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Profitability of Rice Production under the Large Agricultural Plot Scheme in Khlong Khuean District, Chachoengsao Province Thailand

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A Large Agricultural Plot Scheme (LAPS) is one of Thai government agricultural strategies that was launched in 2015, in order to help farmers to access throughout supply chains and enhance the competitiveness of small-scale farmers. This study aimed to describe the characteristics of participating farmers in the LAPS and profitability by investigating the effect of some socio-economic factors. The samples used in this study were 50 rice farmers who participated in the LAPS in Khlong Khuean District, Chachoengsao Province by using questionnaire collected from rice farmers during June to August 2017. Data were analysed by using descriptive analysis, profitability analysis, and linear regression model. The results revealed that the majority of sample farmers were male (60%) with average ages between 51-60 years old (42%). Most participants graduated from grade 1-4 (54%). Most of participants had rice farming experience between 36-40 years (24%) and had average land size during 10-20 Rai (44%). The number of family labor was two persons (50%). Moreover, farmers averagely participated in training sessions 10-20 times per year (54%), and most of them (92%) were members of farmers' organization with an average profit at 135,267.40 THB per years. The result from regression analysis revealed that the factors affecting the profitability of rice production in the LAPS were only land size which statistically significant at 1%. The results obtained from this study provide useful information for relevant authorities and rice farmers in order to increase profitability.

Keywords: profitability, Large Agricultural Plot Scheme, Small-scale Rice Farmer, Chachoengsao, Khlong Khuean

Introduction

In Thailand, the agricultural profession has been with Thai people for a long time. Regarding production and yield per Rai of major countries in 2016, Thailand is in the sixth rank of the world (Office of Agricultural, 2016). Important food crops in Thailand are rice because over 60 percent of Thai population are farmers, so rice can built worldwide reputations and generate

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high income (Thai Rice Foundation under Royal Patronage, 2016). Rice plays an important role in Thai society from food to jobs. Rice plant areas account for more than half of the country areas and employ more than half of the country workforce. Rice is one of the main foods and a source of nutrition for most Thai citizens and also an important part of Thai exports (Evenson *et al*., 1996). The statistic in Figure.1 displays plant areas by million Rai and productivity by million tons. The numbers show the decreases in plant areas and productivity in 2015–2016; and the trends rose up in 2017. This confirms the statement of Asian Development Bank indicating that Thailand has been the largest rice-exporting country for almost 30 years (Asian Development Bank, 2012).

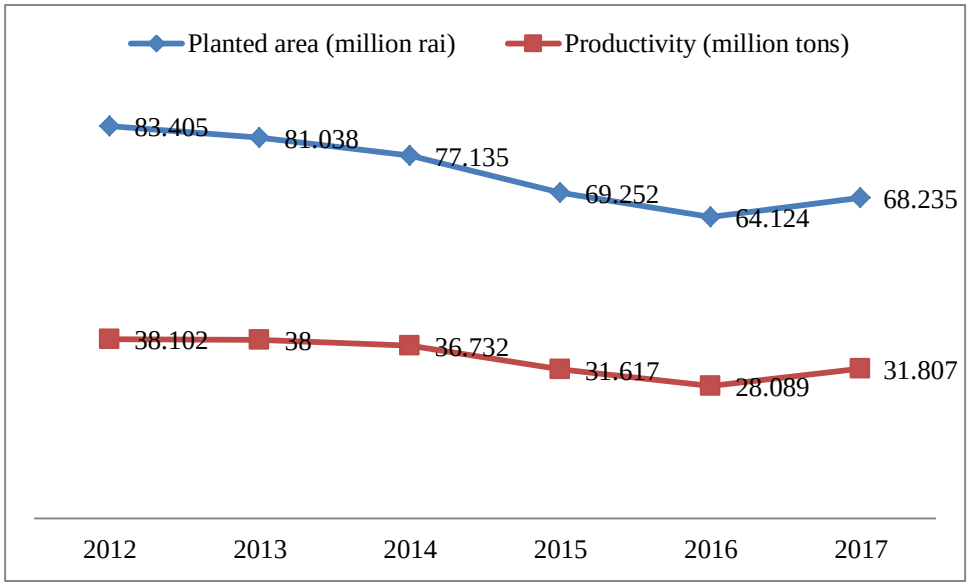

Fig. 1 Export status of Thai's rice since 2012 - 2017
Source: Adapted from Thai Rice Exporters Association 2017 (http://www.thairiceexporters.or.th/production.htm)

From the abovementioned importance of rice, Thai government issued a major agricultural strategy in 2015 called Large Agricultural Plot Scheme (LAPS) in order to help farmers throughout supply chains and enhance the competitiveness of small-scale farmers. The government selected target area as a target site for LAPS project. The objectives of the LAPS were to adjust the system of agricultural promotion in large areas to help reducing the cost of production from small farmers, integrating tools, assessing to high technology machines for productivity, as well as improving professional management production. Moreover, the quality of products from the scheme is equality, and

farmers are able to access to markets together with increased marketing power. Consequently, these advantages assist farmers to gain higher profit after doing their own farms.

Small farm households might face more difficulty in adjusting to the rising input costs, and this might incur more loss than large farms (Mottaleb and Mohanty, 2015). As such LAPS launched for helping smallholder farmer. The concept of the LAPS is similarly to the concept of the studied by Adewuyi A.K. and Adebayo E.F. (2014) which emphasized that in case of farm-level can improve the profitability of rice production so increasing productivity and be producing high value. An integration of all members of the LAPS, especially those who are the most vulnerable, is essential. Agriculture development initiatives should recognize that objectives for tool and resource must be used to ensure that the LAPS will urge members' participants in every aspect. The practice of intercropping increases yield and profitability due to higher returns per land (Ibeawuchi *et al.,* 2005; Amanullah *et al.,* 2006).

In terms of profitability, if farmers gain profit from rice production, it means that they success because profit is an indicator of achievement. Profitability consideration of the need of all beneficiaries is essential in achieving greater technical efficiency and profitability in agricultural production. (Okam *et al.,* 2016). Many factors can help to improve and create profit that is the reason why farmers need to improve ability to manage productivity professionally. Moreover, characteristics of farmers will show difference profitability. Structured questionnaires were used to elicit information from rice farmer by using socio-economic characteristics, input, and output variables (Nwike, 2015).

Interestingly, the profitability of rice production under LAPS is one tool to measure the success of project implementation. Therefore, this study measured the profitability of rice production under LAPS in Khlong Khuean district in Chachoengsao province, Thailand as a case study. This area is a LAPS pilot for Agricultural Extension operations. There is an exchange of learning techniques to think of obstacles, which can be used to develop effective guidelines for the development of effective management of agricultural products. This scheme also includes a guideline for development, improvement, and promotion of productivity; and it can be used as a policy proposal for effective product management (Office of Agricultural Economic, 2015).

Therefore, the objectives of this study were to;

1) Evaluate profitability of rice production under the LAPS project.

2) Investigate factors effecting profitability of rice production under the LAPS project.

The results obtained from this study can assist farmers to apply for investment planning.

Materials and Methods

This study was conducted in Khlong Khuean district, Chachoengsao province, Thailand, situated in the eastern region of the country (Fig.2). Rice cultivation area was 764,049 Rai, ranked as the second largest in the eastern region of Thailand (Office of Agricultural Economics, 2015).

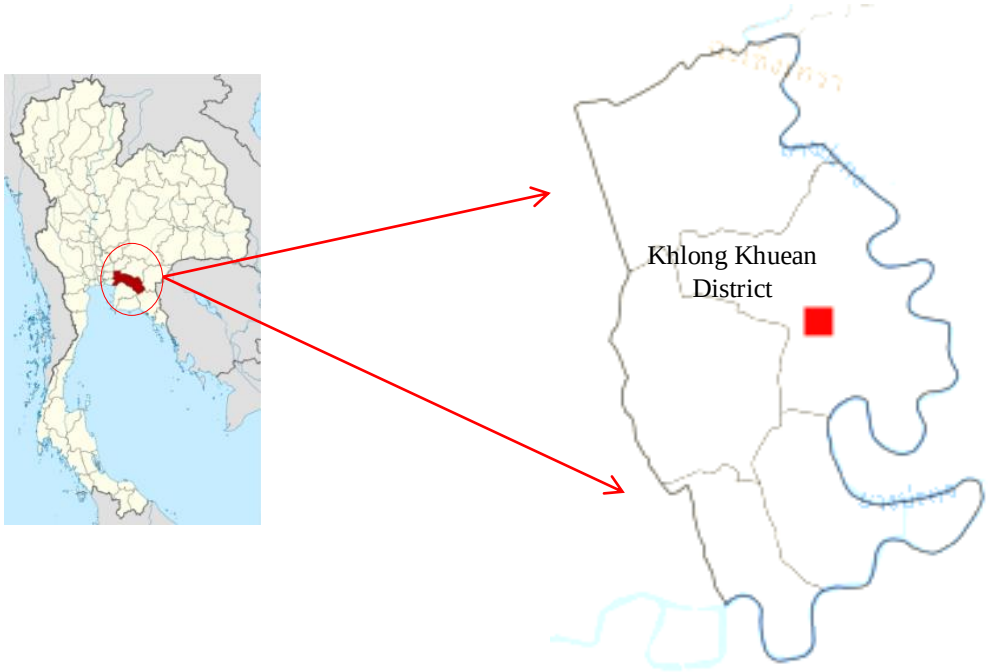

Fig. 2 Map of Khlong Khuean District consisting of 6 villages
Source: Adapted from Agri-Map Online 2017 (http://agri-map-online.moac.go.th/#)

Sampling and Sample Size

The total of 50 rice farmers who were members of LAPS in Khlong Khuean district, Chachoengsao province, Thailand from six villages in 2017 was chosen for this study. The purposive sampling technique was then applied to select respondents. Descriptive statistics: frequency, percentages, and mean were used to analyse the socioeconomic characteristics of farmer. Furthermore, profitability of farmers was derived from the gross margin analysis, as follows;

Gross margin analysis is the specific type of budgeting technique used for gross margin analysis (Obayelu, A. *et al.,* 2013) as well as the net income. The gross margin analysis is expressed as;

$$GM = TR - TVC$$

Where:

GM = Gross margin
TR = Total Revenue
TVC = Total variable cost

And total profit is given by $\pi = GM - TFC$

Where:
π = Total profit
GM = Gross margin
TFC = Total Variable Cost

An analytical model for studying the profitability of rice farmers from the LAPS project is presented and adopted from Okam C.Y. *et al.,* (2016), as follows,

$$Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + E$$

Where:
Z_i = Profit
β_0 = Constant term
$\beta_{1.....,8}$ = Coefficient to be estimated
X_1 = Gender
X_2 = Age of rice farmers
X_3 = Education level of farmers
X_4 = Rice farming experience
X_5 = The number of family labors
X_6 = Land size
X_7 = The number of training sessions
X_8 = Membership in other project of agriculture
E = Error term

Results

Table 1 presents socio-economic characteristics of 50 sample farmers who were members of the LAPS project. The result revealed that the majority of sample farmers were male (60%) with average ages between 51-60 years old (42%), graduated from Grade 1-4 (54%), had rice farming experience more than 20 years (74%) and had average land size during 10-20 Rai (44%).

Moreover, on average, the number of family labours was two persons (50%), participated in training sessions between 10 to 20 times per year (54%), and became members of farmers' organizations (92%) of all participants.

Table 1. Socio-economic characteristics of LAPS project farmers (n=50)

Characteristics	Frequency	Percentage
Gender		
Male	30	60
Female	20	40
Age of rice farmers (years) (Mean = 55.76)		
20-30	1	2
31-40	1	2
41-50	12	24
51-60	21	42
>60	15	30
Education level of farmers		
Grade 1-4	27	54
Grade 5-6	8	16
Junior High School	1	2
Senior High School/Vocational Certificate /Diploma or equivalent	13	26
Diploma	1	2
Rice farming experience (years) (Mean = 32.62)		
<10	2	4
10-20	11	22
>20	37	74
The number of family labours		
None	1	2
1	23	46
2	25	50
3	1	2
Land size (Rai) (Mean = 23.32)		
<10	5	10
10-20	22	44
21-30	10	20
31-40	8	16
41-50	3	6
>50	2	4
The number of training sessions (Mean = 11.94)		
<10	18	36
10-20	27	54
21-30	5	10
Membership in other agricultural projects		
Member of other projects	46	92
Not member of other projects	4	8

Note : 6.24 Rai = 1 hectare

Profitability of rice production

Table 2 represents the viability of an enterprise indicated by the number of rice production profits. This area cropped rice twice a year. From gross margin analysis, the average profit of rice production under the LAPS per household was 135,267.40 THB per years. Profitability per Rai was 5,910.86 THB. Meanwhile, the average profitability of rice production at the country level was 1,655.39 THB/Rai (Office of Agricultural Economic, n.d.), indicating that participation in the LAPS can help farmer to gain the higher profitability of rice production. This result was similarly to the study of Thaipublica pointing out that farmers who participate in government projects can gain higher profit (5,900 THB/Rai) than the profit of those who were not (2,140 THB/Rai) (Thaipublica, 2014).

Table 2 Profitability of rice production in the study area

Variables	Unit	Min.	Max.	Mean	SD.
Total output	Ton/household	5	103	40.6116	25.211
Selling price	THB/Ton	3,100	7,800	6,284	1,177.40
GM	THB/Rai	568	17,707	5,805.80	3,083.49
TC	THB/Rai	1,619	9,678	6,141.20	1,564.74
TVC	THB/Rai	1,316	7,571	4,347.94	1,309.15
TFC	THB/Rai	37	4,143	1,793.40	1,164.53
Total profit	THB/Rai	**585**	**17,707**	**5,910.86**	**3,086.09**

Note: 35.820 Thai baht (THB) = 1 US dollar (as of the survey period on December 2016)

Factors influencing to profitability

Table 3 reveals the result of the regression analysis. A multiple regression model was adopted for data analysis. The coefficients of determination (R^2) was 51.50%, revealing that 51.50% of the variation in the dependent variable had an effect on the profitability of rice farming due to independent variable, and exposed that the factors affected the profitability of rice production. According to the data from LAPS member farmers, selected eight variables were considered to have an effect on rice production profitability namely, gender, age of rice farmers, education level of farmers, rice farming experience, the number of family labours measured by the number of family member involved in rice production, land size, the number of training sessions, and membership in other agricultural projects. The result from the regression analysis pointed out that the factors influencing on the rice production profitability in LAPS were only the land size. These factors illustrated characteristics that related to the result of Ohaka *et al.* (2013) cited in Nwike and Ugwumba (2015) who showed that

the relationship between profit and output with statistically significant at 1%. Furthermore, the positive relationship with the total profit implied that if cultivated land for rice farming increase, total profit will also increase as well this result is consistency with the studied by Rahman *et al.*, (2014). Considering F-Ratio was 5.441, and the adjust R^2 was 0.420 indicating that 42% of the variation in the dependent variable (profitability) was caused by the independent variables.

Table 3 Regression result from gross profit and socio-economic characteristics of LAPS farmers in unit per Rai.

Variables	Coefficient	SE	t-stat	p-value
Constant	.472	1.032	.457	.650
Gender (X_1)	-.157	.254	-.619	.539
Age (X_2)	.071	.168	.424	.673
Educate level (X_3)	.037	.123	.301	.765
Rice farming experience (X_4)	.059	.068	.877	.386
The number of family labors measured by the number of member involved in rice production (X_5)	.127	.231	.551	.585
Area in the LAPS project (X_6)	.591	.103	5.718***	.000***
The number of training sessions (X_7)	-.106	.222	-.477	.636
Membership in other project of agriculture (X_8)	-.181	.591	-.349	.729
R^2	.515			
Adjust R^2	.420			
F – ratio	5.441			

Noted ; ***Significant at 1%

Conclusion

Large Agricultural Plot Scheme (LAPS) was established in order to assist farmers to access throughout the supply chain and enhance the competitiveness of small-scale farmers. The government select a target area as a target site for the LAPS project. Khlong Khuean district in Chachoengsao province, Thailand is the LAPS pilot area for Agricultural extension operations. This study evaluated profitability of rice production under the LAPS project, and investigate factors affecting the profitability of rice production under the LAPS project. The result revealed that the average profit was 135,267.40 THB per year, profit per Rai was 5,910.86 THB. Meanwhile, an average profit of rice production at the country level was 1,655.39 THB/Rai indicating that participating in the LAPS can help farmers to gain more profit from rice

production. The result from regression analysis pointed out that around t51.50% of the variation in the dependent variable had an effect on profitability of rice farming. The factor affecting the profitability of the rice production in LAPS was only land size. Rice cultivation under the LAPS program is of national interest. Farm managers and related agencies should pay more attention to operating costs, raw materials, production costs, and should invite farmers to attend a regular meeting. The results from this study provide useful information for relevant authorities as well as rice farmers in order to increase profit by using the characteristics and the factors that influence on profitability from this study.

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