The effects of industrial zones on the change in land-lost households' income: The case of Yen Binh industrial zone, Thai Nguyen province

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Abstract

The rapid urban expansion of Vietnam requires land requisition that puts sources of livelihood especially at the urban fringes at risk. The livelihood of farmers losing land has become an important social issue in Vietnam. This study aimed to examine the impact of rapid urbanization and industrialization upon the income of farmers who lost land with the establishment of the Yen Binh industrial zone. The study involved primary data collected from 200 households that were randomly in three districts of the zone in 2017. Secondary data were also collected from various sources. Descriptive statistics and binary logistic regression model were used to analyze the social, economic, demographic and institutional characteristics of the sample households. Results showed that the factors that significantly influenced the households' income change include active labour force participation of households, professional qualification, size of the land that was lost, job specification, working in industrial zone, investment from land compensation and commune variable. Having a job in Yen Binh industrial zone had the greatest impact on the change in income. The findings highlighted the need for farmers who lost land to improve their educational qualification and occupational skills in order to enhance their capacity for sustainable and diversified sources of livelihood. In particular, the local government should provide livelihood assistance in the form of training for skills to help farmers find jobs in the industrial zone.

Keywords: Income Change; Land-Lost Households; Land Acquisition; Binary Logit Model; Yen Binh Industrial Zone

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1. Introduction

Recent Industrialization efforts in Vietnam have created widespread social and political tensions. Most of these could be attributed to land-grabbing incidents in order to give way to the construction of industrial parks. The tensions stirred policy debates that revolve around the trade-off between industrialization and mass welfare, and towards finding an alternative industrial-development policy. Concerns that received much attention were: (a) optimum compensation for affected people; and, (b) the livelihood benefits of industrial zones.

Vietnam has witnessed rapid urbanization and industrialization over the past two decades, not only in the growth of urban populations but also in urban spatial expansion. One of the outcomes of this process was the government's compulsory acquisition of a large area of privately owned land from farmers for the development of industrial zones, infrastructure, urban housing and other purposes for public use (Nguyen, 2009). Rapid urbanization led to great demand for land, and thus a large proportion of agricultural land has been requisitioned for industrial construction.

The number of farmers losing their land had been growing every year. According to the Vietnam Statistical Yearbook, over the period 2011-2016, the government had requisitioned 750,000 hectares of agricultural land some 600,000 hectares of which were intended for non-agricultural purposes. This constituted around 80 percent of the country's agricultural land. In Vietnam, agriculture is the main source of livelihood for the majority of poor farming households (World Bank, 2012). Therefore, the government's land acquisition should have a considerable effect on the living of farming households.

The loss of land has detrimental impact on the household's sources of livelihood especially those that are largely dependent on farming and similar activities. Nevertheless, such negative effects may be compensated by more employment opportunities generated by urbanization and industrialization. Even then, not all local farmers have successfully taken advantage of these opportunities. A survey in several provinces of Vietnam revealed that approximately two thirds of land-losing households benefited from new jobs and improved local infrastructure; for the remaining one third of the households, land acquisition had negative effects, especially in cases where all productive land was lost and/or the family members did not have the educational qualification or vocational skills to take on the new jobs (Asian Development Bank, 2012). This suggests that forced land acquisition by government might have increased income inequality among households in Vietnam.

A growing number of studies have focused on the welfare effect of optimum compensation in the context of industrialization-led displacement (Saumik and Vengadeshvaran, 2013). In a recent study, Ghatak and Mookherjee (2014) found that the reservation prices of most land owners were higher than the market price of land. As a result, they recommended that the compensation should be higher than the market value. In a related vein, a recent study by Ghatak et al. (2013) found that under-compensation relative to market value significantly raised the likelihood of rejecting the compensation offer. They also found that forced acquisition of land resulted in reduced income growth.

International experience indicates that rapid urbanisation and economic growth coincide with conversion of land from the agricultural sector to industry, infrastructure and residential uses (Ramankutty et al., 2002). In China, the most populous country, urbanisation has been encroaching upon a considerable area of farmland

and such encroachment raises special concerns about food security and rural livelihoods (Xiaojun et al., 2017, Chen, 2007; Deng et al., 2006; Wei et al., 2009; Xie et al., 2005). Consequently, farmland shrinking has significantly affected the livelihoods of rural dwellers. Tsering *et al*. (2007) examined the relationship between farmland conservation and urban farmers' livelihoods in the Tibet autonomous region of China. Their study found that the arable resource is the most important asset because of its scarcity and this valuable resource is declining on a large scale in this area. They also concluded that land is actually essential for the food security of households and local sustainable development in the future. However, the authors noted that for achieving better livelihood outcomes in the future, farmers should be well educated and well-equipped with labour skills to mitigate their livelihood dependence on farmland. Using secondary data gathered from various published documents in India, Mahapatra (2007) examined how landlessness affected livelihood choices in rural Orrisa, India. The study revealed that about one third of landless households adopted a livelihood strategy which absolutely relied on wage employment.

On the other hand, there are arguments that in certain situations, the rising landless level or land shrinking should be seen as a positive trend because this creates opportunities for diversifying livelihood strategies and mitigating dependence on farmland (Bouahom, et al., 2004; Davis, 2006; Deshingkar, 2005; Koczberski and Curry, 2005; Rigg, 2006). Ellis (1998) and Barrett et al. (2001) distinguished pull and push factors that determine rural livelihood diversification. Land scarcity was categorised as one of the push factors which induces rural households to diversify their livelihood in response to the adverse livelihood contexts. Koczberski and Curry (2005) investigated the relationship between farmland size decline and change in livelihood strategies among oil palm settlers in Papua New Guinea. Their research findings indicated such settlers successfully responded to the farmland shrinking by adopting non-farm livelihood strategies and intensifying farm production. A similar finding could be found in a study by Jansen et al. (2006), who utilised econometric methods for investigating the determinants of livelihood strategies and outcomes of households in the hillside areas of Honduras. Their findings reveal that land is not the key constraint prohibiting the potential for higher incomes, and more land does not lead to higher per capita income of households. Households possessing less land tend to gain higher productivity or to engage in non-farm activities.

However, little is known about the livelihood consequences of the establishment of an industrial area, especially on affected households. The specific concerns as to whether the promised jobs by the state authority would be available to the semi-literate rural households with very limited skills or whether the effects of industrialization would trickle down for the benefit of affected households have been raised by activists and economists alike (Banerjee et al., 2012). This paper bridges this knowledge gap by addressing the effects of the setting up of an industrial zone.

The main objective of this study is to test the hypothesis that the establishment of an industrial area due to urbanization and industrialization affects the income earnings of households deprived of land. To the best of my knowledge, the existing empirical evidence for the impact of land loss on income distribution is limited and are based on qualitative methods or descriptive statistics. In a case study by Nguyen (2009) in a peri-urban village of Hanoi where about two thirds of farmland was taken away to give way to new urban areas and infrastructure, it was found that many households near universities and urban centers had benefited. Income earned from renting out boarding houses to students and migrant workers had become the most important

source for the majority of households. However, a number of other households had precarious income because they did not have rooms to rent out and many landless farmers became jobless, particularly elderly and less educated ones. The result manifested an increasing social differentiation among local households (Nguyen, 2009).

Nguyen et al. (2011) investigated the livelihood adaptation and social differentiation among households deprived of land in some communes of Hung Yen where farmland decreased by 70 percent due to the conversion of farmland to industrial zones and clusters between the periods 2001 and 2006. Their research findings revealed that diversification in both farm and nonfarm activities emerged as the most common livelihood strategy among land-losing households. Among land-losing households, those with a farming background before losing land tend to be at a-disadvantage in taking up high-return activities. The authors concluded that the difference in returns among the different livelihood strategies was one of the main causes of rising social stratification among households.

As already mentioned above, although there has been some discussion in the available literature about the impact of land loss on income distribution, no econometric evidence exists. Hence, using a unique dataset from a 2017 household survey and econometric methods, this study makes a significant contribution to the literature by providing the econometric evidence to prove that the effect of land loss on household income is statistically significant. These empirical findings, therefore, confirm that land loss affects the income of households near Yen Binh industrial zone of Thai Nguyen province. In addition, the result shows that household size, access to credit and funding support for vocational training are not statistically associated with the likelihood of increase in households' income. However, other factors, including active labour force participation, household head's level of education, land loss, job specification, working in industrial zone, investment, and commune variables are associated with increase in the income of households near the Yen Binh industrial zone.

2. Methodology

2.1. Study area

This study was carried out in Yen Binh industrial zone of Pho Yen, a district of Thai Nguyen province. The district is located on the south side of Thai Nguyen province, about 30 km from the Central Business District. Pho Yen has a very prime location surrounded by many important roads, namely National Route 3, Hanoi-Thai Nguyen railway, Noi Bai International Airport, Da Phuc port, and is in close proximity to new urban areas, new industrial zones, including Yen Binh industrial zone. Of the districts of Thai Nguyen, Pho Yen has the most numerous projects of land acquisitions with a vast area of cultivated land having been acquired by the State for use in urbanization and industrialization, and economic development in recent years. During the period 2012-2016, around 40 hectares of agricultural land were compulsorily acquired by the provincial government for the Yen Binh industrial zone of Pho Yen project. As a result, the farmland acquisition has led to a considerable decrease in the size of farmland per household in Pho Yen.

2.2. Data collection

A semi-structured questionnaire composed of closed and open-ended questions was used as a survey instrument. Purposive sampling method was used to choose the study areas. The sample size taken was 26 smallholder farmers randomly selected from 1175 households in Bai Bong commune. One hundred and six households were also randomly selected from 4718 households in Dong Tien commune. Sixty eight households were also randomly selected from 3005 households in Hong Tien commune. In total, the sample size was 200 respondents. The survey was conducted from the beginning of June to the end of July 2017, and the data were collected by means of face-to-face interviews with the head of a household in the presence of other household members. A total of 200 households that lost land of various sizes and proportions were successfully interviewed. Some lost little, some lost part of their land and others lost most or all of their land.

2.3. Model specification

The binary logistic regression method was used to model the factors affecting the likelihood of an increase in households' income after construction of Yen Binh industrial zone. The outcome variable, the change in income, was dichotomous taking the value of 1 if there was increase and 0, otherwise. The increase in income after the establishment of the Yen Binh industrial zone was contingent upon a set of independent variables that were a mixture of categorical, continuous and ordinal variables (Table 1). The mathematical representation of logistic regression model is as follows (Gujarati, 1995):

$$\frac{Prob(Y_i=1)}{Prob(Y_i=1)} = \frac{P_i}{1-P_i} = e^{(\beta_0+\beta_1 X_{1i}+\beta_2 X_{2i}+\cdots+\beta_k X_{ki})} \qquad (1)$$

Where P_i is the probability that Y_i takes the value 1 (increase in income) $1 - P_i$ is the probability that Y is 0 (no increase); e is the exponential constant. Taking the natural log of both sides of equation (1), we get:

$$L_i = \ln\left(\frac{P_i}{1-P_i}\right) = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \cdots + \beta_k X_{ki} \qquad (2)$$

Where L_i stands for logit model, which is linear in X_i as well as in β; subscript i denotes the ith observation in the sample; P is the probability of the outcome; β_0 is the intercept term; $\beta_1 + \beta_2 + \cdots + \beta_k$ are the coefficients associated with each independent variable $X_1, X_2, \dots, X_k$. Table 1 shows the description of independent variables used in the logistic regression model as well as their categories.

2.4. 2.4. Data analysis

Descriptive statistics was used to present the mean and standard deviations of independent variables in the model (Table 1). Binary logistic regression (Table 3) was also applied in similar studies by Nahayo (2017), Tran (2014) and Tran et al. (2014) the variables included in the model were checked for multicollinearity using linear regression analysis by considering the tolerance value and the variance inflation factor (Montgomery and Peck, 1992; Menard, 1995). The goodness-of-fit of the model was tested using Hosmer Lemeshow test (Sidibé 2005). The statistical package for social science (SPSS) 20.0 was used to analyze the quantitative data.

Table 1. Brief description of variables used in the binary logistic regression model (*N*=200)

Variables	Mean	S.D.	Description	Codes	Categories
Household size	4.460	0.890	Total household members		Number
Active labour force	2.760	1.085	The number of household members aged 15-60 years.		Number
Age of household head	47.740	8.333	Age of household head		Number
Gender of household head	0.760	0.431	Binary, sex of the household head	1 0	Male Female
Professional qualification	1.770	0.939	Ordinal, education level of the household head	1 2 3 4	No qualification Vocational training Professional secondary school Professional college and university
Land loss	744.77	557.107	The size of farmland that was compulsorily acquired by the government		Number, m²
Job specification	2.660	0.636	Ordinal, job of household	1 2 3 4	Farm employment Formal paid job Informal paid job Farm and off/non-farm job
Access to credit	0.350	0.477	Binary, if the household receives any loan from banks or credit institutions in the last 24 months	1 0	Yes Otherwise
Funding support for vocational training	0.30	0.459	Binary, if the household obtains the grand aid in the last 24 months	1 0	Yes Otherwise
Working in Yen Binh industrial zone	0.290	0.453	Binary, if the household has member working in Yen Binh industrial zone	1 0	Yes Otherwise
Investment	48.610	68.072	The amount of compensation from the government for land acquisition used by household to expand production or build renting flats.		Number, million VND
Commune variable			The commune in which the household resided (Hong Tien Commune is the base group)		Dummy variable

3. Results and discussion

3.1. Demographic characteristics of the respondents in the sampled communities

The result of socio demographic characteristics of respondents in table 2 revealed that male were 69.2%, 80.0% and 71.0% in Bai Bong, Dong Tien and Hong Tien communities respectively while female household heads were 30.8%, 20.0% and 29.0% respectively in these communities. It is often not common for a household to be headed by female. Age distribution indicated that 3.8%, 26.9%, 34.6%, 23.1%, and 11.50% of the household heads in Bai Bong community had ages of less than 30 years, 30-39 years, 40-49 years, 50-59 years and above 60 years respectively. Also, 20.0%, 41.9%, 30.5% and 4.6%, in Dong Tien district had ages of 30-39 years, 40-49 years, 50-59 years and above 60 years respectively. It was further revealed that 3.8%, 92.3%, and 3.8% represent household size of less than 3, 3-6 and above 6 people in Bai Bong and 15.2%, 83.8%, 1.0% and 4.3%, 95.7%, 0% in Dong Tien and Hong Tien communities respectively. Highest incidence is seen between 3-6 household sizes while above 6 had the least in sampled communities. Also, households of less than 1, 2-4 and above 4 labor account for 7.7%, 80.8% and 11.5% in Bai Bong community and 7.6%, 85.7%, 6.7%, and 5.8%, 91.3%, 2.9% in Dong Tien and Hong Tien communities respectively.

Professional qualification of the household heads in the study area indicated that 61.5%, 66.7% and 30.4% had no qualification, 15.4%, 14.3% and 31.9% had primary vocational training, 15.4%, 16.2% and 31.9% had professional secondary school while 7.7%, 2.9% and 5.8% have attained college or tertiary education in Bai Bong, Hong Tien and Dong Tien communities respectively. Additionally, the percentages of household heads involved in informal paid job were highest with the figures of 66.7%, 42.3% and 58.0% in Bai Bong, Hong Tien and Dong Tien communities respectively, while the lowest percentages were seen in household heads involved in farming as their major livelihood (Table 2).

Most of households in three communities used only small amount of compensation of less than 50 million VND for expanding production with the figures of above 75%. Also, households with members working in industrial zone took a small proportion of around 25%. While the large proportion of households in Hong Tien experienced an increase in income after establishment Yen Binh industrial zone, that of respondents in Bai Bong did not find any change in their income (Table 2).

3.2. Determinants of change in land-lost households' income

Binary logistic regression model was applied to study the influence of independent variables on the farmers' change in income. Table 3 presents the statistical results from the analysis. The Chi Square and the Hosmer-Lemeshow statistics indicated that the selected variables fit the model well. Additionally, considering the tolerance and the variance inflation factor values, no multicollinearity was found among the independent variables. Results in Table 3 show that the factors that significantly influenced the households' increase in income include the number of labour of household, professional qualification, land loss, job specification, working in Yen Binh industrial zone, investment and dummy commune variables. In addition, only about 62% of interviewed households experienced increase in income.

Table 2. Socio-demographic Features of Respondents in the Sampled Communities of Bai Bong, Dong Tien and Hong Tien, %

Variables	Bai Bong	Dong Tien	Hong Tien
Gender			
Male	69.2	80.0	71.0
Female	30.8	20.0	29.0
Age			
<30	3.8	0	0
31-40	26.9	20.0	14.5
41-50	34.6	41.9	59.4
51-60	23.1	30.5	20.3
>60	11.5	7.6	5.8
Household size			
<3	3.8	15.2	4.3
3-6	92.3	83.8	95.7
>6	3.8	1.0	0.0
Active labour force			
<=1	7.7	7.6	5.8
2-4	80.8	85.7	91.3
>4	11.5	6.7	2.9
Professional qualification			
No qualification	61.5	66.7	30.4
Primary vocational training	15.4	14.3	31.9
Professional secondary school	15.4	16.2	31.9
Professional college and university	7.7	2.9	5.8
Job specification			
Farm employment	0.0	0.0	11.6
Formal paid job	32.4	57.7	17.4
Informal paid job	66.7	42.3	58.0
Farm and off/non-farm job	1.0	0.0	13.0
Land loss			
<=300 m^2	11.5	18.1	18.8
301-600	23.1	29.5	47.8
601-900	30.8	17.1	18.8
901-1200	11.5	15.2	11.6
>1200 m^2	23.1	20.0	2.9
Investment			
<=50 million VND	80.8	75.2	79.7
51-100	15.4	17.1	8.7
101-150	0.0	1.0	4.3
151-200	3.8	4.8	2.9
>200 million VND	0.0	1.9	4.3
Working in Yen Binh industrial zone			
No	76.9	72.4	68.1
Yes	23.1	27.6	31.9
Funding support for vocational training			
No	65.4	65.7	78.3
Yes	34.6	34.3	21.7
Change in income			
No	61.5	48.6	13.0
Yes	38.5	51.4	87.0

Table 3. Binary logistic regression estimates of the factors affecting the change in households' income (*N*=200)

	β	Standard Errors	Wald	Significance	Odds Ratio
Household size	.433	.305	2.019	.155	1.542
Active labour force	1.056	.359	8.651	.003	2.875
Age of household head	-.032	.035	.837	.360	.968
Gender of household head	-.624	.620	1.011	.315	.536
Professional qualification	1.654	.434	14.539	.000	5.225
Land loss	-.002	.001	12.194	.000	.998
Job specification	1.402	.532	6.944	.008	4.062
Access to credit	-.708	.651	1.185	.276	.493
Funding support for vocational training	-.477	.671	.505	.477	.621
Working in Yen Binh industrial zone	2.050	.696	8.677	.003	7.767
Investment	.013	.006	4.647	.031	1.013
Bai Bong	-2.542	.867	8.598	.003	.079
Dong Tien	-.681	.307	4.908	.027	.506
Constant	-6.207	3.397	3.339	.068	.002
Model Chi-square		155.986***			
Hosmer-Lemeshow test: Chi-square		2.777			
Significance		0.948			
Cox and Snell R square		0.542			
Nagelkerke R square		0.737			
Overall predicted percentage correct		89.5			

*,P<0.1; **, P<0.05; ***, P<0.01; ****, P<0.001.

With labour activity of the household considered, additional family labour activity increases the probability of a household being rich and reduces the probability of a household being poor. The households with high active labour force were 2.875 times more likely to experience income increase than households with low level of labour activity. In general, this finding is in line with the expectation. While the age of the household head was not statistically associated with the likelihood of change in income, households headed by old people were found to be less likely to have income increase. Gender of household head was not statistically associated with income increase either. However, the male-headed households were 0.536 times less likely than female-headed households to experience the increase in income.

Professional qualification of household head was found to be positively associated with the chance of their households experiencing the increase in income. A similar finding was also found in rural Vietnam where household heads with better education were more likely to be rich than to be the middle class (Do et al., 2001). This finding indicates that those farmers with high educational level are more likely to diversify livelihood strategies by going into non-farm and/or off-farm activities than those who are less educated. This is due most probably to the fact that educated person may gain better skill, experience, and knowledge that help them

engage in diversified livelihood strategies. Literate individuals are very ambitious to get information and use it and are more capable of finding a job. The odd ratio reveals that, holding other variables constant, a change in household head's level of education by one unit will increase a probability of increase in income by a factor of 5.225. Thus, education is a fundamental instrument in equipping farmers with necessary skills which enable them to diversify income sources.

The coefficient on land loss is negative and statistically significant, indicating that farmland loss has impact on the probability of change in income of household. The findings, therefore, confirm that the loss of farmland has affected income distribution of households living near Yen Binh induatrial zone. The negative association suggests that the likelihood of increase in income decreases as the size of the land lost increases. This can be explained by the fact that a significant amount of income that was contributed by agricultural production was lost due to the area of acquired farmland. The odds ratio of only 0.998 for land loss reveals that, other things being constant, the odds ratio in favor of increase in income decreases by a factor of 0.998 as the land loss increases by one meter. However, the small odds ratio indicates that the loss of farm income due to land loss might have been compensated by extra income from nonfarm jobs.

The variable job specification was found to have positive and significant influence in change in income by l% probability level. This result implies that households with different income-generating activities are more likely to increase the income after construction of industrial zone. Other things being constant, the odd ratio reveals that the probability of a household's income increase improved by a factor of 4.062 for those farmers who diversified into non-farm and off-farm activities. In general, the above findings tend to support Do et al. (2001) who found that in Vietnam, nonfarm households were more likely to be rich and less likely to be poor than farm households when the reference group was the middle class.

It was found that job in Yen Binh industrial zone has a positive and significant effect on the probability of increase in income at 1% probability level. This result implies that the households with a member who works in Yen Binh industrial zone are more likely to augment their income. This can be explained by the fact that the income from agriculture and handicraft industry is often precarious. By contrast, working in the industrial zone is more stable.. Other things kept constant, the likelihood of a household with increased income goes up by 7.767 % as a household member gets to work in Yen Binh industrial zone. This result agrees with the previous finding by Nguyen et al. (2012).

Regarding the contribution of investment to income change, the results reveal that investment in expanding production and building flats for rent positively and significantly influence the probability of increase in income at less than 5% significance level. This result suggests that households that invested more money from government compensation in income generating activities are more likely to increase in income than those who invested less amount from such compensation. Before the land was acquired, most of the households were farmers, and it was said that the land was the main productive asset generating income for the family. Therefore, when land was requisitioned, the households were compensated. As a result, the use of compensation money to create materials and tools of production and expanding business has an important impact on supplementing the income of households. Other things being held the same, the odds ratio of 1.013 for the amount of compensation invested by households indicates that, the odds ratio in favor of increase in

income goes up by a factor of 1.013 as the amount of investment increases by one unit. Similar result was found by Nguyen et al. (2012).

Finally, with respect to the communal level factors that affect income change, the results show that holding all other variables constants, the odds ratio reveals that the probability of households experiencing the increase in income decreased by 0.079% for those households living in Bai Bong. Similarly, a likelihood of income increase falls by 0.506% for households in Dong Tien. These findings suggest that income inequality may be affected by many factors at village-level such as the quality of land, access to markets, level of local infrastructure development, population density and opportunities for nonfarm employment.

4. Conclusion and policy implications

The relationship between farmland loss due to construction of Yen Binh industrial zone and income change has been examined in previous studies using qualitative analysis or descriptive statistics. Going beyond the literature, I conducted an econometric analysis of this relationship using a unique dataset from a 2017 household survey. The current study has provided further econometric evidence that the size of land loss in 2012 was statistically associated with the probability of the change in income of a household. These results, therefore, confirm that farmland loss had impact on income change of households near in Yen Binh industrial area.

The Binary logistic regression model was used to answer the questions whether or not the construction of Yen Binh industrial zone affects rural household's income. The model results suggest that the change in income is influenced by various factors. The result indicated that out of the 12 hypothesized variables seven were found to significantly influence household's change in income at different probability levels. These variables include active labour force, professional qualification, size of the land loss, job specification, job at Yen Binh industrial zone, investment and commune variable. The model result indicated that active labour force, professional qualification, job specification, job at Yen Binh industrial zone and investment variables influenced positively and significantly the households' income change, while the size of the land loss and commune variable negatively and significantly affected the change in household income.

The finding of the study came up with possible policy recommendations in the area of the increase in income after establishing industrial zone. The positive and significant influence of professional qualification on income change suggests to give due attention in promoting farmers' education through strengthening and establishing both formal and informal type of education. The negative and significant influence of land loss size on increase in income suggests for concerned bodies to develop appropriate strategies and policies especially for land resource-poor farmers. The presence of very small size of land also calls for giving emphasis in agricultural intensification to enhance the productivity of the land in order to generate adequate income and food. Job specification had significant and positive influence on increase in household income, and this calls for government and other responsible bodies to design necessary strategies so as to diversify the rural economy away from agriculture to increase off/non-farm earnings. The significant and positive effect of households' job in Yen Binh industrial zone shows the way to considerably boost income. This also suggests to government

and other responsible bodies to build capacity through education and training of household members to enable them to find work in factories of industrial zone. The strong and significant association between investment in expanding production and increase in income calls for policy measures to solve financial problems by developing and strengthening financial institution, creating credit access and promoting better income generating options.

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