Factors Affecting the Household Succession in Agricultural Occupation in Nakhon Ratchasima Province, Thailand

Chacattrai Rayasawath

Faculty of Humanities and Social Sciences, Nakhon Ratchasima Rajabhat University, Nakhon Ratchasima 30000, Thailand; chacattrai.r@nrru.ac.th or rayasawath@gmail.com; Tel.: +66-973-278-855

check for updates

Abstract: This research aims to determine the factors affecting the succession of youths from farming households in agricultural occupations within Nakhon Ratchasima Province, Thailand. Primary information was collected from 400 farm households using a structured questionnaire. Binary logistic regression analysis shows that five variables significantly influence the decision of the new generation on succession in agricultural occupation: Their experience in agricultural work, attitude towards agriculture as an occupation, the number of agricultural labor within a household, marital status, and if they faced problems with the agricultural resources in the past. The results also imply the need for agriculture-related agencies and other relevant sectors to focus on the promotion of agricultural occupation succession by educating, creating awareness, and attitude shifting for the new generation, to make them realize both the significance and benefits gained from taking up agriculture as an occupation. Moreover, publicizing the Young Smart Farmers Program—youths who are successful in agriculture—would also help promote youths' succession in agricultural occupation in households.

Keywords: agricultural occupation; household succession; family farms; Nakhon Ratchasima; binary logistic regression analysis

1. Introduction

Agriculture has long been in the mainstream of Thai society; the topography and natural resources of Thailand are quite suitable for agricultural production. Large tracks of land areas with good water supply and fertile soil have always been utilized for cultivating crops. These not only include rice, which is the nation's staple food and main economic commodity, but also horticulture and other field crops. The less fertile areas are used for animal husbandry or fisheries. Agriculture is practiced all over Thailand, although the major agricultural products vary from one region to another. For instance, crops from horticulture—lychee and longan are mostly produced in the northern region, while durian, mangosteen, and rambutan are mainly harvested from the eastern region. The majority of agricultural products in the northeastern and central regions include cassava, sugarcane, and rice; additionally, they include dairy cattle and chicken, respectively. Meanwhile, para rubber, oil palm and cultured marine shrimps are the main products of the southern region [1]. For a long time, agricultural production has been the leading source of income for many people of Thailand.

In 2014, the National Statistical Office [2] revealed that in a typical Thai household, the cash generated from agriculture may not be sufficient to take care of the farmer's family subsistence. In fact, only 36% of the average income of an agricultural household in Thailand during 2011–2012 was from agriculture, while as much as 64% came from non-agricultural income. Moreover, the Kasikorn Research Center [3] indicated that during 2012–2014, the farmers' income generated from agriculture

had been continuously experiencing a negative growth rate. As a matter of fact, the growth rate of farmers' income from agriculture in 2014 was at negative 6%, while in the first half of 2015, the growth rate was negative 12% on average. This could be due to the decreasing prices of commodities and the drastic severe drought that negatively affected agricultural production.

The agriculture sector of Thailand has been encountering several problems, including less demand of products and low price of commodities, and most importantly, low productivity resulting from low income derived from agriculture. Several agricultural yields in Thailand have continuously declined, resulting in consequences such as the decrease in cassava productivity from around 32.4 million tons in 2015 to around 31.5 million tons in 2018—decreasing at the rate of 931.5 tons per year [4]. The reduction of agricultural productivity in Thailand is also due to climate change and insufficient knowledge of farmers in modern agriculture technologies. Meanwhile, the major causes of less demand for agriculture commodities could include inadequate in-depth marketing information and production planning, low quality and safety of agricultural products, and lack of environment-friendly production systems. Finally, low income caused by the aforementioned problems not only results in poor development, but also in the unsustainability of the farming occupation. This adversely affects the ability of agricultural labor to sustain their long-term self-dependency [1,5]. Nevertheless, labor is necessary, as it plays an important role in driving forward agricultural productivity, efficiency, and sustainability.

It has been noted that at present, the availability of agricultural labor in Thailand has been decreasing. The Bureau of Agricultural Development Policy and Planning [6] reported that the number of agricultural labor, aged between 15 to 64 years old, which numbered at one time to be 16.1 million, has decreased continuously. The percentage decline was from 58% during the Eighth National Economic and Social Development Plan (1997–2001) to 36% during the Tenth National Economic and Social Development Plan (2007–2011). This could be due to the transfer of labor from the agricultural sector to the industrial sector, and also because the country is entering the stage of an aging society. The new generation therefore does not desire to become a farmer because of inadequate welfare and labor protection, inconsistent income, and the challenges brought about by hardships and difficulties in working with nature. As a consequence, there is shortage of labor in the agricultural sector.

However, this problem is not unique to Thailand. Malaysia, a big importer of migrant workers from other Southeast Asian countries, has been experiencing a shortage of agricultural labor [7]. Like Thailand and Malaysia, a labor succession crisis in European agriculture was also observed and reported [8]. Countries, such as Norway, Finland, France, and Germany, have been facing major declines in their active agricultural holdings [9]. Researchers are therefore interested in the factors that affect labor succession in family farms [10–16]. One study used the Reasoned Action Approach (RAA) to identify the beliefs underlying the succession of family labor in farms within Brazil [17]. Other studies have used the binary dependent variable regression to study the factors affecting the succession in family farms [12,18–20].

In order to sustain and develop the agriculture sector, succession in family farms became a focus of several studies [13,21]. However, finding a successor within a family is difficult for many developed countries [21]. Furthermore, one study [13] revealed that most farm owners in Slovenia are over fifty-five years old. The number of farmers over fifty-five years old has been increasing while the number of farmers under 40 years old is declining [14]. Like many developed countries, Thailand, which is considered as an upper middle-income country, is inevitably facing the same agricultural succession-related problem. Therefore, identification of the factors affecting young people's succession in their family farms is necessary. This is why it is such a concern of many scholars [13, 14,21]. The young people of the new generation are the core actors who can take over agricultural occupations to maintain sustainability of agriculture, thus maintaining future agricultural economic development [22]. The youths are learning, physically and mentally growing, consistently adopting new knowledge and technologies, and creatively implementing that knowledge and those technologies into their activities. They are the potential human resources who have the ability and opportunity

to drive forward agriculture at the regional and national levels. Therefore, it is important to support and motivate the new generation to take up agriculture, and to replace the decreasing number of older workers in agricultural labor. Such support could include promoting agriculture as an occupation among the children and relatives of parent farmers due to their proximity, familiarity and understanding. It could also include exposure to challenges, knowledge, and the very nature of the occupation. In fact, this could be the best possible means of promoting the sustainable development of agriculture and enhance its stability as an occupation.

This study therefore aims to identify the factors affecting the succession in agricultural occupations among the youths in farming households in Nakhon Ratchasima Province, which in 2014 had one of the largest agricultural areas in Thailand. It is operated by one agricultural land owner—6278 sq km [4] in size. The Province has also been ranked as the second highest number of farm households in Thailand, with 51,575 [23]. Although it only focused on Nakhon Ratchasima Province, this study was able to gather information that reflects the agricultural situation of the North East part of Thailand as a whole. Such information would be valuable for the development and sustainability of the agricultural sector, not only for the Northeast Region, but also for Thailand as a whole.

2. Materials and Methods

2.1. Study Area

This study was conducted in Nakhon Ratchasima Province in view of its importance in the agricultural sector of the northeast region of Thailand, and also because it is the largest province in the region. Nakhon Ratchasima is located in a tropical climatic region between latitudes of 14° and 16° N and between longitudes of 101° and 103° E. The Province covers an area of 20,494 sq km with an altitude that ranges from 150 to 300 m above the mean sea level. In 2015, the municipal and non-municipal areas had populations of 636,960 (24.21%) and 1,994,475 (75.79%), respectively. Agriculture, which is the main source of livelihood of the province, covers a total area of 13,417 sq km [24]. Rice paddies account for 48.70% of the total agricultural lands while the area for upland field crops represents 44.78%; the remaining 6.52% is used for other crops and products [4]. Crop production in the province is totally dependent on the rainfall which unpredictable and highly irregular. Thus, most farmers could cultivate only one crop of rice per year. According to a report in 2016 [4], 1240 sq km of farmland in the Province was irrigated, while 12,177 sq km was not.

2.2. Sample Size and Data Collection

The research employed a combination of quantitative and qualitative data.

2.2.1. Collection of Quantitative Data

The households considered in the study consisted of the agricultural households within Nakhon Ratchasima Province, which totaled 251,575 [23]. The data were collected from a sample group that represents the total agricultural households in the Province, the sample size of which was calculated using the formula of Yamane (1967) [25] at a 95% confidence level and a 5% marginal of error. This formula is well-known [26] and was applied due to the known finite number of farm households in the targeted districts. The sample size was 400 households. Then, the two-stage sampling method was adopted and described as follows:

Stage 1 Purposive sampling: Since the agricultural households were scattered across the Province, three districts with the largest number of agricultural households were purposely selected, namely the Pak Thong Chai District (13,503 households), None Soong District (13,452 households), and Bua Yai District (12,680 households). Therefore, the sample size was computed proportionally to the three district's agricultural households. Thus, the household samples of the three districts were 136, 136, and 128 (for a total of 400 households), for Pak Thong Chai, None Soong, and Bua Yai, respectively.

Stage 2 Stratified random sampling: Firstly, the study considered the households randomly in four sub-districts of each district. Secondly, two villages of each sub-district were selected randomly for the sample size. Finally, the study specifically considered the young people who were members of the sample agricultural households—son(s) and/or daughter(s)—in their working age, between 15 and 24 years, as prescribed by the United Nations [27]. The households with one young person per household—representative of the household—who could possibly become a farmer, were randomly selected for the data collection which was conducted on weekends during April to May 2017. During the questionnaire survey, the respondents were briefed on the information needed and were asked to answer the questionnaire, face to face.

Questionnaires were used to gather the quantitative data, and were designed based on data collection references and previous research studies [8,13]. The contents of the questionnaire were adjusted to cover all the information required to meet the goal of this study.

2.2.2. Collection of Qualitative Data

The key informants interviewed for this data collection were the four representatives from the new generation farmers in Nakhon Ratchasima Province who participated in the Young Smart Farmer Program, organized in 2015 by the Agriculture Extension Department of the Ministry of Agriculture and Cooperatives. They could represent the new generation's successors in agricultural occupations.

Qualitative data were gathered using a structured interview template which, like the questionnaire, was also designed based on data collection references and research studies [13,21]. The contents were adjusted to cover all the possible information required to meet the needs of this study, such as (1) agricultural information (production and marketing), (2) background of the farming business, (3) opinion of the new generation towards succession in agricultural occupation, and (4) guidelines for the promotion of agricultural occupation to the new generation. Then, content analysis was employed to expound and describe the qualitative data.

2.3. Binary Logistic Regression Model of Statistical Analysis

2.3.1. The Model Used in This Study

This study employed a statistical model (Logistic Regression) which was appropriate, as it took only one of two possible values: The binary values [28,29] of the most important data was collected for the study. Using this Model, the factors (X—independent variables) affecting the household succession in agricultural occupation, and the results (Y—dependent variables) could be measured. The formula for the analysis was as follows:

$$Y = B_0 + B_1 SEX + B_2 AGE + B_3 STATUS + B_4 EDU + B_5 WORK + B_6 INCOME + B_7 EXP + B_8 DEBT + B_9 LABOR + B_{10} LAND + B_{11} WATER + B_{12} SOIL + B_{13} POLICY + B_{14} ATT + u_i \tag{1}$$

Before using the Logistic Regression Model to analyze the collected binary data, the tests suitable to the Model were examined.

(1) Multi-collinearity: Multivariate correlation analysis determines the correlation among independent variables, so that if the Pearson correlation is more than 0.8, then there is multi-collinearity. Since the results of the data analysis showed that the correlation coefficients were less than 0.5, than the model was not affected by the multi-collinearity among the predictors. The variance inflation factor was also used in this study and it was less than two in all predictor variables, confirming that there was no multi-collinearity problem.

(2) Chi-square and R-square values: Chi-square is used to test the null hypothesis (H_0). The logistic regression model achieves a goodness of fit when the Chi-square test statistics are highly significant at 1.0% ($p < 0.00001$). In this study, the R-square value of the Cox and Snell test, and the Nagelkerke test were between 0 and 1 which supports the goodness of fit of the model.

(3) Percentage: When the value of the Percent Correction Prediction is high, this means that the ability or the accuracy of the prediction is high.

2.3.2. Selection of Dependent and Independent Variables

In this study, the binary dependent variable (Y) was assigned a score of 1 when "the youth in an agricultural household decides to take agriculture as a future occupation" and a score of 0 when "the youth in an agricultural household decides NOT to take agriculture as a future occupation".

As hypothesized, the independent variable for this study was influenced by fourteen parameters—representatives of X—human, institutional, economic and natural conditions, on individual scale which were mostly selected based on the parameters used in the study of Kerbler [13]. These parameters were divided in three groups; personal factors, agricultural production factors, and positive attitude toward agricultural occupation as shown in Table 1.

Table 1. Independent variables used in testing the hypothesis.

Variable	Code	Data Entry
Personal Factors		
1. Sex of informants	SEX	1 = Male, 0 = Female
2. Age of informants	AGE	Age (year)
3. Marital status of informants	STATUS	1 = Single, 0 = Others
4. Educational level of informants	EDU	1 = Lower than Bachelor's degree, 0 = Bachelor's degree or above
5. Main household income-generating occupation	WORK	1 = Farmers, 0 = Others
6. Household income from agriculture	INCOME	Amount (Baht/Year)
7. Experience in agricultural work of informants	EXP	1 = Having had some experience in helping the family in agriculture, 0 = NEVER had experience in helping the family in agriculture
8. Household debts	DEBT	1 = Yes, 0 = None
Agricultural production factors		
1. Number of agricultural labor in households	LABOR	Number (persons)
2. Agriculture areas owned	LAND	Area (Rai; 1 Rai = 1600 sq m)
3. Water supply sufficiency	WATER	1 = Sufficient, 0 = Insufficient
4. Soil fertility	SOIL	1 = Fertile, 0 = Not fertile
5. Benefits gained from government's policy support systems	POLICY	1 = Yes, 0 = Never
Positive attitude toward agricultural occupation	**ATT**	Score (1 = Strongly disagree, 2 = Disagree, 3 = Undecided, 4 = Agree and 5 = Strongly agree)

The parameters in all three groups are described below:

(1) Personal Factors: This represents the availability of the respondents' socio-economic profile and household assets. The human aspects present the ability of respondents to respond to any challenges for taking over their family farms. Sex of the respondents can highly determine the acceptance of the new generation of agricultural family to do farming [30]. Age indicates the comprehensiveness to suitably operate the farms [13]. Marital status, which is one of the family features, can lead to negative stress level in farming affecting the efficiency of succeeding in the farm operations [31]. Educational level reflects the ability of a person with higher level of educational attainment to allocate resources and use new technologies in effectively operating the farms, leading to farm's increased earning capacity [15]. Main household income-generating occupation matters because people who live in a farmer's family and earn income mainly from agriculture can be presumed to be familiar

with agriculture as an occupation. This situation can encourage the people to succeed in farming. Household income earned from agriculture can be a major determinant, influencing people to engage in agriculture activities, especially for people or families with low income [32]. Agricultural experiences can strengthen one's ability to aim for high productivity. Household debt can reduce the capacity of farm investments and pose possible impacts on people to make decisions in successions of family farm operations [15].

(2) Agricultural production factors: This mainly represents the ability of farms to produce agricultural products, in terms of quality and quantity. Agricultural labor in household, in suitable numbers and quality, can play an important role in producing agricultural products and can help farmer-owners in attaining stable productivity. Agriculture areas with land ownership can provide reasonable successor potentials and secure incomes. Large areas are more attractive than small areas [15]. Water supply sufficiency and soil fertility, which can secure agricultural productivity, can also promote successions in family farms. Agriculture-related policies, especially subsidy policies, can also support farmers to secure their income leading to continuous farming activities.

(3) Positive attitude toward agricultural occupation: Attitude is an important factor that influences people to get involved with agricultural activities [33]. Positive attitude can potentially bring the youths to work and succeed in their family farm operations. There were five levels of Likert Scale ranging from "strongly disagree" to "strongly agree" in the questionnaire, comprising five parts. These include: attitude issues toward agricultural occupation including career success, job characteristics, career advancement and stability, co-workers and interpersonal relationships, financial return, and work environment [34,35].

3. Results

3.1. Household Data

The descriptive statistics of the household respondents are presented in Table 2. Most of the sample households have one to two members engaged in agriculture and own land which is not larger than 10 Rai (16,000 sq m). In addition, analysis of the household incomes revealed that most of the respondents earn less than 100,000 baht (THB) per year. Most of the respondents remain in debt, either from legal financial sources, (e.g., Bank of Agriculture and Cooperatives as the largest source), or from other sources such as illegal money lenders, cooperatives, village funds, and credit cards.

The majority of the respondents have no problem with soil fertility but are faced with the problem of insufficient water supply for farming. Regarding the agriculture-support policy from government, the majority of the respondents agreed that the government's support policy influences the continuity of farming, as most of them have received governmental support. The support programs were drought or flood assistance, credit on farm inputs with low interest rates, and reduction of production costs.

The study also revealed that most of the sampled youths from agriculture households in Nakhon Ratchasima Province had previously helped in their respective family farms. In addition, the analysis on agricultural occupation succession of the sample group revealed that most of the respondents expected to become farmers because of five reasons, listed respectively, from high to low, as follows: (1) Agriculture has been a traditional occupation of the family; (2) rice is produced for family consumption; (3) lack of preference to other occupations and/or no other job options; (4) the desire for independence; and (5) not wanting to leave the farmland uncultivated. Those who chose not to become famers presented six reasons, listed respectively, from high to low, as follows: (1) Agriculture is not a preferred occupation; (2) no possessions of skills and no expertise in agriculture; (3) no security; (4) the occupation is not sustainable, e.g., unstable price of rice and water supply; (5) inconsistency with the college degree obtained; and (6) hardships in the farms.

Table 2. Profile of household respondents.

Variables	Frequency	Percentages
Household labor engaged in agriculture (*n* = 400)		
1–2	175	43.8
3–4	147	36.8
Over 5	78	19.4
Agriculture land owned (rai) (*n* = 368)		
Less than 10	134	36.4
11–20	114	31.0
21–30	33	9.0
31–40	29	7.8
41–50	23	6.3
Over 50	35	9.5
Agriculture land rented (rai) (*n* = 83)		
Less than 10	37	44.6
11–20	30	36.2
21–30	6	7.2
31–40	2	2.4
41–50	2	2.4
Over 50	6	7.2
Household income from agriculture (THB per year) (*n* = 400)		
Less than 100,000	238	59.5
100,001–200,000	82	20.5
200,001–300,000	32	8.0
Over 300,000	48	12.0
Household debts (*n* = 400)		
No	142	35.5
Yes	258	64.5
Soil fertility (*n* = 400)		
Fertile	228	57.0
Not fertile	172	43.0
Water supply sufficiency (*n* = 400)		
Sufficient	148	37.0
Insufficient	252	63.0
Benefits gained from government policy support (*n* = 400)		
Never	99	24.8
Yes	301	75.2
Types of government policy support (*n* = 400)		
Never	128	32.0
Yes	272	68.0
Experience of informants in agricultural work (*n* = 400)		
Never	86	21.5
Yes	314	78.5
Agricultural occupation succession of young farmers (*n* = 400)		
No	151	37.8
Yes	249	62.2

Source: Field survey, 2016. Note: 1 rai = 1600 sq m, 1 US $ = 35.29 THB.

3.2. Factors Affecting the Household Succession in Agricultural Occupation

Using statistical analysis, the suitability of the model was tested, with the results shown in Table 3. The value of the Chi-square model, in accordance with the Maximum Likelihood methodology, was 125.386, with the level of significance at 0.001. This technically means that at least one of the coefficients of the independent variables is not zero, and demonstrates that the model is suitable for

the analysis. In addition, the model has good predictive ability based on the measure using Pseudo-R^2 (Cox and Snell = 0.296 and Nagelkerke = 0.435). The percentage of Correct Predictions shows that the model can predict correctly at 82.25%.

Table 3. Statistical test for suitability of the model.

Test Statistics	Value	Significance
Number of Observations	400	
−2 Log-Likelihood	161.135	
Cox & Snell R^2	0.296	
Nagelkerke R^2	0.435	
Chi-square	125.386 ***	0.0000
Percent Correct Prediction	82.25	

Note: *** Level of significance at 0.001.

After considering the coefficient of the independent variables and the level of significance of such coefficients (Table 4), the factors affecting the succession in agricultural occupation were established as follows.

(1) Marital status (STATUS): This variable has a coefficient of −1.4005 and significance level of 0.0030, which is below 0.01. This means that the married, the divorced, and/or the widowed have higher tendency to become farmers than the single individuals. With the marginal effect at −0.1510, this implies that if the respondent is single, the chance of succession in agricultural occupation reduces to 15.10%, compared to the married, the divorced, and/or the widowed.

(2) Household agricultural work experience (EXP): This variable has a coefficient of 1.8880 and significance level of 0.0001, which is below 0.001. Thus, those with household agricultural work experience are more inclined to support the succession in agricultural occupation than those without experience in household agricultural works. With marginal effect of 0.3634, the tendency of succession in agricultural occupation increases at 36.34%, compared with those with no experience in household agricultural works.

(3) Number of household agricultural labor (LABOR): With coefficient of 0.3602 and level of significance at 0.0001, which is below 0.001, this demonstrates that respondents living in households with greater number of agricultural labor have a higher tendency to support the succession in agricultural occupation. With marginal effect of 0.0481, this means that if the sample households have more than one agricultural labor member, the chance of succession increases by 4.81%.

(4) Having experienced problems with agricultural resources (WATER): This variable has a coefficient of −0.7662 and significance level of 0.0258, which is lower than 0.05. This indicates that respondents who experienced problems with agricultural resources in the past are less inclined to support the succession in agricultural occupation than those who never experienced problems. The marginal effect of −0.0970 implies that if the respondent has experienced problems with the agricultural resources, the chance of succession decreases by 9.70% compared to those who have never experienced problems with the agricultural resources.

(5) Level of attitude toward agricultural occupation (ATT): This variable has a coefficient of 1.5731 and significance level of 0.0001, which is below 0.001. This demonstrates that the respondents having higher level of attitude toward agricultural occupation are more inclined to support the succession in agricultural occupation. With marginal effect of 0.2130, this means that respondents who have at least one unit higher of attitude level increase the chance of succession in agricultural occupation by 21.30%.

Table 4. Results of analysis of the factors affecting household succession in agricultural occupation.

Variable	Coefficient	Standard Error	*p* Value	Marginal Effect
Constant	−5.6357 *	2.1972	0.0103	−0.7536
SEX	−0.0170	0.3067	0.9557	−0.0022
AGE	−0.0123	0.0671	0.8544	−0.0016
STATUS	−1.4005 **	0.4712	0.0030	−0.1510
EDU	0.0802	0.3071	0.7940	0.0107
WORK	−0.1483	0.1764	0.4006	−0.0198
INCOME	0.0000	0.0000	0.4803	0.0000
EXP	1.8880 ***	0.4092	0.0001	0.3634
DEBT	−0.0666	0.3246	0.8373	−0.0088
LABOR	0.3602 ***	0.0939	0.0001	0.0481
LAND	0.0157	0.0083	0.0604	0.0021
WATER	−0.7662 *	0.3437	0.0258	−0.0970
SOIL	−0.0740	0.3292	0.8220	−0.0099
POLICY	0.1860	0.3059	0.5432	−0.0254
ATT	1.5731 ***	0.3632	0.0001	0.2130

Note: * Level of significance at 0.05; ** Level of significance at 0.01, *** Level of significance at 0.001.

4. Discussion

Of the new generation, respondents who are single have a lower probability (<15.10%) of joining the agricultural occupation compared to respondents who are married, divorced or widowed. This is probably because single individuals are more independent in life, and are capable of seeking more opportunities or different life experiences [36,37]. Most youths in school, despite being members of agricultural families, prefer secure-income jobs over agricultural occupations [19,38–40]. This new generation of youths does not wish to work as farmers at home [14,41], while those who are married, or have families, want to stay close to their families by engaging in agricultural work. Despite being without their spouses, the divorced and/or widowed may still have dependents, such as children to take care of. This could be a possible reason for choosing to engage in agricultural occupations, and as a consequence helps ensure succession in agricultural occupations.

The portion of the new generation that has agricultural work experience, has 36.34% more chance of taking over the agricultural occupation compared with those without any agricultural work experience. This agrees with previous studies [42,43] which found that children who go to work in farms while they are young often become farmers when they grow up. Young farmers interested with family succession seem to understand that agricultural occupations require experience-based knowledge. According to key informants, it is possible that those that have gained some agricultural work experience through helping their parents in the farms, tend to become farmers because they know that they have the capability [21,44]. Those who have never worked in agriculture or helped their parents in agriculture usually think that farming is very difficult and that they are not capable of doing the job.

Members of the new generation who are in families where there is at least one agricultural laborer in their household have 4.81% higher chances to take over the agricultural occupation. Laborers in households include parents, siblings, and other individuals living in the same house [10,45,46]. The fact that there is already somebody working or having worked in the agricultural occupation increases the possibility of the new generation in the family to take over the agricultural occupation [43,47–49]. These existing laborers are available for agricultural labor-demanding work and are able to advise the new generation to take over the occupation [10,50]. The results are consistent with the findings of Mishra and El-Osta [15], who revealed that dairy farms require a steady supply of household labor, and the probability of expecting a succession in planning and management of family farms was highest in dairy farms (about 10%).

Members of the new generation who are in households that experienced problems with the resources for agriculture have 9.70% lower chances of supporting agricultural occupation succession compared with those without having experienced such problems. Examples of problems related to resources in agriculture are water supply, flood, and infertile soil. These problems can cause losses in profit or insufficient incomes and result in low morale and a diminished spirit in agricultural occupations [51–54]. Most importantly, this situation also gives uncomfortable feelings to the new generation in the household, who would think that an agricultural occupation is filled with problems and obstacles. Therefore, it is thought to be very difficult to succeed, which undermines the desire of the youths to take up this occupation in the future [55].

When the attitude level towards agricultural occupation rises by at least one unit, the tendency of respondents to follow the succession in agricultural occupation increases by 21.30%. This implies that if the new generation has positive attitude towards agriculture, the tendency to take over the agricultural occupation is higher than those with lower level of attitude [13,16]. Attitude includes the perception of career success, job characteristics, career advancement and stability, interpersonal relationships, return of investment, and work environment. A high level of attitude indicates a strong motivation or desire to do the job in a better way [56,57]. Furthermore, the qualitative interview results suggest that the positive normative beliefs and attitudes toward agriculture involve devotion in farm works by the young generation. In contrast, the study of Vogel et al. (2004) [58] indicated that the attitude of caring as a tradition is not an important function in agriculture.

Although the findings of this research show that several factors, such as SEX, AGE, EDU, WORK, INCOME, DEBT, LAND, SOIL, and POLICY do not influence the youths in the study area to take over their family farms, they may still be active factors in other locations. For instance, education or knowledge and supports of the government might persuade the youths in Malaysia, to engage in agricultural entrepreneurship [33].

5. Conclusions

Labor is an essential factor for agricultural productivity, ensuring food security at the global, national, and household level, as well as influencing self-dependency of people. In Thailand, especially in Nakhon Ratchasima Province, migration of labor to the large cities has been taking place. Children in agricultural households who graduated from compulsory education or higher have no interest in taking over their parents' agricultural occupations. Consequently, the farming society is gradually changing into an industrial labor society, a situation which is becoming more severe. Results of this study show that the factors affecting the succession in agricultural occupation are: agricultural work experience, attitude towards agricultural occupation, number of household agricultural laborers, marital status, and having experienced problems with the agricultural resources.

Therefore, promotion of agricultural occupation succession should be emphasized by agriculture-related agencies in different sectors. This could be done by educating, creating awareness, and changing attitudes of the new generation to make them realize the significance and benefits gained from taking up agricultural occupations. The study also found that the new generation's members who had good attitudes towards agriculture have higher tendencies to take over agricultural occupations. Therefore, it is important to create a positive attitude among the youths towards agricultural occupations. One study showed that succession is +27% more likely when the children have specialized education in agriculture [20]. Therefore, related agencies can establish programs on agriculture or interlace relevant lessons into the different training courses or curriculum for the targeted groups of youths and children. Such lessons should include hands-on and practical sessions in order that the participating youths can immerse themselves in an agricultural experience. This could be done by organizing quick-result activities to entice the target groups, e.g., in horticulture, mushroom farming, or poultry raising for egg production. In addition, promoting the Young Smart Farmers Program could also increase the rate of succession in agricultural occupations. Members of the Young Smart Farmers Program who have been successful in the agricultural occupation, started with trial

and error in their agricultural ventures, and it was considered hard work by Thai society. Therefore, when they became successful, they were accepted and respected by the society [5].

Their experiences, the lessons they learn, and the ideas they establish are usually appreciated and followed by the new generation. Not only do their experiences inspire the new generation but they also enhance the promotion of agricultural occupations among the youth. Dissemination of their success stories can be done by inviting them to speak publicly of their exemplary work, to relate their experiences with the new generation in the audience. It can also be done by taking the new generation on field trips to the farms of successful farmers. Thus, the current promotion methods of the government agencies should be improved to correspond to the situation of modern and diversified agriculture. Communication and information technology is believed to play a significant role in the agricultural occupation [59–64], especially because the new generation is more familiar with new technologies, which they can access and adopt with ease. The application of new technologies in agriculture is a great way of promoting agriculture to a wide array of stakeholders. For example, productivity enhancement and production cost reduction, marketing network development, online marketing of agricultural products, and collaborative networking for agricultural occupation extension, are among the recent innovations that should be promoted.

References

1. Office of Agricultural Economics. *Agricultural Commodity Situation, 2014*; Agricultural Statistics Report Number 401; Office of Agricultural Economics, Ministry of Agriculture and Cooperatives: Bangkok, Thailand, 2014. (In Thai)

2. National Statistical Office. *The 2014 Survey of the Older Persons in Thailand. National Statistical Office, Ministry of Social Development and Human Security, Thailand*; National Statistical Office, Ministry of Information and Communication Technology: Bangkok, Thailand, 2014; p. 245.

3. Kasikorn Research Center. 2015 Farm income to suffer, pushing household debt higher. In *K-Econ Analysis*; Kasikorn Research Center: Bangkok, Thailand, 2015.

4. Office of Agricultural Economics. *Agricultural Statistics of Thailand 2016*; Office of Agricultural Economics, Ministry of Agriculture and Cooperatives: Bangkok, Thailand, 2016.

5. Jingjit, R. *Smart Farmers*; Trade Policy and Strategy Office, Ministry of Commerce: Bangkok, Thailand, 2013. (In Thai)

6. Bureau of Agricultural Development Policy and Planning. *Study on Agricultural Labor Shortages in the Northeastern Region, Thailand*; Office of Agricultural Economics, Ministry of Agriculture and Cooperatives: Bangkok, Thailand, 2014. (In Thai)

7. Kaur, A. Labour migration trends and policy challenges in Southeast Asia. *Policy Soc.* **2010**, *29*, 385–397. [CrossRef]

8. Bertoni, D.; Cavicchioli, D. Farm succession, occupational choice and farm adaptation at the rural-urban interface: The case of Italian horticultural farms. *Land Use Policy* **2016**, *57*, 739–748. [CrossRef]

9. Burton, R.J.; Fischer, H. The succession crisis in European agriculture. *Sociol. Rural.* **2015**, *55*, 155–166. [CrossRef]

10. Dumas, C.; Dupuis, J.P.; Richer, F.; St.-Cyr, L. Factors that influence the next generation's decision to take over the family farm. *Fam. Bus. Rev.* **1995**, *8*, 99–120. [CrossRef]

11. Glauben, T.; Tietje, H.; Weiss, C.R. Intergenerational succession in farm households: Evidence from Upper Austria. *Rev. Econ. Househ.* **2004**, *2*, 443–462. [CrossRef]
12. Glauben, T.; Petrick, M.; Tietje, H.; Weiss, C. Probability and timing of succession or closure in family firms: A switching regression analysis of farm households in Germany. *Appl. Econ.* **2009**, *41*, 45–54. [CrossRef]
13. Kerbler, B. Factors affecting farm succession: The case of Slovenia. *Agric. Econ.* **2012**, *58*, 285–298. [CrossRef]
14. Leonard, B.; Kinsella, A.; O'Donoghue, C.; Farrell, M.; Mahon, M. Policy drivers of farm succession and inheritance. *Land Use Policy* **2017**, *61*, 147–159. [CrossRef]
15. Mishra, A.K.; El-Osta, H.S. Factors affecting succession decisions in family farm businesses: Evidence from a national survey. *J. ASFMRA* **2007**, *70*, 1–10.
16. Suess-Reyes, J.; Fuetsch, E. The future of family farming: A literature review on innovative, sustainable and succession-oriented strategies. *J. Rural Stud.* **2016**, *47*, 117–140. [CrossRef]
17. Morais, M.; Binotto, E.; Augusto, J.; Borges, R. Identifying beliefs underlying successors' intention to take over the farm. *Land Use Policy* **2017**, *68*, 48–58. [CrossRef]
18. Kimhi, A.; Nachlieli, N. Intergenerational succession on Israeli family farms. *J. Agric. Econ.* **2001**, *52*, 42–58. [CrossRef]
19. Ochoa, A.M.A.; Oliva, V.C.; Sáez, C.A. Explaining farm succession: The impact of farm location and off-farm employment opportunities. *Span. J. Agric. Res.* **2007**, *5*, 214–225. [CrossRef]
20. Cavicchioli, D.; Bertoni, D.; Tesser, F.; Frisio, D.G. What factors encourage intrafamily farm succession in mountain areas? Evidence from an alpine valley in Italy. *Mt. Res. Dev.* **2015**, *35*, 152–160. [CrossRef]
21. Joosse, S.; Grubbström, A. Continuity in farming-Not just family business. *J. Rural Stud.* **2017**, *50*, 198–208. [CrossRef]
22. Chiswell, H.M. The Importance of Next Generation Farmers: A Conceptual Framework to Bring the Potential Successor into Focus. *Geogr. Compass* **2014**, *8*, 300–312. [CrossRef]
23. Department of Agricultural Extension. *Data on Basic Agricultural Structure of Nakhon Ratchasima*; Department of Agricultural Extension, Ministry of Agriculture and Cooperatives: Bangkok, Thailand, 2014. (In Thai)
24. Nakhon Ratchasima Provincial Statistical Office. *Nakhon Ratchasima Provincial Statistical Report: 2016*; National Statistical Office, Ministry Of Information and Communication Technology: Bangkok, Thailand, 2016.
25. Yamane, T. *Statistics, An Introductory Analysis*, 2nd ed.; Harper and Row: New York, NY, USA, 1967; ISBN 978-0060473211.
26. Panpeng, J.; Ahmad, M.M. Vulnerability of Fishing Communities from Sea-Level Change: A Study of Laemsing District in Chanthaburi Province, Thailand. *Sustainability* **2017**, *9*, 1388. [CrossRef]
27. United Nations. *Definition of Youth*; Office of Agricultural Economics, United Nations: New York, NY, USA, 2008.
28. Gujarati, D. *Essentials of Econometrics*, 3rd ed.; McGraw-Hill: New York, NY, USA, 2006; ISBN 978-0072970920.
29. Field, A. *Discovering Statistics Using SPSS*, 3rd ed.; Saga: London, UK, 2009; ISBN 978-1847879073.
30. Silva, J.L.; Mohamad, S.H.A.; Uli, J.; Abu Samah, B. Socio-demography factors that influence youth attitude towards contract farming. *Am. J. Appl. Sci.* **2010**, *7*, 603–608. [CrossRef]
31. Foltz, R.D.; Marshall, M.I. Family Business Decision-Making: Factors and Influences on Choosing a Successor. In Proceedings of the Agricultural & Applied Economics Association's 2012 AAEA Annual Meeting, Seattle, WA, USA, 12–14 August 2012.
32. Hyttia, N.; Kola, J. Finish citizens' attitude towards multifunctional agriculture. *Int. Food Agribus. Manag. Rev.* **2006**, *9*, 1–22.
33. Abdullah, A.A.; Sulaiman, N.N. Factors That Influence the Interest of Youths in Agricultural Entrepreneurship. *Int. J. Bus. Soc. Sci.* **2013**, *4*, 288–312.
34. Bradley, E.W. Toward Understanding Task, Mission and Public Service Motivation: A Conceptual and Empirical Synthesis of Goal Theory and Public Service Motivation. In Proceedings of the 7th National Public Management Research Conference, Georgetown Public Policy Institute, Washington, DC, USA, 9 October 2003; pp. 9–11.
35. Ryan, M.R.; Deci, L.E. Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being. *Am. Psychol.* **2000**. [CrossRef]
36. Van Passel, S.; Nevens, F.; Mathijs, E.; Van Huylenbroeck, G. Measuring farm sustainability and explaining differences in sustainable efficiency. *Ecol. Econ.* **2007**, *62*, 149–161. [CrossRef]
37. Lobley, M.; Baker, J.R.; Whitehead, I. Farm succession and retirement: Some international comparisons. *J. Agric. Food Syst. Community Dev.* **2010**, *1*, 49–64. [CrossRef]

38. Furlong, A.; Biggart, A. Framing 'Choices': A longitudinal study of occupational aspirations among 13-to 16-year-olds. *J. Educ. Work* **1999**, *12*, 21–35. [CrossRef]
39. Hennessy, T.C.; Rehman, T. An investigation into factors affecting the occupational choices of nominated farm heirs in Ireland. *J. Agric. Econ.* **2007**, *58*, 61–75. [CrossRef]
40. Kimhi, A. Optimal timing of farm transferal from parent to child. *Am. J. Agric. Econ.* **1994**, *76*, 228–236. [CrossRef]
41. Leavy, J.; Smith, S. Future farmers: Youth aspirations, expectations and life choices. *Future Agric. Discuss. Pap.* **2010**, *13*, 1–15.
42. Corsi, A. Family farm succession and specific knowledge in Italy. *Riv. Econ. Agrar.* **2009**, *64*, 13–30.
43. Brandth, B.; Overrein, G. Resourcing children in a changing rural context: Fathering and farm succession in two generations of farmers. *Sociol. Rural.* **2013**, *53*, 95–111. [CrossRef]
44. Burton, R.J. An alternative to farmer age as an indicator of life-cycle stage: The case for a farm family age index. *J. Rural Stud.* **2006**, *22*, 485–492. [CrossRef]
45. Gasson, R.; Errington, A.J. *The Farm Family Business*; CAB International: Wallingford, UK, 1993; ISBN 0-85198-859-8.
46. Laband, D.N.; Lentz, B.F. Occupational inheritance in agriculture. *Am. J. Agric. Econ.* **1983**, *65*, 311–314. [CrossRef]
47. Cassidy, A.; McGrath, B. The relationship between 'non-successor' farm offspring and the continuity of the irish family farm. *Sociol. Rural.* **2014**, *54*, 399–416. [CrossRef]
48. Darnhofer, I.; Bellon, S.; Dedieu, B.; Milestad, R. Adaptiveness to enhance the sustainability of farming systems. A review. *Agron. Sustain. Dev.* **2010**, *30*, 545–555. [CrossRef]
49. Price, L.; Evans, N. From stress to distress: Conceptualizing the British family farming patriarchal way of life. *J. Rural Stud.* **2009**, *25*, 1–11. [CrossRef]
50. Stiglbauer, A.M.; Weiss, C.R. Family and non-family succession in the Upper-Austrian farm sector. *Cah. Econ. Sociol. Rural.* **2000**, *54*, 5–26.
51. Burton, R.J.; Walford, N. Multiple succession and land division on family farms in the South East of England: A counterbalance to agricultural concentration? *J. Rural Stud.* **2005**, *21*, 335–347. [CrossRef]
52. Gale, H.F. Why did the number of young farm entrants decline? *Am. J. Agric. Econ.* **1993**, *75*, 138–146. [CrossRef]
53. Goetz, S.J.; Debertin, D.L. Why farmers quit: A county-level analysis. *Am. J. Agric. Econ.* **2001**, *83*, 1010–1023. [CrossRef]
54. Ramos, G. The continuity of family agriculture and the succession system: The Basque case. *J. Comp. Fam. Stud.* **2005**, *36*, 367–375.
55. Storm, H.; Mittenzwei, K.; Heckelei, T. Direct payments, spatial competition, and farm survival in Norway. *Am. J. Agric. Econ.* **2014**, *97*, 1192–1205. [CrossRef]
56. Comer, S.; Ekanem, E.; Muhammad, S.; Singh, S.P.; Tegegne, F. Sustainable and conventional farmers: A comparison of socio-economic characteristics, attitude, and beliefs. *J. Sustain. Agric.* **1999**, *15*, 29–45. [CrossRef]
57. Vanslembrouck, I.; Huylenbroeck, G.; Verbeke, W. Determinants of the willingness of belgian farmers to participate in agri-environmental measures. *J. Agric. Econ.* **2002**, *53*, 489–511. [CrossRef]
58. Vogel, S.; Hofreither, M.E.; Schneeberger, W.; Weiss, E. Factors of farm enlargement plans in the Austrian Mountain Regions. *Bodenkultur* **2004**, *55*, 73–81.
59. Milovanović, S. The role and potential of information technology in agricultural improvement. *Econ. Agric.* **2014**, *2*, 471–485. [CrossRef]
60. Aker, J.C. Dial "A" for agriculture: A review of information and communication technologies for agricultural extension in developing countries. *Agric. Econ.* **2011**, *42*, 631–647. [CrossRef]
61. Cox, S. Information technology: The global key to precision agriculture and sustainability. *Comput.'Electron. Agric.* **2002**, *36*, 93–111. [CrossRef]
62. Rigi, K.; Farahmand, M.; Sheikhpour, S.; Moradi, H.; Keshtehgar, A. Role of information technology in agricultural development. *J. Novel Appl. Sci.* **2014**, *3*, 203–205.

63. Janssen, S.J.C.; Porter, C.H.; Moore, A.D.; Athanasiadis, I.N.; Foster, I.; Jones, J.W.; Antle, J.M. Towards a new generation of agricultural system data, models and knowledge products: Information and communication technology. *Agric. Syst.* **2017**, *155*, 200–212. [CrossRef] [PubMed]

64. Wang, M.; Zhang, N. Information technology alters the roadmap to agricultural modernization. *Comput. Electron. Agric.* **2002**, *36*, 91–92. [CrossRef]