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Factors Influencing Farmers' Decisions on Highland Paddy Rice Planting in Chiang Mai Province

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Abstract

For an extended period, rice has held a significant position as the staple food of Thailand, serving as a crucial economic crop that contributes substantially to the country's revenue. Farming is the primary occupation of the majority of Thai people. This study aims to identify both the factors influencing farmers' decisions and the specific factors that play a role in their decision-making process for highland paddy rice planting in Chiang Mai Province. The study involved a sample group of 398 ethnic farmers cultivating paddy rice in the highland areas of Chiang Mai. The data was collected using a structured questionnaire and analyzed using descriptive statistics, including percentage, mean, standard deviation, Likert scale, and logit model. The results of the general information study revealed that most of the farmers were males, aged 40 to 49, completing primary education. The planting area was less than 10 rai. Upon analyzing the results of the study concerning the factors influencing farmers' decisions to plant paddy in the highlands, it was found that the group of farmers in Chiang Mai Province expressed a moderate overall opinion about the factors impacting their decision-making process. Regarding the factors that influenced the decision-making process for cultivating highland paddy rice, the study considered six variables: age, income, experience, selling price, customer requirements, and distribution channel. These variables were analyzed at a confidence level ranging from 95 to 99 percent. The primary challenge confronted by highland farmers in Chiang Mai is the scarcity of paddy seeds available for planting. In light of this issue, it is imperative for relevant agencies to intervene and actively encourage farmers to produce their own rice seeds for personal use.

Keywords: Ethnic Farmers, Farmer's Decisions, Tobit Model, Highland Paddy Rice Planting, Chiang Mai Province

1. Introduction

Rice has been the main staple food of Thai people since ancient times and is revered as the essence of their livelihood. Consequently, farming is the main occupation of the majority of the country's people. Rice holds the distinction of being the most crucial economic crop, generating substantial income for the country. Its paramount importance lies in the fact that rice is not just a commodity but a matter of people's livelihoods, making it a vital aspect for everyone in the nation. Rice seed is like the life of rice growers as it is one of the most important factors in increasing rice production efficiency without increasing production costs. The availability

of a rice variety with high productivity, meeting market demands in terms of quality, and exhibiting resistance to diseases and pests while being well-suited to the local environment would lead to a reduction in rice production expenses or a decrease in the cost of rice production.

Rice and the way of life of Thai people have been intimately intertwined for a long time. Rice serves not only as the primary food source but also as the very foundation of culture, spiritual life, dignity, and pride. Additionally, rice serves as an important export product, significantly impacting the way of life for farmers, who can generate income from various rice farming products. There are mechanical tools to help in farming, which is different from the ancient times when oxen or buffaloes were used for plowing. Thai and Asian people focus on growing rice for consumption and creating a main occupation to support their families. Nowadays, rice cultivation has evolved from traditional barter systems to modern trading practices, incorporating advanced technologies to achieve enhanced speed and productivity (Nakhon Ratchasima Agricultural Extension Office, 2014).

Thailand cultivates a diverse range of fragrant rice varieties across all regions, including steamed rice, sticky rice, local rice varieties, and bred rice varieties like Khao Dok Mali 105, Pathum Thani 1, RD6, and RD15, among others. Among these, Khao Dok Mali 105 stands out as the most renowned and popular rice variety in the country. In addition to the aforementioned rice varieties, there are Thai fragrant rice varieties such as Hom Nang Mol, Hom an, Hom Dong, and Hom Jan, which are steamed rice; there is also sticky rice such as RD6 and Dok Hom. It was reported that there were more than 155 fragrant rice varieties in Thailand (Office of Agricultural Economics, 2017).

Fragrance rice is considered an important factor in setting rice prices; fragrant rice has a higher selling price than non-fragrant rice. In 2017 (November 2016 – October 2017), it was revealed that fragrant rice was sold at 1,825 – 3,133 Thai baht per 100 kilograms, and 5% white rice (non-fragrant rice) was sold at 1,125 – 1,205 Thai baht per 100 kilograms (Office of Agricultural Economics, 2017). The low production ability was due to low adaptation to the environment and low disease and insect resistance. Nevertheless, local rice varieties with unique genetics have adapted well to the local environment.

Currently, farmers and consumers are paying attention to health, environmental protection, and the reduction of the use of chemicals in agriculture activities. Consequently, farmers begin to produce rice that is grown organically on their farms. This production method involves abstaining from the utilization of chemicals or synthetic substances, such as chemical fertilizers, plant growth regulators, herbicides, and insecticides, throughout all stages of production and storage. When necessary, natural materials and non-toxic plant extracts safe for humans are employed, ensuring that the final product remains free from any pesticide residues in the soil or water. Simultaneously, this approach preserves the environment, leading to the production of high-quality rice while ensuring safety from the harmful effects of pesticide residues. As a result, consumers enjoy better sanitation and an improved quality of life.

Considering the significance and the existing challenges, the researcher endeavors to play a proactive role in addressing the issues, promoting, and advocating for rice cultivation to inspire more farmers to engage in rice farming. So, the researcher aims to study the factors influencing affecting farmers' decisions on highland paddy rice planting. However, the research is conducted on factors influencing farmers' decisions on highland paddy rice planting in Chiang Mai Province. It can help strengthen Thailand's rice production and provide education to farmers about the production process in line with international standards, which will yield significant benefits for the agricultural sector. The ultimate goal is to promote sustainable agricultural practices and reduce reliance on chemicals in agricultural production. Increasing the area and the quantity of farming production will give Chiang Mai Province the potential to produce more rice for export to the world market. Moreover, rice farmers in Chiang Mai Province have become more resilient, reducing their debt burden, and fostering a state of well-being while actively contributing to the country's development. They achieve this by producing safe agricultural products sustainably for the nation.

2. Literature Review

According to recent studies, rice is an essential staple food for more than half of the world's population playing a vital role in global food security (Srinuttrakul *et al*., 2021). In Thailand, rice is the most economically significant crop, with Thai Hom Mali rice, also known as Thai Jasmine rice, being considered the highest quality rice due to its soft texture, aroma, and superb cooking quality (Srinuttrakul *et al*., 2021).

To achieve desired objectives, humans make decisions by selecting from the various options available to them. Therefore, decisions are made only when there are several choices (Juliana *et al*., 2023). Researchers have been investigating factors that influence the production activities and planting decisions of rural households, which have been a critical area of research in recent years (Yang *et al*., 2019).

Gaining a comprehensive understanding of the diverse factors that contribute to the decision-making process of rural households is crucial to improving their production activities and can empower them to make well-informed choices. Furthermore, the identification of factors influencing planting decisions can help farmers make appropriate choices regarding what crops to cultivate. This, in turn, plays a significant role in enhancing food security not only in Thailand but also on a global scale (Yang *et al*., 2019).

In conclusion, the significance of rice in the world's food system cannot be over-emphasized, and the exceptional quality of Thai Highland paddy rice planting renders it a crucial crop for bolstering Thailand's economy. Furthermore, the ability to make strategic decisions is intrinsic to human life, and comprehending the factors that impact production activities and planting decisions can make a substantial contribution to enhancing global food security and improving the livelihoods of farmers.

2.1 Concepts and Decision Theory

Decision refers to the conclusive act of selecting something with the aim of obtaining the optimal outcome, ensuring minimal errors or potential damages.

2.1.1 Decision-making Process

The consumer purchase decision process can be considered in several steps. It is a 5-step process starting from the event before the actual purchase to the event after the purchase, which outlines the key steps (Kotler & Keller, 2006) as follows:

1) Problem Recognition Buying behavior or using the service starts with the consumer's needs, which may be obtained from internal or external stimuli.

2) Information Search: After consumers have a problem and want to go up Searching for information about that product or service is the process that will happen. later, but this process may not occur in cases where consumers have a high demand for that product or service and are able to purchase the product immediately. Searching for information may not be available because consumers will buy the product immediately.

3) Evaluation of Alternatives: After consumers have conducted information searches, they proceed to evaluate various alternatives. This entails comprehending and assessing different options, leading consumers to decide which brand or product to purchase. The decision-making approach can vary among individual consumers, depending on the specific circumstances of the decision and the available options.

4) Purchase Decisions when consumers can prioritize the importance of choosing to buy or use the service from an alternative assessment are now possible. Next are the attitudes of other people toward making a purchase decision and unpredictable factors.

5) Post-purchase Behavior: Consumers will experience consumption after purchase and may or may not be satisfied. If satisfied consumers get to know the advantages, they may have to tell the agent. This leads to new customers or repeat purchases. Yes, but if there is dissatisfaction, consumers may stop buying products or using services next time.

2.2 Related research

Studies investigating the factors that influence decision-making are conducted both within Thailand and globally. Chaiubon et al. (2020) studied factors affecting decision-making in organic, safe, and chemical rice cultivation among Ban Nong Sok Dao farmers in Non-Sung Sub-district, Mueang District, Udon Thani Province. A questionnaire was utilized to gather data from rice farmers, and the samples were categorized into three groups: 10 participants in the organic rice group, 21 participants in the safe rice group, and 124 participants in the chemical rice group. The data were analyzed using descriptive statistics, including percentages. The mean, standard deviation, and midpoint methods were used to classify the important factors affecting decision-making in rice planting. The results revealed that the farmers' decision-making process for implementing organic rice cultivation is primarily influenced by their health condition, whereas at a high level, marketing represents a major challenge. The key factor that significantly influences farmers' decision-

making in adopting good agricultural practices is their health condition. Additionally, the major challenge at the high level is related to marketing. Regarding the implementation of chemical rice cultivation, critical factors affecting farmers' decision-making include capital funds, production processes, labor, and marketing. At the high level, two prominent issues are the lack of government policy support for chemical cultivation and the deficiencies in knowledge related to organic rice cultivation.

Again, Krimjai et al. (2023) determined the factors that influence the decision to buy plants through social media by collecting data from a Generation Y group of 300 people who have used or bought products online. The study incorporated two main categories of factors: personal factors and online marketing mix factors. Data analysis involved the use of basic statistics to examine general data, while analytical parameters were subjected to multiple regression analysis. The results revealed that among the personal factors influencing the decision to purchase plants through the Facebook platform on social media, consumers attached the greatest significance to three aspects. First, the availability of a diverse range of products to choose from was highly valued. Second, the convenience of being able to place orders at any time was rated as important. Finally, consumers considered the use of product review information from experts as a crucial factor in guiding their purchasing decisions. The study investigated the online marketing mix factors influencing the decision to purchase plants through live broadcasts on the Facebook platform via social media. The identified aspects are as follows: specific services, and personal services in terms of distribution channels, prices, products, and promotion of marketing respectively. In addition to the marketing mix factors, the study explored the key personal factors that consumers paid attention to, which included: 1) Consumers valued having a diverse range of products to choose from. 2) Convenience and speed which is the ability to place orders easily and swiftly at any time was highly important. 3) Product review information from experts to guide their purchasing decisions. It is worth noting that these findings are based on foreign research.

Moreover, Rachmawati et al. (2019) studied the factors influencing customers' purchase decisions for residential property in Selangor, Malaysia. A questionnaire was administered to 312 residents to collect data, which was subsequently analyzed using descriptive statistics and multiple regression analysis. The research revealed that quality, price, location, promotion, and corporate image have significant positive influences on customers' purchasing decisions. The results also indicate that location is the most important factor, followed by price, quality, corporate image, and promotions, which play the least important role in customer purchase intent.

Furthermore, Jun et al. (2021) analyzed the factors influencing customer decisions to use online food delivery services during the COVID-19 pandemic. Data was gathered through online questionnaires, and the basic statistical analysis was conducted using IBM SPSS 22 and AMOS 22. The results indicated the following key findings: (a) Perceived usefulness significantly impacts customers' direct and indirect usage of online food delivery services through their customer attitude. (b) Enjoyment and trust play vital roles in shaping customers' behavioral

intentions toward using online food delivery services. (c) There is a positive correlation between social influence and customer attitude regarding online food delivery services. (d) A positive relationship exists between customer attitude and behavioral intention in the context of online food delivery services. These findings provide theoretical and managerial implications that contribute to the online food delivery service industry.

Therefore, based on the relevant research studies, it can be inferred that the investigation of factors influencing decision-making predominantly relied on data collection through structured questionnaires. The data were then analyzed using basic statistics such as percentage, mean, standard deviation, etc. Finally, Likert Scale was employed to gauge the levels of decision-making in these studies.

3. Methodology

The research conducted was observational in nature, aiming to investigate the factors that influence farmers' decisions regarding highland paddy rice planting in Chiang Mai Province.

3.1 Population and Sample Sizes

The population in the research was 244,291 ethnic farmers who plant highland paddy rice in Chiang Mai Province (Highland Research and Development Institute, 2018). The sample for this study was 398 ethnic farmers growing paddy in the highlands of Chiang Mai Province, calculated from Taro Yamane's formula.

3.2 Research Instrument

The research instrument consisted of an interview using a structured questionnaire, which was divided into three parts. The first part is general information about the respondents. The second part analyses the factors influencing decisions on rice planting. Finally, the third part includes suggestions for decisions on farmers' rice planting.

3.3 Data Analysis

General data analysis of the farmers includes basic statistics, showing in percentages. The analysis of factors influencing the decision to plant paddy in the highland area was conducted using the Likert Scale, which assigns levels based on mean and standard deviation. The levels were divided according to the guidelines established by (Srisa-ard, 1992).

Mean Score	Factors Influencing Decision on Rice Planting
4.51 – 5.00	affect the decision at the highest level
3.51 – 4.50	affect the decision at a high level
2.51 – 3.50	affect the decision at a moderate level
1.51 – 2.50	affect the decision at a low level
1.00 – 1.50	affect the decision at the lowest level

The study employed the Logit Model to analyze the factors influencing decision-making in highland paddy rice planting, which can be modeled as follows:

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \ldots + \beta_{11} X_{11} + \varepsilon$$

Yi = Decision (0 = No, 1 = Yes)

β_0 = Constant
β_i = Coefficient (i = 1, …, 11)
X_1 = Gender (0 = Male, 1 = Female)
X_2 = Age (in Years)
X_3 = Education level (0 = Primary level,
1 = Lower secondary school,
2 = Upper secondary school/ vocational certificate,
3 = High vocational/ diploma,
4 = Bachelor's Degree, 5 = Others)
X_4 = Income (Bath/Month)
X_5 = Experience (Year)
X_6 = Farmland (Rai)
X_7 = Rice varieties (0 = No, 1 = Yes)
X_8 = Selling price (0 = No, 1 = Yes)
X_9 = Customer requirements (0 = No, 1 = Yes)
X_{10} = How to plant and care for crops (0 = No, 1 = Yes)
X_{11} = Distribution channel (0 = No, 1 = Yes)
ε = Error term

4. Results

4.1 General Information of the Respondents

Table 1 showed that the majority of farmers were males, comprising 204 individuals, which accounted for 51.3% of the total. In contrast, 194 females represented 48.7% of the farmers surveyed. Regarding age distribution, the highest number of farmers fell within the 40-49 years old category, with 91 individuals, making up 22.9% of the respondents. The next age group with the largest representation was the 30-39 years old category, consisting of 90 individuals, accounting for 22.6%. The age groups with lower representation were as follows: 50-59 years old (84 individuals, 21.1%), 20-29 years old (65 individuals, 16.3%), over 60 years old (48 individuals, 12.1%), and under 20 years old (20 individuals, 5.0%).

A significant majority of farmers were found to be married, comprising 330 individuals, which accounted for 82.9% of the respondents. The next most common marital status was single, with 66 individuals representing 16.6% of the farmers surveyed. Only a small percentage of farmers reported being divorced, with 2 individuals, making up 0.5% of the total.

Concerning education levels, the findings revealed that the majority of respondents had completed primary school education, with 202 individuals, representing 50.8% of the sample. The next most prevalent category was completion of education at other levels, which included 118 individuals, accounting for 29.6%. In contrast, the completion of vocational/undergraduate and graduate degrees had the lowest representation, each with only one person, making up 0.3% of the respondents for each category.

The highest average monthly income was between 10,000 to 30,000 Thai baht, with 392 individuals, making up 98.5% of the participants. The next income category was between 50,001-70,000 Thai baht, which had 3 individuals, accounting for 0.8% of the sample.

Moreover, there were 2 individuals (0.5%) whose average monthly income fell within the range of 30,001-50,000 Thai baht. Lastly, only 1 person (0.3%) reported an average monthly income exceeding 70,000 Thai baht.

With experience in rice cultivation, the highest number of people, 140, accounting for 35.2%, have experience in rice cultivation of 21-30 years. The next group has experience in rice cultivation of 10–20 years, with 78 people accounting for 19.6%. The group with experience in rice cultivation for 31-40 years had 70 people, accounting for 17.6%. Those with more than 40 years of experience in rice cultivation had 66 people, accounting for 16.6%. Finally, the smallest group with less than 10 years of experience in rice cultivation is 44 people, accounting for 11.1%.

The majority of the farmers had fewer than 5 family members involved in agriculture, with 267 people accounting for 67.1%. The next group had between 5-10 family members involved in agriculture, with 129 people accounting for 32.4%. Finally, there were only 2 people (0.5%) who had more than 10 family members involved in agriculture.

Most farmers had less than 10 rai of land for their cultivation, with 310 people accounting for 77.9%. The next group had 10-20 rai of land for their cultivation, with 86 people accounting for 21.6%. Finally, there were only 2 people (0.5%) who had more than 20 rai of land for cultivation.

Table 1: General information of the respondents from a questionnaire (N=398)

Personal information	Number of People	Percentage (%)
1. Gender		
Male	204	51.3
Female	194	48.7
2. Age		
Under 20 years old	20	5
Between 20-29 years old	65	16.3
Between 30-39 years old	90	22.6
Between 40-49 years old	91	22.9
Between 50-59 years old	84	21.1
More than 60 years old	48	12.1
3. Marital status		
Single	66	16.6
Married	330	82.9
Divorced	2	0.5
4. Education level		
Primary level	202	50.8
Lower secondary school	55	13.8
Upper secondary school/vocational certificate	21	5.3
High vocational/diploma	1	0.3
Bachelor’s degree	1	0.3
Others	118	29.6

5. Average monthly income (Thai baht/Month)		
10,000-30,000 Thai baht	392	98.5
30,001-50,000 Thai baht	2	0.5
50,001-70,000 Thai baht	3	0.8
More than 70,000 Thai baht	1	0.3
6. Years of experience in rice farming		
Less than 10 years	44	11.1
10 - 20 years	78	19.6
21 - 30 years	140	35.2
31 - 40 years	70	17.6
More than 40 years	66	16.6
7. Number of household workers		
Family workers		
Less than 5 people	267	67.1
Between 5-10 people	129	32.4
More than 10 people	2	0.5
8. Farming area		
Own farming area		
Less than 10 rai	310	77.9
Between 10-20 rai	86	21.6
More than 20 rai	2	0.5
Total	**398**	**100**

Source: From the survey

4.2 Factors Affecting Decision Level Highland Paddy Rice Planting

Table 2 revealed that a group of farmers in the highlands of Chiang Mai Province have an overall moderate level of opinion about factors affecting decision-making. The overall level is moderate, with a mean of 3.32 and an standard deviation equal to 1.19.

When considering each of the variables, it showed that the opinion level about factors affecting decision-making is high. There are three items: selling price, customer demand, and distribution channels, with mean values of 4.65, 3.74, and 3.65, respectively. For the other three variables, farmers had moderately high opinion levels about factors affecting decision-making, including how to plant and care for crops, rice varieties, and farmland, with mean values of 2.81, 2.64, and 2.41, respectively.

Table 2: The factors affecting decision level of highland paddy rice planting in Chiang Mai Province

List	$\bar{x}$	S.D.	Level of Opinion	Ranking
1. Farmland	2.41	0.98	Moderate	6
2. Rice varieties	2.64	0.97	Moderate	5
3. Selling price	4.65	1.36	High	1
4. Customer requirements	3.74	1.36	High	2
5. How to plant and care for crops	2.81	1.10	Moderate	4
6. Distribution channel	3.65	1.34	High	3
Total	**3.32**	**1.19**	**Medium**	

4.3 Factors Influencing the Decision to Plant Paddy Rice in the Highland

The logistic model analysis of factors influencing the decision to cultivate paddy rice in the highlands among farmers in Chiang Mai Province, as presented in Table 4, yielded notable results. The McFadden R^2 value was 0.182, the Log-likelihood was -113.162, and the Restricted log-likelihood was -138.372. With a prediction accuracy of 88.94%, the model effectively explains the decision-making process for highland paddy rice planting among farmers in the province at a statistically significant level with a confidence level of 95% and above. The variables that significantly influenced the decision included age, income, experience, selling price, customer requirements, and distribution channel. On the other hand, the variables of gender, farmland, rice varieties, and how to plant and care for crops (cultivation method) did not have a statistically significant effect on the decision to cultivate highland paddy rice among the sampled farmers.

The study, upon examining the factors influencing the decision of farmers in Chiang Mai Province to cultivate highland paddy rice, revealed statistically significant factors at the 0.01 level. These influential factors include the farmer's age, level of education, income, selling price, and customer requirements. Moreover, the study identified factors that significantly influenced the decision to cultivate paddy in highland areas at the 0.05 level of statistical significance. Notably, experiences and distribution channels were found to be statistically significant, while gender, farmland, rice varieties, and how to plant and care for crops (cultivation method) showed no significant correlation as indicated in (Table 3).

Farmer’s age had a statistically significant and positive impact on their decision to cultivate highland paddy rice. With a confidence level of 99%, it was observed that young farmers experienced a 2.2% increase in the likelihood of choosing to plant rice paddy on higher ground when all other factors were kept constant.

Farmer's income had a statistically significant negative effect on the decision to plant paddy in highland areas. A confidence level of 99% means that low-income farmers experienced a 11.2% reduction in the likelihood that they will decide to plant paddy in higher areas when other factors are held constant.

The farmer's experience had a statistically significant positive effect on the decision to plant rice in the highlands. A confidence level of 95% means that more experienced farmers increase their chances of deciding to grow paddy on the highlands by 1.1% when other factors are held constant.

The selling price of rice had a statistically significant positive effect on the decision to cultivate paddy in highland areas. A confidence level of 99% means that an increase in rice prices will increase the likelihood that farmers will decide to sow paddy in higher areas by 32.7% when other factors are held constant.

Distribution channels also had a statistically significant positive effect on the decision to cultivate paddy in highland areas. A confidence level of 95% means that a variety of distribution channels will increase the likelihood of farmers deciding to sow high-land paddy by 9.2% when other factors are held constant.

Table 3: Factors influencing farmers' decisions to plant paddy rice in the highlands of Chiang Mai Province

Variables	Coefficient	Standard Error	Sig.	Marginal effect
Constant	-0.648	0.412	0.116^{ns}	-0.484
Gender (X_1)	0.473	0.378	0.211^{ns}	0.049
Age (X_2)	1.217	0.346	0.000^{***}	0.022
Education level (X_3)	-0.178	0.301	0.204^{ns}	-0.042
Income (X_4)	-1.686	0.496	0.001^{***}	-0.112
Experience (X_5)	0.977	0.392	0.013^{**}	0.011
Farmland (X_6)	-0.411	0.344	0.232^{ns}	-0.009
Rice varieties (X_7)	-0.729	0.449	0.104^{ns}	-0.035
Selling price (X_8)	4.587	1.487	0.002^{***}	0.327
Customer requirements (X_9)	2.626	0.979	0.007^{***}	0.084
How to plant and care for crops (X_{10})	0.578	0.635	0.363^{ns}	0.148
Distribution channel (X_{11})	1.574	0.686	0.022^{**}	0.092
McFadden R-squared = 0.182		Log likelihood = -113.162		
Restr. log-likelihood = -138.372		LR statistic = 50.42159		
Prob (LR statistic) = 0.000		Prediction accuracy = 88.94		

Note: * = $p \leq 0.1$, ** = $p \leq 0.05$, *** = $p \leq 0.01$, ns = Not Significant

4.4 Problems and Obstacles of Farmers Who Cultivate Highland Paddy Rice Planting in Chiang Mai Province

In Table 4, the problems and obstacles encountered by farmers engaged in highland paddy rice cultivation in Chiang Mai Province are presented in order of their severity. The three most severe problems are the lack of highland paddy rice seeds for cultivation and internal problems among co-farmers, with 374 people each accounting for 94.0%. The next two problems are low yield per rai with 364 people, accounting for 91.5%, and the problem of sources for selling highland paddy rice with 363 people, accounting for 91.2%. The least severe problem is the challenge of plant diseases and insects.

Table 4: Problems, Obstacles, and Suggestions of Farmers Who Cultivate Highland Paddy Rice Planting in Chiang Mai Province

Problem and Obstacles	Number of farmers	Percentage	Ranking
1. Shortage of highland paddy rice planting seeds for cultivation	374	94.0	1
2. Lack of capital	246	61.8	6
3. Problems with plant diseases and insects	77	19.3	7
4. Shortage of labor	313	78.6	5
5. Low yield per rai	364	91.5	2
6. Difficulty in selling the product at a fair price	339	85.2	4
7. Difficulty in finding buyers or sources to sell highland paddy rice	363	91.2	3
Total	**398**	**100.00**	

5. Discussion

The study on factors impacting the decision to cultivate paddy in the highlands revealed a positive correlation between the age of farmers and their decision-making process. As the majority of the farmers surveyed were young, it suggests that the emerging generation is more receptive to embracing new knowledge compared to the older generation. This is in line with the work of Kaewlaima et al. (2017), which revealed that young farmers are considered budding individuals in the agricultural field,

possessing a fresh approach to knowledge and displaying greater readiness to cultivate new insights compared to their more experienced, older counterparts. The next factor is farmers' income, which negatively affects decision-making for planting paddy in highland areas. It shows that farmers' income has less influence on their decision to plant paddy in highland areas. Low-income farmers avoid experimenting with different rice varieties due to fears of higher production costs compared to their original expenses.

Farmer's experience positively impacts decision-making, as more seasoned farmers possess a deep understanding of the production process and extensive knowledge of rice cultivation accumulated over time through numerous trials and errors. This wealth of experience enables them to make decisions more effortlessly compared to less experienced farmers. This finding aligns with the studies conducted by Kaewlaima et al. (2017) and Thongprecha and Nalampang (2011), which suggest that farmers engaged in agriculture for an extended period have amassed greater knowledge, expertise, and understanding of agricultural practices compared to those with limited farming experience. The positive impact of the selling price on the decision to plant paddy in the highlands stems from farmers perceiving the new rice variety as having a higher selling price compared to regular rice. Furthermore, the rice variety in question has undergone experimental planting at the Faculty of Agriculture, Chiang Mai University, allowing for the potential enhancement of its value. Consequently, due to the high selling price, it exerts a positive influence on the decision-making process.

Customer requirements have a positive influence on decision-making, as the farmers interviewed said *"We will decide to produce" and "We have to pay attention to market needs"*. The farmers viewed the paddy in the highland areas as another rice variety that the market wanted, especially for customers who maintain their health, causing farmers to be interested in planting paddy in high areas. The presence of distribution channels exerts a positive influence on the decision to cultivate paddy in highland areas. This is potentially attributed to the fact that a significant number of farmers surveyed were part of the new-generation farmers with broader social knowledge. Thus, by providing access to a diverse range of distribution channels, we are assured that the obtained products will undoubtedly find suitable markets for sale.

6. Suggestions

There should be a promotion for farmers to produce rice seeds for their own use, supply paddy rice seeds, and support important factors of production to solve the perennial shortage of paddy rice seed problems. Practical research should be encouraged on the issue of reducing production costs, and the government should assist farmers with production costs, then help with low-interest funding sources that are easy to access. Farmers should keep records of income and expenses in order to determine whether the cost of cultivation increased or decreased in order to obtain maximum income. Therefore, farmers should be encouraged to join groups involved in agricultural activities, like farmer-based organizations, to strengthen the agricultural community.

7. Recommendation for Further Studies

This study suggests several recommendations for further research to enhance Thailand's rice production and improve the decision-making process of highland ethnic farmers in Chiang Mai Province. Firstly, a detailed investigation into the health factors that significantly influence farmers' decisions on highland paddy rice planting is recommended. Secondly, further research is suggested to explore cost-effective strategies that can help reduce the cost of rice production. Thirdly, expanding market access for highland ethnic farmers in Chiang Mai Province is also recommended. Finally, the potential benefits of policy interventions aimed at promoting sustainable rice production practices among highland ethnic farmers should be strategically implemented. These initiatives could help in developing alternative methods of pest control, analyzing the existing practices used by farmers, developing new markets or value chains, and encouraging the adoption of sustainable rice production practices. These recommendations could provide significant insights into the factors that influence farmers' decisions on highland paddy rice planting and help strengthen Thailand's rice production.

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