# Key Success Factors and Constraints of Organic Vegetable Production Systems in Thailand: Lessons Learned from Selected Cases of Best Practices

**Panchit Seeniang* and Supaporn Thaipakdee**

## ABSTRACT

The objectives of the research were to study 1) the key success factors of an organic vegetable production system and 2) the constraints on organic vegetable production and marketing in Thailand. Data were collected from a sample of farmers and processors/handlers recognized for their best practices—namely, Rai Thon Nuey (Dare to Sweat Farm), Rai Plook Ruk (Thai Organic Farm), Suwannabhumi Organic Co. Ltd., and Swift Co. Ltd. The techniques of semi-structured interviews and observation were applied. Empirical and documentary analyses were administered. Findings revealed that key success factors and important techniques of organic farming are practiced with implicit knowledge which starts from the preparation of the ecosystem and soil nutrient then considers crop maintenance in the food chain system, and finally involves harvesting only the edible pieces. While market access with simple postharvesting at the farm level results in a longer shelf life, good quality produce is necessary. Constraints of organic vegetable production were: 1) bio-physical constraints, such as low soil fertility, water shortage, irregular rainfall and pests; 2) economic constraints such as high initial costs, high labor costs, high transport costs, and lack of market channels; and 3) knowledge constraints, such as lacking in understanding of farm problems such as nutrient balance, crop-environment interactions, postharvest management, waste management, and consumers' perceptions. The important problem of organic vegetable farming was that farmers didn't know what their problems were. As a solution, sharing of problems and exchanging knowledge and experiences among the various stakeholders should be considered.

**Keywords**: organic farming, organic vegetable

## บทคัดย่อ

การวิจัยครั้งนี้มีวัตถุประสงค์เพื่อศึกษา 1) ปัจจัยที่สร้างความสำเร็จในระบบการผลิตผักอินทรีย์ และ 2) ข้อจำกัดของการผลิตและการตลาดผักอินทรีย์ในประเทศไทย จากการเก็บรวบรวมข้อมูลการปฏิบัติที่เป็นเลิศของเกษตรกร และผู้ประกอบการ ได้แก่ ไร่ทนเหนื่อย ไร่ปลูกรัก บริษัทสุวรรณภูมิออแกนิค จำกัด และบริษัท สวิฟท์ จำกัด โดยใช้เทคนิคการสัมภาษณ์แบบกึ่งโครงสร้างและการสังเกต ใช้การวิเคราะห์ข้อมูลเชิงประจักษ์และการวิเคราะห์เอกสาร ผลการวิจัยพบว่า ปัจจัยที่สร้างความสำเร็จและเทคนิคที่สำคัญของการทำเกษตรอินทรีย์ คือการทำโดยอาศัยความรู้ที่ฝังลึกซึ่งเริ่มจากการเตรียมระบบนิเวศและ

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ธาตุอาหารพืช จากนั้นการดูแลรักษาพืชด้วยระบบห่วงโซ่อาหาร จนถึงการเก็บเกี่ยวเฉพาะส่วนที่สามารถนำไปบริโภคได้ ขณะที่การเข้าถึงตลาดพร้อมกับการจัดการหลังการเก็บเกี่ยวอย่างง่ายในระดับฟาร์มจะนำมาสู่การยืดอายุในการวางจำหน่ายและผลผลิตที่มีคุณภาพดี ข้อจำกัดของการผลิตผักอินทรีย์ ประกอบด้วย 1) ข้อจำกัดด้านชีว-กายภาพ ได้แก่ ความอุดมสมบูรณ์ของดินต่ำ การขาดแคลนน้ำ ฝนไม่ตกต้องตามฤดูกาล และศัตรูพืช 2) ข้อจำกัดด้านเศรษฐศาสตร์ ได้แก่ ต้นทุนเริ่มกิจการสูง ค่าแรงงานสูง ค่าขนส่งแพง และตลาด และ 3) ข้อจำกัดด้านความรู้ การขาดความเข้าใจในปัญหาของฟาร์ม ได้แก่ ความสมดุลของธาตุอาหาร สิ่งแวดล้อมพืช การจัดการหลังการเก็บเกี่ยว การจัดการของเสีย และทัศนคติของผู้บริโภค ปัญหาที่สำคัญของการทำฟาร์มผักอินทรีย์คือ เกษตรกรไม่รู้ว่าอะไรคือปัญหาในการทำฟาร์ม ในการแก้ไขปัญหา การแบ่งปันปัญหา การแลกเปลี่ยนความรู้และประสบการณ์ระหว่างผู้มีส่วนได้ส่วนเสียควรได้รับการพิจารณา

**คำสำคัญ:** เกษตรอินทรีย์ ผักอินทรีย์

## INTRODUCTION

Vegetable production is essentially a small-farm venture that benefits thousands of families in urban, peri-urban and rural communities. Growing vegetables provides self-employment to families who are engaged in all aspects of the business: propagation, production, harvesting, preparation for the market, and even selling. However, as noted by Food and Agriculture Organization of the United Nations (1999a), in recent years, production costs have increased by about 50–60 percent. Most farmers are compelled to use family labor in order to cut costs and remain competitive in local markets. High costs compel resource-poor farmers to limit their inputs, such as fertilizer and agro-chemicals, often resulting in crop losses and lower outputs. Often, there is an overuse of harmful chemicals, which endanger the health of consumers and pollute the environment (Food and Agriculture Organization of the United Nations, 1999a).

Organic agriculture is the most dynamic and rapidly growing sector of the global food industry (Ellis, Panyakul, Vildozo, & Kasterine, 2006). Furthermore, organic farming is one of several approaches to sustainable agriculture (Food and Agriculture Organization of the United Nations, 1999b), and because of its commercial viability, it may provide solutions to the current problems in conventional agriculture (Scialabba, 2000; Wheeler, 2008).

At the same time, health awareness of Thai urban consumers is increasing, particularly regarding the very high levels of pesticide used by Thai farmers and thus, the possibility of toxic residues in food. Thai agriculture suffers from problems linked to the high external inputs to the system; as the awareness of problems linked to high-input agriculture is increasing, politicians, NGOs and farmers are searching for alternatives (Roitner-Schobesberger, 2006). In Thailand, organic farming re-emerged in the early 1980s after the health and environmental effects of the improper use of and heavy reliance on agrochemicals began to manifest themselves (Ellis et al., 2006).

In addition, Thailand has the capacity and potential to develop its competitiveness to be a major source of organic foods to serve both domestic and international markets, with current organic production being overwhelmingly of rice, with vegetables as a distinct second and baby corn prominent among the remaining crops (United States Department of Agriculture[USDA], 2006; Ratanawaraha, Ellis, Panyakul, & Rauschellbach, 2007). Of particular interest is the significant expansion in fresh vegetable production, resulting in growth for the domestic as well as export markets (Lorlowhakarn et al., 2007). Nevertheless, in relation to the total agricultural area, organic agriculture represents only a small fraction of traded

output (Ratanawaraha, et al., 2007). Ellis et al. (2006) and Pichpongsa (2007) have commented on the changing state of organic markets over the past 30 years. Since the 1990s, when the Thai organic market commenced exporting, there were rising concerns about health issues in the domestic market around the same time. By the mid 1990s, the economic recession in Thailand caused the collapse of the domestic market and hence exports increased. Early in the 21st century, the domestic market started to regain momentum and organic vegetables were the most popular. Most of the certified organic crop production at that time was export-oriented, leaving only an insignificant volume for the domestic market, consisting of fresh vegetables and grains—mostly rice and beans. Since that time, the range, volume, and brands of fresh organic vegetables have all expanded considerably. In 2004, many certified brands of organic farm produce started to appear in local supermarkets and modern trade outlets, particularly in Bangkok. These new entrants led to an increasingly competitive environment and helped reduce consumer prices (Ellis et al., 2006; Pichpongsa, 2007).

Production of organic crops is undertaken mainly by smallholders, farmer groups or by large agro-enterprises using organized groups of contract farmers (Ellis et al., 2006; Lorlowhakarn et al., 2007). Estimates indicate that certified organic production increased from 2,147 ha in 2001 to 22,550 ha in 2006, equivalent to 0.11 percent of the country's total agricultural area (21 million ha), representing an increase of over 950 percent over the 2001 area (Ratanawaraha et al., 2007). Nevertheless, Thailand's organically farmed land as a percentage of total agricultural area is among the lowest in the world, and is mid-ranked among Asian countries (Willer & Yussefi, 2006). In Thailand, many farmers adopt organic farming then abandon it because they perceive organic farming as a failure (Panthong et al., 2006). The abandonment of farmers from organic farming raises questions. Why do many farmers not succeed. How should they farm?

The main objectives of this study were to examine the existing situation and key success factors in the production of organic vegetables in Thailand, to investigate the constraints of organic vegetable production and marketing in Thailand from the lessons learnt by farmers and traders, and to formulate recommendations for improving the way to develop an organic vegetable system in Thailand.

## METHODOLOGY

Empirical and documentary analyses were applied using production and market information on organic vegetables. At the same time, primary data were collected from four selected best-practice farmers and/or processors/handlers—namely, Rai Thon Nuey, a commercial family farm located in Lop Buri province; Rai Plook Ruk (Thai Organic Farm) located in Ratchaburi province, with their own shop and health restaurant; Suwannabhumi Organic Co. Ltd., a company providing different kinds of organic products; Swift Co. Ltd., a company providing both organic and conventional line products and having control over small farmers. Semi-structured interviews and observation in the workplace were used for data collection. The following were included in the key questions:

1) How do the farmers undertake organic farming? What are the highlights of the main ideas and practices of farmers on organic farming from preparation through to harvest?

2) How can they succeed in organic production?

3) What techniques do they apply to generate their produce ?

4) What are the constraints on organic vegetable production and marketing? What are the differences between organic and chemical vegetables?

5) How should farmers start organic farming?

## RESULTS AND DISCUSSION

Thailand's organic sector is driven mainly by private companies, government projects, farmer cooperatives, grassroots support groups, and NGOs. The private sector in general comprises farmers who either work on large farms or operate as contract farmers at pre-agreed volumes, grades, and price levels. The companies provide technical advice and cash advances to the contract farmers. In registering for organic standards, the companies will also pay for and hold the organic certification in their name and not in the farmer's. It is noteworthy that larger Thai-based companies are increasingly entering the organic sector at all stages in the supply chain, including the production, processing, and marketing levels. These include large agro-industrial companies, whose aim is either to supply modern trade outlets in the domestic market, or to export to industrialized countries (Ellis et al., 2006).

Organic vegetables are mainly leafy vegetables (especially the types used in salads), Chinese vegetables, and premium crops such as asparagus and baby corn, produced mainly in central Thailand and in Chiang Mai province. In 2005 the total volume of organic vegetables including herbs delivered to market in Thailand was estimated at 4,618.18 t, valued at EUR 5.33 million (Ellis et al., 2006).

Organic vegetable producers can be classified into three types (Ellis et al., 2006; Stracke-Lassmann, 2007):

1) producers with single farms (commercial family farms)

2) small holders working together as a farmer group with contract farming that can be:

a. farmer groups under a common organic project

b. farmer groups under the large conventional companies with an organic product line as a contract grower group

3) large-scale corporate farms

**Farming techniques**

Rai Thon Nuey manages the field environment and farm inputs by using natural means. Soil nutrient is managed by using green manure or ploughing in weeds. Herbicides are not used but advantage is taken of the mechanism of the food chain. The company has an eco-friendly system for producing organic vegetables. Rai Plook Ruk has strengths in product management and market channels because they have their own restaurant. The farm of the Suwannabhumi Organic Company has special techniques for insect management, using lights and sounds to attract insects which are then killed. This may be a useful technique for emergency situations. The Swift Company uses their own model to help farmers start their operations by having a good production plan and strong marketing.

In summary, the techniques used on the four best-practice farms are: 1) preparation of the ecosystem, including soil nutrient management and tillage which is important for the plant root system, 2) planting, including selecting a crop type with a suitable season and diversifying crops, 3) crop maintenance, including biological control, lights and sounds to attract insects and using the food chain system, and 4) harvesting only the edible pieces and also using simple postharvest management (Figure 1). However, these techniques require farmers to be able to think outside the bounds of conventional agriculture, since most successful farmers have a systematic way of thinking and have come to farming through a career change. As a result, they are successful in organic farming.

The "organic agriculture" that the government, private sector, and country-wide farmers are interested in will not occur if it is practiced without true knowledge or it may develop in the wrong directions (Rangsipaht, Pornpratansombat, Parnuwad, & Saengchan, 2005).

**Key success factors on farming**

The key success factors and important techniques of organic agriculture based on the

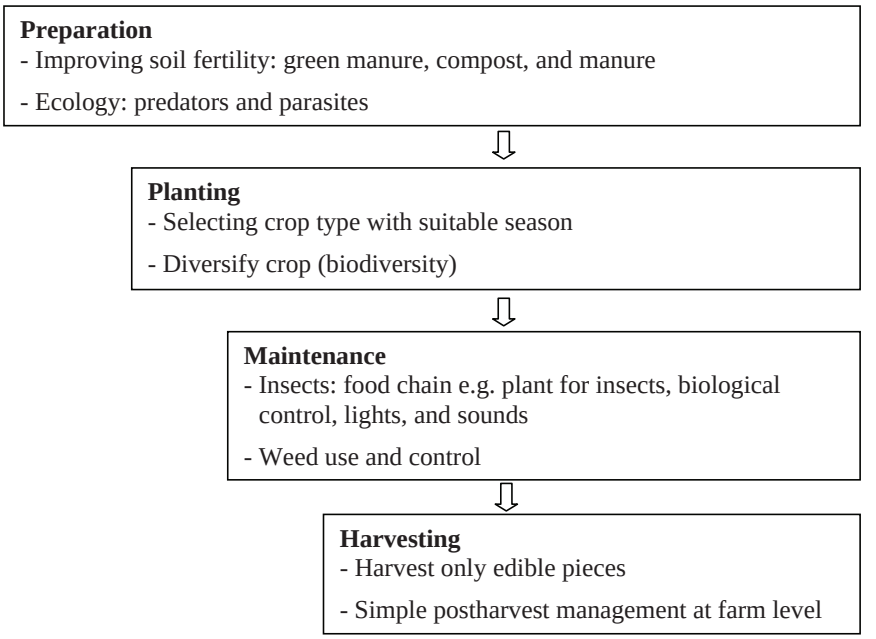


**Figure 1** Organic vegetable techniques

best-practice organic farms are:

1) Knowledge of "organic agriculture" enables people to think and to solve problems

2) A balanced ecosystem to enable everyone to live in harmony and for everyone to have enough to eat

3) Management of plant nutrients so there are sufficient supplies in the soil

4) Pest management through practicing natural management in the food chain, with a consistent approach

5) Diversification of crops by growing at least two types of plant simultaneously

6) Harvesting only edible pieces and leaving the rest for nutrient conservation in the field

7) Simple postharvest management at the farm level

8) All systems must be carried out simultaneously and collaboratively for successful organic agriculture.

These seemed to be the basic principles; however, they were not easily applied because many farmers lacked a systematic way of thinking and working. The principle of organic farming is sharing and giving, and at the same time integrating all resources in order to reduce wastes.

The processors and traders of organic vegetable products have key success factors (Table 1) that include: a farm production plan to provide sufficient volumes, improving quality by having good farming practices, a guarantee of direct access to markets at minimum or no cost, a direct supply chain from the farm to pack houses, minimizing waste (approaching zero), on-time payment and cost saving via a buyer's operation and production line.

These practices require not only the ability to think outside the bounds of conventional agriculture but also a good plan. Furthermore, market access with simple postharvest management at the farm level can lead to a longer shelf life, with good quality produce to be successfully promoted in the market. In addition, cooperation between the producer and the processor to streamline the supply chain and the promotion of fair trading are needed to reduce the cost of organic vegetables.

**Table 1** Key success factors of an organic vegetable system

| Production | Processing/ trading |
|---|---|
| - Farm production plan | - Direct supply from farm to pack houses |
| - Sufficient volume | - Minimizing waste (approaching zero) |
| - Good farming practice: knowledge, balanced ecosystem, plant nutrients, pest management | - Cost saving for buyer's operation and production line (streamline) |
| - Harvest only edible pieces | - On-time payment |
| - Postharvest control | - Direct access to market |
| - Quality of supply | |
| - Simultaneous and collaborate system | |

**Constraints of production**

Apart from the key success factors, some constraints were identified that act as obstacles to the production of organic vegetables in Thailand. The constraints were classified into bio-physical, economic and knowledge categories (Figure 2).

The bio-physical constraints consisted of low soil fertility, water shortage, irregular rainfall and pests. However, while these factors are similar to those encountered in conventional farming, they are more difficult to manage because no chemical applications are allowed in organic farming. The economic constraints were the high initial cost due to the requirements to prepare virgin land and the costs of improving the system, bio-physical problems and certification, high labor costs, high transport costs, the need for economies of scale with the volume produced especially for export, and extra marketing costs to achieve a premium price in the market. Finally, the knowledge constraints were a lack of understanding of on-farm problems such as nutrient balancing, crops and nutrients in relation to the environment, postharvest and processing management, and waste or residue management to add value, and also consumers' perceptions (health and environmental impacts). These constraints imply that more scientific knowledge and useful research are needed. In addition, a public relations

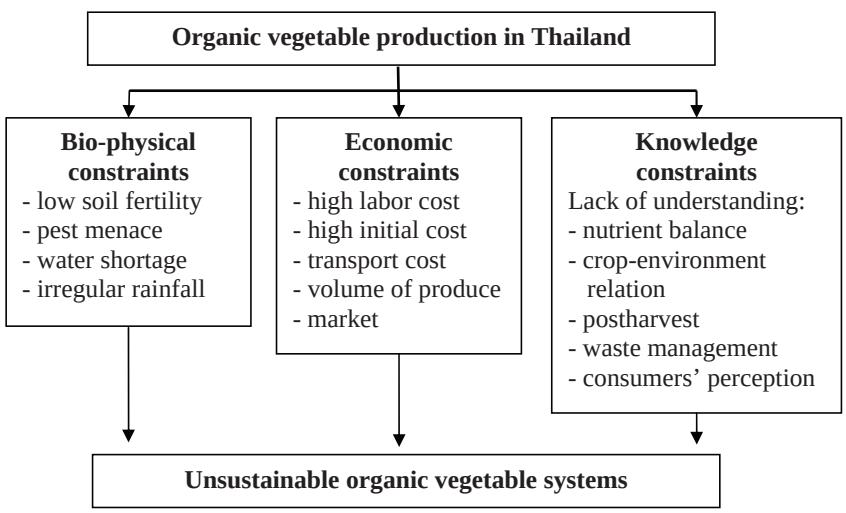


**Figure 2** Constraints on organic vegetable production

campaign on the benefits to both individuals and society should be promoted.

**Vegetable system problems**

Moreover, the study showed that an important problem of organic vegetable farming is that farmers do not know the fundamental causes of their farm problems, especially with regard to production techniques; rather they try to farm in response to the conditions of certification or the market. Consequently, they do not know the source of the problems and, as a result, they cannot solve the problems occurring on the farm and thus break the vicious circle that leads to abandonment of the business.

Figure 3 presents the problems in the vegetable system that are important obstacles to the implementation of vegetable organic farming. Due to chemical use and over use for pest control on the farm, the input costs are high. In the postharvesting process, producers pack their produce without applying any controls and then collectors or middlemen just collect the produce. The produces change hands through many traders before reaching the main markets and retailers. An extended time to deliver the fresh harvest to the consumer creates wastes and can greatly damage product quality if there is no postharvest control. Significant costs and profit-taking are added at every point in the supply chain. The products finally reach the consumers in a poor state and have a high price. All parts of this process threaten the enhancement of the organic vegetable system.

The way to solve the existing problems may be through sharing experiences, problems, and knowledge; by exchanging know-how; and though understanding the natural processes. Moreover, the four steps of problem solving should be considered (Naruthum, 2008; Pornpratansombat, 2010): 1) problem realization or knowing what the problem is; 2) in-depth analysis of fundamental causes of the problem; 3) cessation of the problem by implementing a decision making process, where the problem is either corrected or avoided, based on self reliance; 4) creating an alternative solution, with the pros and cons of each potential solution considered in order to select the most reasonable one. These steps should be implemented using an extension approach to facilitate or improve the farmers' abilities to solve their own problems.

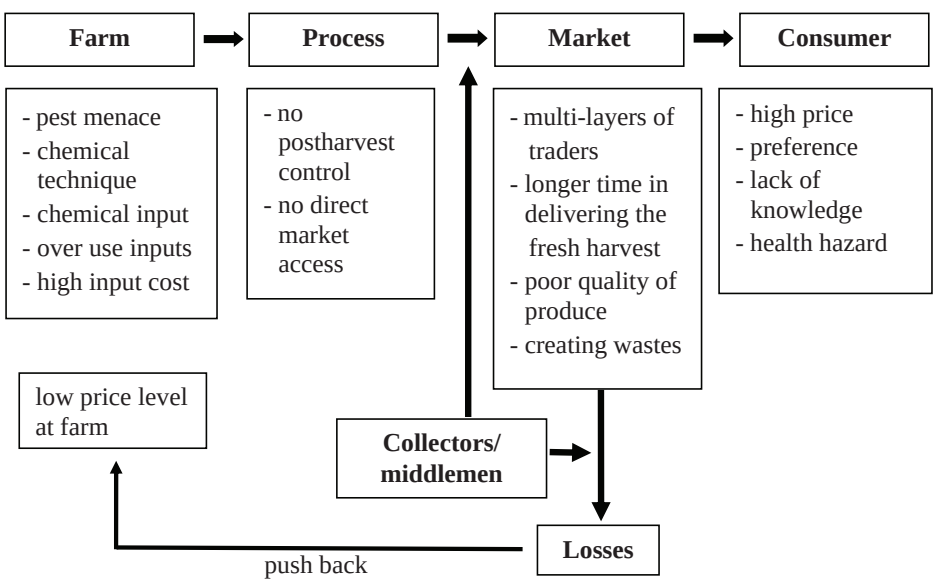


**Figure 3** Vegetable system problems

## CONCLUSIONS

Organic vegetables are mainly leafy vegetables (especially the types used in salads), Chinese vegetables, and exported crops such as asparagus and baby corn**.** Organic vegetables depend more on marketing. The success of farming required undertaking all practices with true knowledge and there must be collaboration on all systems which must operate simultaneously; for example, creating a production plan to provide sufficient volume, improving waste reduction practices throughout the supply chain, and direct access to markets in order to promote success. Some constraints and problems of organic vegetable farming not only occurred at the farm level and in the marketing system but also in the vegetable system resulting in obstacles to the expansion of organic farming to conventional vegetable farms.

## RECOMMENDATIONS

The sharing of problems, knowledge, and the exchange of know-how among farmers and with processors or traders should be considered. At the same time, farmers and processors need to understand problems and be able to manage them as well as apply knowledge to solve them. To improve their lack of capacity, strategies should be advocated, such as a production plan for farmers, including techniques for reducing a company's costs of production and developing the ability for farmers to manage their own problems.

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