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Growing organic herbs to support local businesses and promote sustainability under the Plant Genetic Conservation project, Surat Thani, Thailand

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Abstract The main focus of this study was to cultivate organic herbs to support local businesses involved in a project to conserve plant genetic diversity. The results indicated that all members were consistently growing organic herbs at their homes, with each cultivating five types of organic herbs and processing them for local enterprises. Additionally, they gained knowledge from the training program on various aspects, including processing and packaging, product quality inspection, marketing, and distribution. Following the training, there was an exchange of knowledge regarding the cultivation of herbal plants. The study found that age and educational attainment had statistically significant related with participation in the community enterprise operation at the 0.05 level, according to the Chi-square test results between personal data and the cultivation of organic herbal plants. Furthermore, the member responsibilities, product type, market type, and distribution methods were statistically significant related with participation in activities at the 0.05 level. This relationship was identified through testing the relationship between the community enterprise's overall data and participation in activities. A qualitative investigation revealed that the community enterprise's health products were safe and met quality standards. The promotion of connected-consuming behaviors was also noted. Online networks, such as Facebook and Line Group, served as platforms for training participants to network and share experiences, with 87.26% of participants exchanging data. Moreover, the training is facilitated the establishment of networks between farmers and external organizations to enhance distribution and production. The need for information exchange among training participants are emerged as a key driver for networking. This is involved the exchange of innovations and inputs to reduce production costs.

Keywords: Growing organic herbs, Local enterprises, Sustainability

Introduction

Thailand, being an agricultural country, extensively employs chemicals in many farms (Laohaudomchok *et al*., 2020). These chemicals serve as crucial

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inputs for enhancing the growth performance of food plants. Additionally, they aid in reducing the risk of damage to agricultural yields while simultaneously increasing yields. However, the excessive use of chemicals can lead to adverse impacts (Bisht and Chauhan, 2020). As of 2021, the country predominantly imported hazardous chemicals, with a significant portion originating from China, accounting for 72% of the total import, which amounted to 98,626,227 kilograms. The majority of these imported hazardous chemicals were herbicides, constituting 54.49% of the total. Following herbicides were insecticides at 21.71% and substances for plant disease prevention and eradication at 17.82%, respectively (DGA, 2023; ORA, 2023).

Given that Thailand serves as a hub for commercial agricultural production, the shift from traditional agricultural practices has led to synthetic chemicals playing a crucial role in crop protection (Lee, 2021). The extensive use of pesticides has become common, compelling farmers to invest in synthetic chemical inputs to ensure agricultural yields. However, this reliance on synthetic chemicals incurs high production costs, resulting in chronic losses and mounting debts for farmers (Rao and Morimoto, 2020). Consequently, farmers face challenges in maintaining a good quality of life and a stable income. Addressing issues related to the high cost of inputs and poor output quality is imperative for farmers and requires prompt resolution. Organic farming emerges as a viable alternative, emphasizing the conservation and restoration of agricultural ecosystems and national resources. Furthermore, organic farming integrates social and economic dimensions, recognizing that environmental sustainability is intertwined with the social and economic well-being of farmers (Gamage *et al*., 2023). Thus, organic farming presents an approach to alleviate the production cost problem. In fact, embracing natural methods can lead to reduced production costs and improved sales of agricultural yields.

The Department of Provincial Administration's strategy aims to promote and enhance the well-being and happiness of the people. One of the initiatives includes projects to promote and develop learning centers at the district level under the royal initiative projects. These projects are designed to formulate strategies based on the royal initiative and the philosophy of sufficiency economy, following in the footsteps of His Majesty (Sapbamrer *et al.*, 2023). Organic farming aligns well with the royal initiative, as it encourages farmers to engage in agriculture free from chemicals, relying on nature sustainably and harmoniously (Amekawa *et al.*, 2021). Additionally, the Thai government has developed a national master plan for the development of Thai herbs, Issue 1, 2017-2021 (Laipasu *et al*., 2023; On-aree *et al*., 2021).

Surat Thani province has been at the forefront, advocating for the Thai Herbal City Development Plan, aimed at enhancing the country's economic

competitiveness within the ASEAN region (Khongying and Siriyong, 2023). The plan aims to double the value of Thai herbs under the vision "Thai Herbs for Health Stability and Sustainability of Thai Economy" (Kaewkhuntee and Kortana, 2020). As part of these efforts, community enterprises have been promoted, focusing on business management in herbal processing, packaging, and marketing, under the Plant Genetic Conservation Project initiated by Her Royal Highness Princess Maha Chakri Sirindhorn. As part of these efforts, community enterprises have been promoted, focusing on business management in herbal processing, packaging, and marketing, under the Plant Genetic Conservation Project initiated by Her Royal Highness Princess Maha Chakri Sirindhorn (Hasayotin *et al*., 2023).

The Ban Thung Tamon community enterprise in Phanom district, Surat Thani province, plays a crucial role in the development of herbal plant production and community enterprises. The study aimed to investigate herbal plant cultivation within the context of promoting community enterprise development under the "Plant Genetic Conservation Project" for Development in Surat Thani Province.

Materials and methods

This agricultural extension study was conducted as action research aimed at promoting and supporting a good quality of life for farmers through participation in community enterprises at the local level. The project focused on herbal plant cultivation to promote local enterprises, encompassing five main types of herbs and turmeric. The study involved several stages, including the farmer participation process, collaboration in creating a training kit for growing organic medicinal herbs, the herbal plant cultivation process, knowledge exchange, processing and packaging, product quality inspection, as well as marketing and distribution. The sample group for this study comprised 144 out of 225 farmers in the Panom district of Surat Thani Province. The sample was selected using the method outlined by Krejcie and Morgan (1970).

In this study, the research instruments included an in-depth interview schedule, work data recording form, observation, focus group discussions, community forums, and questionnaires. To ensure the quality of the instruments, five scholars assessed their suitability, consistency, and comprehensiveness of content. Each item's Index of Content (IOC) was evaluated, with an average mean score of 0.50 and above deemed acceptable. Before implementation, the rating scale instrument underwent a trial run with a non-sample group comprising 30 individuals. Additionally, the reliability of the questionnaire was assessed

using Cronbach's α-coefficient, which yielded a value of 0.8, indicating a high level of internal consistency among the questionnaire items.

The study consisted of three phases: 1) preparation of the training kit on organic herbal plant growing; 2) holding a training with the participation process; and 3) following up on project participation results. This study tasted one year. Obtained data were analyzed by using descriptive statistics (percentage, frequency, mean and standard deviation), and Chi-square testing. The determination of practice/opinion levels based on 5 rating levels of Roengprapan (2000) were as follows:

Scale Limits	Score	Descriptive Equivalents
4.21-5.00	5	Highest
3.41-4.20	4	High
2.61-3.40	3	Moderate
1.81-2.60	2	Low
1.00-1.80	1	Lowest

Results

Social-economic attributes of the sample group respondents

Results of the study revealed that most of the respondents were female (77.08%), 51-60 years old, lower secondary school (43.75%) and elementary school graduates (42.36). Most of the respondents were farmers (75.00%), followed by community traders and company employees, respectively. All of the respondents were community enterprise members. They were committee members (18.75%) and registered members (81.25%). In other words, 42.36 percent were general members and 39.23 percent were ordinary members. Positions and responsibilities were systematically adjusted each year. It was under administration and restriction in the community such as production resources, local economy time constraints, and workplace relocation, etc.

Results of creating the training kit for growing organic herbal plants

The preparation of the training kit was based on suggestions of members and marketing tendency having a bit volume of orders in advance for products. According to market survey of the marketing section, main herbal plants as new materials from which products were produced as follows: Aloe Vera (85.25%), Blue Pea (72.50%), Kaffir Lime (68.35%), Citronella Grass (45.55%), and Turmeric (60.50%), respectively.

The training kit was prepared in accordance with steps and passed quality assessment by 5 scholars and improvement was based on suggestions of the

scholars. The training kit consisted of 8 parts: 1) standards on indicators, 2) essence, 3) learning objectives, 4) content of herbal plants, 5) activities on training process, 6) media on equipment used as learning sources, 7) measurement and evaluation, and 8) recording of results after training. The IOC range was found at 0.56-1.0 which was in a satisfaction level and used in the training. Besides, it was found that the sample group was satisfied with the training kit at a high level ($\bar{x}$=3.87, SD=0.350). Based on details, content of the herbal pants and activities on training process were found at a highest level ($\bar{x}$=4.36, SD=0.762 and $\bar{x}$ = 4.27, SD=0.674, respectively) as shown in Table 1.

Table 1. Results of the assessment of the training kit on organic herbal plant growing

Items	Level of description (n=144)		
	Mean	SD	Description
1. Standards an indication	3.31	0.830	Moderate
2. Essence	3.36	0.753	Moderate
3. Learning objectives	4.15	0.901	High
4. Content of the 5 kinds of herbal plants	4.36	0.762	Highest
5. Activities on training process	4.27	0.674	Highest
6. Media and equipment on learning sources	4.05	0.681	High
7. Measurement/evaluation	3.78	0.681	High
8. Recording results after the training	3.68	0.547	High
Total	**3.87**	**0.350**	**High**

Results obtained from the training on organic herbal plant growing

According to the training on organic herbal plant growing, it was found that the sample group chose to grow the 5 kinds of herbal plants in the same amount. They had been growing it in the areas their houses for 3 years found most (80.25%). This was followed by growing the herbal plants in gardens and fields (25%). Besides, it was found to be the most that the growing area was less than 100 square meters. Meanwhile, the sample group had knowledge exchange about herbal plant growing. For the participation process, the sample group cooperated in herbal plant growing on producing process, processing and packaging, inspecting of product quality, processing and packaging, inspecting of product quality, marketing and distribution.

Regarding the product processing process, the sample group chose to produce popular products. This included bar/liquid soap, shampoo, hair conditioner, lotion, herbal scrub powder and herbal compress. For domestic and foreign marketing, these were direct sales, online sales, consignment and trade shows. However, it was found that wholesale to hotels and resorts was the highest (65.25), followed by selling in stores and community markets (15.50%). Based

on the business operation, the sample group members had a monthly income range of 9,000-14,000 bath most (52.78%). They were interested in activities on the training process most; production process (64.58%) and produced a design and packaging (25.00%) as shown in Table 2.

Table 2. Interest in the production process activities of the community enterprise in additional issues

Item	No. of respondents	%
1. Finding new materials from neighboring communities	6	4.17
2. Working for the production process	93	64.58
3. Product design and packaging	36	25.00
4. Being a sales representative	9	6.25
Total	**144**	**100.00**

Regarding Chi-square test between personal data and participation in the community enterprise activities by growing organic herbal plants, it was found that, as a whole, age and educational attainment had statistically significant related with the participation in the community enterprise operation at 0.05.

Based on its details, the age had related with the participation in the community enterprise operation (Chi-square=102.297, Sig.=0.000). This was based on the following: Participation production (Chi-square-57.883, Sig.=0.000), marketing and distribution (Chi-square=30.503, Sig.=0.000), and self-development (Chi-square=84.370, Sig.=0.000). All of these had a statistical significance level at 0.05.

In terms of educational attainment, there was a relationship with the participation in activities on the community enterprise operation (Chi-square=5.974, Sig.=0.000). Based on its details, educational attainment had a relationship with the participation in production (Chi-square=16.728, Sig.=0.00), marketing and distribution (Chi-square=32.905, Sig.=0.000), and self-development (Chi-square=32.905, Sig.=0.000). All of these had a statistical significance level at 0.05. However, sex and occupation had no relationship with the participation activities of the community enterprise operation (Table 3).

Regarding the relationship testing between data of the community enterprise i.e. participation in activities, it was found that the following had a statistically significant relationship with the participation in activities: responsibilities of members, product type, market type and distribution at 0.05 level.

Table 3. Texting the relationship between personal data and participation in the community enterprise activities

Personal data		Participation in activities of the community enterprising			
		Production	Marketing and distribution	Self-development	Overall
Sex	Chi-square	4.989	2.168	5.577	6.986
	Sig.	0.173	0.338	0.134	0.222
Age	Chi-square	57.883	30.503	84.370	102.297
	Sig.	0.000*	0.000*	0.000*	0.000*
Educational attainment	Chi-square	16.728	11.347	32.905	54.974
	Sig.	0.010*	0.023*	0.000*	0.000*
Occupation	Chi-square	6.485	1.968	8.816	5.845
	Sig.	0.090	0.374	0.121	0.322

*Statistical significance level at 0.05

Based on its details, the responsibilities of members had a relationship with participation in activities of the community enterprise (Chi-square=23.141, Sig.=0.000). Considering each aspect, the responsibilities of members had no relationship with it. Regarding product type, there was a relationship with participation in activities of the community enterprise (Chi-square=81.585, Sig.=0.000). Based on its details, product type had a relationship with participation in production (Chi-square=56.44, Sig.=0.000), marketing and distribution (Chi-square=42.983, Sig.=0.000), and self-development (Chi-square=55.448, Sig.=0.000). All of these had a statistically significant relationship at 0.05.

Regarding market type and distribution, it was found to have a relationship with participation in activities of the community enterprise (Chi-square=79.704, Sig.=0.000). Based on its details, market type and distribution had a relationship with participation in production (Chi-square=44.365, Sig.=0.000), marketing and distribution (Chi-square=38.203, Sig.=0.000) and self-development (Chi-square=65.122, Sig.=0.000). All of these had a statistically significant relationship at 0.05.

According to incomes of the community enterprise members, there was a relationship with participation in activities of the community enterprise (Chi-square=29.456, Sig.=0.001). Based on its details, incomes of the community enterprise members had a relationship with participation in production (Chi-square=20.118, Sig.=0.003), self0development (Chi-square=13.643, Sig.=0.034) and marketing/distribution (Chi-square=7.740, Sig.=0.012). All of these had a statistically significant relationship at 0.05 (Table 4).

Table 4. Testing the relationship between data on the community enterprise and participation in activities of the community enterprise

Data of the community enterprise		Participation in activities of the community			
		Production	**Marketing and distribution**	**Self-development**	**Overall**
Responsibilities of members	Chi-square	4.494	1.362	4.805	23.141
	Sig.	0.213	0.506	0.187	0.000*
Product type	Chi-square	56.441	42.983	55.448	81.585
	Sig.	0.000*	0.000*	0.000*	0.000*
Market type/distribution	Chi-square	44.365	38.203	65.122	49.704
	Sig.	0.000*	0.000	0.000*	0.000*
Incomes of the community enterprise members	Chi-square	20.118	7.740	13.643	29.456
	Sig.	0.003	0.012	0.034*	0.001*

*Statistical significance level at 0.05

Conclusions of qualitative data gained from the training on organic herbal plant growing

According to the qualitative study conducted with the sample group participating in activities of the community enterprise, they grew organic herbal plants in the development dimension to promote the local community enterprise under the Plant Genetic Conservation Project for sustainability in Surat Thani province. They had been doing it for 3 years without agrochemicals in every step of production. They coordinated in input production; product quality inspection and control and they could apply for registration from the Food and Drug Administration office.

It was found that health products of the community enterprise were safe and its quality met standards. There was the promotion of connect consuming behaviors, Operation of activities of the community enterprise could be concluded as a diagram of the connection between various elements as follows:

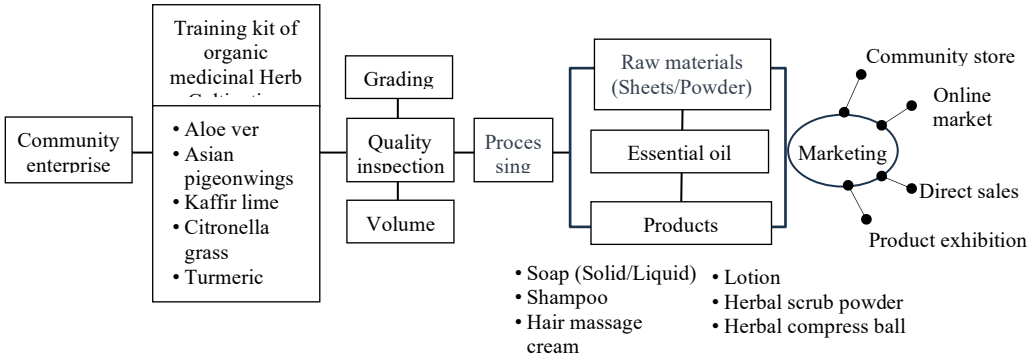

Figure 1. The relationship between the elements of cultivating organic medicinal herb plants to promote community enterprise

Networking after the training on organic herbal plant growing: networking of leaning and experience exchange among the training participants was in the form of online networks such as Facebook line group, there was information on data exchange (87.26%). Only 18.74 percent had not yet created networks. Besides, the training participants created networks with farmers and external agencies for developing production and distribution (15.62%). The important reason in networking raised from needs for information on data exchange of the training participants. It also included input exchange and innovation exchange on the production to reduce production costs.

Discussion

The Plant Genetic Conservation project in Surat Thani, Thailand, has done on growing organic herbs to support local businesses and promote sustainability. The study is provided important insights into the growth of community enterprises and organic farming techniques. The results of this study would be compared and contrasted with previous research in this debate, which would be followed by suggestions and a summary.

The result of this study in terms of the promoting organic farming and sustainability that the study underscored the importance of organic farming as an alternative to chemical-intensive agriculture, aligning with previous research (Gamage *et al.,* 2023). It highlighted the potential of organic farming to mitigate environmental degradation while ensuring economic sustainability for farmers. This aligns with the global trend towards sustainable agriculture,as supported by various initiatives and policies worldwide (Lee, 2021; Tscharntke *et al*., 2021). In term of community enterprise development with the emphasis on community enterprise development echoes findings from similar studies (Olmedo *et al.,* 2023; Sapbamrer *et al*., 2023). Community-based approaches have been recognized as effective strategies for promoting economic development and enhancing social cohesion, particularly in rural areas (Puangsuk, 2017). The integration of herbal plant cultivation into community enterprises aligns with efforts to diversify rural economies and empower local communities (Bejarano *et al.*, 2020). Additionally, the study's impact on training programs emphasized how beneficial they are for participants' development of knowledge and skills. This result is consistent with earlier studies that highlighted the value of capacity-building programs in promoting sustainable farming practices. (Adeyanju *et al*., 2021; Kansanga *et al*., 2021). Training programs are not only enhanced technical skills but also facilitated knowledge exchange and networking, as evidenced by the establishment of online networks among participants.

Contradictions and novel contributions were as follows: 1) age and educational attainment; while the study found a significant relationship between age, educational attainment, and participation in community enterprise activities, this contradicts some previous research suggesting that factors like age may not always correlate with participation levels (Nasalski, 2021). In order to fully comprehend the complex processes impacting involvement in community enterprises, more research is required, taking into account variables outside of demographics, and 2) Product type and market distribution; the study emphasizes how important to consider the product types and market distribution affect community entrepreneurial activity participation. This supports that market orientation is crucial for corporate operations, but it also emphasizes the necessity for customized strategies to meet the demands of certain markets. (Aghasafari *et al*., 2020). Community enterprises must be thorough understood the customer tastes and market dynamics in order to effectively promote organic products.

Based on the findings, several recommendations can be proposed to enhance the effectiveness of community enterprise development and organic farming initiatives.

Product portfolio diversification revealed to meet changing customer tastes and market needs, community businesses may consider expanding their range of offerings. This could entail finding organic product niche markets and performing market research. Training programs are specifically designed to address the requirements and difficulties that farmers and community business members encounter need to be created. The improvement of technical proficiency, business management strategies, and sustainable agricultural methods ought to be the main objectives of these programs. Increasing networking chances are concerned on farmers, community businesses, and outside organizations that should collaborate to increase networking opportunities. Information sharing and the spread of innovation can be facilitated via platforms for collaboration and knowledge exchange, such as farmer cooperatives and internet networks.

Policy support revealed through financial incentives, technical help, and regulatory support, government policies that should encourage and promote the development of community enterprises and organic farming techniques. This may foster an atmosphere to be favorable to rural economic growth and sustainable agriculture.

In conclusion, the study is offered insightful information about growing organic herbs in Surat Thani, Thailand, to help local companies and advance sustainability. This study is expanded the body of knowledge on community enterprise development and organic agricultural techniques by contrasting its

findings with previous research and highlighting areas for improvement. By putting the suggested solutions into practice, agricultural systems' resilience and sustainability that can be further improved, and community-level economic empowerment would be promoted.

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