
Factors affecting farmer's participation on agricultural extension of the longan collaborative farming project in Lamphun Province, Thailand

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Abstract The study found that the level of participation of interviewed members in this agricultural extension was moderately level. The aspect with the highest average score was the participation in benefits, followed by participation in decision - making, participation in implementation, and participation in evaluation. The positive participating factors in agricultural extension were found to be variety of technology using for production, production income, holding a position in collaborative farm, being a member of agricultural organization, a number of information sources and a number of contact channels. The negative participating factor was the land size which used for longan production.

Keywords: Farmer's participation, Agricultural extension, Collaborative farming project

Introduction

The The agricultural sector in Thailand is still confronting many problems and challenges such as the inaccessibility of most farmers to obtain accurate and necessary information, and lack of land ownership or some part of it. Therefore, farmers have no incentive to invest in any effort to improve their production efficiency, resulting in low production efficiency and improper use of inputs (Office of Agricultural Economics, 2017; Chantharat *et al.*, 2018). It is also indicated that several cash crops are grown in the areas classified as 'slightly suitable' or 'unsuitable', resulting in low productivity and high production costs with low return or loss (Land Development Department, 2019). Agricultural production is also affected by global climate change, where higher temperatures may cause the spread of more weeds and pests (Meteorological Department, 2020). In addition, smallholder farmers also lack economies of scale, lack bargaining power in the market system, and have limited access to modern technology (Attavanich *et al.*, 2019).

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Thailand's agricultural sector has also been affected by the vulnerability or volatility of the global economy. External factors such as crude oil price and exchange rate can affect agricultural production, so do internal factors like the Thai economy, water situation, and pests (Department of Internal Trade, 2020). Moreover, agricultural household debts tend to increase (Bureau of Agricultural Economic Research, 2020). It was also observed that few numbers of new generations inherited farming occupation (Lursinsap *et al.*, 2023), whereas the farming population is getting older as the country is becoming an aging society. This situation will affect the quality and quantity of labor and can deteriorate the financial stability of Thai households (Bank of Thailand, 2018).

As agricultural production is in a rapidly changing context with higher production costs, and agricultural marketing is highly competitive in terms of quantity and quality, smallholder farmers increasingly encountered the problems regarding the production and distribution of agricultural products. Ministry of Agriculture and Cooperatives, therefore, launched a 'collaborative farming' project in 2016 to solve such problems. The Department of Agricultural Extension is the main agency implementing this project across the country via its district and provincial agricultural offices. It also works collaboratively with other relevant agencies such as Provincial Cooperative Office, Provincial Land Development Station, Provincial Irrigation Project, and Provincial Commercial Office. In 2021, there were 8,181 farms participating in the collaborative farming project with 494,441 farmers, and 6,476,505 Rai of farmland. The collaborative farming project covers 11 agricultural product categories including rice, field crops, perennials, vegetables/herbs, fruit/perennial plants, mulberry, ornamental flowers, livestock, economic insects, and others (Department of Agricultural Extension [DOAE], 2021).

Lamphun Province is one of the important agricultural areas in the upper northern region. There are reported to be 687,123 Rai of agricultural area (24.40 % of the total land area) with 59,886 farm households. Most farm households grow fruit/perennial plants, followed by rice and field crops (Lamphun Provincial Agriculture and Cooperative Office, 2021). According to Department of Internal Trade (2020), longan is an important economic crop in the province with 348,570 Rai of plantation area, which is the largest compared to other crops' production area. In addition, longan also generates the highest revenue the province, followed by in - season rice, maize, and mango (Lamphun Provincial Agricultural Extension Office [LPAEO], 2020a). Lamphun Province has implemented the collaborative farming project since 2016. In 2021, there were 74 collaborative farms with 4,127 farmers and 39,066.50 Rai of farmland. The collaborative farms produce 11 types of agricultural products including rice, maize, longan, native chicken, potato, dairy cow, bee, garlic, vegetable/herb, rubber, and mango (DOAE, 2021).

As for longan, Lamphun province had 40 longan collaborative farms in 2020, which are the highest number in Thailand. The longan collaborative farms are located in all districts with 2,327 participating farmers and 15,663 Rai of plantation area. LPAEO and its district agricultural offices carried out activities together with the collaborative farmer members to achieve production cost reduction, productivity improvement, and development in quality, marketing, and management. To implement the relevant activities, all offices of LPAEO have been working with various government agencies and educational institutions in the areas, such as Maejo Longan Research and Development Center, Lamphun Land Development Station, and Lamphun Provincial Irrigation Project (LPAEO, 2020b).

However, the operation of longan collaborative farms in Lamphun province achieved limited success. The evaluation of longan collaborative farming project in the province indicates that in the year 2020, of 40 collaborative farms, only six (15 %) earned an A grade. Moreover, Longan collaborative farms still encountered many problems such as the lack of effective management (LPAEO, 2020b), low adoption of production technology (Mingmongkonsasithorn *et al.*, 2019; Thammakhunkaew *et al.*, 2021), and lack of marketing linkage with cooperatives and private sector (Lamphun Provincial Cooperative Office, 2019). Moreover, the operations of departments under Ministry of Agriculture and Cooperatives lack integration and have different budget allocation timeframes (LPAEO, 2020b).

From the aforementioned problems, it shows that the farmer's participation is an important factor in driving the operation of longan collaborative farm to be successful and sustainable. The participation is communication between individuals, groups, communities or organizations in the course of one or more activities, and both of formal and informal, which can involve the process of getting people involved in the development of work (Berkley, 1975; Cohen and Uphoff, 1981). The participation of beneficiary groups will develop and strengthen the capacity of development initiatives, which increase potential and lead to change and sustainability (Rahman, 1993; Conyers and Hills, 1990). Participation aims to achieve the collective aims of the group, and strengthening unity a sense of responsibility for the group as well (Namburi, 2019). Participation of farmers on agricultural extension activities, can develop and increase the potential of agricultural production and ensures the sustainability of agribusiness (Anwarudin and Dayat, 2019; Jaipong *et al.*, 2022). Including the participation of farmers in water resource management activities will result in relevant agencies using the information to plan access solutions. The utilization of water will affect the quality of farmer's life in the future (Jitae, 2019). Managing participation in an appropriate way is more likely to achieve beneficial results (Reed *et al.*, 2017).

The concept of participation used to study with farmers on agricultural extension of the longan collaborative farming project in Lamphun province

is based on the concept introduced by Cohen and Uphoff (1980). Cohen and Uphoff described that the participation of farmers consists of a set of cycle activities; participation in decision-making by defining one's needs and prioritizing them. Subsequently, a participate selects the policies and citizens involved. Decision making is an ongoing process that must be continued from the very beginning to the end during the planning process and the implementation of the plan, participation in implementation. The components of project implementation are derived from the question of who can contribute to the project and how they can benefit, such as resource assistance, administration, coordination, assistance, etc., participation in benefits by considering the importance of quantitative and qualitative benefits. A participate will also have to consider the distribution of benefit, including the positive and negative benefits of the project, and participation in evaluation of these outcomes as: what is important to observe are opinions, preferences and expectations and which influence can change the behavior of individuals in different groups.

The objectives were to study the participation level of the farmer members on agricultural extension of collaborative farming project, and analyzed the influential factors in this participation level of the farmer members in Lamphun province.

Materials and methods

Population and samples

The population was the farmer members from the selected longan collaborative farms in Lamphun province, Thailand. The method of multi-stage sampling was employed to collect a sample set consisting of the following four steps.

A purposive technique was used to select sampled districts. The following top 5 out of 8 districts of the most longan plantation were included in this study: Li, Pa Sang, Mae Tha, Mueang Lamphun, and Ban Hong. These five selected districts totally cover 85.84 % of the longan plantation area in the province.

A purposive technique was used to select longan collaborative farms from the selected five districts based on the following attributes: group size, year of establishment, and production type (in/off-season). In total, the distribution of 11 longan collaborative farms among five districts chosen is as follows: 5 longan collaborative farms in Li, 2 longan collaborative farms in Pa Sang and Mae Tha, and 1 longan collaborative farm in Mueang Lamphun and Ban Hong.

Based on the sampling method, there was a total of 1,218 farmer members. Unfortunately, this number was rather high for practically collecting the informative data. Thus, this number was used to calculate a sample size based on Yamane's formulation (Yamane, 1973) at 95% of the confident level. Thus, the sample size

of 1,218 is reduced to 302 samples. For each selected collaborative farm, a simple random sampling was used to identify individual farmer for data collection.

Research instruments and data collection

The instrument is used a structured questionnaire asking about farmer's participation in agricultural extension of the longan collaborative farming project in Lamphun province, Thailand. The questionnaire focused on these 4 aspects of participation in decision-making, participation in implementation, participation in benefits, and participation in evaluation. Likert's scoring scheme (Likert, 1932) was adopted to evaluate each aspect, which is 1 = very low; 2 = low; 3 = moderate; 4 = high; 5 = very high. A structured interview was conducted by using an approved and tested questionnaire. The approved questionnaire was preliminarily tested on 30 tentative farmers, not the target samples, having similar characteristics. Then, Cronbach's alpha was applied to evaluate and analyze the reliability of the questionnaire. The total questions of 4 parts have Cronbach's reliability value $\alpha = 0.716 - 0.814$ which is higher than the threshold value of 0.7 (Peterson, 1994; Taber, 2018; Hair *et al.*, 1998). Hence, the questionnaire passed the test and could be used for collecting the data.

Data analysis

The collected data were analyzed by using descriptive statistics such as frequency, mean, and percentage to explain personal characteristics with the weight mean score of Likert's scoring scheme. The following 5 levels are defined: 1.00-1.80 = very low; 1.81-2.60 = low; 2.61-3.40 = moderate; 3.41-4.20 = high; 4.21-5.00 = very high. Multiple regression analysis was used to identify the primary independent variables with the level of farmer's participation as the dependent variable. There are 15 independent variables which are sex, age, education, production plan, land size used for production, number of water resources, number of workers employed, variety of technology used, ways to distribute the products, production income, holding a position in longan collaborative farm, holding a social position, number of memberships in agricultural organization, number of information sources, and number of contact channels.

Results

Characteristics of the samples

From the analysis of all 302 samples, the following 23 statistical values were discovered more than half are male (57.3%) with the average age of 60.5

years old, 55.6% of them graduated from elementary school, 36.8% of them have a longan in - season type of production plan, 29.8% of them had an off - season type of production plan, 33.4% of them had both types of production plan, nearly half of the farmers have 6 - 15 rai of land size used for production (42.1%), more than half of the farmers had one resource of water (66.9%), most of them employed 1 - 5 workers produced longan (40.7%), 63.6% of them used 4 - 6 varieties of technology, 84.1% of them had only one way of product distribution, 67.5% of them sell the products at their farms, the average income from longan production were 106,179.8 baht, 74.5% of them did not have any position in any collaborative farm, only 60.9% of them hold a social position, 72.8% of them were members of 1 - 2 agricultural organizations, 37.7% of them were only 2 information sources, 37.7% of them were one contact channel.

Level of farmer's participation

The study found that the farmer members of longan collaborative farms in Lamphun province was moderately participated in all aspects on agricultural extension of the longan collaborative farming project at the level of $\bar{x} = 3.35$; participation in benefits that was the level of $\bar{x} = 3.49$; participation in decision - making was at the level of $\bar{x} = 3.42$; participation in implementation was at the level of $\bar{x} = 3.37$; and participation in evaluation was at the level of $\bar{x} = 3.11$, respectively. (Table 1).

Table 1. Level of farmer's participation

Aspects of farmer's participation (n=302)	$\bar{x} \pm S\bar{x}$	Level of participation
1) participation in decision-making	3.42±0.057	High
2) participation in implementation	3.37±0.053	Moderate
3) participation in benefits	3.49±0.055	High
4) participation in evaluation	3.11±0.063	Moderate
Total	3.35±0.053	Moderate

Note: 1.00 - 1.80 = very low; 1.81 - 2.60 = low; 2.61 - 3.40 = moderate; 3.41 - 4.20 = high; 4.21 - 5.00 = very high

Factors affecting farmer's participation

The results showed that the F value was significantly at the level of 0.01. Therefore, at least one independent variable affecting farmer's participation on agricultural extension of the longan collaborative farming project in Lamphun province was significantly differed at the level of 0.05, and all 15 independent variables explained the variation of the dependent variables.

Seven influencing independent factors were found which classified into positive and negative participation. There were six positive factors showed a variety of technology use, production income, holding a position in longan collaborative farm, number of memberships in agricultural organizations, number of information sources, and number of contact channels at the significant level of 0.05. But there was one negative factor related to the land size for longan production at the significant level of 0.05. These seven fundamental factors were influenced the satisfaction of other circumstances by 42.10% ($R^2 = 0.421$) as summarized in Table 2.

Table 2. Summary of the factors affecting the participation and relevant statistical values from the analysis

Independent variables	Statistics showing relationship between independent and dependent variables				Multicollinearity	
	B	β	t	Sig.	Tolerance	VIF
(Constant)	2.302	-	6.741	<.001**	-	-
1) Sex	.182	.098	1.892	.060	.753	1.328
2) Age	.001	.013	.261	.794	.785	1.275
3) Levels of education	-.060	-.032	-.572	.567	.639	1.565
4) Production plan	.114	.059	1.151	.251	.781	1.281
5) Land size used for production	-.007	-.113	-2.173	.031*	.748	1.337
6) Number of water sources	-.102	-.069	-1.349	.178	.768	1.301
7) Number of workers employed	-.001	-.008	-.158	.875	.756	1.322
8) Variety of technology used	.110	.205	3.927	.000**	.743	1.345
9) Ways of product distribution	-.048	-.048	-.990	.323	.864	1.157
10) Production income	6.925E-007	.115	2.086	.038*	.667	1.500
11) Holding a position in longan collaborative farm	.691	.329	5.875	.000**	.647	1.547
12) Holding a social position	-.037	-.020	-.379	.705	.755	1.324
13) Number of memberships in agricultural organizations	.087	.111	2.043	.042*	.689	1.451
14) Number of information sources	.048	.117	2.075	.039*	.638	1.567
15) Number of contact channels	.098	.131	2.253	.025*	.597	1.674
	R ² =.421 (42.10%)		SEE. = .716 F=13.870 (Sig.<.001)			

From the statistical analysis, the conclusion of each factor was explicitly stated as following. For variety of technology use, the increased in technology

and participation were congruent. Deploying one additional technology is obviously raised the level of participation by 0.110 points. For production income, increased in income that additionally improved the level of participation by 6.925E - 007 points. For holding a position in longan collaborative farm, holding a position in longan collaborative farm was clearly boost the level of participation by 0.691 points. For having several memberships in agricultural organizations, being a member of one additional agricultural organization can be made the level of participation higher by 0.087 points. For number of information sources, it was more than one source of information increased the level of participation by 0.048 points. For number of contact channels were more than one contact channel that improved the level of participation by 0.098 points. Land size used for production possessed additional land size of one rai that reduced the level of participation by 0.007 points.

Discussion

In terms of economic study, it was found that earning more income from longan production can stimulate the chance of participation in agricultural extension of the longan collaborative farming project. This may be resulted to farmers being satisfied with the income from longan production after joining the project, which induced the consequence of making them more involved in activities. The finding confirmed the result reported by Wichit *et al.* (2019). They reported that increased farmer incomes resulted in an increased demand for their involvement in ecotourism management because those high-income farmers were ready to make an easy decision to participate in the activity as previously studied by Poomasree (2022). They reported that production income was a factor affecting people's participation in the administration of Choeng Doi subdistrict municipality. Including farmers who used a variety of technologies to produce longan tended to increase their participation on agricultural extension of the longan collaborative farming project. This may be resulted of farmers focusing on longan production technology which gained from the agricultural extension. Consequently, the farmers were confidence and wanted to learn more information. The finding confirmed the result reported by Ngoro *et al.* (2014). They reported that farmers who accepted the use of technology will participate in agricultural extension activities.

However, possessing a lot of pieces of land for longan production clearly affected to decrease the farmers' participation on agricultural extension of the longan collaborative farming project. Each piece of owned land needed to look after and required more activities for efficient land use. It was not regularly participating in group activities as result. The finding confirmed the result reported by Wichit *et al.* (2019). They reported that each piece of land decreased

participation level in ecotourism management. There was more farmland, inevitably be found to be more responsibilities. Therefore, it was necessary to use a lot of labours and time, resulting in being unable to participate in the activity. The results of the study contradicted the findings of Siddig (2014) who found that farmer had a large planting area of date palm would involve in extension activities.

According to social status, holding a position in some longan collaborative farm tended to increase the participation on agricultural extension of the longan collaborative farming project. It was due to a farmer was able to play a remarkable role in group management and became a coordinator as well as a leader in carrying out various activities in the group. The finding confirmed the result reported by Techakhod *et al.* (2019) who found that a leader was a very important role in the operation of Chiang Mai community enterprise group. This will increase the efficiency of group management. Farmers who are members of many agricultural organizations tend to participate in agricultural extension of longan collaborative farming project. This may be resulted to be good relationship with other farmers' networks. Thus, it was necessary to gain more diverse knowledge and skills which applied to work together in a group. The finding confirmed the result reported by Suvedi *et al.* (2017). They reported that being a member of various group results in farmers participating on agricultural extension activities. Farmers with a variety of information sources tended to increase the participation on extension of the longan collaborative farming project. The source of information is very important for agricultural extension because it is a source for distributing information, knowledge, and technology related to the production or operation of the group. If a farmer receives the information, it will cause a response to use and affect the participation in various activities of the group as in the previous study by Phrakhrusutaworathannakit and Chinavaro (2022). They reported that receiving information affected people's participation in local government. Awareness of the information is a factor affecting member participation in development of participatory guaranteed systems (PGS) (Amthed *et al.*, 2022). Receiving information sources affected people's participation in water resource management and agricultural extension activities (Worawongpongsa *et al.*, 2020; Goshu, 2019).

Moreover, a variety of channels to contact staff tended to increase participation on agricultural extension of longan collaborative farming project. The contact channel will facilitate farmers to better communicate with officials or related agencies. Because it will allow farmers to receive information, knowledge, and advice directly from the authorities in order to keep up with the situation and to solve the problems in a timely manner. The finding confirmed the result reported by Sartepyim *et al.* (2022). They reported that the contact channels

are good and appropriate tools for establishing good relationships among farmers in the mango collaborative farm. More frequent field visits providing agricultural services resulted in greater incentives for farmers to participate in agricultural extension activities (Chouichom, 2014). This can empower farmers to consult with officials and to provide the relevant agricultural resources, which can increase efficiency and improve participation in agricultural extension activities (Maryani *et al.*, 2017).

It led to a study of the level of farmer's participation on agricultural extension in 4 dimensions, including the study of factors affecting farmer's participation on agricultural extension of the longan collaborative farming project in Lamphun province. The results of the study would help to raise the level of farmer's participation on agricultural extension of the longan collaborative farming project and would develop the potential of longan collaborative farms in Lamphun province. In addition, it can be used as a guideline for managing the agricultural extension of longan collaborative farms in other provinces, including other types of products.

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