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What motivates farmers' decision to organic farming conversion: The case of conventional mango farming in Vietnam

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C H R O N I C L E

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A B S T R A C T

This research is aimed at analyzing perception and identifying determinants of the decision to convert to organic mango farming in Mekong Delta (MD) Vietnam. The research was conducted by using a direct survey data set from 109 household heads in this region collected by stratified random sampling method. The research method used was descriptive statistics and the binary Logit model. The research results revealed some interesting points. In the total observations gathered, only about half of households decided to convert, mainly due to local implementation and awareness of safety for consumers and environmental protection. Still, the most important reason for farmers to convert was to get a higher selling price. The binary Logit model analyzing the determinants found that the older the farmer, the more difficult it is to decide to convert. At the same time, training and enhancing awareness about organic farming will increase the probability of conversion decisions. Based on the research results, several relevant solutions on investment, production linkage, and propaganda to raise people's awareness were recommended, thereby increasing the probability of deciding to convert.

1. Introduction

In recent years, many countries around the world have embarked on the organic farming revolution with many outstanding advances. The world's leading countries in organic farming include India, Mexico, Australia, Argentina, China, Germany, the United States, and Spain. Of these, Australia is the country with the largest organic farming (35.6 million hectares), followed by Argentina (3.4 million hectares) and China (3 million hectares) (World Bank, 2023). Europe is also showing a positive trend with 14.6 million hectares of land currently dedicated to organic production. In addition to the common benefits of organic farming in protecting the health and the environment, a report by the International Federation of Organic Agriculture Movements (IFOAM) states that organic farming also plays a role in mitigating climate change, serving the global sustainable development goals (SDGs) of the United Nations. The Mekong Delta of Vietnam is one of the largest and most fertile deltas in Southeast Asia, the largest food production and export region, and the largest tropical fruit growing region in Vietnam with a natural area of 4,092.2 thousand hectares, of which 2,575.2 thousand hectares of land is used for agricultural production, accounting for 62.9% of the total natural land area of the whole region (General Statistics Office, 2023). Vietnam is the 13th largest mango producer in the world with a total mango growing area of 87,000 hectares nationwide. Since 2005-2006, this region has focused on investing heavily in the mango industry. Specifically, from investing in technical infrastructure, flood control dyke systems, and improving crop varieties to producing according to GAP standards, forming specialized areas. However, in recent years, the mango industry has faced many challenges in terms of quality, preservation, processing technology or technical barriers, standards to meet domestic and export requirements. Although traditional mango cultivation is still highly effective, currently most mangoes are consumed domestically, Vietnam only exports 4% of total output, so Vietnam has not yet accessed demanding and potential markets. Even in the production activities of the fruit industry from the beginning of 2023 until now, mango is also one of the product groups that has decreased sharply. In the first quarter of 2023 alone, the mango group had an estimated export turnover of

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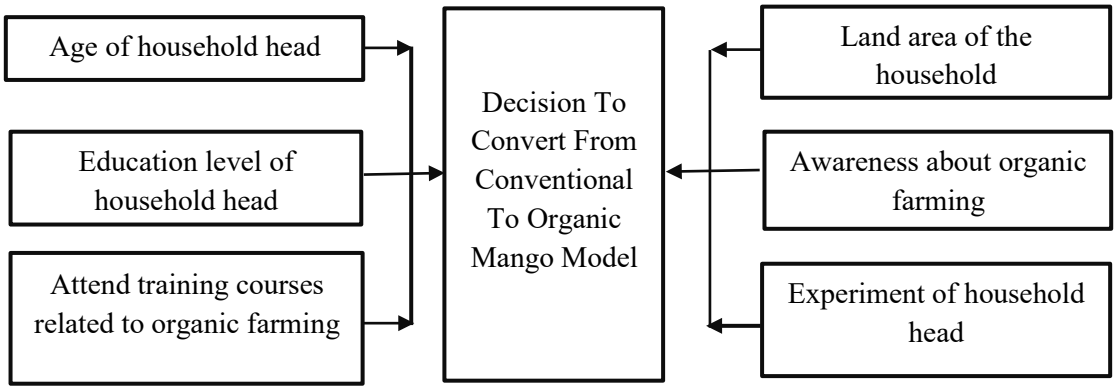
more than 55 million USD, down more than 44% compared to the same period last year (Vietnam Ministry of Agriculture and Rural Development, 2023). Especially in the era of complicated epidemics, with countless new diseases, the demand for products of organic origin is inevitable. Based on the above practices, the right direction is to study the conversion of mango cultivation towards organic, to meet the requirements of the domestic and world markets. Therefore, the research was conducted to point out the factors affecting the willingness to convert to the organic model of mango farmers in Dong Thap province is extremely necessary. Therefore, the main research objective of the study is to analyze the factors affecting the willingness to convert to the organic model of mango farmers in the Mekong Delta (MD), thereby providing suggestions to help people overcome difficulties in the process of converting farming models, developing high-value, sustainable, environmentally friendly organic agriculture to serve consumption in the province, domestically and for export. In addition, it also provides more information for managers to establish policies and solutions to orient the development of agricultural production in the locality to achieve higher efficiency, especially in line with the Sustainable Development Goals (SDGs) of the United Nations.

2. Literature review and proposed model

Previous research on factors that change agricultural cultivation or factors that influence the decision to change in economic and social issues is a topic that many researchers are interested in recently (Drost et al., 2004; Ashfaq et. al, 2008; Geier, 2007). In which, they all point out the factors that affect the decision to change farmers and/or the factors that affect the behavior of not changing. Along with that, previous research proposes solutions to improve productivity, quality as well as income for farmers. In fact, the goal of production in general and agricultural production in particular and socio-economic development is to meet the increasing material and spiritual needs of the whole society when natural resources are limited (Khong Tien Dung, 2022). Thereby, there are many studies on the effectiveness of the change. Research by Khong Tien Dung (2020) on financial efficiency and willingness to convert to organic rice model of farmers in the Mekong Delta analyzed the production status as well as the financial efficiency of the traditional rice production model and the organic rice model. This author also analyses and compares the production situation and financial efficiency of the two traditional and organic rice growing models. Although the cost of the organic model is higher than the traditional model, when comparing the revenue, the organic model's efficiency is higher than the traditional model, and participating in the organic model helps farmers have a higher selling price of rice than the traditional model. Nguyen Ngoc Thuy et al. (2021) found that conversion of crop structure is also decided based on the ecological conditions of the conversion area. In addition, Mekong Delta has a favorable ecological climate for the conversion of crop structure, demonstrated in practice through a number of successful conversion models that bring economic efficiency and income, improve farmers' lives, and contribute to increasing income per unit area. The transformation of agricultural production structure is a process of agricultural production in both breadth and depth, the direction of agricultural development according to the needs of the market economy is a process of building and perfecting according to institutions. According to Nguyen Thuy Trang (2016) in the research about evaluation of economic efficiency, environment and risks of the conversion model from sugarcane to shrimp in Soc Trang and Hau Giang provinces. Although the investment cost of the shrimp farming model is higher than the investment cost of the sugarcane growing model. However, the profit of the shrimp farming model is 17.3 times higher than that of the sugarcane growing model. In brief, previous studies mostly focused on influencing factors or factors affecting decisions or behavior, besides, the studies are diverse in content as well as knowledge. Most of the studies on factors for converting crop structure towards improving financial efficiency. Referring to research works related to converting production models shows that there are many advantages affecting the conversion of production models of farmers, each research has different influencing factors but has a common result because the profit of the model contributes to increasing income for farmers. There are very few studies on the willingness to convert to organic mango growing model, especially focusing on the behavior of the key stakeholder - farmer. Based on the review of previous research and behavioral theory, this research is aimed at clearly indicating the determinants of farmers to convert to organic mango farming and propose solutions to increase the probability of farmers deciding to agree to convert to this model.



Source: Proposed by authors, 2023

Fig. 1. Model of farmers' decision to convert

3. Data collection and data analysis approach

3.1 Data collection approach

In order to determine the sample size required for the survey, this research employed the sample size formula by Harris (1985), Cochran (1977), Cameron (2010), in which n ≥ 50+m, where n is the number of observations needed to be determined and m is the number of independent variables including in the model. With 6 independent variables, based on the above formula, the minimum sample size is calculated to be 56 observations. However, the number of samples that the author actually conducted the survey was 109 observations. After selecting representative research points for each district, the survey sample was selected using the stratified random sampling method.

3.2 Data analysis approach

Suppose the information we need to collect about the dependent variable is whether an event occurs or not, the dependent variable Y now has two values 0 and 1, with 0 being that the event we are interested in does not occur and 1 being that it does occur, and also information about the independent variables X. We will estimate the probability of event Y occurring (probability) when we know the value of X. The dependent variable Y has two values 0 and 1. From this, we can assess the probability of the event occurring (Y=1) if the predicted probability is greater than 0.5, conversely, the probability of the event not occurring (Y=0) if the predicted probability is less than 0.5.

Study the Logistic function model in the simplest case when there is only one independent variable. In this formula E(Y/X) is the probability that Y=1 (the probability that the event occurs) when the independent variable X has a specific value of Xi. The expression (B_0+B_1X) is denoted by z, then the Logistic model as follows:

$$P\ (Y=1) = \frac{e^z}{1+e^z}$$

So the probability of the event not occurring is P (Y=0) = 1 – P (Y=1) = 1 - $\frac{e^z}{1+e^z}$

Compare the probability of an event occurring with the probability of the event not occurring, this difference can be expressed in the formula:

$$\frac{P(Y=1)}{P(Y=0)} = \frac{\frac{e^z}{1+e^z}}{1-\frac{e^z}{1+e^z}}$$

Take the Log base e on both sides of the above equation and transform the right side to get the result result:

$$log_e = \left[\frac{P(Y=1)}{p(y=0)}\right] = log_e.e^e$$

Since $log_e\, e^e = z$, the final result is:

$$log_e\left[\frac{P(Y=1)}{P(Y=0)}\right] = B_0 + B_1X$$

In which Y is the dependent variable representing the decision to convert the crop structure. If Y=1, the household converts to the organic farming model. If Y=0 does not convert to organic farming model, Xi are independent variables, the factors affecting the decision to convert to organic farming. The selection of Xi factors is based on the results of household survey at the time of research.

Odds ratio:

$$\text{Odds} = \frac{\text{P0}}{1-\text{P0}} = \frac{\text{P(Probability of participating in organic farming)}}{\text{P(Probability of not participating in organic model)}}$$

From the data collected through 109 observations, we conduct regression analysis as follows:

$$\text{Ln(Odds)} = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \cdots + \beta_k$$

Then, the influencing factors and expectations are presented in Table 1 as follow.

Table 1
The determinants of farmers decision to convert to organic farming

Variable name	Unit	Description	Expected sign
Age	Year	Age of household head influences the decision to convert	-
Education level	Year in school	Number of years in school of household head (key producer) has a positive influence on the decision to be willing to convert	+
Training	1=Yes; 0=No	Participation in training has a positive influence on the decision to be willing to convert farming model	+
Area	1,000m^2	Total cultivated area of the household is expected to has a positive influence on the decision to be convert	+
Perception	1=Know; 0=Do not know	Farmers' awareness of organic farming	+
Experient	Year	Farmers' experience in participating in agricultural production.	+

Source: Survey data, 2023

4. Results and Discussion

4.1 Socio-demographic characteristics of the respondents and financial indicators results of conventional farming model

The findings reveal that the youngest age of the household head is 30 and the oldest at 77, with an average age of 55. The proportions of households aged 51-60 and over 60 years old accounts for 63.3% (51-60 years old is 36.7%, over 60 years old is 26.6%), this is the group of households with stable families but their health has gradually declined so they are comfortable with the current mango growing profession. The group of households with stable families, good health and production experience (41-50 years old) accounts for 33.33%, the lowest is the group under 40 years old (4.5%). The analysis results show that most household heads have attended school. Of the households that studied from grade 1 to grade 5, 14 households studied in grade 5, accounting for the highest proportion of 12.84%, and the lowest was 0 households that studied in grade 1. Of the households that studied in grade 2 (from grade 6 to grade 9), 21 households studied in grade 6, accounting for the highest proportion of 19.26%, and 3 households studied in grade 7, accounting for the lowest proportion of 2.75%. For grade 3 (from grade 10 to grade 12), 15 households studied in grade 10, accounting for the highest proportion of 13.76%, and 4 households studied in grade 11, accounting for the lowest proportion of 3.67%. In addition, no households head to the level of secondary school, college, or university. The education level of the household head shows that in the field of mango production, most mango production workers have a bit low education level. In general, the survey illustrates that households with a cultivation area ofless than 5,000m2 have 49 households, accounting for 44.96% of the total number of households. The cultivation area from 5,000m^2 to 10,000m^2 has 55 households, accounting for 50.46%. The group of households with an area of 11,000m^2 or more has 5 households, accounting for the lowest proportion of 4.6% of the total number of households. The survey also shows that households cultivate on a small area and use their own land for cultivation. The findings reveal that the number of households participating in the main production that participated in the training course accounts for 55.05%, including 60 households in total. The number of farmers who did not attend the training course accounted for 44.95%, including 49 households in total. The survey results showed that farmers with less than 10 years of mango production experience accounted for 23.85% with 26 households. Moreover, households with 11-20 years of production experience accounted for the highest proportion of 46.79% with 51 households. Experience from 21-30 years had 28 households, accounting for 25.69%. For farmers with 31-40 years of mango growing experience, the lowest proportion was 3.69% with 4 households in total. Most of the farmers had quite a lot of production experience but only relatively high mango growing experience. Most of the farmers had recently switched from rice to mango growing due to the local call and for convenience in production and consumption. Regularly changing farming is extremely difficult and requires a long time for crops to adapt to the environment and unfavorable natural conditions. The socio-economic characteristics of the household owner mentioned above show that changing and influencing the decision of the household will be quite difficult, however, policy makers can rely on the results of the following model to propose appropriate strategies.

Income from mango growing activities

Table 2
Comparison of average income from two mango crop in year

Indicators	Unit	Crop		Diff.
		1	2	
Revenue (1)	1,000 VND	12,588,802.0	6,734,700	5,854.102***
Expenses (2)	1,000 VND	6,213,487.46	5,498,734.06	714,753.4***
Profit (without family labor cost) (3)	1,000 VND	6,375,314.54	1,235,965.94	5,139,348.6***
Profit (with family labor cost) (4)	1,000 VND	4,936,037	-151,238	666,275***
Salary/day of family labor	1.000 VND/day	1,746,337.15	353,133.13	1,393,204.02***
(1)/(2)	Times	2.02	1.22	
(3)/(2)	Times	1.02	0.22	
(4)/(2)	Times	0.79	-0.02	

Source: Survey data, 2023
Note: ^{ns} is no difference in significance level;, **, ***: difference in significance level 10%, 5%, 1%*

Table 2 shows that the average income of crop 1 is nearly 6.3 million, crop 2 is nearly 1.1 million VND. This difference is mainly due to the difference in selling price and productivity between the two crops. In each crop, the difference in income between households is also quite high. No household suffered a loss in crop 1. In crop 2, 28 households did not cultivate because the cost of cultivation was higher than the revenue achieved, so the farmers decided not to cultivate or the farmers did not invest when the mango was in the harvestable stage (the mango stage from 30-35 days old is the stage that requires a lot of investment in fertilizer and pesticides and starting to bag the fruit), high labor costs, scarcity of hired labor and difficult output, so not cultivating crop 2 is a safe option during the epidemic period. 35/81 households suffered losses when cultivating the second crop.

When looking at the financial indicator's evaluation, three indicators were performed and the details as follow:

Income per family labor ratio: In the study area, if a household uses one day of family in crop 1, it will earn 1.75 million VND/workday. Crop 2 earns nearly 353 thousand VND/workday. We can see that the income in crop 1 is about 1.4 million VND higher than crop 2. In general, in both crops, the income that farmers earn per day of work is not too high. This income will be the motivation and basis for farmers to decide to continue working on their land. However, in reality, some households with less cultivation will work for households with larger cultivation areas or do other jobs to earn extra income. On the other hand, the number of working days in a crop is also relatively less, most of the farmers have no work to participate in.

Revenue per cost ratio: This ratio shows how much a household earns for each dong spent. This ratio partly reflects whether the money that farmers spend to invest in production activities is effective or not. This ratio is higher in crop 1 than in crop 2. Specifically, in crop 1, one VND spent is earned 2.02 times while in crop 2 one VND spent is earned 1.22 times. Although crop 2 has a low ratio, in general, these ratios show that the investment cost for mango cultivation is also effective. Due to the differences in costs and revenues of households as presented, the revenue/cost ratio between households also fluctuates greatly. Although this index shows that the financial efficiency of mango growing is quite high, the magnitude of household income is not high because the average cultivated area per household is relatively small (5.73 hectares/household). With an income of about 353 thousand VND/hectare in the second crop, the average income of each household with an area of about 5.73 hectares/ha is about 2 million VND/household/crop. That is the income for about 5-6 months of the crop. This income level is relatively low compared to the income from labor in the industrial sector. This will be the motivation for the shift of labor from rural to urban areas.

Profit (with family labor cost): This index shows how much income a household will receive for every 1 dong of cost spent. Statistics show that the income/cost index of crop 1 is 1.02, meaning that when a farmer spends 1 VND of cost, the farmer will earn 1.02 VND of income. Similarly, in crop 2, when a farmer spends 1 VND of cost, the farmer will earn 0.22 VND of income.

Profit (without family labor cost) ratio: this ratio reflects the efficiency of mango growing activities, this index shows how much profit a farmer will gain for every 1 VND of cost. In crop 1, this index is 0.79, when a farmer spends 1 VND of cost to produce, the farmer will earn 0.79 VND of profit, in crop 2, this index is -0.02, meaning that when spending 1 VND of cost, the farmer will lose 0.02 VND.

4.3 Farmers' perception of organic mango farming

Faced with the trend and demand for clean, sustainable production associated with environmental protection. Vietnam government has promoted many activities towards the use of safe organic products through propaganda sessions, conference, and technical trainings related to organic production models to promote clean production by farmers. Through these activities, farmers aim to be more aware of the appropriate use of pesticides and fertilizers for mango trees. In addition, it is necessary to grasp the aspirations of farmers about the need to convert farming to suit the current trend. Through the analysis results of 109 households, it shows that the majority of farmers are willing to participate in the organic mango model. Out of 109 households, 56 households are willing to participate in the organic mango model, accounting for 51.38% of the total. However, there are 53 households that do not participate in the model, accounting for 48.62% of the total. The reason why households are not willing to participate in the model is because they are familiar with the traditional mango farming model.

Reasons of farmers'decision to convert into organic farming

Agricultural farming in the direction of food safety and environmental protection is no longer strange to farmers in the surveyed area, most of the farmers have been implementing clean and safe farming for a long time, some of which have also prepared to convert every day so that the mango trees can easily adapt to the change. The reason why many farmers choose to participate in the organic model is to sell at a high price, with 57/57 choices, in fact the selling price of 1kg of organic mango can be twice as high as the price of traditional mango. During the 2021 covid epidemic, although the price of traditional mangoes decreased significantly compared to previous years, the price of organic mangoes remained stable

or even unchanged, the reason is that some organic mango farmers signed purchase and sale contracts with businesses, so the price was stable, on the other hand, there are still limitations in the issue of signing consumption contracts that have not been widely popularized because the harvest quantity has not been synchronized. Implemented and introduced by the locality, 53/57 were selected. In large-scale mango growing areas, local officials are often more interested, in addition, households participating in affiliated organizations often have officials who regularly implement new state policies, implement future agricultural production plans, so most of the households in the research area are implemented and introduced by the locality about the organic farming model. Safe for consumers with 47/57 farmers choosing and protecting the environment with 36/57, organic mango farming in particular as well as organic farming in general has become popular in recent years.

Findings also reveal that not only farmers want to convert to organic mangoes but also want to convert to many other types of fruit trees, not only because they care about the health of consumers but also the health of their families. Unlike rice production, mangoes are grown in gardens, even on the land where the farmers live, frequent exposure to chemicals has a significant impact on the health of family members. Participating in the movement was chosen by 2 farmers, low conversion costs were chosen by 1 farmer and stable output was not chosen by farmers. Through that, it can be seen that farmers in the research area are aware of the benefits that the organic farming may provides.

4.3 Binary Logit model results

Aiming for sustainable organic agriculture, creating high-quality agricultural products, valuable, safe for human health and protecting the environment, farmers need to promote farmers towards organic production models. Meanwhile, biological pesticides and organic fertilizers are safer, less toxic and beneficial to the environment, decompose quickly in nature, do not affect biodiversity in the agricultural ecosystem, and leave little residue in agricultural products. Binary logit regression model results are discussed below.

Before performing the Logit model, this research tested the existence of multicollinearity. The test results found that the mean VIF value of 1.56 < 10, showing that there is no multicollinearity in the model. In addition, by testing the existence of heteroscedasticity in order to conclude whether the model has heteroscedasticity or not, the study uses the Breush – Pagan test. The test results find that the value Prob>chi2 = 0.80 > the value α. Thus, there is no heteroscedasticity in the model. Finally, to test whether the model has a correlation or not, the study uses the correlation matrix and the test result shows that there is no autocorrelation in the model.

Table 3

Factors influencing the decision to participate in the organic model

Variable	Coef.	Marginal effect (dy/dx)	Std. Err.
Age	-0.230	-0.057***	0.015
Education level	-0.015	-0.003^{ns}	0.032
Training	2.040	0.450***	0.136
Area	-0.093	-0.023^{ns}	0.028
Perception	2.099	0.44*	0.173
Experient	0.140	0.003^{ns}	0.016
Obs: 109			
LR chi^2 = 89.91			
Prob>chi^2= 0.0000			
Pseudo R^2 = 0.5959			

Source: Survey data, 2023

Note: *, **, ***, ^{ns} are statistical significance levels at 10%, 5%, 1% and not statistically significant, respectively, standard error in parentheses

The results of the binary Logit regression reveal that Prob>chi2=0.0000, indicating that the model is statistically significant at the 1% level. The Pseudo R2 coefficient of the model is 0.5959, meaning that the independent variables explain 59.59% of the change in the dependent variable. The analysis results show that out of the 6 independent variables included in the model, 3 variables have an impact on the decision of farmers to participate in the organic model.

First, the analysis results show that the age variable is statistically significant at the 1% level with a negative coefficient of -0.23, indicating that the age variable has a negative impact on the decision of farmers to participate in the organic model. The average age of the main producer is over 55 years old, the older they are, the more reluctant they are to learn new science and technology, at the same time, the time to convert from traditional mango to organic mango model takes 3 to 4 more years for mango to adapt, farmers do not have enough time and health to expand cultivation and convert the model. The coefficient of this variable is -0.23, meaning that age has a negative impact on the decision to convert, if the farmer increases by 1 year, the possibility of the farmer deciding to convert to the organic model will decrease by 23% under the condition that other factors remain unchanged. Education level has a negative relationship because the marginal impact value is negative. However, the education level variable is not statistically significant. Thus, people with high education

levels are aware that investing in the organic model is more risky than farming according to the traditional model and they have a stable income from growing traditional mangoes, so they do not want to participate in the organic model.

Second, the analysis results show that the training variable is statistically significant at the 1% level with a coefficient of 2.040 and has a positive sign, indicating that the training variable has a positive impact on the decision to participate in the organic model and is consistent with the research model. When participating in training, it brings many benefits to farmers, farmers are no longer confused when considering the conversion, farmers will be provided with information about the benefits, techniques and measures to improve the farming situation, helping farmers intend to convert to the organic model. If other factors remain unchanged, when farmers participate in a training class, it is expected to increase the possibility of converting to organic mango farming by 204%. About the area variable, the analysis results show that the coefficient of the variable is not statistically significant, the fact that farmers have a large farming area does not mean that they want to convert to an organic model. Households with large areas when synchronously changing farming have a higher level of risk, a longer conversion time, and more labor, so in reality, farmers will still be afraid of converting. Therefore, this variable does not affect the probability of participating in the organic model of the household.

Third, a household that knows information about the market will increase their decision to convert farming. The results of the variable show that it affects the decision to convert the model at a significance level of 10%. When assuming other factors remain unchanged, the marginal impact of the variable of information awareness affects the conversion of the production model of the household in a positive direction. When the household knows information on the market, the probability of deciding to convert is 209%.

Finally, analysis results also shown that the experi coefficient of the variable is not statistically significant, the fact that farmers have a lot of production experience does not affect their decision to convert, because they have been farming for a long time and stably, so changing something new requires updating and learning every day, with the characteristics of farmers being afraid of change, so this variable does not affect the probability of participating in the organic model of the household.

5. Conclusion and Recommendations

In conclude, the survey indicated that out of 109 households, 52 households agreed to convert to the organic model. However, 57 households decided not to convert. The survey results showed that the majority of farmers did not decide to convert to the organic model because they did not know about the technique, it was difficult to find an outlet for their products, the investment cost was high and their age did not allow it, so farmers were reluctant to convert. Farmers who decided to convert to the organic model were farmers who were interested in the conversion decision because the selling price of organic mango was higher, it was safe for consumers as well as safe for their own families, and finally, they were encouraged by the locality to convert. The Logit model was applied to determine the factors affecting the conversion of farmers and showed that three factors directly affected the conversion, including age, training and awareness of the impact on the conversion to the organic model. In addition, the research also shows that some factors are not statistically significant, including education level, area and experience.

Based on the research results, the author proposes some solutions to promote the decision to convert the farming model for mango trees as follows: (1) Regarding investment: Expand the scale of production according to quality standards on the basis of linking with consumers. This solution aims to increase the output of high-quality mangoes to meet market demand. Increase investment in quality organic fertilizer production facilities, avoid the production of low standard quality organic fertilizers that affect the quality and quality of mangoes. Strengthen the construction of a market information system to provide information on techniques, economics, weather and input and output markets for actors participating in the production linkage model. (2) Regarding the reorganization of production linkages (i) cooperatives, guilds and cooperative groups consolidate and expand the specialty mango growing areas, continue to improve the land, convert traditional mango production areas to organic mango production, with large output to ensure export demand. Link more mango production and consumption cooperatives strong enough to contribute to price stabilization and protect farmers' rights, (ii) promote the collective economy well. Implement policies to improve the collective economy, it is necessary to support policies on taxes, capital, and training in technical management skills for cooperatives, guilds and cooperative groups that operate effectively. (3) Regarding creating incentives form farmers: (i) focus on encouraging enterprises to research technology, organize production, and supply organic fertilizers with large output and high prices for farmers, (ii) there are forms of propaganda and mobilization to raise people's awareness of the inevitable requirement to use organic fertilizers for sustainable agricultural development so that they actively change production methods, use organic fertilizers instead of chemical fertilizers and prioritize the consumption of organic agricultural products. Encourage farmers to promote the spirit of cooperation, support each other in techniques, overcome the consequences of weather and natural disasters to minimize risks in production.

Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Author Contributions

Tien Dung Khong designed the study questionnaire, collected and analyzed the data, and drafted the article. Bui Le Thai Hanh made critical revisions to the article. Tien Dung Khong and Huynh Thi Dan Xuan drafted the article. All authors read and approved the final article.

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Data Availability Statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

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