

## Development of Organic Farming on the Path of Growth for Farmers' Good Quality of Life according to the Sustainable Environmental Management

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### ABSTRACT

Most agricultural practices have focused on high volume of produces by using chemicals. Currently consumers highly focus on the safety of food and agricultural produces that increases trend of green and organic consumption resulting in increasing organic farming. This study aimed to analyze factors affecting development of organic farming; to investigate guidelines of sustainable organic farming management; and promote networking of organic farming on the path of growth under Thailand 4.0 in the EEC. Data collection was conducted via questionnaire to farmers practicing organic farming in three provinces in the EEC, with 150 farmers in each province, 450 in total, as well as interviews with officials of District Agricultural Extension offices, organic farmers, and network leaders. Data analysis was conducted using descriptive statistics and content analysis.

Factors affecting the development of organic farming consisted of sufficient production and management according to the organic farming standards, and farmers' accessibility; efficient and appropriate production system management; potential in farming of organic vegetables; good attitude towards organic farming; marketing of organic farming; and attention to health and consumers' organic vegetables. All these factors are in accordance with the organic productivity, income and health. In addition, organic farming is environmentally friendly. Guidelines for development of the organic farming include marketing, logistics, and standards for organic products such as promotion of production and creation of self-reliant networks; support changes in production to secure sustainable farming; drive pilot projects to integrate the development of organic farming; and integration of the development of production and marketing.

**KEYWORDS:** Organic Farming; the Eastern Economic Corridor (EEC); the Sustainable Development; Environmental Management; Good Quality of Life; Factors

### 1. Introduction

Based on the Strategy of Thailand 4.0 focusing on stability, prosperity, and sustainability with the aim of, achieving a new form of economic growth, the industrial sector is one target to upgrade the country's competitiveness. The east of Thailand is an area which is strategically located in ASEAN with basic infrastructure responsive to both residential and industrial estates or industrial zones which collectively account for a major part of the country's industrial production base, especially in the petrochemicals, automotive and parts, and electronic appliance sectors. Moreover, it is a global hub of investment, tourist destinations, and an industrial base for energy. The three target provinces are Rayong, Chonburi, and Chachoengsao,

located in the Eastern Economic Corridor (EEC). However, investment in EEC projects is indicative of the readiness of Thailand in many aspects such as best location in ASEAN thanks to the strong industrial foundation, large production base, connectivity of transport in many forms, as well as world-class tourist locations, preparing it to support and provide integrated business services, as well as potential towards prosperity and growth from investment in parallel with urbanization and future needs of ASEAN markets. Industrial production in the EEC needs efficient distribution channels of import-export including land, sea, and air. If the EEC succeeds in attracting growing numbers of investors, the increase in volume of the goods will be in line with the heightened level of economic growth.

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The continual expansion of the population increases demand for and volume of agricultural products both for domestic consumption and export. Farmers and entrepreneurs must compete and accelerate the development of their produces to gain wide access to the market system. As a result, the agricultural system focuses on raising economic benefits. Farmers turn to agricultural chemicals to improve the quality of produces, increase output, prevent disease, and reduce the number of pests that cause damage to the farmers' produces. According to a report, Thailand ranks 48<sup>th</sup> in the world agricultural output. However, it imports the highest quantity of agricultural chemicals in Southeast Asia and ranks fourth in the world in the use of pesticides (Thairath, 2018). This indicates that there is a tendency for farmers to continually increase the use of chemicals as they want their produces to be sufficient for the market demand and to be competitive with other farmers while dealing with the problems of climate change and the volatility of the economic system for survival, which both continue to impact the society and environment.

Most agricultural practices that focus on high volume of produces, with processes starting from plantation to production for consumption or further processing industries, all affect the environment. This includes energy consumption from the use of agricultural machinery, and danger from chemical fertilizers and chemical pesticides that cause sudden and chronic health problems among farmers who come into close contact with the chemicals, as well as contamination to consumers and in the environment such as soil pollution and water pollution, resulting in widespread negative impacts on the ecosystem. The quality of export produces both in the forms of fresh or processed fruits is affected by chemical residues. Due to these problems, consumers are concerned about their health and the health of the environment. Consumers highly focus on the safety of food and agricultural produces. This can be seen from the increasing trend of green consumption, consumption of organic fruits and vegetables, and organic products. Agricultural products are important to the health of farmers, producers, consumers, as well as to the country's economy and environment. As a result, farmers, producers, and entrepreneurs must focus on the shift of the agricultural sector toward safety, health, and sustainability. A study found that the three key performance indicators evince the transition away from conventional or chemical farming towards a sustainable form of farming; climatic impact, economic stability, and social stability (Cristache *et al.*, 2018).

For the past many years, policies formulated by the government and agencies supervising agricultural products have focused on the promotion of farmers to reduce the use of agricultural chemicals and shift to more organic farming. Organic farming, mixed farming, sustainable farming, and natural farming all contribute to the agriculture that avoids using chemicals, synthetic substances, promotes the balance of agricultural eco-system, as well as contributes to sustainably increased value and volume of produces more than agriculture using chemicals (Chaimongkol, 2013). At the same time, the development of agricultural logistics consists of basic infrastructure and more

facilities for agricultural logistics, trainings, promotion and development of farmers, as well as agricultural institutions that have the ability for management, marketing, network creation, and environmentally friendly operation. However, the operation of agricultural logistics and the creation of value-added in the supply chain still face limitations. Most farmers still lack knowledge, understanding, and skills required for efficient organic farming management in according with the study of Jesarati *et al.* (2018) which stated that organic agriculture is rapidly growing while the lack of knowledge and skills to manage organic farms and the lack of market opportunities for the organic products are the most important reasons. This has become an issue that corresponds to the development of Thailand's agricultural sector.

Therefore, this researcher is interested in studying factors affecting the development of organic farming on the path of growth under Thailand 4.0 for sustainable quality of life and environmental management in the three aforementioned provinces. The factors investigated are therefore used to propose guidelines to encourage and develop the organic farming as well as establish a network of organic farming in the EEC. There are areas with basic infrastructure that can facilitate the upgrading of the traditional agricultural sector into a higher quality agricultural system, one that is safe for the health of consumers and is environmentally friendly.

## 2. Methods

The methodology included a review of the literature on policies, measures, and guidelines relevant to organic farming by applying the principles of environmental management appropriate to the community in each area, compiling information on the development of the EEC, scope of target areas in the development of the EEC, as well as the development plan of the EEC of the three provinces to investigate the context and scope of the development of each area. After that, field trips to survey and collect both qualitative and quantitative data by random sampling of specific communities, covering agricultural communities in the areas in the agricultural pilot project were conducted. Other areas in the EEC by Ministry of the Interior and Ministry of Agriculture and Cooperatives namely Chachoengsao, Chonburi, and Rayong.

Data and information were collected by interviewing four groups of informants namely; (1) District Agricultural Extension Offices in Chachoengsao, Chonburi, and Rayong; (2) organic farmers in provinces outside the EEC; (3) networks of organic farmers in Chachoengsao, Chonburi, and Rayong; and (4) networks of organic farmers in provinces outside the EEC.

In addition, a questionnaire was used to gather data from farmers practicing organic farming in the three provinces in the EEC. There have been 102,711 farmers and so the sample size of the farmers was 400. The researcher used disproportional quota and accidental sampling to 150 farmers in each province, totaling 450 samples.

Tools used in this study i.e. interviewing form and questionnaire were validated by experts in the field.

IOC (Items Objective Congruence Index) was employed and it was above 0.5. In addition, questionnaire was tested with farmers who are outside the EEC areas and a reliability of questionnaire was about 0.803.

Data analysis of the results of the questionnaire and interviews was conducted by content analysis to group

factors affecting organic farming and positive and negative effects of the organic farming. The descriptive statistics was also used to analyze the frequency of each factor and effect.

The conceptual framework used in the study is shown in Figure 1.

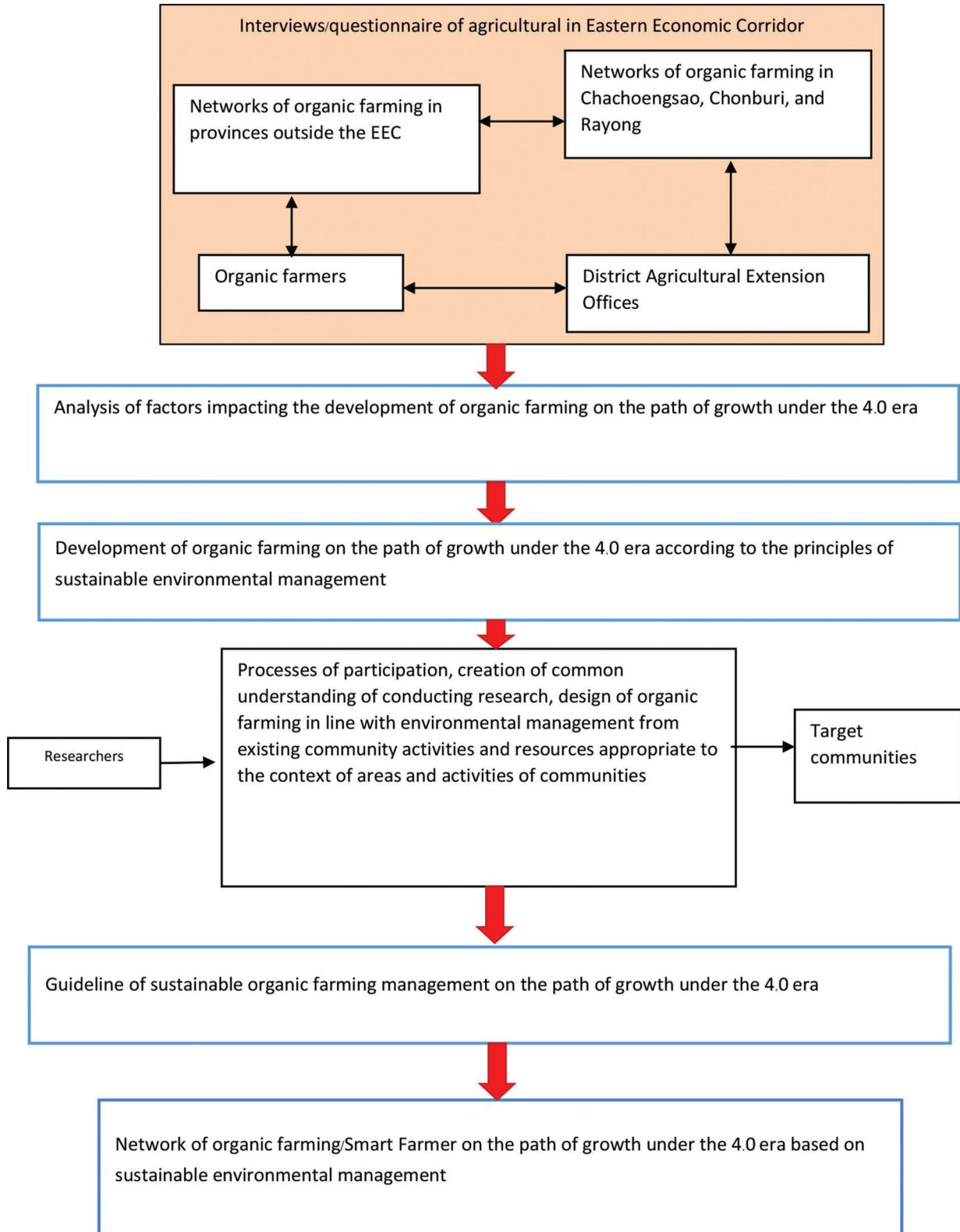


Figure 1: Conceptual Framework used in the study

### 3. Results and Discussion

#### 3.1 State of the Art of Organic Farming in the EEC

Based on field trips to compile data on the operation of development of organic farming networks in Chachoengsao, Chonburi, and Rayong, the researcher concludes a guideline to integrate organic farming networks in the EEC from the recommendations of the sample to Thailand 4.0 Development Plan, as referenced by the Permanent Secretary for Agriculture and Cooperatives (2009). This includes the promotion of farmers to gain easy access to information, increased potential of sufficient production of agricultural products for domestic consumption, innovation and development including advanced technology, solutions to farmers' debt problems, modernization of existing rules and regulations, value-added for agricultural goods, improvement of production in line with climate change, focus on more research and development, and integration of work of all relevant ministries covering all dimensions.

The integration of the networks of organic farmers should operate with the private sector in cooperation with relevant agencies, including those at the center and at provincial levels, farmer groups, and academic institutions in the form of memorandums of cooperation to develop and strengthen organic farmers in local communities, and new farmer groups with potential to enter the organic farming system. This needs the government's support of production factors and basic infrastructure, academic knowledge, market linkage, funding sources, processing, budget, and personnel, as well as setting up local working groups to consider planning, production, marketing, standards, and budget as follows:

1. Provide the mechanism and networks to drive the development of organic farming for systematic, integrated supervision, production, and marketing of organic farming at local, provincial, and network levels in the form of sub-committees/working groups such as organic farming group at Sanam Chai Khet District. These should place importance on farmer communities as a main driving force with government agencies such as District Agricultural Extension Offices acting as supporting and facilitating agencies in various aspects, recruitment and nomination processes of farmer representatives and experts through considerations of the appropriateness of areas such as "Doctor Ku," local wise people, and farmer representatives at Environmental Conservation Organization at Wang Chan District, Rayong.
2. Assess regular performance of the development of organic farming in order to use the results to improve the action plan for flexibility, and appropriateness amidst the fast-changing situations in the EEC.
3. Promote regional academic institutions as networks to drive the development of organic farming in collaboration with communities such as Kasetsart University. Kasetsart supports agricultural technology such as in the case of the installation of pumping stations and solar cells for farmers in Singhanart Sub-district, Lat Bua Luang District, Ayutthaya.

4. Arrange for the study of guidelines to establish the National Institute of Organic Farming Development similar to the royally initiated Center for Training and Development of Agricultural Occupation at Wat Yannasang Wararam as a major organization to drive the development of organic farming into the future.

#### 3.2 Factors Affecting the Development of Organic Farming on the Path of Growth under Thailand 4.0

The results of the quantitative analysis by using questionnaire with 450 farmers in the three province of the EEC revealed the factors affecting the development of organic farming as follows: management of sufficient production factors in line with organic farming standards, and farmers' accessibility; efficient and appropriate management of production system, as well as farmers' knowledge and understanding of business operation of organic vegetables; and potential in producing organic vegetables and good attitude towards organic farming of relevant farmers, producers, and entrepreneurs in organic farming networks. These affecting factors are in accordance with the organic farming productivity and profitability and thus farmer income (Ullah *et al.*, 2015). In addition, the factors included marketing of organic farming that facilitated the consumers and farmers to understand the health benefit of organic vegetables and expanded consumers' demand in line with the most important factors, which are the health factors for farmers to adopt organic farming (Cukur *et al.*, 2019). Furthermore, there are crucial factors involving logistic management to support organic farming; consumers' concern for health and confidence in organic vegetables; robust groups and networks of organic vegetables in the EEC; pro-active communication and public relations that impacted the mechanism to drive organic farming development of all stakeholders in organic farming networks; clear and appropriate standards and certification system of organic vegetables; database on organic vegetables that was reliable and accessible, covering all dimensions; research that supported the development of organic farming; concrete and continuous support from public and private agencies; potential and good attitude toward organic farming of government officials involved in the development of organic farming; and policies and laws that supported and promoted the development of organic farming. Many other studies also mentioned environmental protection (Cukur *et al.*, 2019) which is one of the important factors for adoption of the organic farming as organic farming is an environmentally friendly form of agricultural management. It was confirmed by one study that the five major factors that influence the adoption of organic farming are economic, social, marketing, cultivation, and government policy with marketing and government policy factors being most crucial (Azam & Shaheen, 2019).

#### 3.3 Impact of the EEC on Organic Farming in Chachoengsao, Chonburi, and Rayong

The results from the questionnaires and the interviews revealed the positive and negative effects of the organic farming as shown in Table 1. According to the government's targets, the EEC areas would be

**Table 1:** Positive and Negative effects of the organic farming

Positive affect	Negative affect
<p>- Growth of industries focusing on the application of new agriculture-based technology such as use of sensors to measure soil quality and volume of water, advanced techniques to analyze data, and automatic system.</p> <p>- Research and development on biotechnology such as improvement of plant and animal species, quality screening, packaging, preservation of vegetables, fruits, and flowers using advanced technology such as use of sensor system to test meat in fruits, etc.</p> <p>- One of the areas with investment in transport, basic infrastructure to create economic activities across dimensions, resulting in expansion, attracting both domestic and foreign investors.</p> <p>- Marketing and logistics that speedily distributed organic products both by land and air, convenient and speedy transport system to distribute products.</p> <p>- Increased visits from tourists in the areas, providing good opportunity for marketing of organic products.</p> <p>- Policy put in place to assist small entrepreneurs with SME development fund according to the concept of civil state of Chachoengsao to assist organic farmers, support SMEs to develop towards high-valued agro industry according to the National Strategy and Thailand Reform Strategy in line with Thailand 4.0 Policy and as a fund to fulfill the needs of SMEs engaging in organic farming who otherwise would not gain access to regular sources of funding.</p>	<p>- The government’s insufficient and discontinuous budget support to develop potential and competitiveness in agricultural and industrial sectors.</p> <p>- Limited support and assistance from the government sector, support might not cover the development of organic farming which was unable to gain access to capital sources, resulting in a lack of liquidity for the organic farming business and finally going out of business.</p> <p>- Pollution problems and global warming derived from the industrial sector, impacting long-term development of organic farming.</p> <p>- Area expansion of industrial estates necessitated the move of agricultural communities to the outside, reducing farmers’ land to earn living, etc.</p> <p>- Reduced labor force in organic farming due to the focus on agricultural development using machine technology and experts in specific fields.</p> <p>- Increased use of water resources due to immigration of people from outside the EEC.</p> <p>- Laws gave rights to many non-local entrepreneurs to own land in the Eastern Special Development Zone, resulting in a lack of security to control ownership or possessory rights of locals, impacting the stability of resource ownership of local communities.</p> <p>- No true participation process for farmers if the government did not have the clear policy on the participation of farmers in the development of organic farming.</p> <p>- Increased use of water resources due to immigration of people from outside the EEC.</p> <p>- The EEC Plan did not focus on small organic farming but rather on large farming with no common benefit seen for small farmers.</p> <p>- Lack of transfer of organic farming wisdom due to the fact that the next generation turned to industrial jobs.</p> <p>- Personnel of District and Sub-district Agricultural Extension Offices lacked knowledge on organic farming so they could not fully promote and support the development.</p>

upgraded as the country’s leading economic zone by combining industrial technology with IT, affecting the development of organic farming both positively and negatively.

**3.4 Guidelines to Develop Organic Farming according to the Principles of Sustainable Environmental Management in the EEC**

Based on the study of the factors affecting the development of organic farming on the path of growth under Thailand 4.0 from the lessons learned from nationwide organic farming and in the EEC, two guidelines were developed that can be summarized as follows:

1. Promotion of production, marketing, logistics, and standards of organic products.
- Promote production and create networks of self-reliance both by promoting and supporting production

factors necessary for organic production, and creation and linkage of organic farming which would assist the grouping of farmers to practice organic farming and link with networks, as well as reduce reliance on external production factors. Moreover, marketing channels and price guarantees were developed to accommodate the excess of community and local produce in order to help farmers.

- Promote the shift of production to secure and sustainable agriculture such as projects to promote organic farming and production of safe products, projects to promote the use of organic substances in place of agricultural chemicals, projects of learning centers for organic livestock, creation of networks to connect and exchange learning towards self-reliance with government agencies such as Department of Agriculture, Department of Agricultural Extension, Land Development Department, and

Department of Livestock Development as supporting agencies.

- Drive pilot projects to integrate the systematic development of organic farming at area level such as the project to forge skills and promote agricultural occupation in Wang Chan District, Rayong. The project generated income for small farmers. It was one of the projects operated by Ministry of Agriculture and Cooperatives to allow farmers to learn and adapt in the social, economic, natural, and changing environmental contexts for a sustainable future. This project enhanced the development as occupations by establishing guidelines to develop projects based on community cooperation, leading to job security, and increased income, in parallel with local environmental protection as true heritage for the next generation. It provided sustainability for those practicing agricultural occupation. It was the major component of good quality of life by espousing the royally initiated concept or the King's Philosophy for the maximum use of the areas, distribution of opportunities, upgrading of farmers' income, as well as rehabilitation of the eco-system.
  - Drive the integration of the development of production and marketing with area based joint cooperation which includes processing, distribution, and selling of organic products (Dunn *et al.*, 2014) without overlapping, and with the maximum use of budget. Promotion was therefore integrated to produce agricultural products in the form of organic products in areas with potential and readiness to support farmers' self-reliance, job security, income generation for farmers, as well as creation of value-added for organic products, and robust health.
  - Fertilizer management for organic farming. The country's organic farming development focused on soil improvement by mostly using organic matters in the form of organic fertilizer in parallel with bio-fertilizer which usually lacked plants' main nutrients such as nitrogen, phosphorous, and potassium. Therefore, relevant agencies should study the use of minerals and soil nutrients. Research had been conducted on the efficiency of plants' nutrients namely minerals and soil nutrients and enforcement of regulations on the export of these minerals to maximize the development of the country's organic farming.
  - Transport process from farmer groups or members to markets of organic farming networks. A database must be managed to predict the customers' demand for production. The effect related to logistics transport included transport costs, utility service costs, and volatility of exchange rates.
2. Provision of the knowledge and innovation management consisted of the following:
- Research and development with major contributions such as increased potential for innovation-based entrepreneurs, research and development on systems, production and standards of organic products, promotion of the use of organic substances to reduce the use of chemicals in agriculture, support the research and development of in-depth foreign markets, etc. with government agencies such as Ministry of Agriculture and Cooperatives, Ministry of Commerce, and National Innovation Agency as the main agencies to drive the research and development.

- Public relations to enhance knowledge and understanding with major media campaigns to replace chemicals with organic substances and activities to promote knowledge of organic product marketing.
- Transfer of knowledge and develop potential of personnel with major contributions such as training for leaders of farmer groups and officials on the adoption of organic farming systems, workshops for local farmers in cooperation with lecturers from other agencies such as Ministry of Agriculture and Cooperatives.
- Compile and disseminate knowledge and innovation on organic farming for systematic knowledge management and beneficial dissemination to farmers and interested persons.
- Establish the center for organic farming knowledge management such as a center for local wisdom and the regional universities.

## 4. Conclusion

Factors affecting the development of organic farming on the path of growth for farmer's good quality of life consisted of sufficient production factor and management according to the organic farming standards, and with farmers' accessibility; efficient and appropriate production system management; potential in farming of organic vegetables; good attitude towards organic farming of both farmers and consumers; marketing for organic farming; attention to health and consumers' organic vegetables. Two major guidelines for developing organic farming according to the principle of sustainable environmental management in the EEC include: (1) promotion of production, marketing, logistics, and standards of organic products, e.g., pilot project and create networks of self-reliance; and (2) provision of knowledge and innovation management, e.g., R&D and a center for organic farming.

## 5. Suggestions

### 5.1 Policy Recommendations

The policy recommendations from the study consist of the following.

1. Ministry of Agriculture and Cooperatives should provide the opportunity for farmers and communities to participate in presenting their opinions on policy and planning, as well as systematic management of the projects related to organic farming policy.
2. Ministry of Agriculture and Cooperatives should formulate policy on the concrete and continual creation of knowledge about organic farming for operating officials.
3. Department of Agriculture should formulate policy on organic farming on the concept that good strategies must have diversities in order to respond to all groups of stakeholders.
4. Ministry of Agriculture and Cooperatives policy should systematically support organic farming such as production system, market system, consumption system, and standard system in parallel with the formulation of strategies to motivate farmers to shift from chemical-based farming to organic farming.

From 1 to 4 it can be noted that government policy is essential to drive and motivate organic farming in line with Kallas *et al.* (2009) identifying the policy changes that have been more relevant in motivating adoption of organic practices.

1. Database on organic farming should be clearly developed such as the number of organic farmers, plantation areas, and groups of organic farming.
2. Guideline to implement the government projects whereby it is not necessary to have major projects but rather well-planned small projects that can gain full access to the areas.
3. Assessment of the policies, projects, and activities should be disseminated to the public so that they are aware of the policies and acknowledge them.

## 5.2 Operational Recommendations and Information

1. The efficient development of organic farming should focus on the farmers themselves, and producers. The assessment or investigation of efficient production should take into consideration the quality of life of farmers. The consideration of more income from production cannot truly assess the efficient production of pesticide-free vegetables and organic vegetables.
2. Agricultural District should apply the principles of efficient organic farming management under the responsibility of the farmers themselves, their ability of self-reliance, grouping of farmers, planting planning, dissemination to the public, and farmers in various areas for appropriate application.
3. Relevant agencies both public and private such as Ministry of Agriculture and Cooperatives should conduct study to define standard criteria for inputs and success factors to develop organic farming so that farmers can use them as a guideline for self-assessment and improvement of efficient production of organic vegetables.
4. Marketing Organization for Farmers and private agencies should concretely place importance on development to strengthen organic farming in the EEC. The consideration of the trend of future situations reveals that farmers may face pollution problems due to industrial production. The government should foster confidence among consumers, assist in transferring knowledge to farmers, and operate projects to find accommodating markets.
5. Both public and private agencies related to production of pesticide-free vegetables and organic vegetables should participate in the development of organic

farming. Government agencies should provide knowledge, certify standards, and disseminate knowledge about the projects concerning organic agricultural products for wider recognition. The private agencies should create markets to accommodate produces so that farmers can grow quality organic vegetables and sell them to consumers.

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