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Research Article

Potential developments in smart farming among alumni members of the Future Farmers Organization of Thailand, Central Region

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Abstract

The study results revealed that out of 130 alumni members surveyed, 37 were engaged in agriculture. The details indicated that they primarily focused on growing field crops (21.62%), followed by vegetable growing, beef/dairy cattle rearing, duck rearing, ornamental plant growing, organic farming, mixed farming, orcharding, and seed-producing (16.21%, 13.51%, 13.51%, 10.81%, 8.10%, 8.10%, 5.40%, and 2.70%, respectively). The sample group utilized the knowledge and experience gained from activities of the Future Farmers Organization of Thailand (FFT) to establish production cooperation networks most frequently (86.52%), followed by marketing (63.75%) and exchange of knowledge (60.65%). The sample group indicated a need for potential development in production at the highest level ($\bar{X}$= 4.56, S.D. = 0.132), followed by processing and product value addition ($\bar{X}$= 4.32, S.D. = 0.163). Approaches suggested to increase production capacity included: 1) creating a smart farming system; 2) managing products and services; 3) developing branding, packaging, and accreditation; 4) administering agribusiness and marketing; and 5) managing finances and accounting through the establishment of an accounting system and capital analysis for business planning.Regarding a comparison of agricultural production potential development, there was a statistically significant difference at the 0.01 level between female and male sample group members. The former emphasized the importance of processing, innovation to reduce production costs, and the utilization of technology to replace labor, respectively.

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Introduction

The current global society is rapidly advancing in information technology, necessitating constant adaptation from individuals. In the College of Agriculture and Technology, teaching and learning facilitation takes three forms: 1) classroom activities, 2) farm work, and 3) organizing extracurricular activities. Emphasis is placed on hands-on learning in real-world situations to equip students with the knowledge and skills necessary for effective planning and problem-solving. Students have the flexibility to choose their major field of study based on their interests and potential. Notably,

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they can select learning methods through supervised occupational experience programs that promote teaching and learning through farm experiential learning.

Siriwan (1989) proposed that teaching and learning facilitation in agricultural vocational education can be categorized into three types: school demonstration farm projects, student experimental projects, and agricultural projects under supervision. In Thailand, these typically fall under the college demonstration category, characterized by the following features:

In this project type, students do not have ownership or direct responsibility for farm work management or farm incomes. All farm yields belong to the college, with college administrators, agriculture teachers, and personnel responsible for farm management providing guidelines for student involvement. Students engage in various farm tasks under strict and close supervision. This project type serves as a platform for students to acquire basic skills on the job and gain experience in agricultural occupations.

This project type serves as a master plan that provides students with opportunities to work in various farming fields and participate in various internships. Somudon (2006) and Maaneechot (2013) stated that activities aimed at promoting agricultural vocational education to train students to consider themselves as future farmer leaders are part of the Future Farmers of Thailand organization, adapted from the Future Farmers of America (FFA). It is essential for developing theories and practices among agriculture/fisheries students. Nowattana (2010) claimed that the Future Farmer Organization of Thailand, under the program in the College of Agriculture and Technology, emphasizes the development of leadership, personality, collaboration, sportsmanship, thrift, and tolerance. Many students are interested in the Future Farmers of Thailand organization, which has been carrying out its tasks for a long time. It also fosters good relationships between students and teachers, which positively impacts effective teaching and learning.

Objective

To learn how to do agriculture correctly and correctly.

To pass on knowledge to younger generations who work in agriculture.

To carry out the process of carrying out the main activities of the Future Farmers of Thailand organization

Agricultural project writing skills used in the upgrade project to effectively write plans for farming into the future.

Method

The study on the potential development of farmers who are alumni of the Future Farmers Organization of Thailand, leading to smart farming, utilized a mixed methods research approach. Both qualitative and quantitative techniques were employed to collect data aimed at exploring and promoting the sample group's involvement in agricultural production potential development, as detailed below:

Exploration of general data and needs for potential development in agricultural production among farmers who are alumni of the Future Farmers Organization of Thailand. Questionnaires and interviews were used for data collection with a sample group consisting of 37 out of 130 alumni of the Future Farmers Organization of Thailand. All participants were farmers selected through purposive sampling.

The grouping of agricultural production among the sample group was analyzed to shape and support the development of production potential in various ways. In this study, a project was initiated to develop the potential in agricultural production among the sample group. Monitoring was conducted after they had undergone training, and assessment was performed through interviews and recorded data on agricultural production activities.

Research instruments in this study included questionnaires, structured-interview schedules, recording forms, and assessment forms. The content validity and consistency of objectives were inspected using the IOC value (0.06-0.10), followed by improvements based on expert suggestions. The collected data were analyzed using descriptive statistics and paired-samples t-test, with the results interpreted through content analysis. Need and satisfaction ratings were utilized as estimation scales, employing a 5-point rating scale. Criteria for interpreting the formula calculation were as follows:

$$\frac{\text{The highest threshold–the lowest threshold}}{\text{Total number of criteria}} = \frac{5-1}{5} = 0.80$$

Were:

Score	Scale limits	**Descriptive** (need/satisfaction)
5	4.21-5.00	Highest
4	3.41-4.20	High
3	2.61-3.40	Moderate
2	1.81-2.60	Low
1	1.50-1.80	Lowest

Results

The results of the study on the potential development of alumni of the Future Farmers Organization of Thailand (FFT) leading to smart farming, based on three periods, were as follows:

Table 1. General data of the farmers who were alumni of FFT based on sex and educational attainment (Central unit)

Variables	**n=37**	**%**
Sex		
Male	15	40.54
Female	22	59.46
Educational level		
Vocational certificate	13	35.14
Higher vocational certificate	19	51.35
Bachelor s degree	5	13.51
Total	**37**	**100.00**

According to the table, it was found that more than half of the samples were female (59.46%). Most of the sample comprised higher vocational certificate students (51.35%), while a smaller percentage were bachelor's degree students (13.51%).

Table 2. Data on the occupation of the samples

Item	**n=37**	**%**
Growing vegetables	6	16.21
Growing field crop	8	21.62
Rearing dairy/beef cattle	5	13.51
Rearing ducks	4	10.81
Growing ornamental plants	4	10.81
Organic farming	3	8.10
Mixed farming	5	5.40
Orcharding (fruit trees)	2	5.40
Producing seeds	2	5.40
Producing organic fertilizer	1	2.70
Total		**100.00**

According to Table 2, most of the samples were involved in field crop cultivation (21.62%), followed by vegetable growing (16.21%), dairy/beef cattle rearing, and duck rearing. Only 5.40 percent of the samples were involved in seed production, and 2.70 percent in organic fertilizer production.

Table 3. Adoption of knowledge and experiences acquired from activities of FFT.

Item	**n=90**	**%**
Building a network of cooperation in agricultural production	32	86.49
Marketing and distribution	30	81.08
Exchange of agricultural body of knowledge	28	75.67
Planning of agricultural production body of knowledge	24	64.87
Planning of agricultural production, project implementation and assessment need for being an agricultural leader	23	62.16
Processing and value-added of agricultural yield	23	62.16
Agricultural production technology	19	51.35

According to Table 3, the sample group adopted knowledge and experience to build a cooperation network in agricultural production the most (86.49%). It was followed by marketing and distribution, exchange of agricultural body of knowledge, and assessment (81.08%, 75.67%, and 64.87%, respectively). However, agricultural production technology was found to be the least adopted (51.35%).

Table 4. Need for potential development in agricultural production.

Item	$\bar{x}$	**S.D.**	**Description**
Reducing production costs	4.23	0.320	High
Processing and yield value – added	4.35	0.135	Highest
New business enhancement and marketing	4.32	0.163	Highest
Appropriate technology and tools for agricultural production	4.56	0.132	Highest
Agricultural production with a database	3.53	0.423	High
Smart farm and digital technology agricultural production	4.02	0.125	High
Sustainable organic farming production	4.12	0.321	High
The agricultural network system of the New Age	3.80	0.231	High
Total	4.28	0.325	High

According to Table 4, as a whole, the sample group showed a high level of need for potential development in agricultural production ($\bar{x}$=4.28; S.D.=0.325). Based on its details, the following was found at the highest level: appropriate technology and tools for agricultural production; processing and value-added yield; and enhancement of new business and marketing ($\bar{x}$=4.56; S.D.=0.132; $\bar{x}$=4.35; S.D.=0.135; and $\bar{x}$=4.32; S.D.=0.163, respectively). The rest were found at a high level.

Table 5. Suggestions of guidelines for increasing potential in agricultural production in the form of a member network group of FFT.

Item	**n = 37**	**%**
New age of agricultural production	22	59.45
Agricultural processing and yield value-added	28	75.68
New business enhancement and marketing	23	62.16
Development of production and marketing network	21	56.77
Creating a smart farming system	35	94.59
Management of freight and service system	34	91.89
Branding, packaging development, and accreditation	31	83.78
New age of agricultural business and marketing	30	81.08
Finance and accounting management by establishing an accounting system and analyzing costs	29	78.37
Appropriate technology in agricultural production	25	67.57
Management of quality and cost reduction of agricultural	28	75.68
Business planning for young agricultural entrepreneurs	24	64.86

According to the Tables, the top five guidelines for increasing potential in agricultural production in the form of member network group of Future Farmers Organization of Thailand are as follows: 1) creating a smart farming system (94.59%); 2) management of freight and service system (91.89%); 3) branding, packaging development, and accreditation (83.78%); 4) new age of agricultural business and marketing (81.08%); 5) financial and accounting management by establishing an accounting system and analyzing costs (78.37%), respectively.

Table 5. Comparison of agricultural production potential development needs between male and female participants

Item	**n=37**	$\bar{x}$	**S.D.**	**T**	**Sig**
Male	15	4.02	0.134	-13.316*	0.000
Female	22	4.34	0.253		

*Statistical significance level at 0.1

The comparison of needs for the development of potential in agricultural production based on gender revealed a statistically significant difference at the 0.01 level—specifically, the female sample group prioritized processing and creating a diversity of products and new marketing strategies. In contrast, the male sample group emphasized the production process, innovation to reduce production costs, and the utilization of technology to replace the workforce.

In-depth interviews were conducted with alumni of the Future Farmers Organization of Thailand (Central unit) who were engaged in farming, leading to smart farming. The following insights were revealed:

Acquired knowledge from participating in activities of the Future Farmers Organization of Thailand was adopted for farming in the following ways:

Learning correct farming methods.

Passing on their knowledge to younger generations working in agriculture.

Implementing the process of executing the main activities of the Future Farmers Organization of Thailand for farming, which was promoted as an effective master plan for future farming.

Activities of the Future Farmers Organization of Thailand promote agricultural occupation and facilitate networking in farming through:

Promotion of skills in analytical thinking process and effective career planning.

Creation of working networks using the main activity pattern, such as community relations activities, to build a stable network of farmers.

Preparing income and expense accounts correctly, focusing on business enhancement and savings.

Besides, the activities could help in planning to use money fully and efficiently in the main activity model of the Future Farmers Organization of Thailand; that is, business enhancement and savings. It involved the size of production per sales area; marketing or business size in the nature of large-scale marketing in agricultural export traders; and middle-level marketing in provincial areas, e.g., Si Moeng, Tai, Si Mum Maeng, and Nong Buoy markets in Phetchaburi province.

Participation in activities of the Future Farmers Organization of Thailand took the form of participation in agricultural vocational seminars and exchanging knowledge in academic conferences at unit, regional, and national levels. In this respect, the main activities included the following:

Activities promoting the skills and experience of agricultural leaders, such as selection as an outstanding alumnus of the Future Farmers Organization of Thailand at unit, regional, and national levels. A report was presented to Her Royal Highness Princess Maha Chakri Sirindhorn.

Participation in agricultural development activities related to the Future Farmers Organization of Thailand.

Public relations activities regarding news or information of the Future Farmer Organization of Thailand and agricultural networks. It aimed to promote learning in the College of Agriculture or Alumni House to access learning about suitable farming methods.

Activities that generated other agricultural support information for interested farmers to use in decision-making, such as information about shops selling agricultural products and reducing agricultural production costs.

The additional needs of the sample group are as follows:

Learning based on demonstrating proper and safe farming practices performed by alumni.

Support for agricultural inputs such as plant varieties and animal breeds from alumni.

Conclusion and Discussion

According to the results of the study conducted with a sample group of 37 alumni of FFT, it was found that they were most engaged in growing field crops (21.62%), followed by vegetable production, dairy/beef cattle rearing, duck rearing, ornamental plant growing, organic farming, mixed farming, orcharding, and seed production (16.21%, 13.51%, 13.51%, 10.81%, 8.10%, 8.10%, 5.40%, and 2.70%, respectively). This aligns with the objectives of agricultural vocational teaching and learning facilitation, which aimed to enable learners to apply acquired knowledge, skills, and experience from agricultural education to farming practices (Siriwan, 2013; Intorted, 2015; Poungsuk, 2017).

Furthermore, the occupational development of the sample group, consisting of farmers and FFT alumni, was facilitated through relationship networks formed from their participation in activities. The study revealed that the sample group communicated with each other to exchange knowledge and experience in agricultural occupation and yields. It indicates that the activities of the Future Farmers Organization of Thailand promoted and supported agricultural development as a professional group with creative thinking, particularly in the exchange of knowledge within agribusiness networks, which is essential in today's agricultural careers with borderless communication (Sarakul and Sriboonruang, 2022; ETDA, 2019).

Additionally, it was found that both male and female sample groups had different needs for potential development, with statistical significance at the 0.01 level. It suggests that the farmer sample group was interested in self-potential development. The female group prioritized processing, creating a diversity of products, and adopting new trends in marketing, while the male group focused on the production process, innovation for reducing production costs, and utilizing technology to replace the workforce. This relationship between gender and human potential development aligns with previous studies (Subsiri et al., 2017; Poungsuk and Junlex, 2018), which found that male farmers were more

interested in production and agricultural machinery, whereas female farmers focused on self-development in online business and product development.

In conclusion, the sample group provided many vital suggestions for the potential development of agricultural production in the digital age. These suggestions address challenges such as the COVID-19 pandemic and changes in communication systems related to production management with the assistance of appropriate technology. Importantly, business activities have transformed into online marketing.

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