

# Factors Influencing the Potential for Organic Agriculture of Phra Thaen Subdistrict Municipality, Tha Maka District, Kanchanaburi Province, Thailand

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**Abstract** The purposes of the research were to analyze the potential and factors affecting the organic agriculture potential of farmers in Phra Thaen subdistrict municipality, Tha Maka district, Kanchanaburi province. The data were collected from 389 persons of organic farmers, community leaders, community development officers, technical officers, and officers of the public and private sectors. The research used mixed methods, consisting of quantitative research combined with qualitative data, quantitative data analysis by descriptive statistics, Pearson product-moment correlation coefficient and stepwise multiple regression, and content analysis for qualitative data. The results found that the potential of organic agriculture of Phra Thaen Subdistrict Municipality in overall and individual aspects was at a high level, consisting of the potential of infrastructure, society and culture, economy, natural resources, and human resources, consistent with SWOT analysis. It found that the apparent potential of organic agriculture was the organic agriculture market for farmers in the community. The community was the way to the regional and national market; the irrigation system covered all areas; local scholars had knowledge and ability in organic agriculture, and community leaders focused on organic agriculture, including establishing an organic agriculture group, Phra Thaen Model Organic Agriculture. Factors affecting the organic agriculture potential of farmers in Phra Thaen subdistrict municipality were found

that seven variables were leadership ( $X_5$ ), grouping ( $X_6$ ), agricultural area ( $X_7$ ), farming experience ( $X_{12}$ ), working capital ( $X_4$ ), expenditure ( $X_3$ ), and income ( $X_2$ ). It could explain the potential of organic agriculture at 77.9% with the multiple correlation coefficients ( $R$ ) = 0.882, which can be written as a standard score equation:  $\hat{Z}_y = 0.427Z_{X_5} + 0.251Z_{X_6} - 0.159Z_{X_7} + 0.157Z_{X_{12}} + 0.173Z_{X_4} - 0.124Z_{X_3} + 0.777Z_{X_2}$  (1)

**Keywords** Community Potential, Phra Thaen Model Organic Agriculture, Food Safety Community, Keyhole Market

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## 1. Introduction

Human resources and community development have an essential role in developing the country, especially in agriculture, focusing on produce for a living. The agricultural society's production model confronts the change of the farming model due to government policy focusing on technology and the economy driven by innovation. It has enhanced agricultural and food production into a standard system, focuses on sustainable agriculture and raises more farmers' income, and increases the production potential of agricultural products to the

organic agriculture standards and food safety as well as the sustainability of organic agriculture. The food safety policy and the management of plantations and farms of producers and consumers for protection presently have an influence on the country intending for national security and exports [1, 2, 3]. Nevertheless, the policy has yet to reach farmers in all areas. They have still farmed by using chemical pesticides to control weeds, insect infestation and disease, and chemical fertilizers to make plants grow faster. It causes pesticide residues to have hazardous effects on the environment, ecosystems, consumers, and farmers' health. According to the results of blood tests for farmers randomly, it was found that a few farmers must risk bioaccumulation [4].

Organic agriculture in monoculture and integrated farming systems are a model of farm management, modifications on production, and the utilization of agricultural technologies, starting from the seed. Chemical fertilizers and pesticides have caused adverse effects on the environment and biodiversity [5,6]. Conventional farmers have switched to organic agriculture due to the trend for health-conscious consumers. Most research on organic agriculture is primarily to evaluate economic outcomes, analyze results, and search for guidelines to develop an organic agriculture model. It found that Thai farmers need to gain knowledge and understanding of using agricultural chemicals, causing health and environmental effects. The government should encourage organic agriculture in the integrated farming system based on an organic agriculture development strategy, the new theory of farming for self-reliance conforming to a sufficiency economy. It should have the policy to promote and support farmers producing organic food and entrepreneurs of agricultural shops and markets for health. Moreover, there must push the policy to drive agriculture both in local and national policies [7, 8].

The study in organic agriculture found that farmers have knowledge and expertise in the production process due to learning from experiences and learning resources. They are interested and active in the production and consumption of organic products. However, they still need a proper understanding of organic agriculture based on academic approaches to receive certifications and apply modern technology and science in production. In addition, they needed to gain knowledge of farm management and market mechanism for products based on organic agriculture. Participation in development partners can push to drive at the community level sustainably. The main partners are villagers, farmers, the Department of Agriculture, the Department of Local Administrations, and universities lecturing in agriculture courses by the driving of organic agriculture and manufacturing supply chains in four elements: production factors, production and management factors, innovation and production technology factors, and productivity and productivity management factors [9,10]. Government policy focuses on promoting farmers interested in organic agriculture to gain an understanding

of organic agriculture. Participation of development partners at the occupational level, regional level, and national level aims for stability, wealth, and sustainability and emphasizes the creation of knowledge in agriculture, science, technology, and participatory innovation, linking to the creation of added value for agricultural products safely [11, 12]. The policy of the government leads to practice in the community sector. Phra Thaen subdistrict, Tha Maka district, Kanchanaburi province is a fertile agricultural area and an outstanding community to develop health promotion in the environment, natural resources, sustainable agriculture, community tourism, and waste management. Phra Thaen subdistrict is an interesting community suitable for learning and extending lessons to other communities in urban and rural community dimensions. It is one of the sixteen subdistricts in Tha Maka district, Kanchanaburi province, and originally called Phra Thaen Dong Rang. After that district's official name was called Phra Thaen subdistrict. There are sixteen villages governed by two Department of Local Administration, namely Phra Thaen subdistrict municipality and Phra Thaen Lumpraya subdistrict municipality. The semi-rural area is in the west, with suitable conditions for fertile agriculture. The agricultural sector in Phra Thaen subdistrict municipality is interested in organic agriculture and gathers farmer groups having the same goal, named Keyhole Market. It led to opinion exchange, determining the types of stores, and planning for setting up the market in the same concept. This point shows the potential of the Phra Thaen subdistrict municipality community [13].

Issues for research: factors influencing the potential of organic agriculture in Phra Thaen Subdistrict municipality, Tha Maka district, Kanchanaburi province. The study aims to examine guidelines to develop farmers interested in organic agriculture, focus on exploring the potential and analyze factors of the participation of relevant groups. It led to cooperation to find guidelines and develop strategies for driving organic agriculture, which conform to the development strategy and organic agriculture development policy in Thailand, promoting the development of organic agriculture into practice from the community, local and national levels. They concretely aimed to integrate for results.

## 2. Literature Review

Organic agriculture is a new alternative and the market for Thai farmers with the growing market because of consumers' demand for more products for health. The production of organic agricultural products [14] and the change to produce organic products have allowed Thailand to increase exports. Thailand is a farming country with advantages in geography and climate and is a major food producer and exporter. Therefore, there is an opportunity to develop the potential to be one of the global organic

producers of added-value agricultural products and foods. In addition, it encourages the government's food safety project successfully [15, 16].

The basic concept of organic agriculture is holistic management of agricultural production, which have essential to the conservation of natural resources and the agricultural ecosystem. The organic agriculture approach relies on ecological mechanisms for production and emphasizes farmers, producers, and local communities. It aims to create stability in farming for farmers, as well as preserve and restore the way of life of the agricultural community. Organic farmers need to increasingly develop more knowledge regarding nature and their farm management [8]. As a result, organic agriculture is an agricultural approach based on the learning and wisdom process because farmers must observe, analyze and synthesize, and summarize the lessons on farming their farms. Organic agriculture is a holistic agricultural system, so suitable practices lead to food security and safety for themselves, family, the community, and the nation [17]. Moreover, Jai-aree, Tanpichai, and Yingyuad [9] stated that encouraging sectors to participate in community development leads to sustainability to support utilizing biological resources. The adjustment of the production system conforms to climate changes to add value for safe agricultural products and respond to the demand of various consumers. The promotion of development raises production levels, increases production capacity in the industrial chain, strengthens the potential of farmer institutions and aggregation, and focuses on encouraging factors for managing the agricultural sector and supporting new generations of farmers to develop a supply and demand database [11].

The strategy and national development plan emphasize economic and social sectors based on environmentally friendly development. It is a green economy focusing on eco-friendly production and consumption and a fair-trade model (Fairtrade Labelling Organizations International - FLO) to create equality in international trade. The encouragement of sustainable development has caused better trading conditions, protected the producer's and workers' rights, especially in developing countries, created public awareness, and campaigned for rules and practices changes in the general international trading system [18]. Organic agriculture is, therefore, a good alternative for developing Thailand's agriculture in the national strategy to grow the quality of life and a friendly environment. It is a production system to help producers and consumers to be safe from chemical utilization, has good health, and decrease the problem of excessive utilization of natural resources. The production process causes the lowest impact on the ecosystem and the environment to achieve farming sustainability and a strategy promoting organic agriculture occurs [19, 20].

Developing the agricultural sector as an organic agriculture model has strengthened agricultural production strongly and sustainably. The development and

maintenance of water sources for agriculture focus on the participation of people to improve water sources based on the potential in the areas, increasing the protection of agriculture areas, and expanding the farmers' opportunities to access more plantations. It encourages and transmits academic knowledge, science, technology and innovation, and local wisdom in participatory agriculture. It aims to develop management factors of agricultural sectors and the new generations of farmers by database development on farm demand and supply. As well as it has created a young farmer to allow farmers' children having plantations to have attitudes and desire to do farming, including developing good values and strengthening the stability of farmers and farmer institutions [11, 21].

The organic market has an opportunity to grow based on the trend of healthy and eco-friendly products. Developing production standards and integrating public and private sectors have affected economic competition. Increasing the potential of organic marketing is achieved by exchanging knowledge and transferring appropriate technology to organic farmers. Marketing promotion must be standardized generally. Improving the opportunity to distribute organic products in the marketing channel is a strength. Establishing their community market allows people to sell their products [22, 23, 24]. It is a significant factor for farmers' sustainability and acceptance in the organic market. A participatory certification system has been established under various production, economics, society, and marketing models. The producers must operate under IFOAM's PGS principles and apply to Thai national organic standards. Participatory Guarantee System (PGS) is one of the organic guarantees. It is a social process of stakeholders to improve the local geosocial status and motivate small farmers as producers and entrepreneurs to develop local markets [25, 26].

### 3. Objectives

- to analyze the farmer's potential of organic agriculture in Phra Thaen subdistrict municipality, Tha Maka district, Kanchanaburi province.
- to examine factors affecting farmers' potential for organic agriculture in Phra Thaen subdistrict municipality, Tha Maka district, Kanchanaburi province.

### 4. Methodology

This study applied a case study research design that was in-depth investigations. For enhancing the strangeness of the present case study, the mixed-methods approach had been determined to apply for the data collection. A documentary analysis was first conducted from historical as well as contemporary sources on organic agriculture. An empirical analysis was then conducted with an overview

survey, in-depth interviews, community surveys, focus group discussions, and a questionnaire survey.

#### 4.1. Population and Sample

Based on the importance and value of case studies, the population was 6,063 farmers living in Phra Thaen subdistrict municipality, Tha Maka district, Kanchanaburi province. The sample size was determined by using the Yamane formula [27] with a 95 percent confidence level, including random cluster sampling. An empirical analysis was then carried out with a survey questionnaire with 389 respondents.

#### 4.2. Key Informants

The representation of organic farmers, community leaders, the mayor of Phra Thaen subdistrict municipality, the deputy mayor of Phra Thaen subdistrict municipality, village headmen, technical officers, and officers of the public and private sectors in Phra Thaen subdistrict municipality were selected seventeen people by using purposive sampling.

#### 4.3. Research Instruments

- A questionnaire on the potential of organic Agriculture was divided into five aspects: human resources potential, natural resources potential, economic potential, social potential, and infrastructure potential. Factors affecting the community potential in organic Agriculture of farmers in Phra Thaen subdistrict municipality were divided into three sections: personal factors, economic and social factors, and skill, knowledge, and understanding factors with five-level rating scales.

**Tool quality testing** found validity by three experts to examine the question's consistency with the objectives, language usage, and content validity. Item objective congruence (IOC) index was at 0.67-1.00. The tool was used to assess reliability with 30 farmers living in the plain areas, upper central, by Cronbach's alpha coefficient of 0.98.

- Interview Forms were semi-structured interviews on factors affecting the farmers' community potential in organic Agriculture in Phra Thaen subdistrict municipality.
- Questions for analysis of strengths, weaknesses, opportunities, and threats (SWOT analysis) with key informants were analyzed factors affecting the community potential in organic Agriculture of farmers in Phra Thaen subdistrict municipality.

#### 4.4. Data Collection

The researchers collected the data themselves.

- Quantitative data were collected by questionnaires with 389 samples, received 100 percent feedback, and checked analyzed data in terms of completeness, fact, and accuracy.
- Qualitative data were collected through in-depth interviews, community surveys, focus group discussions, and document analysis on analyzing content consistency in the document, such as performance reports, local development plans, etc.

#### 4.5. Data Analysis

As for analyzing factors affecting the community potential in organic Agriculture of farmers in Phra Thaen subdistrict municipality, quantitative data used descriptive statistics, namely mean and standard deviation, Pearson product-moment correlation coefficient, and stepwise multiple regression analysis. Besides, qualitative data used content analysis to examine data accuracy by triangulation technique with different methods and sources.

## 5. Finding and Discussion

With the use of a case study, an in-depth understanding, simplifying complex issues and adding strength to what already exists in the Phra Thaen subdistrict municipality were achieved as follows:

#### 5.1. General Information

Phra Thaen subdistrict municipality, Tha Maka district, Kanchanaburi province originally called Phra Thaen Dong Rang due to the evidence of the stone altar. There were two mountain ranges in the altar area. The mountain range in the west is called Khao Tawai Phra Phleng, forty-five meters high. On the top of the mountain is a small mandapa covering the Buddha's footprint with two Burmese sal trees. The mountain range on the east side is a low hill. A solid stone with a slope looks like a royal bed. There was a story told that the Buddha came to sleep and passed away. Thus, it has named the village and the temple, Phra Thaen Dong Rang [13]. After that, the official name was Phra Thaen subdistrict, but the temple name still uses Phra Thaen Dong Rang. The area of the Phra Thaen subdistrict is generally plain and fertile soil for farming. Villages were established along the transportation routes. The main occupations are farming and trading. The agricultural sector in Phra Thaen subdistrict municipality is interested in organic agriculture and gathers farmer's groups. They have planted vegetables, farming, and gardening in Phra Thaen subdistrict municipality, Tha Maka district, Kanchanaburi province. As for Infrastructure and transportation, Phra Thaen subdistrict municipality has convenient transportation routes linking with Bangkok and agricultural markets in various regions. It has water for agriculture, and people in

municipal areas use private pools, public pools, and Tha San-Bang Pla Canal.

**5.2. Agricultural Information**

The encouragement information of agricultural development in Phra Thaen subdistrict municipality, Tha Maka district, Kanchanaburi province has a development strategy for promoting and developing data systems, agricultural system development plan, and the drive of operations under the area context. It has advanced and developed farmers, farmer groups, and the establishment of the farming system in production, processing, and distribution adhering to sufficient economy philosophy and a new theory of agriculture. Moreover, it has encouraged research for the development of agricultural systems combining traditional wisdom with modern innovation and technology, farmers to apply the sufficient economy philosophy to create happiness and a sustainable existence, agricultural members, land management for sustainable agriculture, infrastructure development, and irrigation systems for agriculture. They have used alternative energy for agriculture suitably covering the overall area, established agricultural settlements, agricultural industry, community stores, and agricultural zoning for main crops, fruits, vegetables, flowers, livestock, and fisheries. As well as they have promoted to development of the quality and production standards of food safety and agricultural products, including the establishment of a farmer development fund cooperating with the public sectors, farmers, farmer groups, and relevant sectors.

**5.3. The Community Potential in Organic Agriculture and Factors Affecting Farmer Potential of Organic Agriculture**

Based on the research finding, the community potential in organic agriculture and factors affecting farmer potential of organic agriculture in the Phra Thaen subdistrict municipality are as follows:

*Studying the potential level in organic agriculture* showed that the overall Community potential in organic agriculture was high level ( $\bar{x} = 3.89$ , S.D. = 0.37), with the overall potential of human resources at a high level ( $\bar{x} = 3.83$ , S.D. = 0.38). As for considering each aspect, it found that local scholars having good knowledge of organic agriculture ( $\bar{x} = 3.83$ , S.D. = 0.38), community leaders attaching importance to organic agriculture ( $\bar{x} = 4.26$ , S.D. = 0.68), and the community had the policy to encourage farmers in organic agriculture ( $\bar{x} = 4.23$ , S.D. = 0.57), respectively. In addition, the organics farmers thought that

the production process was complicated based on organic agriculture standards, and community leaders can raise funds for community activities ( $\bar{x} = 3.41$ , S.D. = 0.74 and  $\bar{x} = 3.41$ , S.D. = 0.73), at the medium level.

*The overall natural resources potential* was a high level ( $\bar{x} = 3.87$ , S.D. = 0.40). It was found that a suitable climate in the community for organic agriculture ( $\bar{x} = 4.44$ , S.D. = 0.64) was the highest level. The overall economic potential was high level ( $\bar{x} = 3.89$ , S.D. = 0.44). The community market for supporting agricultural products ( $\bar{x} = 4.72$ , S.D. = 0.49) was the highest level. The overall social and cultural potential was high level ( $\bar{x} = 3.91$ , S.D. = 0.48). The highest level was community-organized activities on essential days ( $\bar{x} = 4.16$ , S.D. = 0.87). The overall infrastructure potential was high ( $\bar{x} = 3.94$ , S.D. = 0.44). The irrigation system covering every area ( $\bar{x} = 4.32$ , S.D. = 0.75) was at the highest level, as shown in Table 1.

**Table 1.** Potential of Organic Agriculture

(n = 389)			
Community Potential in Organic Agriculture	$\bar{x}$	S.D.	Opinion level
Human resource potential	3.83	0.38	high
Natural resource potential	3.87	0.40	high
Economic potential	3.89	0.44	high
Social and cultural potential	3.91	0.48	high
Infrastructure potential	3.94	0.44	high
<b>Overall Community Potential in Organic Agriculture</b>	<b>3.89</b>	<b>0.37</b>	high

In addition, the researcher studied the community potential in organic agriculture from questionnaires and analyzed strengths, weaknesses, opportunities, and threats by SWOT analysis with key informants, including document analysis. It found that the strengths were municipality and community leaders attach importance to organic agriculture by imposing a policy for the city to be a Food Safety Community under the group of Phra Thaen Model Organic Agriculture. Local scholars have knowledge and competence in organic agriculture and are ready to pass on their knowledge and skills to interested villagers. The irrigation system for agriculture covers community areas throughout the year, and farmers gathered a group to create an organic community market, "Keyhole Market." However, the weakness was some production factors could not procure and produce according to appropriate organic and good agriculture standards.

**Table 2.** Potential Analysis in Organic Agriculture

Strength (S)	<ol style="list-style-type: none"> <li>1. Municipality and community leaders attach importance to organic Agriculture by imposing a policy for the city to be a "Food Safety Community" under the group "Phra Thaen Model Organic Agriculture."</li> <li>2. Local scholars have knowledge and competence in organic Agriculture and are ready to pass on their knowledge and skills to interested villagers.</li> <li>3. Irrigation system for agriculture covering community areas throughout the year.</li> <li>4. Farmers gathered to create an organic community market, "Keyhole Market."</li> </ol>
Weakness (W)	<ol style="list-style-type: none"> <li>1. Some production factors must be procured and produced according to appropriate organic and good agriculture standards.</li> </ol>
Opportunity (O)	<ol style="list-style-type: none"> <li>1. The government and Kanchanaburi province have a policy for communities to participate in their local development into a food safety city.</li> <li>2. According to the provincial development strategy guidelines, Kanchanaburi province can encourage the budget for Phra Thaen subdistrict municipality with plans/projects.</li> <li>3. The encouragement and acceptance of network partners outside the community, such as universities, Thai Health, BEDO, etc.</li> </ol>
Threat (T)	<ol style="list-style-type: none"> <li>1. The coronavirus outbreak (COVID-19) has slowed the encouragement under the provincial policy.</li> </ol>

Community potential in organic agriculture of Phra Thaen subdistrict municipality was at a high level because it was found that the human resources potential of organic agriculture was a highlight that local scholars have knowledge and competence in organic agriculture and are ready to pass on their knowledge and skills to interested villagers. It corresponded with the research of Hangsoongnern, Angkasith, Opatpatanakit and Sirisunyluck [6] found that most organic farmers were self-reliant in food and production factors due to the local scholars' knowledge of the community. They have confidence that the organic agriculture system will survive due to the sufficiency analysis of farmers in the area. Farmers have accepted the sufficiency economy practically.

The aggregation of farmers, community leaders, and people in the community has resulted in a group of occupational development and local wisdom as strengths. There is especially an organic community market to distribute organic products for farmers, which is one point that shows the potential of the Phra Thaen subdistrict municipality. The result of research corresponding with the results of Nunta [22] found that opportunities for organic agriculture depended on the trend of consumers for healthy and eco-friendly products. It should develop production standards and increase the potential of organic marketing by exchanging knowledge and transferring appropriate technology to organic farmers in the community. That conformed to the information of the Thai Organic Agriculture Foundation [26] explained that organic agriculture must be certified participatory guarantee system (PGS) for organic guarantee. It is a social process of stakeholders to improve the local geosocial and motivate small farmers as producers and entrepreneurs to develop local markets.

The potential analysis in organic Agriculture in Phra Thaen subdistrict municipality, Tha Maka district, Kanchanaburi province was divided into five aspects,

namely human resources potential, natural resources potential, economic potential, social potential, and infrastructure potential. The strengths, weaknesses, opportunities, and threats (SWOT) of relevant people in Phra Thaen subdistrict municipality, Tha Maka district, Kanchanaburi province were analyzed for potentials and limitations analysis in organic Agriculture of Phra Thaen subdistrict municipality, Tha Maka district, Kanchanaburi province. It found that the main point is to develop a stable and standardized quality of life, encourage people to get jobs, and gain income considering using valuable and sustainable resources adhering to the sufficiency economy philosophy. The factors and changing situations affected the development and analysis of the organic Agriculture potential in Phra Thaen subdistrict municipality, Tha Maka district, Kanchanaburi province.

According to data analysis, it was found that Phra Thaen subdistrict municipality, Tha Maka district, Kanchanaburi province is an outstanding community in the development and health promotion in various dimensions such as alcoholic beverage control, accident control, sustainable agriculture, community tourism, and waste management. It is organized as an interesting and suitable community for learning and expanding lessons to other communities in urban and rural dimensions. The area is a semi-rural town with an appropriate place for fertile agriculture. The results analysis of strengths, weaknesses, opportunities, and threats (SWOT) of relevant people in Phra Thaen subdistrict municipality, Tha Maka district, Kanchanaburi province. It found that 70 percent of people are engaged in agriculture, such as vegetables, rice, sugar cane, and cassava. 70 percent of income came from agriculture as well as some occupation and income from other parts, such as general employment. It is considered that the population's unemployment rate in the Phra Thaen subdistrict municipality was not high. The population has plantations that confront flooding every year. Some areas during the dry spell need more space for farming.

Community expansion has increased the number of people due to migration.

The human resources potential in the Phra Thae subdistrict municipality was high. Local scholars have knowledge and competence in organic agriculture. The potential in natural resources is that the community can manage the waste of production and consumption that does not affect the quality of life. It has promoted and developed farmers, farmer groups, and the establishment of the agricultural system in production, processing, and distribution, adhering to sufficient economic philosophy and a new theory of agriculture. That is the potential of farmers to promote organic agricultural products to the Thai farmer's market. The findings of this research are consistent with the Department of Environmental Quality Promotion [15], which found that geographic and climatic advantages, therefore, can develop the producer potential of organic products. The modification to produce organic products has increased the opportunity to export for adding value to agricultural and food products of the country and helping to increase the success of the government's Food Safety projects.

The strength of the infrastructure potential is the municipal irrigation system that provides water for consumption throughout the year. Farmers participate in improving canals and water sources in the community, support the development of infrastructure and irrigation systems for agriculture and use alternative energy for agriculture to cover all areas. As for human resource potential, community leaders have cooperated in local development. People and community leaders are ready to cooperate with the government in developing their communities. Jai-aree [17] stated that knowledge about growing organic vegetables according to academic standards is the issue that farmers must clearly and correctly have the knowledge and understanding leading to correct practice. A necessary approach is to create participation of development partners, which drives the community sustainably. The main sectors are villagers, farmers, the Department of Agriculture, the Department of Local Administration, and universities lecturing on agriculture.

As for the economic potential, the strength was that farmers and people in the community had a group for occupational development and local wisdom. People in the community are interested in consuming products with pesticide residue-free and buying organic agricultural products. There is also an organic community market for organic products due to the gathering of farmers for organic agriculture, "Phra Thae Model Organic Agriculture," and the opening "Keyhole Market" of farmers showing the community potential of Phra Thae subdistrict municipality [13]. The research results corresponded with the research of Nunta [22] found that opportunities for organic agriculture depended on the trend of consumers for healthy and eco-products. It should develop production standards and increase the potential of

organic marketing by exchanging knowledge and transferring appropriate technology to organic farmers. Moreover, it conformed to the research of Support, Kongtanajaruanun, Bunmark, Awirothananon, and Intanoo [24], and the study of Jiumpanyarach [23] explained that marketing promotion must be standardized generally. Increasing the opportunity to distribute organic products in the marketing channel is a strength. Establishing their community market will allow people to sell their products. It is the main factor of farmers' sustainability.

As for the factors affecting the potential in organic agriculture of farmers in Phra Thae subdistrict municipality, Tha Maka district, Kanchanaburi province, and the study of the variable's relationship, the researcher defined symbols to represent dependent and independent variables to understand the same meaning and easy to understand of values in the table as in Table 3.

### 5.3.1. Symbols Used for Data Analysis

Defining Y to represent Community Potential in Organic Agriculture of Farmers

Personal Factor

X<sub>1</sub> represents Behavior and Character

Economic and Social Factors

X<sub>2</sub> represents Incomes

X<sub>3</sub> represents Expense

X<sub>4</sub> represents Working Capital

X<sub>5</sub> represents Leadership

X<sub>6</sub> represents Grouping

X<sub>7</sub> represents Agricultural Areas

Skills, Knowledge, and Understanding Factors

X<sub>8</sub> represents Family Decision

X<sub>9</sub> represents Learning Ability

X<sub>10</sub> represents Collaboration Ability

X<sub>11</sub> represents Product Management Ability

X<sub>12</sub> represents Agricultural Experience

The analysis of the relationship between agricultural potential and twelve variables of related factors were income, expense, working capital, leadership, grouping, agricultural areas, family decision, learning ability, collaboration ability, product management ability, and agricultural experience. It found that the agricultural potential of farmers was at a high level of positive correlation at the statistical significance level of 0.01 with two variables, namely leadership ( $r = .786, p < 0.01$ ) and grouping ( $r = .728, p < 0.01$ ). In addition, the agricultural potential of farmers was at a high level of positive correlation at the statistical significance level of 0.01 with two variables, namely agricultural experience ( $r = .689, p < 0.01$ ) and working capital ( $r = .633, p < 0.01$ ). The agricultural potential of farmers was at a medium level of positive correlation at the statistical significance level of 0.01 with one variable, namely income ( $r = .437, p < 0.01$ ).

The agricultural potential of farmers was at a low level of positive correlation at the statistical significance level of

0.01 with one variable, personal factor ( $r = .132, p < 0.01$ ).

The agricultural experience was at a high level of positive correlation at the statistical significance level of 0.01 with three variables, namely leadership ( $r = .667, p < 0.01$ ), grouping ( $r = .633, p < 0.01$ ), and working capital ( $r = .571, p < 0.01$ ). Moreover, the agricultural experience was at a low level of positive correlation at the statistical significance level of 0.01 with three variables, namely income ( $r = .398, p < 0.01$ ), product management ability ( $r = .294, p < 0.01$ ), family decision ( $r = .197, p < 0.01$ ), expense ( $r = .145, p < 0.01$ ) and agricultural areas ( $r = .139, p < 0.01$ ). The agricultural experience was at a low level of positive correlation at the statistical significance level of 0.05 with learning ability ( $r = .117, p < 0.05$ )

As for the correlation analysis, it was found that the independent variables had a low-level to a high-level relationship with the dependent variable. Thus, it is expected that these independent variables can predict dependent variables according to putting the 12 variables into regression in the last step of the analysis. Seven variables in the equation consisted of leadership ( $X_5$ ), which could significantly explain the variability in community potential in organic agriculture at 61.8 percent. The variables that influenced the leadership variable were grouping ( $X_6$ ), agricultural areas ( $X_7$ ), agricultural experience ( $X_{12}$ ), working capital ( $X_4$ ), expense ( $X_3$ ), and income ( $X_2$ ); the leadership variable discussed by Jai-aree [17] stated that the participation of development partners is a significant approach causing the drive-in community level sustainably. The main emphasis is leaders, namely

villagers, farmers, the Department of Agriculture, and the Department of Local Administrations. The variables of grouping, agricultural areas, and agricultural experience conformed to Sirinthanathorn [28], explaining that organic agriculture was created from experiences, knowledge creation, participatory communication, and acceptance and usage of members. The agricultural areas are created by themselves and the cooperation of network groups. The variable of expense and income, economy, and financial status of farmers were consistent with the research of Titisari [29] said that the agriculture potential should be a modern agricultural system. The economy is essential to farmers because they must prepare for costs and labor to clear and sufficient products for demands in farm management, resulting in higher incomes.

As for considering seven predictor variables, it was found that they could explain the variability of the potential in organic agriculture up to 77.9 percent with a multiple correlation coefficient ( $R$ )= 0.882. The predictive equation could be constructed in unstandardized scores and standardized scores (Table 4).

The predictive equation in the unstandardized score:

$$\hat{Y} = 0.758 + 0.435X_5 + 0.260X_6 - 0.135X_7 + 0.166X_{12} + 0.183X_4 - 0.117X_3 + 0.059X_2 \quad (2)$$

The predictive equation in the standardized score:

$$\hat{Z}_y = 0.427Z_{X5} + 0.251Z_{X6} - 0.159Z_{X7} + 0.157Z_{X12} + 0.173Z_{X4} - 0.124Z_{X3} + 0.777Z_{X2} \quad (3)$$

**Table 3.** Relationship between Factors Affecting Community Potential in Organic Agriculture of Farmers in Phra Thaeen subdistrict municipality, Tha Maka district, Kanchanaburi province

	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	X <sub>7</sub>	X <sub>8</sub>	X <sub>9</sub>	X <sub>10</sub>	X <sub>11</sub>	X <sub>12</sub>	Y
X <sub>1</sub>	1												
X <sub>2</sub>	.042	1											
X <sub>3</sub>	.058	.098	1										
X <sub>4</sub>	.147**	.323**	.240**	1									
X <sub>5</sub>	.104*	.387**	.133**	.600**	1								
X <sub>6</sub>	.170**	.398**	.108*	.645**	.644**	1							
X <sub>7</sub>	-.048	.070	.413**	.264**	.148**	.162**	1						
X <sub>8</sub>	-.040	.102*	.530**	.236**	.117*	.118*	.775**	1					
X <sub>9</sub>	-.032	.057	.591**	.138**	.074	.119*	.439**	.601**	1				
X <sub>10</sub>	.030	.060	.387**	.094	.065	.092	.307**	.393**	.423**	1			
X <sub>11</sub>	-.070	.133**	.574**	.200**	.136**	.204**	.643**	.740**	.546**	.419**	1		
X <sub>12</sub>	.082	.398**	.145**	.571**	.667**	.633**	.139**	.197**	.117*	.095	.294**	1	
Y	.132**	.437**	-.034	.633**	.786**	.728**	-.034	-.030	-.022	.000	.000	.689**	1

Note:\*\* Statistical Significance of 0.01

\* Statistical Significance of 0.05

**Table 4.** Factors Affecting Community Potential in Organic Farming of Farmers in Phra Thaen subdistrict municipality, Tha Maka district, Kanchanaburi province

Variables	R <sup>2</sup> Change	b	Beta	S.E.	t	p-value
Leadership (X <sub>5</sub> )	.618	.435	.427	.228	11.776	.000**
Grouping (X <sub>6</sub> )	.083	.260	.251	.202	6.830	.000**
Agricultural Area (X <sub>7</sub> )	.032	-.135	-.159	.191	-5.895	.000**
Agricultural Experience (X <sub>12</sub> )	.017	.166	.157	.185	4.408	.000**
Working Capital (X <sub>4</sub> )	.012	.183	.173	.181	4.965	.000**
Expense (X <sub>3</sub> )	.012	-.117	-.124	.177	-4.586	.000**
Income (X <sub>2</sub> )	.005	.059	.077	<b>175.</b>	2.830	.005**

Constants (a) = .758, R = .882, R<sup>2</sup> = .779

(\*\*p < 0.01)

## 6. Conclusion and Recommendations

### 6.1. Conclusion

Potential analysis of strengths in organic agriculture in Phra Thaen subdistrict municipality, Tha Maka district, Kanchanaburi province was divided into five aspects: human resources potential, natural resources potential, economic potential, social potential, and infrastructure potential. The strengths, weaknesses, opportunities, and threats (SWOT) of relevant people in Phra Thaen subdistrict municipality, Tha Maka district, Kanchanaburi province were analyzed for potentials and limitations analysis in organic agriculture of Phra Thaen subdistrict municipality, Tha Maka district, Kanchanaburi province. It found that the main point is to develop a stable and standardized quality of life, encourage people to get jobs and gain income considering using valuable and sustainable resources adhering to the sufficiency economy philosophy.

Community potential in organic agriculture helps to plan for appropriate agricultural development, especially to encourage farmers in the area to start organic agriculture. The essential data collection in agriculture of farmers in Phra Thaen subdistrict municipality, Tha Maka district, Kanchanaburi province can adapt primary data to analyze the strengths and weaknesses of the community. Participation in preparing the agricultural development plan of Phra Thaen subdistrict municipality, Tha Maka district, Kanchanaburi province, can apply to preparing the development plan for farmers. According to the potential of farmers in the area, they have participated in improving the canals and water resources in the community and encouraging infrastructure and irrigation systems for agriculture in the community.

The result analysis of factors affecting community potential in organic agriculture of farmers found that there are seven variables: leadership (X<sub>5</sub>), grouping (X<sub>6</sub>), agricultural area (X<sub>7</sub>), agricultural experience (X<sub>12</sub>), working capital (X<sub>4</sub>), expense (X<sub>3</sub>), and income (X<sub>2</sub>) which explained the potential of organic agriculture up to 0.779 or 77.9 percent with the multiple correlation coefficient (R) = 0.882.

According to the results of the research mentioned above, it can be summarized as a diagram of factors affecting community potential in organic Agriculture of farmers in Phra Thaen subdistrict municipality that involves the community in terms of food security, food safety city, the creation of organic community market, and the encouragement and acceptance of network partners.

### 6.2. Recommendation

The research received information on farmers' potential for organic agriculture in Phra Thaen subdistrict municipality, Kanchanaburi province. Thus, Phra Thaen subdistrict municipality, Tha Maka district, Kanchanaburi province should compile information and knowledge in organic agriculture, organic agriculture standard certification, the ability of the organic agriculture leaders from the local scholars, and local wisdom to be the knowledge center of organic agriculture for farmers interested in organic agriculture in the area. They should continuously inherit an organic agriculture development strategy for farmers interested in organic agriculture to have an income. In addition, it develops the community's potential in all dimensions. It should be linked to the organic agriculture database to analyze the organic agriculture data for future planning and expanding organic agriculture areas into developing organic agriculture effectively.

### 6.3. Recommendations for Future Research

The research received information on factors affecting farmers' potential in organic agriculture in Phra Thaen subdistrict municipality, Tha Maka district, Kanchanaburi province, Thailand. Therefore, the approach for further research should study the factors affecting organic agriculture or other spatial data relating to organic agriculture, for example, areas requiring organic agriculture assistance so that officials or agencies can reach farmers and continue to develop fast.

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