Land Acquisition for Industrial Parks and Household Income: A Study From the Mekong Delta, Vietnam

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Abstract: Along with the process of forming and developing industrial parks, the situation of land acquisition to serve the construction of industrial parks has been taking place across the country, especially in rural areas. Farming households whose land is acquired must cope with the change of resources to in their livelihoods and income. To develop industrial parks sustainably, for industrialization, it is necessary to pay adequate attention to the change of life and income of people who lost their land. In this study, we employed data collected from 280 households who have land acquired for industrial parks in the Mekong Delta. Binary Logistic regression model is applied to analyze the data to figure out 6 factors that affect income changes of the households. The factors include usage of compensation money for production and business investment after land acquisition, borrowing from formal financial institutions, having their employees working in the industrial parks, educational attainment of the head, dependency ratio and age of household head.

Key words: industrial park, land acquisition, binary logistic regression

1. Introduction

In recent years, the process of forming and developing industrial parks (IPs) has created a new modern infrastructure system, contributing to the rapid expansion of capital, and becoming an important factor affecting GDP growth, economic restructuring, create millions of jobs, generate income in Vietnam. Along with this process, the situation of land acquisition to serve the construction of industrial parks takes place strongly throughout the country. Accumulated to February 20, 2021, the whole country has 33,215 projects with a total registered capital of 388.8 billion USD. The country had 326 industrial zones established with a total natural land area of nearly 93,000 hectares, of which the industrial land area was nearly 64,000 hectares, accounting for about 68% of the total natural land area [1]. If each hectare of acquired land for

industrial zone development affects 10 agricultural workers [2], the acquisition of agricultural land affects the lives of 640,000 workers. To develop industrial parks to attract investors, especially foreign direct investment, to expand economic capital and significantly affect the GDP growth rate in recent years in Vietnam. However, for sustainable economic development, it is necessary to pay attention to the quality of life and income of farming households after land acquisition for industrial zone development. There have been many studies on compensation — clearance of industrial parks, but the changes in life and collection of people after land acquisition have not been fully noticed, especially the factors influencing their income change. Therefore, identifying scientifically the impacts on income change of people whose land is acquired is a challenge for researchers and policy makers in Vietnam. This study leaves its focus on (i) Identify the factors affecting the changes of farm household's income after land acquisition; and (ii)

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Policy implications to improve farm household income. The Mekong Delta accounts for 12% of the area and 19% of the country's population, the largest agricultural production center of Vietnam, contributing 50% of rice production, 95% of rice exports, 65% of farming output. Aquaculture, 60% of the country's fish exports and 70% of the country's fruits, are important areas in ensuring security, politics, and economic development of the country. By the end of September 2020, the Mekong Delta region had 1,662 valid foreign investment projects, with a total registered capital of more than 22.63 billion USD (Ministry of Planning and Investment, 2020). For this study, the authors conducted interviews with 280 households whose land was acquired in industrial parks in Can Tho City, Tien Giang, Ben Tre, and Vinh Long in the Mekong Delta to apply and test the model.

2. Literature Review

2.1 Land Acquisition

Land acquisition means that the state government makes administrative decisions to recover land use rights or recover land assigned to organizations, People's Committees of communes, wards or townships manage [3]. According to the Asian Development Bank [4], land acquisition and displacement of people can cause serious deprivation and economic, social, and environmental damage if it is not a careful plan. To avoid or minimize project losses, land acquisition and resettlement cannot be avoided, and these plans should be planned and implemented as a development program.

2.2 Industrial Park

According to the Government of Vietnam [5], an industrial park is an area with defined geographical boundaries, specializing in manufacturing industrial goods and providing services for industrial production. An industrial park (also known as industrial estate, trading estate) is an area zoned and planned for the purpose of industrial development [6].

2.3 Factors Influencing Income Change of Household After Land Acquisition

According to the World Bank (2014) [7], income recovery is an important part of the land acquisition policy when the affected people lose their production, business, employment, or other sources of income. Income generation options include: (i) Direct credit for small businesses and self-employment; (ii) Building skills through training; (iii) Assist in finding opportunities in public and private enterprises; (iv) Priority is given to those affected in recruitment of workers related to project activities. In a broader sense, not only income but also sustainable livelihoods for those who have been injured by land acquisition. According to DFID (1999) [8], livelihoods include abilities, assets (including physical and social resources) and activities necessary to make a living.

Livelihood is sustainable when it is resilient, and it is resilient when it is impacted or can promote capabilities and assets both now and, in the future, while not undermining the foundation of resources natural [9]. Fig. 1, modified from the model of sustainable livelihoods [8], shows a policy of compensation and assistance for people whose land is acquired to create a sustainable livelihood when it affects their livelihood assets. Human, material, financial and natural resources combined with changing livelihood modes (Agriculture and non-agriculture) ensure increased income for people after land acquisition.

Research from Dinh Phi Ho & Huynh Son Vu (2011) [10] directly investigated 94 households whose land was acquired in Tan Phu Trung industrial park, Cu Chi district, Ho Chi Minh City, Vietnam to claim 6 factors that influence income changes of farmers after land acquisition, including education level of the household head, number of labors in the household, using compensation money to invest in production and business, family labors working in the industrial park, the proportion of dependencies and the area of land recovered. In addition, other studies discovered other

factors such as the gender of the household head [11]; the acquired land area for industrial zone development will offset increased income for households due to more efficient use of land due to industrialization [12, 13]; Changes in farmers' income after land acquisition are affected by the shortage of agricultural land for production and business, labor surplus in rural areas and instability in life such as education and employment [14-16]. Based on the abovementioned related research results, authors proposed the following hypotheses for this study:
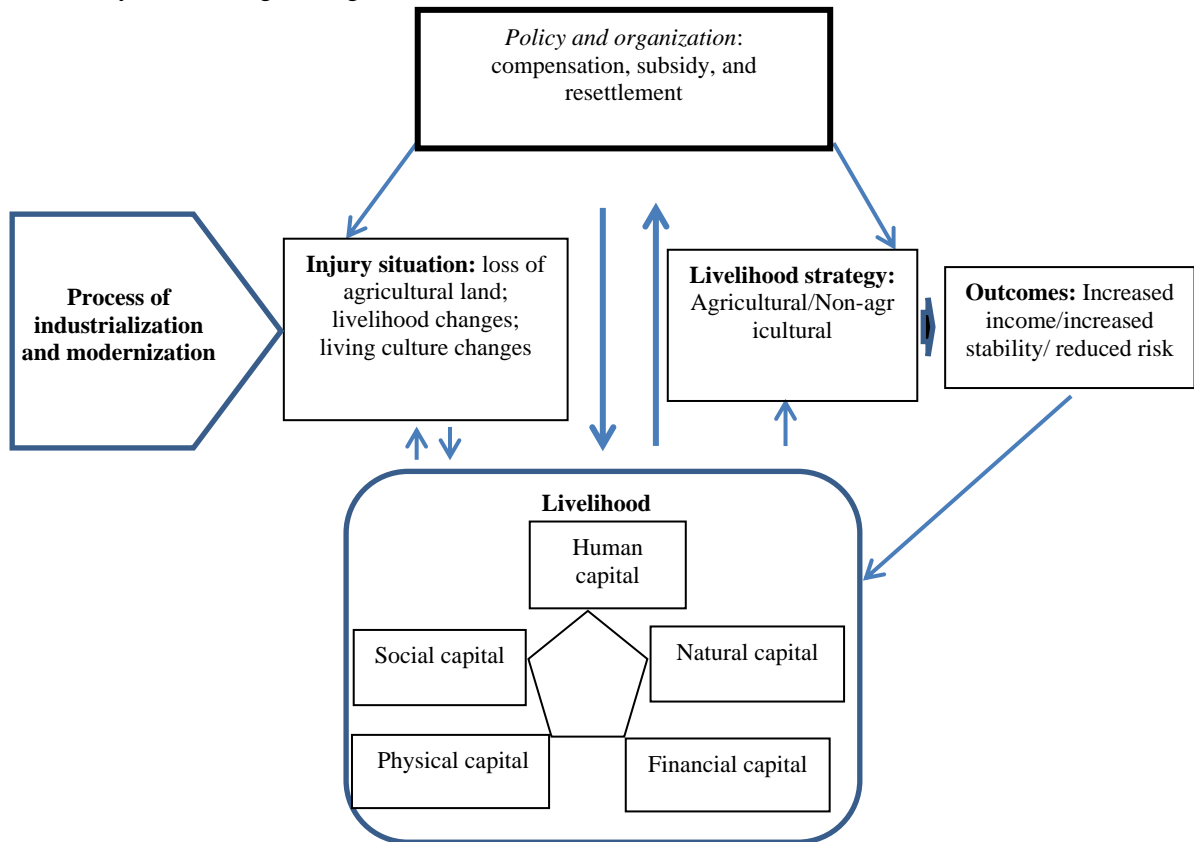

Fig. 1   Sustainable livelihood model [8].

H1: The educational attainment of the household head has positive impact on household's income after land acquisition income.

H2: There is difference in probability to improve income after land acquisition between a female head household and a male head household.

H3: Age of the household head has impact on the ability to increase income.

H4: Dependency ratio of household has negative influence on the ability to increase income.

H5: The more members of the households in the working age, the better the household income will be.

H6: The area of land to be acquired affects the ability of the household to improve income.

H7: If the household uses their compensation money for investment in production and business, their household's income will be better.

H8: The more household labors are hired to work in the industrial park, the better the household income will be.

H9: If the household can borrow money from formal financial institutions, the household more likely can improve their income after the land acquisition.

3. Research Models

A theoretical overview and empirical research are required for further research to expand the theory, provide more empirical evidence, and propose policy implications related to Changes in farmers' income after land acquisition. Previous studies highlighted the deep understanding of the effects of household' income and measurement of the relationships using different, and independent quantitative models such as linear regression, analysis of exploratory factors or separate regression models. However, they did not provide a complete basis for a comprehensive analytical framework of the possibility of income change. Therefore, this study expands the literature to the above extent by using the Binary Logistic regression model, evidenced from Mekong River Delta in Vietnam as followed:

Table 1 Definitions of variables and expectations.

Variables	Symbols	Measurement	Expectations
Dependent variable	Y (increase income)	Dummy variable, which takes value 1 when household income increases, and 0 if household income does not increase/decrease.	
Independent variables			
The educational attainment of the head of household	X1	Years of schooling of the head of household (Years)	+
The gender of the head of household	X2	Male = 1; Female = 0	+
Age of household head	X3	The number of years of age (Years)	+
Dependency ratio	X4	The ratio of the number of people outside the working age to the total number of people in the family (%)	-
Labor in the household	X5	Number of labors in the household (People)	+
The acquired land area	X6	Acquire agricultural and non-agricultural land (m^2)	-/+
Investment in production and business	X7	If the household uses the compensation money to invest in production and business after land acquisition, then X7 = 1; otherwise, X7 = 0.	+
Household labors are allowed to work in the industrial park	X8	X8 = 1 if the household has labor working in the the industrial park; and X8 = 0 if the household has no employees working in the IP.	+
Borrowing money from formal financial institutions.	X9	Yes = 1; otherwise = 0	+

4. Research Design

4.1 Quantitative Model

Form of the research model: Y = f(X1, X2,…,X9)

General form of the linear regression model:

$$Y = B_0 + \sum_{i=1}^{n} B_i X_i + u$$

Xi: Independent variables; Y: dependent variable; u: residuals.

According to Agresti (1996) [17], when the dependent variable is a dummy variable (Dummy variable, Y = 1; Y = 0), the appropriate model is the Binary Logistic regression model. In this study, the dependent variable is a dummy variable, the Binary Logistic regression model is applied in this study.

Thus, the appropriate model is the Binary Logistic regression:

$$Ln\left[\frac{P(Y=1)}{P(Y=0)}\right] = B_0 + B_1 X_1 + B_2 X_2 + B_3 X_3 + .. + B_9 X_9 \quad (1)$$

in which:

$P(Y = 1) = P_0$: The probability of a household after land acquisition is an increase in income (Income improve).

$P(Y = 0) = 1- P_0$: Probability of household after land acquisition is no income increase/same (Income not improve).

X_i: independent variables (i: from 1 to 12); Ln: Log of base e (e = 2,714).

Coefficient Odds (O_0):

$$O_0 = \frac{P_0}{1-P_0} = \frac{P(\text{Income improve})}{P(\text{Income not improve})} \quad \text{(Coefficient Odds)}$$

Substitute O_0 into the Eq. (1):

$$LnO_0 = B_0 + B_1 X_1 + .. + B_9 X_9 \qquad (2)$$

The Odds log is a linear function with the independent variables X_i [18].

Eq. (2) has the form of a Logit function, estimating the regression coefficients by the Maximum Likelihood (ML) method.

4.2 Data Collection and Processing

We conducted a survey of 280 observations in the 4 industrial Parks (IP) of 4 provinces/City from Mekong River Delta (Can Tho City: Hung Phu I parks; Ben Tre: Giao Long IP; Tien Giang: Tan My Chanh IP; Vinh Long: Hoa Phu IP).

The Convenient Stratified Sampling Method was conducted from April to September 2020. After the processing of the data, 240 observations were relevant and were used for data analysis. All data processing was carried out based on the SPSS 20.0 software. Data was collected through direct interviews with detailed questionnaires to test research models and hypotheses.

5. Results

In Fig. 2, the proportion of households with changes in income that did not increase or remained the same was quite high, with the lowest being 23% in Vinh Long, and the highest in Ben Tre 33%. In the overall sample survey, this rate is 27.8%.
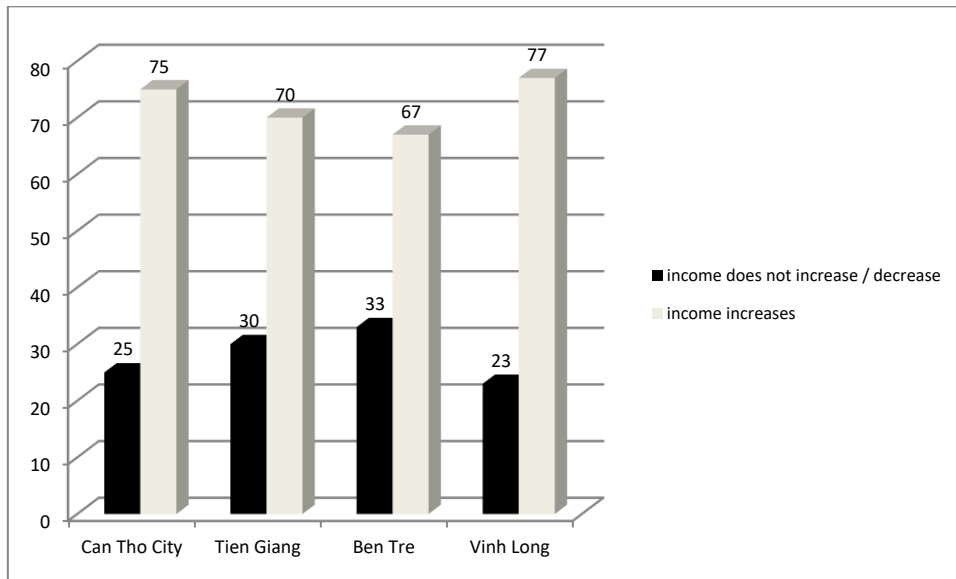

Fig. 2   Status of changes in income after land acquisition (%).

5.1 Descriptive Statistics

In Table 2, for the qualitative variables of the model, the variables "Borrowing money", "Using compensation money to invest in production and business" and "Household workers working in the industrial park" have the proportion of households who do not access is quite high, from 53% to 63%.

Data of these variables has the coefficient Skewness < 0 [19]. Thus, the distribution of the data is in the form of the normal distribution and is left-skewed. The variable "Sex of household head" shows that the percentage of household heads is male, accounting for more than 90%. The data of this variable has the coefficient Skewness > 0, the data distribution is in

the normal form and is deviated right.

In Table 3, for the quantitative variables of the model, the variable "Acquired land area" has a large difference between households and an average of 2763 m^2. Data for this variable have the coefficient Skewness > 0. Thus, the distribution is normal and right deviated. The variable "Number of employees in the household" has an average of 3. The variable "Age of head of household" has an average of 39 years and the variable "Educational attainment" is grade 6. Data for this variable has the coefficient Skewness < 0, distributing the data is in the normal and left-skewed form.

Table 2   Describe qualitative variables.

	Yes	No	Skewness
Borrowing money from formal financial institutions (%).			
	46.7	53.3	-0.134
Using compensation money to invest in production and business (%)	Yes	No	
	46.7	53.3	-0.151
The gender of the head of household (%)	Male	Female	
	90.4	9.6	2.763
Household labors are allowed to work in the industrial park (%)	Yes	No	
	36.7	63.3	-0.557

Table 3   Describe quantitative variables.

	Minimum	Maximum	Mean	S.D	Skewness
Acquire agricultural and non-agricultural land (m^2)	100	14,003	2762,97	2284,876	2.542
Labor in the household (People)	1	5	2.85	1.003	0.055
Dependency ratio (%)	0	40	17.40	18.317	-0.115
Age of household head (Year)	20	59	39.15	10.285	-0.416
The educational attainment of the head of household (Schooling year)	1	12	6.3	3.457	0.486

5.2 Regression Results

The Wald test shows that variable X2, X5 and X6 have Sig. > 0.05; The remaining 6 variables have Sig. ≤ 0.05. The sign of the regression coefficients is consistent with the hypothesis. R^2 Nagelkerke = 0.865. Therefore, 86.3% change of the dependent variables is explained by the independent variables of the model. The Omnibus test has Sig. ≤ 0.05. In general, the independent variables are linearly correlated with the dependent ones. Thus, the independent variables have a statistically significant impact on the variable Y "income improve" including: X1, X3, X4, X7, X8, X9.

Table 4   Regression coefficients.

	Coefficients (B)	Wald	Sig.	Exp(B)	95% C.I. for EXP(B)	
					Lower	Upper
X1	0.854	12.082	0.001	2.349	1.451	3.802
X2	1.667	1.722	0.189	5.298	0.439	63.894
X3	0.158	5.097	0.024	1.171	1.021	1.343
X4	-0.213	20.136	0.000	0.808	0.736	0.887
X5	0.678	0.823	0.364	1.969	0.456	8.514
X6	0.000	0.349	0.555	1.000	1.000	1.001
X7	5.771	10.868	0.001	320.907	10.382	9919.426
X8	3.468	6.751	0.009	32.068	2.344	438.681
X9	3.538	9.744	0.002	34.389	3.730	317.022
Constant	-16.905	4.970	0.026			
R^2 Nagelkerke	0.865					
Omnibus Tests (Sig.)	0.000					

In Table 5, the order of impact on the probability of a household after land acquisition is an increase in income from the highest to the lowest is as follows: X7 (use compensation money for investment in production and business); X9 (Borrowing money from formal financial institutions); X8 (the household has labor working in the industrial park); X1 (The educational attainment of the head of household); X4 (Dependency ratio); X3 (Age of household head).

Table 5   Degrees of impact of factors affecting income changes.

	B	E^b	P_1 (%)	Initial Probability P_0 = 10%	
				Change in probability	Position
X1	0.854	2.349	20.69786	10.69786	4
X3	0.158	1.171	11.51313	1.513126	6
X4	-0.213	0.808	8.238173	-1.76183	5
X7	5.771	320.907	97.27196	87.27196	1
X8	3.468	32.068	78.08513	68.08513	3
X9	3.538	34.389	79.25742	69.25742	2

Note: Assuming the initial probability of a poor household is (P_0), the probability that the household is poor will be Pi due to the effects of the variable Xi. According to Agresti (2007) [20], P_1 is defined as follows:

$$P_i = \frac{P_0 \times e^B}{1 - P_0(1 - e^B)}$$

5.3 Predicted Scenario for A Change of Income

According to Agresti (2007) [20], the predicted form of the model is:

$$E(Y/Xi) = \frac{e^{LnOdds}}{1 + e^{LnOdds}}$$

E (Y/Xi): Probability that Y = 1 occurs when the independent variable X has a specific value Xi.

$$LnOdds = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + .. + B_9X_9$$

$$E(Y/Xi) = \frac{e^{B0+B1X1+B2X2+B3X3+..+B9X9}}{1 + e^{B0+B1X1+B2X2+B3X3+..+B9X9}}$$

i: from 1 to 9

By excluding the variables which are not statistically significant, the results of the Binary Logistic regression model are shown in the Table 6 below. The coefficients are adjusted accordingly, we have an adjusted regression Eq. (2).

Table 6   Regression results (only significant variables).

	B	S.E.	Wald	Sig.	Exp(B)
X1	0.822	0.213	14.949	0.000	2.275
X3	0.119	0.051	5.398	0.020	1.126
X4	-0.194	0.036	29.259	0.000	0.823
X7	4.932	1.268	15.124	0.000	138.633
X8	2.731	1.054	6.711	0.010	15.347
X9	2.887	0.893	10.456	0.001	17.939
Constant	-9.144	4.218	4.699	0.030	

The regression equation of the model:

Y = -9.114 +0.822X1 + 0.119X3 – 0.194X4 +4.932X7 + 2.731X8 +2.887X9   (2)

In addition, to we conducted two forecast scenarios reported in the Table 7 below.

Scenario 1: Xi includes the independent variables with the lowest values

Substituting the Scenario 1 values into Eq. (2) results in LogOdds. If a household has the following conditions, it has a 0% probability of an "income improve". X1 = 1 (Years of schooling of the head of household (Years); X3 = 20 (Age of household head); X4 = 80 (Dependency ratio); X7 = 0 (Use compensation money for investment in production and business); X8 = 0 (the household has labor working in the industrial park); X9 = 0 (Borrowing money from formal financial institutions".

Scenario 2: Xi includes the independent variables with the best values

Substituting the Scenario 2 values into equation (2) results in LogOdds. If a household has the following conditions, it has a 100% probability of an "income improve". X1 = 12; X3 = 59; X4 = 0; X7 = 1; X8 = 1; X9 = 1.

Table 7 Forecast scenarios with the impact factors.

No	Variables	Regression coefficient (B)	Values of Variables	
			Scenario 1	Scenario 2
1	X1	0.822	1	12
2	X3	0.119	20	59
3	X4	-0.194	80	0
4	X7	4.932	0	1
5	X8	2.731	0	1
6	X9	2.887	0	1
12	Constant	1.844		
	LogOdds		-4.856	34.897
	$e^{LogOdds}$		0.007782	1430785515636480
	$1+e^{LogOdds}$		1.007782	1430785515636490
	P(Y/Xi): Probability that Y = 1 occurs is when the independent variable X has a specific value Xi (%).		0	100

6. Discussion and Policy Implications

Firstly, the study has identified 6 factors affecting income change, including: Investment in production and business; Borrowing money from formal financial institutions; Household labors are allowed to work in the industrial park; The educational attainment of the head of household; Age of household head; Number of labors in the household. This result aligns with that of Dinh Phi Ho & Huynh Son Vu (2011) [10] on income changes in Tan Phu Trung industrial zone, Cu Chi district, Ho Chi Minh City, Vietnam; Tran Tuan Nguyen et al. (2019) [16] on "Effect of Land Acquisition and Compensation on the Livelihoods of People in Quang Ninh, Vietnam".

Secondly, the study has identified the impact level of each factor from the strongest to the weakest. Use

compensation money for investment in production and business; Borrowing money from formal financial institutions; the household has labor working in the industrial park; the educational level; Age of household head; Dependency ratio.

Results of this study imply that in order to increase income as follows. Using compensation money to invest in production and business: when distributing compensation money to people, the government should organize seminars or consultation sessions on occupations, fields of production, business Which are suitable for in the area so that people, after receiving the compensation, have a way to use this money appropriately, avoiding the situation like in the past, they only focused on consumption and building houses. Borrowing money from formal financial institutions: Credit plays the role of creating

conditions for people to implement a new livelihood and contribute to increase income. When doing land acquisition for industrial zones development, Government should be considered, combined with a credit system to advise, and support investment projects for production and business to ensure households less risk and increase income after acquisition land. Household labors working in the industrial park: The problem of employment of workers after land acquisition will fluctuate greatly and are full of risks looking for new job opportunities, and it directly affects the life of the household. Therefore, the government should pay attention to providing free vocational training for the workforce in the project affected area, especially for the number of labors who must change jobs due to reduced agricultural land, and to introduce jobs to them so that they have opportunities to find jobs. There should be a policy to force the investor to recover land for project implementation, when recruiting employees, there should be a policy to prioritize the recruitment of the number of employees from families whose land is acquired. The educational level: The government should encourage and facilitate people to go to school, especially for households whose land is acquired. The current situation of the households whose land is acquired in the industrial zone besides those with increased incomes, they have good conditions for their children to go to school. However there also are many households fall into the hard condition due to the lack of agricultural land for production and inadequate use of compensation money in taking care of their family's education. Therefore, to contribute to stabilizing and improving the household's income, one solution should pay attention to tuition fee exemptions and reductions for children of poor families. Dependency ratio and age of household head: It will be very difficult for households to settle into a new life when a household with a lot of labors is unable to work. When implementing land acquisition projects, it is advisable to cooperate with organizations — unions

to have social support plans for households after land acquisition. The greater the age of the head of household, the higher the possibility of income growth after land acquisition. Therefore, it is advisable to pay attention to young household heads in consulting the implementation of production-business investment projects when implementing land acquisition projects.

This study aims at expanding the theoretical framework and providing evidence in empirical results on changes in farmers' income after land acquisition in the Mekong Delta, Vietnam. The findings highlight the very important role of factors affecting changes in farmers' income through the Binary Logistic regression model. There have been certain limitations in this research. The data were collected only from one region in Vietnam that limits the external validity of the study. We suggest further study should apply for more regions at the same time to tackle this limitation. Furthermore, this study only looks at 9 factors affecting changes in household's income, meanwhile there are other factors which have not been mentioned in this research.

References

[1]   Economic Zone Management Department, Ministry of Planning and Investment, Foreign investment attraction in Vietnam, 2021, available online at: https://fia.mpi.gov.vn/Detail/CatID/457641e2-2605-4632 -bbd8-39ee65454a06/NewsID/ac0c9077-fb5b-4521-b37e -00c1a8380de8/MenuID.

[2]   Dinh Long, Leaving farmers to be shallow but disgruntled, People's Deputies, Voice of Congress, Forum of National Assembly deputies, People's Councils and Voters, 2010, available online at: http://daibieunhandan.vn/default.aspx?tabid=75&NewsId =39917.

[3]   National Assembly of the Socialist Republic of Vietnam, Land Law 2003, 2003, available online at: https://www.google.com/search?q=National+Assembly+ of+the+Socialist+Republic+of+Vietnam.

[4]   ADB (Asian Development Bank), *Handbook on Resettlement*, 1995, available online at: http://www.adb.org/Documents/Translations/Vietnamese/ Resettlement_Handbook_VN.pdf .

[5]   Government of Vietnam, Decree No. 29/2008/ND-CP dated 14 March 2008, Regulation on Industrial Zones,

Export Processing Zones and Economic Zones, 2008, available online at: https://m.thuvienphapluat.vn/van-ban/doanh-nghiep/Nghi-dinh-29-2008-ND-CP-khu-cong-nghiep-khu-che-xuat-khu-kinh-te-64162.asp.

[6]   Wikipedia, Industrial park, 2019, available online at: https://en.wikipedia.org/wiki/Industrial_park.

[7]   Work Bank, Involuntary resettlement source book planning and implementation in development projects, 2014, available online at: http://www-wds.worldbank.org/external/default/WDSContentServer.pdf.

[8]   DFID (Department for International Development), Sustainable Livelihoods guidance sheets, 1999, available online at: http://www.nssd.net/pdf/sectiont.pdf.

[9]   T. Hanstad, R. Nielsen and J. Brown, Land and livelihoods- Making land rights real for India's rural poor, Rural Development Institute (RDI) USA, 2004, available online at: http://www.fao.org/docrep/007/j2602e/j2602e00.htm.

[10] Dinh Phi Ho and Huynh Son Vu, Changes in people,s income after land acquisition for industrial park construction: Influencing factors and policy implications. *Economic Development Journal* 249(2011) 35-41.

[11] Nguyen Minh Thuan, Duong Ngoc Thanh and Nguyen Thanh Nghiep, Factors affecting income of farmers after land acquisition for construction of industrial zones in Vinh Long province, *Can Tho University Journal of Science* 54 (2018) (4) 80-90.

[12] Hoang Van Cuong, Pham Phu Minh and Van Thien Hao, Solutions for sustainable development of the industrial parks in the next years, Vietnam Industrial Parks, 2017, available online at: http://khucongnghiep.com.vn/en/tabid/129/articletype/ArticleView/articleId/1798/default.aspx.

[13] H. Anwarul, Land use and land acquisition law in India, Working papers, Indian Council for research on International Economic Relations, 2018, available online at: https://icrier.org/pdf/Working_Paper_361.pdf.

[14] Word Bank, Resettlement action plan, Working Paper, SFG3292, 2016.

[15] Thi Ha Thanh Nguyen, Van Tuan Tran, Quang Thanh Bui, Quang Huy Man and Timo de Vries Walter, Socio-economic effects of agricultural land conversion for urban development: Case study of Hanoi, Vietnam, *Land Use Policy* 54 (2018) 583-592.

[16] Tran Tuan Nguyen, Gábor Hegedus and Tien Long Nguyen, *Effect of Land Acquisition and Compensation on the Livelihoods of People in Quang Ninh District, Quang Binh Province: Labor and Income*, Land, Licencee MDPI, Basel Swistzerland, 2019.

[17] A. Agresti, *An Introduction to Categorical Data Analysis*, John Wiley and Sons, New York, 1996.

[18] D. R. Cox, *Analysis of Binary Data*, London: Chapman & Hall, 1970.

[19] R. D. Mason, *Statistical Techniques in Business and Economics* (10th ed.), Mc Graw-Hill, 1999.

[20] A. Agresti, *An Introduction to Categorical Data Analysis*, A John Wiley & Sons Pubplication, 2007.