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Factors affecting the adoption of organic agricultural standards among members of community enterprises in Roi Et Province, Thailand

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Abstract The level of adoption of organic agricultural standards in crop production among members of community enterprises in Roi Et Province was assessed which based on the Certification Alliance Organic Standards. The findings revealed that four components including maintenance of organic management practices, pest and disease management, conversion to organic production, and enclosed cropping systems, were adopted at a very high level. The remaining components, including land and water management, contamination prevention, biodiversity, crop selection, and breeding, showed high levels of adoption. Split and parallel production received the lowest score but remained within the high adoption range. In addition, multiple regression analysis showed that experiences in organic farming, knowledge related to organic farming, and attitude towards organic farming positively and statistically influenced the level of adoption of organic agricultural standards among members of community enterprises in Roi Et Province.

Keywords: Adoption, Organic agricultural standards, Community enterprises, Roi-Et Province

Introduction

Organic farming is a holistic production system that promotes ecosystem health by fostering biodiversity and biological cycles while avoiding synthetic inputs and genetically modified organisms (National Bureau of Agricultural Commodity and Food Standards, 2021). As global health consciousness rises, consumer demand for chemical-free, safe food grows, prompting farmers to adopt organic practices to reduce costs and meet market needs. For this reason, organic

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farming has been receiving increasing attention from both consumers and farmers as it responds to concerns about food safety and sustainability.

In the context of Thailand, the government has set guidelines through the Agricultural and Cooperatives Action Plan 2023-2027 (Ministry of Agriculture and Cooperatives, 2022), promoting '*safe agriculture*'. In addition, Thailand's National Organic Agriculture Development Strategy (2017–2021) (Ministry of Agriculture and Cooperative, n.d.) set forth the country's vision: "Thailand aims to become a regional leader in the sustainable and internationally recognized production, consumption, trade, and services of organic agriculture". Thus, organic farming is considered one of the key objectives in the development of agriculture in Thailand. This includes the development of quality standards and certification systems, promoting and supporting farmers to produce high-quality organic products, raising awareness among both producers and consumers, and supporting organic farming practices rooted in local traditions. The goal is to integrate these practices with commercial organic farming while expanding the domestic and international organic market. In addition, the National Organic Agriculture Development Board, (2017) has also undertaken efforts to expand organic farming areas, increase market share, and enhance the capacity of local farming groups to strengthen the organic agriculture sector.

Regarding Thailand's organic agriculture standards, Organic Agriculture Certification Thailand has adopted the standards of the Certification Alliance (CertAll), which are based on the fundamental standards of IFOAM and are considered equivalent to the ASEAN Standard for Organic Agriculture (ASOA), the Common Objectives and Requirements of Organic Standards (COROS), and the EU Regulation (EC) (Organic Agriculture Certification Thailand, 2019). For organic crop production, the standard according to the Certification Alliance Organic Standard encompasses a comprehensive set of criteria, including conversion to organic production, maintenance of organic management practices, split and parallel production, prevention of contamination land, soil, and water management, selection of crops and varieties, ecosystem management and biodiversity in crop production, management of pests, diseases, weeds, and crop growth, enclosed cropping systems, mushroom cultivation, and breeding of organic plant varieties (Organic Agriculture Certification Thailand, 2019) .

Phanom Phrai District, Roi Et Province, is considered one of the agricultural areas in Northeastern Thailand undergoing a transition from conventional farming methods-widely reliant on chemical use within local communities-towards organic farming (Roi Et Provincial Agriculture and Cooperatives Office, 2021). This area is known for its diverse crop cultivation such as rice, cassava, sugarcane and various vegetables. The community enterprises in this area have received support from local agencies in promoting and advancing organic farming practices (Pho

Chai Subdistrict Municipality, Phanom Phri District, 2023). The group also strives to position the area as a producer of high-value agricultural products based on organic farming systems (Roi Et Provincial Agriculture and Cooperatives Office, 2023). As a result, Phanom Phrai District has become a significant learning hub for transforming traditional agriculture into organic farming. This group contributes to sustainable agriculture and supports government efforts to expand organic farming in Thailand through knowledge dissemination, innovation, and organic certification systems (Roi Et Provincial Agriculture and Cooperatives Office, 2021).

Therefore, this research focused on investigating the factors affecting the adoption of organic agricultural standards among members of community enterprises in Roi Et Province.

Materials and methods

Research setting

The study area for this research was Phanom Phrai District, Roi Et Province, located in Northeastern Thailand (Figure 1). Phanom Phrai District is known for its diverse crop cultivation. The main crops included rice (especially glutinous and jasmine rice), cassava, sugarcane, and various vegetables such as chili, eggplant, and cucumber. Some areas are also specialized in melon production, while legumes like mung beans and soybeans are commonly grown in rotation with other crops. Thus, this area has been promoted and driven at the district level towards the production of high-value agricultural products. The population comprised 75 farmers who were members of the community enterprises in Phanom Phrai District.

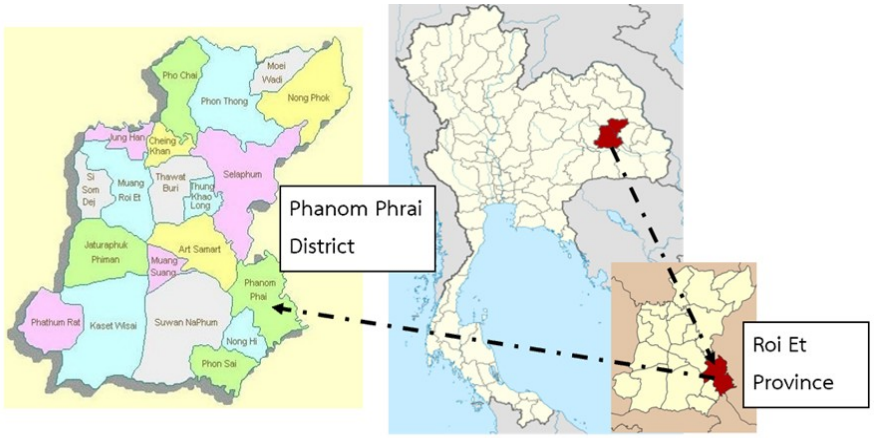

Figure 1. Map of Phanom Phrai District, Roi Et Province

Research instrument

The research instrument used in the study was a self-administered questionnaire consisting of four parts:

Part I: General information about responsdents included sex, age, highest education, household size, number of farm labors, experiences in organic farming, landholding area, farm income, agricultural extension visits, training in organic farming, and organic farm visit.

Part II: Knowledge related to organic farming consisted of 13 true-false questions. The interpretation criteria were classified into three distinct levels: scores ranging from 0 to 4 were categorized as low, 5 to 8 as moderate, and 9 to 13 as high.

Part III: Attitudes towards organic farming consisted of 17 Likert-scale questions with 5 levels of response: strongly agree (5 points), agree (4 points), neutral (3 points), disagree (2 points), and strongly disagree (1 point). The interpretation criteria were categorized into five groups as follows: scores ranging from 17 to 30 were classified as very low, 31 to 44 as low, 45 to 58 as moderate, 59 to 72 as high, and 73 to 85 as very high.

Part IV: Adoption of organic agricultural standards based on the Certification Alliance Organic Standard (Organic Agricultural Certification Thailand, 2019) consisted of ten sub-parts: (i) conversion to organic production, (ii) maintenance of organic management practices, (iii) split and parallel production, (iv) prevention of contamination, (v) land, soil, and water management, (vi) selection of crops and varieties, (vii) ecosystem management and biodiversity in crop production, (viii) management of pests, diseases, weeds, and crop growth, (ix) enclosed cropping systems, and (x) breeding of organic plant varieties. Standards related to mushroom production were not included in the survey, as none of the community enterprise members engaged in mushroom cultivation. The Likert-scale items measured the level of adoption on a 5-point scale: most frequently practiced (4 points), frequently practiced (3 points), moderately practiced (2 points), rarely practiced (1 point), and never practiced (0 point). The interpretation criteria for the mean scores were classified into five levels as follows: scores ranging from 0.00 to 0.79 were interpreted as very low, 0.80 to 1.59 as low, 1.60 to 2.39 as moderate, 2.40 to 3.19 as high, and 3.20 to 4.00 as very high.

In addition, the constructed questionnaire was assessed for content validity by five experts in the field of agriculture and/or organic farming. The questionnaire was then improved based on the experts' feedback before being used in the pilot study. After that the researcher conducted a pilot test of the questionnaire with 20 farmers in Phon Sai District, Roi Et Province, who

possessed characteristics similar to those of the target population in the study. The reliability of the knowledge-related instrument on organic farming, assessed using KR-20, was 0.706. The reliability of attitudes toward organic farming and adoption of organic agricultural standards were assessed using Cronbach's alpha coefficienrt were 0.797 and 0.974, respectively. Therefore, the research instruments demonstrated high levels of validity and reliability.

Data collection

The data collection for this study was conducted during the 2023/2024 cropping year. The researcher distributed questionnaires to farming households listed in the official records of the Office of Agriculture and Cooperatives, Roi Et Province. A total of 75 farmers participated in the questionnaire survey.

Data analysis

Data were analyzed by using frequency, percentagey, mean, and standard deviation. Multiple regression analysis was applied to investigate factors affecting the adoption of organic agricultural standards among members in the community enterprises in Roi-Et Province.

Results

General information of respondents

The study included 75 respondents. The majority were female (60%), with the average age concentrated in the 41–50-year group (42.70%), followed by 51–60 years (34.70%). Most had completed higher secondary education or vocational certificate (33.33%), followed by primary education (24%). In terms of household size, most households had 3-4 members (45.33%), with an average of 2 farm laborers per household. The respondents had an average of 3.77 years of experience in organic farming, with landholding sizes mostly falling in less than or equal to 10 rai (49.33%). Regarding farm income, the majority earned 10,001–50,000 baht per year from organic farming (76%). Most farmers contacted agricultural extension services 1–3 times per year (76%), and 60% had received organic farming training 1–3 times. Additionally, 64% had visited organic farms 1–2 times per year, indicating a moderate level of exposure to practical organic farming practices (Table 1).

Table 1. General information of respondents

Variables	Frequency	Percent
Sex		
Male	30	40.00
Female	45	60.00
Age (years)		
≤ 40	4	5.30
41-50	32	42.70
51-60	26	34.70
≥ 60	13	17.30
Highest education		
Primary level	18	24.00
Lower secondary level	13	17.33
Higher secondary level/ vocational certificate	25	33.33
Higher vocational certificate	5	6.67
Bachelor's degree	10	13.33
Postgraduate level	4	5.33
Household size (persons)		
1-2	23	30.67
3-4	34	45.33
5-6	12	16.00
7-8	6	8.00
Number of farm labors (persons) ($\overline{X}$= 2, S.D. = 0.82, Max = 5, Min = 1)		
Experiences in organic farming (years) ($\overline{X}$= 3.77, S.D. = 1.64, Max = 10, Min = 1)		
Landholding area (rais)		
≤10	37	49.33
10.1 – 20.0	26	34.67
20.1 – 30.0	9	12.00
> 30.0	3	4.00
Farm income (Baht)		
<10,000	9	12.00
10,001-50,000	57	76.00
50,001-100,000	6	8.00
>100,000	3	4.00
Agricultural extension services (times)		
Never	8	10.67
1-3 times	57	76.00
4-6 times	7	9.33
< 7 times	3	4.00
Training in organic farming (times)		
Never	9	12.00
1-3 times	45	60.00
4-6 times	20	26.67
≥ 7 times	1	1.33
Organic farm visit (times)		
Never	20	26.67
1-2 times	48	64.0
3-4 times	2	2.67
≥ 5 times	5	6.67

The level of knowledge related to organic farming

The finding revealed that most respondents (70.67%) demonstrated a moderate level of knowledge related to organic farming. Approximately 24.00% exhibited a high level of knowledge, while only 5.33% had a low level of knowledge (Table 2). This result indicated that most farmers possessed a basic understanding of organic agricultural practices; however, there remains a need for further knowledge enhancement to facilitate more effective adoption and implementation.

Table 2. The level of nowledge level related to organic farming

Knowledge related to organic farming	Frequency	Percent
Low	4	5.33
Mdium	53	70.67
High	18	24.00
Total	75	100.00

The level of attitude towards organic farming

The finding revealed that the majority of respondents (58.67%) exhibited a high level of positive attitude towards organic agricultural standards, while 8.00% demonstrated the highest level of positive attitude. Meanwhile, 33.33% of the respondents held a moderate attitude (Table 3). This result suggested a generally favorable perception among farmers, with potential for further attitudinal development to strengthen the adoption of organic farming practices.

Table 3. The level of attitudes towards organic farming

Attitude towards organic agricultural standards	Frequency	Percent
Moderate	25	33.33
High	44	58.67
Very high	6	8.00
Total	75	100.00

Note: There were no respondents whose attitudes were classified as low or very low.

The level adoption of organic agricultural standards

The findings showed that four components were adopted at a very high level, including maintenance of organic management practices ($\overline{X}$ = 3.36,

SD=0.81), management of pests, diseases, weeds, and crop growth ($\overline{X}$ = 3.28, SD=0.89), conversion to organic production ($\overline{X}$ = 3.24, SD=0.70), and enclosed cropping systems ($\overline{X}$ = 3.21, SD=0.69). Several components were rated at a high level, such as land, soil, and water management ($\overline{X}$ = 3.16, SD=0.77), prevention of contamination ($\overline{X}$ = 3.13, SD=0.56), ecosystem management and biodiversity in crop production ($\overline{X}$ = 3.13, SD=0.65), selection of crops and varieties ($\overline{X}$ = 3.12, SD=0.71), and breeding of organic plant varieties ($\overline{X}$ = 3.00, SD=0.55). The component with the lowest level of adoption, though still classified as high, was split and parallel production, which obtained a mean score of 2.91 (SD=0.59) (see Figure 2).

These findings suggested that while most aspects of organic agricultural standards have been embraced to a high or very high degree, some components-particularly those that may require more technical knowledge or structural adaptation-may benefit from further extension support and targeted capacity-building initiatives to achieve fuller implementation.

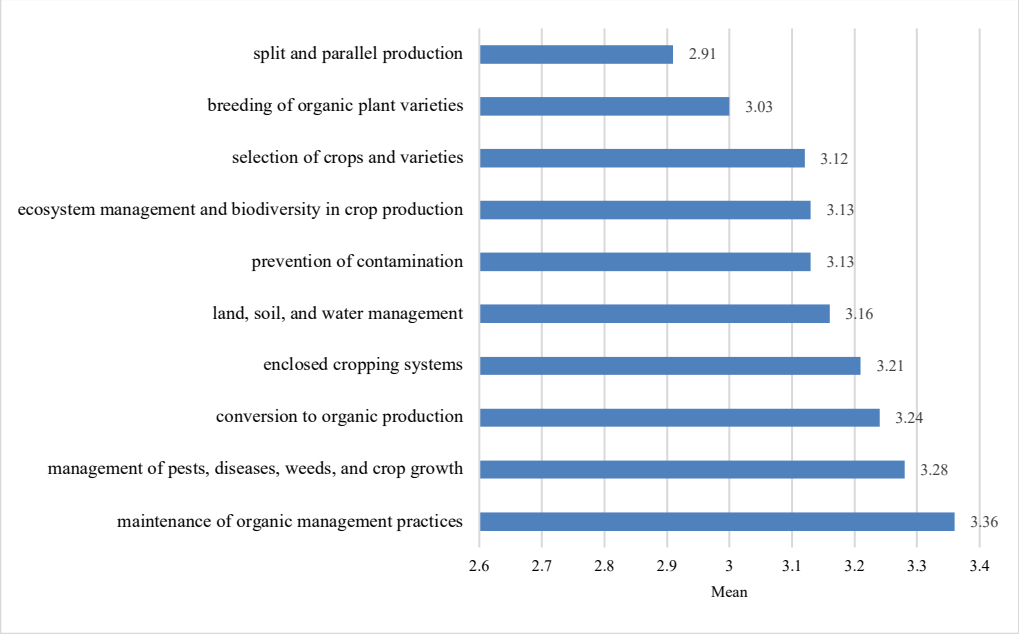

Figure 2. The level of adoption of organic agricultural standards among members of community enterprises in Roi Et Province

Factors affecting the adoption of organic agricultural standards among members of community enterprises in Roi Et Province

Prior to conducting multiple regression analysis, multicollinearity was assessed using Pearson correlation. The results indicated that the correlations were not excessively high, suggesting that multicollinearity was not a significant concern in this study.

A multiple regression analysis was conducted to identify factors affecting the adoption of organic agricultural standards among members of the community enterprises in Phanom Phrai District, Roi Et Province. The results indicated that three variables had a positive and statistically significant impact on the level of the adoption of organic agricultural standards among among members of the community enterprises. These variables included experiences in organic farming (b=0.145, p=.019), knowledge related to organic farming (b=2.25, p= .013), and attitudes towards organic farming (b=0.586, p<.001). However, age education level, the number of farm labors, landholding area, organic farming area, farm income, training in organic farming, and agricultural extension visits did not significantly affect the level of the adoption of organic agricultural standards. The independent variables included in the multiple regression model accounted for 73.2% of the variation in the level of adoption of organic agricultural standards.

Table 4. Factors affecting the adoption of organic agricultural standards among members of community enterprises in Roi Et Province

Independent variables	b	SE	B	t	p
Age	-0.002	0.012	-0.021	-0.178	.859
Education level (dummy)	-0.004	0.021	-0.018	-0.193	.848
Number of farm labors	0.087	0.111	0.092	0.784	.436
Landholding area	-0.001	0.008	-0.018	-0.169	.867
Organic farming area	-0.072	0.048	-0.157	-1.503	.138
Farm income	<0.001	0.000	0.128	1.144	.257
Experiences in organic farming	0.145	0.060	0.306	2.415	.019*
Training in organic farming	-0.096	0.055	-0.253	-1.751	.085
Agricultural extension visits	0.018	0.033	0.072	0.562	.576
Knowledge about organic farming	2.25	0.879	0.327	2.563	.013*
Attitudes towards organic farming	0.586	0.146	0.508	4.011	<.001**
Constant	-0.158	0.825		-0.191	.849

** p < .01; * p < .05; R-square = 0.732

Discussion

Attitudes towards organic farming had a positive effect on the level of adoption of organic agricultural standards, highlighting the crucial role of farmers' mindset in determining their willingness to adhere to organic agricultural standards. The finding of this study aligned with previous research, such as the study by Wachirawit *et al*. (2020) and Daoruang *el al*. (2016), which similarly found that positive attitudes toward organic farming significantly influence farmers' adoption of organic practices. It collectively emphasized the importance of a supportive environment and positive perception in enhancing compliance with organic agricultural standards. Farmers with more positive attitudes are likely to perceive organic farming as more beneficial and sustainable, which motivates their compliance. This finding suggested that fostering positive attitudes through awareness campaigns and educational programs may be an effective strategy to enhance compliance.

Knowledge related to organic farming also significantly and positively influenced the level of adoption in organic agricultural standards. The finding of this study aligns with previous research, such as the study by Wachirawit *et al*. (2020), Pithakpol *et al*. (2020) and Wang *et al*. (2019), which similarly found that having knowledge related organic farming significantly influenced farmers' adoption of organic practices. It is supported the notion that when farmers are well-informed about organic farming practices and standards, they are more likely to comply. Knowledge is not only helped the farmers to understand the importance of organic standards but also equiped them with the technical know-how needed to implement them effectively.

Experiences in organic farming significantly and positively influenced the level of adoption in organic agricultural standards. The finding of this study aligned with previous research, such as the study by Wang *et al*. (2019), which similarly found that experiences organic farming significantly influenced farmers' adoption of organic practices. Farmers with greater experience may have a deeper understanding of the practicalities involved in complying with organic standards and may have already developed systems to integrate these practices into their farming operations. It suggested that continued experience and long-term exposure to organic farming can further solidify compliance behaviors.

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