: *, **, *** mean statistically significant at 10%, 5% and 1%, respectively. Farmers (base group). Estimates are adjusted for sampling weights and robust standard errors in parentheses.

In general, the results indicate that more land loss is linked to higher probability of a household specializing in a single nonfarm activity (informal paid jobs or business operations) or diversifying in multiple activities. Among activity choices, households with more land loss are found to be the most likely to adopt a strategy specializing in informal paid jobs. Given a 10 percentage-point increase in the loss of farmland, the relative risk for households following the strategy specializing in informal paid jobs relative to a farm work-based strategy (base group) would be around 1.34 times, given the other variables in the model are held constant. (Note 8) The corresponding figures for the case of diversifiers, and business operators are around 1.27 times and 1.27 times, respectively.

The results show that households with more farmland per adult are less likely to specialize in any single nonfarm activity or diversify in multiple activities. While the size of residential land has no association with any activity choice, the prime location of a house or a plot of residential land has a close link with higher probability of households specializing in business operations or diversifying in many activities. The relative risk of adopting a strategy specializing in business operations relative to a strategy specializing in farming is around 6.4 times higher for households with a conveniently situated house than those without it, holding all other variables constant. (Note 9) The corresponding relative risk for the case of the diversified strategy is about 2.7 times.

The results indicate that, holding all other variables being constant, households with more family members are more likely to concentrate on agricultural production as their main livelihood. This suggests that specialization in farming is a more labour intensive strategy relative to a strategy specializing in informal paid jobs. Having more male working members increases the probability of a household undertaking informal paid jobs or formal paid jobs as the main livelihood. Male-headed households are less likely to diversify or specialize in business operations, suggesting that female-headed households are likely to be more active than male-headed households in household businesses. Regarding the role of human capital in activity choice, the results show that households with older working members are less likely to specialize in any single nonfarm activity or diversify in multiple activities. The education of working members is positively related to the probability of households pursuing a diversified strategy or a strategy specializing in formal paid jobs or business operations. However, education is not statistically associated with the likelihood of households adopting a strategy specializing in informal paid jobs. This suggests that, in terms of formal education, there has been a very low or no entry barrier to these jobs.

Some commune dummy variables being statistically significant suggest that there may be variable (s) which were not explicitly specified in the model but were captured by the dummy variables for some communes. This implies that livelihood opportunities vary across communes. As indicated by Pender, Jagger, Nkonya, and Sserunkuuma (2004), rural livelihood strategies may be affected by many factors at village-level such as land fertility, access to markets, population density and nonfarm opportunities.

5. Discussion and Policy Implications

This study found that land loss increases with the probability of households diversifying in multiple activities or specializing in informal paid jobs or household businesses. These findings support the existing survey findings obtained by Do (2006), Nguyen et al. (2011) and Nguyen et al. (2013). The results reveal some patterns of livelihood adaptation under the impact of farmland loss. A first pattern shows that households with more land loss are the most likely to concentrate on informal paid jobs as their livelihood strategy. This finding also supports the previous survey finding obtained by Do (2006). This trend may reflect the fact that there is an abundance of casual paid jobs and manual labour jobs available in Hanoi's urban and sub-urban areas. In addition, this suggests that there has been relative ease of entry into these jobs. The informal sector in Hanoi provides the most job opportunities for most unskilled workers (Cling et al., 2010), and such job opportunities are often offered in Hanoi's rural and suburban areas (Cling, Razafindrakoto & Roubaud, 2011). A second pattern of activity choice is that, more land loss is associated with higher likelihood of households specializing in business operations, although the probability of pursuing this strategy is lower than that of following the strategy specializing in informal paid jobs. This may be explained by the fact that business operations often require more capital, managerial skills and other conditions. Regarding the third pattern of livelihood choice, the result indicates that households with more land loss are more likely to diversify their livelihoods. Nevertheless, land loss is not statistically associated with probability of households specializing in formal paid jobs. This may reflect the fact that there are some potential entry barriers to these jobs. As indicated by Reardon, Taylor, Stamoulis, Lanjouw, and Balisacan (2000), the most lucrative nonfarm opportunities often require higher educational qualifications.

In line with the previous findings in rural Vietnam by Van de Walle and Cratty (2004) and Pham et al. (2010), and in some Asian countries by Winters et al. (2009), this study found that farmland is negatively associated with

the probability of households diversifying or specializing in any single nonfarm activity. As previously discussed, a farm work-based strategy is found to be far less lucrative than a strategy diversifying or specializing in formal paid jobs or business operations. The discussion above suggests that farmland is not a potential barrier to the pursuit of lucrative livelihood strategies. However, having a house (or a plot of residential land) in a prime location increases the probability of households pursuing lucrative livelihood strategies. Households owning a house (or a plot of residential land) in a prime location have a higher chance of specializing in household businesses or diversifying their livelihoods such as opening a shop or a workshop. A similar trend was also observed in a rapid urbanizing village in Hanoi by Nguyen (2009) and in some urbanizing communes in Hung Yen-a neighboring province of Hanoi by Nguyen et al. (2011) where houses or parcels of residential land in a prime location were utilized by their owners for opening shops, restaurants, bars, coffees shops or for rent. This suggests that many households have actively taken advantage of emerging nonfarm opportunities in rapid urbanizing areas. Also, this indicates that a prime location for doing businesses is much of importance to the livelihoods of sub-urban households.

The aforementioned discussion about the role of a house (or a residential land plot) with a prime location suggests that government policy can help land-losing households change or diversify their livelihoods by providing them with a plot of land in a prime location for doing businesses. Fortunately, as mentioned in Section 2.2, households who lose more than 30 percent of their farmland will be compensated with a nonagricultural land parcel (*đất dịch vụ*) that can be used as a premise for household businesses such as opening a shop, a workshop, or for rental accommodation. This suggests that *đất dịch vụ* can be a crucial livelihood asset for land-losing households, particularly elderly farmers to change and diversify their livelihoods in Hanoi's sub-urban areas. According to the Asian Development Bank (2007), such a policy has been successfully implemented in Vinh Phuc Province since 2004 where *đất dịch vụ* is utilized by households for opening a shop or providing accommodation lease for workers in industrial zones. This useful lesson, therefore, should be worth considering by other localities.

Consistent with the previous finding in a study by Pham et al. (2010), the current study found that women are more likely than men to engage in nonfarm household businesses but men are more likely to be wage earners in non-farm activities. Possibly, this is because the majority of household businesses were small trades and the provision of local services which were possibly more suitable for women. With respect to the role of human capital in household activity choice, the results indicate that better education of working members increases the probability of a household pursuing a strategy specializing in formal paid jobs or business operations or a diversified strategy, which are more lucrative as compared to a farm work-based strategy. This suggests that, in terms of formal education, these strategies remain a high barrier to entry. Lucrative strategies will be awarded for households with better educational qualifications while such opportunities may not be accessible to households with poorly educated members. As shown by the results, younger working members are less likely to take up a farm work-based strategy, suggesting that emerging nonfarm job opportunities make young rural labour less interested in farming activities. Similar findings were also found in Shandong Province, China where younger and more educated working members are more likely to participate in off-farm activities (Huang, Wu & Rozelle, 2009). This implies that investment in education is a successful key for rural young generations to take up profitable livelihood opportunities. In addition, job creation policies for rural young workers should focus on promoting rural nonfarm activities.

In summary, this study provided the first econometric evidence that land loss has a wide-range of impacts on sub-urban household livelihood strategies. Given the context of land loss due to urbanization in Hanoi's sub-urban areas, a number of land-losing households have actively adapted to the new context by specializing in a single nonfarm activity (informal paid jobs or business operations) or diversifying in multiple activities as ways to mitigate their dependence on farmland. Some land-losing households might be pushed into informal paid jobs as a way to cope with the adverse context of land shortage while other land-losing households might be pulled into household businesses or diversification due to high returns from these activities. The discussions above suggest that land loss can have an indirectly positive effect on household welfare via its positive effect on the choice of lucrative livelihood strategies. This argument is also supported by the survey result findings obtained by Nguyen et al. (2013) which found that farm households with higher land loss levels have higher rates of job change and their income from new jobs increase considerably in comparison with that before losing land. Therefore, a possible implication here is that the rising of land loss should not be seen as an absolutely negative phenomenon because it can improve household welfare by motivating households to change or diversify their livelihoods. A similar trend was also observed in several developing countries by Winters et al. (2009), who found that land-scarce households were driven into paid jobs and thus promotes households to follow this way of improving their welfare.

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Notes

Note 1. Such rights include the rights to exchange, transfer, inherit, lease or mortgage land and use land as a capital contribution.

Note 2. USD (US Dollar) 1 equated to about VND (Vietnam Dong) 17,000 in 2008.

Note 3. The prices of *đất dịch vụ* in some communes of Hoài Duc District ranged from VND 17,000,000 to VND 35,000,000 per m² in 2011, depending on the location of *đất dịch vụ* (Tuan, 2011) (USD 1 equated to about VND 20,000 in 2011). Note that farmers have already received the certificates which confirm that *đất dịch vụ* will be granted to them but they have not yet received *đất dịch vụ*. However, these certificates have been widely purchased (Duong, 2011).

Note 4. “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).

Note 5. 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 a 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.

Note 6. USD 1 equated to about VND 18,000 in 2009.

Note 7. An extremely good fit of the model is confirmed if the value of the Pseudo-R² ranges from 0.2 to 0.4 (Louviere, Hensher & Swait, 2000; Scarpa et al., 2003).

Note 8. Relative Risk Ratios (RRRs) are exponentiated coefficients $=e^{(\beta)} = \exp(\beta)$, where β is the estimated outcome of the standard multinomial logit model in Table 4. For instance, given a 10 percentage-point increase in land loss, the relative risk of choosing the informal paid work strategy relative to the farming strategy $= \exp(2.94 \times 10\%) = 1.341784 \approx 1.34$, holding all other variables constant.

Note 9. $RRR = \exp(1.86 \times 1) = 6.423737 \approx 6.4$, where 1.86 is the value of the estimated coefficient in Table 4 and 1 is the value of the dummy variable of house location if the house has a prime location.

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