International Journal of Agricultural Technology 2018 Vol. 14(2):201-213
Available online http://www.ijat-aatsea.com
ISSN 1686-9141

# Comparison of Costs and Returns on Oil Palm Production of Member and Non-member Farmers under Large Agricultural Plot Scheme in Bang Saphan Noi District, Prachuap Khiri Khan Province

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Juyjaeng, C. and Suwanmaneepong, S. (2018). Comparison of costs and returns on oil palm production of member and non-member farmers under large agricultural plot scheme in Bang Saphan Noi district, Prachuap Khiri Khan Province, Thailand. International Journal of Agricultural Technology 14(2):201-213.

**Abstract** The results showed that the total production cost of LAPS member farmers was 4,028 Thai Baht (THB) per Rai, including the fixed cost was 500 THB per Rai, which land use was a majority cost accounting for 99%, the variable cost was 3,528.48 THB per Rai, which materials and wage were majority costs accounting for 64.72% and 35.28% respectively; and the return over cash cost was 22,716.78 THB per Rai. Meanwhile, the total cost of production of non- LAPS member farmers was 3,304.77 THB per Rai, including the fixed cost was 500 THB per Rai, which land use was a majority cost accounting for 99%, the variable cost was 2,805.17 THB per Rai, which materials and wage were majority costs accounting for 53.81% and 46.19%, respectively and the return over cash cost was 18,152.01 THB per Rai. The oil palm production cost of member and that of non-member farmers under LAPS were differed in the cost of planting materials namely organic fertilizer with statistical significance at the 0.05 level (P-value = 0.047), whereas the others costs were not statistically differed. Regarding production returns, the product prices were significantly differed at the 0 .05 level (P-value = .000).

**Keywords:** oil palm production, cost analysis, large agricultural plot scheme, Prachuap Khiri Khan

## Introduction

The oil palm (*Elaeisguineensis*) is one of the important economic crops in tropical regions. It belongs to the family *palmae* (having 225 genera with over 2600 species), and the subfamily *cocoideae* of which it is the most important member (Ibitoye *et al*., 2011). The oil palm is one of the important economic crops in Thailand; its value is higher than other oil plants (Sriprasom *et al*., 2008; Karnjanalai, 2009; Nahar *et al.*, 2012; Benchasri *et al*., 2014). In addition, oil palms are productive plants that produce the highest yield per area and they receive a huge market demand (Aomsupsin, *et al*., 2014). There are 2,600,000 Rai of oil palm plantation areas in Thailand. The ASEAN Free Trade Area (AFTA) Trade Liberalization has an impact on palm oil and palm oil products. Indonesia and Malaysia

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are the main competitors which have lower production costs than those in Thailand. Importing inexpensive oil palm from those countries will affect the price of palm oil in the great depression. Regarding the analysis of oil palm production problems of Thai oil palm farmers revealed that the cost of oil palm production increased from 2.14 THB per kilogram in 2007 to 2.58 THB per kilogram in 2009 (Office of Agricultural Economics, 2011). This figure represents the high cost of production comparing to the competing countries such as Malaysia, where the cost of production is only in the range of 0.8-1.00 THB (Kasikorn Research Center, 2015). The main reason of the rise of production cost derives from the increase of chemical fertilizer price. In addition, Thailand's oil palms are mainly produced by small farmers in their palm plantation areas around 25 Rai per person (ECIT, 2013).

One strategy to solve the aforementioned problem is to integrate small farmers into a large plot of crops in accordance with the policy of the Ministry of Agriculture and Cooperatives. Smallholder farmers should be integrated into a large plot of crops, fisheries, and livestock in order to provide opportunity to access to information, resources, and marketing. Farmers can efficiently manage their outputs and produce quality products in line with market demand. The area manager can manage production planning throughout the supply chain. (Ministry of Agriculture and Cooperatives, 2016). The oil palm is one of crops in the large agricultural group in order to reduce production costs, which, in 2015, the costs could be reduced by 14.9 percent at the national level and will reduce the costs by 20 percent in 2017 (Sarabun, 2017). The farmers of oil palm plantations in Trang province, for example, could reduce the cost of fertilizer by using organic fertilizer from the plants such as palm bunch for 1,000 THB per Rai -- five THB per kilogram cheaper than using chemical fertilizer. It could reduce the cost by 1,320 THB per Rai, and from the Round-table on Sustainable Palm Oil (RSPO), the cost could be reduced to 2,320 THB per Rai (Sarigulya, 2017).

From the operation of Krabi province under the large agricultural plot scheme (LAPS) in reducing production costs by using chemical fertilizers, about 60%, indicated that implementation of the LAPS could reduce the cost of production from 3.20 THB per kilogram to 2.5 THB per kilogram or 22 percent (Charungkijkul, 2017).

The ultimate goals of oil palm growing under the LAPS in Prachuap Khiri Khan province were to: 1) reduce production cost by encouraging farmers to use organic fertilizers and chemical fertilizers based on the soil analysis and jointly buy production factors; 2) improve the quality of the product by issuing the certificate of product quality according to the standard and selecting good varieties; 3) increase yield by using good varieties or using the right and suitable fertilizer. The target group is

farmers, living in Bang Saphan Noi District, having oil palm plantations in the area, having voluntary willingness to comply with the conditions of the LAPS, and owning land for oil palm plantation (Office of Agricultural Bang Saphan Noi, 2017).

Oil palms are main economic crops of Prachuap Kiri Khan Province where there are appropriate areas for oil palm plantation. The production of oil palm in this area is increasing progressively (Prachuap Khiri Khan Governor's Office, 2016). The condition in various districts is suitable for oil palm plantations, especially Bang Saphan Noi District where there is the largest area for oil palm plantation (Prachuap Khiri Khan Provincial Office, 2014). The area of oil palm plantation in Bang Saphan Noi District is about 50,492 Rai, accounting for 42.94% of the total area of oil palm plantation in the province (Office of Agricultural Prachuap Khiri Khan, 2015).

In 2014, in Prachuap Khiri Khan Province, the price of oil palm was only 3.30-3.50 THB per kilogram, but the cost of production at the front garden was 2.78 THB per kilogram, which farmers rarely earned profit from the oil palm plantation (Wongnan, 2014). Meanwhile, oil palm farmers in Prachuap Khiri Khan province, about 1,830 people or 66.86 % of all palm oil growers in Prachuap Khiri Khan province and 0.17 % of the country's smallholders, were mostly small farmers, with plantation area less than 20 Rai. In 2016, Prachuap Khiri Khan Province participated in the LAPS. There were 57 farmer’s member under LAPS or 3.15 % of all oil palm farmers in Prachuap Khiri Khan Province covering 1,158 Rai of plantation areas. The LAPS initiated in November 2016 (Office of Agricultural Bang Saphan Noi, 2017). The percentage of participations under the LAPS comparing to that of all oil palm farmers was extremely small. Therefore, this study aimed to compare the costs and returns on oil palm production between two groups: member and non-members of LAPS in Bang Saphan Noi district, Prachuap Khiri Khan Province. The results obtained from this study can provide useful information for oil palm growers in making the decision to participate in the LAPS.

## Materials and methods

### *The study area*

Bang Saphan Noi district was selected as a study area for this study. It is located in the southern part of the Prachuap Khiri Khan Province, Thailand (Figure 1). Administrative areas are divided into 5 sub-districts consisting of Pak Prang sub-district, Sai Thong sub-district, Bang Saphan sub-district, Chang Reak sub-district, and Chai Rat sub-district. The climate is warm with heavy rain in the rainy season. The major agricultural products are rubber, palm oil, coconut oil (Bang Saphan Noi District, 2010). Oil palm is alternative energy crop for a farmer (Prachuap Khiri Khan Governor's

Office, 2016). Bang Saphan Noi district, Prachuap Khiri Khan Province is famous for oil palm plantation where the first palm complex of Thailand was constructed, by using technology in the production process that can produce biodiesel and olefin oil for consumption in this place (PT Station, 2017).

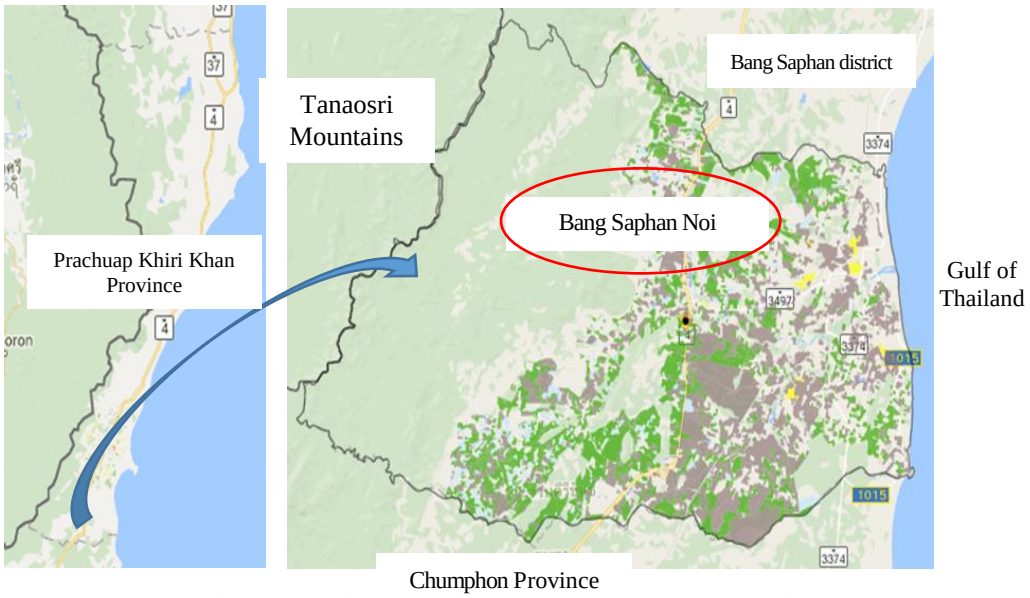


**Figure 1.** Map showing oil palm plantation area in Bang Saphan Noi District, Prachuap Khiri Khan Province (Agri-Map Online, 2017)

### *Population and Sample Size*

The population in this study was composed of 30 farmers members under the LAPS which were the first group of a farmer under LAPS and were willing to comply the project condition, and 30 non-member farmers under LAPS in Bang Saphan Noi District, Prachuap Khiri Khan Province (Office of Agricultural Bang Saphan Noi, 2017).

### *Data collection*

Primary data were collected to study by using structured questionnaires that administered to 60 oil palm farmers. The data were collected from January to June 2017 from 30 farmers participating in LAPS and 30 non-member counterparts. The questionnaire consisted of two parts, the first part contained characteristics of oil palm farmers, and the another part was the information of costs and returns on oil palm production.

### *Data analysis*

The data were analyzed by using frequency, percentage, mean, standard deviation, and cost-benefit analysis, as follows:-

Cost Benefit Analysis:

TC = TFC + TVC

TFC = Land cost + Vat

TVC = Labor cost + Materials cost

TR = P x Q

NR = TR - TVC

NP = TR - TC

Returns over cash costs = TR – TC

Independent sample t-test was applied to determine the different of costs and returns between the two farmer groups.

## Results

The characteristics of oil palm production member farmers under the LAPS and non-member farmers are demonstrated in Table 1. Concerning the member farmers, the majority of the oil palm farmers were female (56.7%) while the rest (43.3%) were male. More than half of the farmers (50.2%) were higher than 60 years old. The result of the findings revealed that 50.0% of participants graduated from primary education and 56.7% of them had 3-4 household members. All respondents were member farmers under the LAPS, Of all participants, 36.7% of them participated in training on oil palm around 6-10 times a year, and the majority of them (36.7%) contacted agricultural extension staff for around 6-10 times. In addition, more than half (80%) of the farmers joined LAPS in November 2016. The most respondents (60%) owned less than 20 Rai of participated lands, and 60% attended the LAPS in order to reduce costs and increase productivity.

Regarding non-member group, the number of both male and female farmers were identical. Most of the farmers (40.0%) aged during 51-60 years old. The findings also exposed that 56.7% graduated from primary education and 60.0% of them had 3-4 household members. Moreover, most of the respondents (13.3%) were members of an agricultural cooperative member group, and 76.7% of them never participated in oil palm training. The results also showed that the majority of respondents (90.0%) never contacted with agricultural extension staff.

**Table 1.** Characteristics of oil palm farmers

| Characteristics | Member | | Non-member | |
|---|---|---|---|---|
| | Frequency | % | Frequency | % |
| **sex** | | | | |
| male | 13 | 43.3 | 15 | 50.0 |
| female | 17 | 56.7 | 15 | 50.0 |
| **age (year)** | | | | |
| < 31 years old | 1 | 3.3 | - | - |
| 31 – 40 years old | - | - | 5 | 16.7 |
| 41 – 50 years old | 2 | 6.6 | 9 | 30.0 |
| 51 – 60 years old | 12 | 39.9 | 12 | 40.0 |
| > 60 years old | 15 | 50.2 | 4 | 13.3 |
| **level of education** | | | | |
| Primary level (Grade 4) | 15 | 50.0 | 17 | 56.7 |
| Primary level (Grade 6) | 5 | 16.7 | 7 | 23.3 |
| Secondary level (Grade 9) | - | - | 2 | 6.7 |
| Secondary level (Grade 12) | 7 | 23.3 | 3 | 10.0 |
| Vocational diploma | 2 | 6.7 | 1 | 3.3 |
| Bachelor's degree | 1 | 3.3 | - | - |
| **household size** | | | | |
| <3 members | 7 | 23.3 | 4 | 13.3 |
| 3-4 members | 17 | 56.7 | 18 | 60.0 |
| 5-6 members | 5 | 16.7 | 4 | 13.3 |
| >6 members | 1 | 3.3 | 4 | 13.3 |
| **Member group name** | | | | |
| Saving group | 12 | 40.0 | 1 | 3.3 |
| Agricultural cooperative | 6 | 20.0 | 4 | 13.3 |
| Oil palm cooperative | 9 | 30.0 | - | - |
| LAPS | 30 | 100.0 | - | - |
| **The number of oil palm training participation (per year)** | | | | |
| No-training | 6 | 20.0 | 23 | 76.7 |
| 1-5 times | 7 | 23.3 | 7 | 23.3 |
| 6-10 times | 11 | 36.7 | - | - |
| 10-15 times | 6 | 20.0 | - | - |
| **The number of contact with agricultural extension staff (per year)** | | | | |
| No contact | 7 | 23.3 | 27 | 90.0 |
| 1-5 times | 8 | 26.7 | 3 | 10.0 |
| 6-10 times | 11 | 36.7 | - | - |
| 10-15 times | 4 | 13.4 | - | - |
| **Time to participate in the LAPS** | | | | |
| November 2016 | 24 | 80.0 | - | - |
| December 2017 | 6 | 20.0 | - | - |

**Table 1.** Characteristics of oil palm farmers (cont.)

| Characteristics | Member | | Non-member | |
|---|---|---|---|---|
| | Frequency | % | Frequency | % |
| **The number of lands participating in the scheme** | | | | |
| <20 Rai | 18 | 60.0 | - | - |
| 20-50 Rai | 12 | 40.0 | - | - |
| >50 Rai | - | - | - | - |
| Reasons to join the LAPS | | | | |
| -to reduce costs and increase productivity | 18 | 60.0 | - | - |
| -to increase bargaining power | 5 | 16.7 | - | - |
| -to access to funding sources | 1 | 3.3 | - | - |
| -to meet agriculture officer | 4 | 13.3 | - | - |
| -to be invited by friends | 2 | 6.7 | - | - |

The characteristics of oil palm production of both LAPS member and non-LAPS member farmers are displayed in Table 2. The majority of the LAPS member farmers (56.7%) were in the 2-4 household of oil palm plantations, and 76.7% of them had 10-20 year experience in oil palm plantations. The findings also revealed that 53.3% of the member farmers had land holding size during 20-50 Rai, as well as 76.7% of their oil palm ages were 10-20 years. The most respondents (56.7%) owned around 100-500 oil palm trees, and 70.0% of them planted oil palm in plain areas. In addition, the result demonstrated that more than 70.0% of the farmers planted *ternera* cultivar, and 36.7% of them obtained oil palm seedlings from oil palm seedling shops from neighboring areas in Chumphon Province.

Regarding the oil palm production of non-LAPS member farmers, the majority of the farmers (86.7%) were in 2-4 household of oil palm plantations, and 76.7% of them had experimented in oil palm plantations for 10-20 years. The result showed that 83.4% of the farmers hold more than 20 rai, as well as 80.0% of their oil palm ages were during 10-20 years. The most respondents (76.7%) owned 100-500 oil palm trees, and 94.4% of them planted oil palm in plain condition as the LAPS counterparts. The finding revealed that more than 63.4% planted *tenera* cultivar, and 66.7% of them received oil palm seedlings from oil palm seedling shops in Chumphon Province, as well.

From Table 2, the most oil palm farmers chose *tenera* cultivar -- a commercial oil palm plantation. The heterozygous species is a hybrid of *pisifera* and *dura* cultivar. Their fruits has a thin-bow shape of 0.5 - 4 m.m., with a black dash around the shell. There are around 60-90 % thick outer shell with a very large number of perennials.

**Table 2.** Characteristics in oil palm plantation of oil palm farmers

| characteristics | member | | non-member | |
|---|---|---|---|---|
| | Frequency | % | Frequency | % |
| **The number of household family** | | | | |
| <2 | 12 | 40.0 | 4 | 13.3 |
| 2-4 | 17 | 56.7 | 26 | 86. 7 |
| >4 | 1 | 3.3 | - | - |
| **The number of experience in oil palm plantations** | | | | |
| <10 years | 4 | 13.3 | 2 | 6.7 |
| 10-20 years | 23 | 76.7 | 23 | 76.7 |
| >20 years | 3 | 10.0 | 5 | 16.6 |
| **Land holding size** | | | | |
| <20 Rai | 12 | 39.9 | 25 | 83.4 |
| 20-50 Rai | 16 | 53.3 | 4 | 13.3 |
| >50 Rai | 2 | 6.7 | 1 | 3.3 |
| **Oil palm age** | | | | |
| <10 years | 4 | 13.3 | 2 | 6.7 |
| 10-20 years | 23 | 76.7 | 24 | 80.0 |
| >20 years | 3 | 10.0 | 4 | 13.3 |
| **The number of oil palm** | | | | |
| <100 trees | - | - | 3 | 10.0 |
| 100–500 trees | 17 | 56.7 | 23 | 76.7 |
| >500 trees | 13 | 43.3 | 4 | 13.3 |
| **Space condition** | | | | |
| Escarpment | 4 | 13.3 | 1 | 3.3 |
| Hill | - | - | 1 | 3.3 |
| Plain | 21 | 70.0 | 28 | 94.4 |
| Field | 5 | 16.7 | - | - |
| **Cultivar** | | | | |
| Tenera | 21 | 70.0 | 19 | 63.4 |
| Surat | 3 | 10.0 | 5 | 16.7 |
| Nigeria | 2 | 6.7 | 1 | 3.3 |
| Costariga | 1 | 3.3 | - | - |
| SB1 | 3 | 10.0 | - | - |
| Uti | - | - | - | - |
| **Sources of oil palm seedlings** | | | | |
| Oil palm seedling shop in Surat Thani | 4 | 13.3 | 5 | 16.7 |
| Oil palm seedling shop in Chumphon | 11 | 36.7 | 20 | 66.7 |
| company | 7 | 23.3 | - | - |
| Foreign countries | 3 | 10.0 | 1 | 3.3 |
| Surat Thani Oil Palm Research Center | 4 | 13.3 | 3 | 10.0 |
| Own growing | 1 | 3.3 | 1 | 3.3 |

Table 3 displayed the comparison of costs of oil palm production between the LAPS member and the non-LAPS member farmers in Bang Saphan Noi district, Prachuap Khiri Khan Province. The figures revealed

that the total fixed costs of both LAPS members and non-LAPS members were 500 THB per Rai, consisting of land cost and vat equally accounting for 495 THB per Rai and 5 THB per Rai respectively.

The total variable cost of the LAPS member farmers was 3,528.48 THB per Rai which were composed of two categories. Firstly, material cost was 2,283.70 THB per Rai including fertilizer, organic fertilizer, dolomize and oil palm cultivar. Secondly, labor cost was 1,244.77 THB per Rai including harvesting and transportation, harvesting product, transportation, leaf trimming, putting fertilizer, and weeding. The variable cost of's the non-LAPS member farmers was 2,805.17 THB per Rai composed of material cost of 1,509.50 THB per Rai including fertilizer, oil palm cultivar, and organic fertilizer, together with labor cost of 1,295.66 THB per Rai including harvesting and transportation, leaf trimming, harvesting product, transportation, putting fertilizer, and weeding. The oil palm production costs of the member and that of non-member farmers were different in Bang Saphan Noi district, Prachuap Khiri Khan Province. The cost of planting materials was different with statistical significance at the 0.05 level (P-value =0.047), and organic fertilizer at the .05 level of significance (P-value = 0.040), whereas the other costs were not statistically different.

**Table 3.** Comparison of costs of oil palm production of LAPS member farmers and non-member farmers in Bang Saphan Noi district, Prachuap Khiri Khan Province

THB per Rai

| cost | member | non-member | t-test | P-value |
|---|---|---|---|---|
| **Fixed cost** | 500.00 | 500.00 | - | - |
| 1. Land use | 495.00 | 495.00 | - | - |
| 2. Vat | 5.00 | 5.00 | - | - |
| **Variable cost** | **3,528.48** | **2,805.17** | 1.381 | .173 |
| 1. Labor | 1,244.77 | 1,295.66 | -.195 | .846 |
| 1.1 Putting fertilizer | 160.31 | 91.66 | .869 | .389 |
| 1.2 Weeding | 95.40 | 42.45 | 1.494 | .141 |
| 1.3 Leaf trimming | 174.47 | 278.27 | -1.073 | .288 |
| 1.4 Harvesting product | 271.05 | 277.86 | -.065 | .948 |
| 1.5 Transportation | 215.84 | 220.31 | -.038 | .970 |
| 1.6 Harvesting &Transportation | 327.70 | 385.11 | -.424 | .673 |
| 2. Materials | **2,283.71** | **1,509.50** | 2.032 | .047* |
| 2.1 Cultivar | 46.36 | 46.05 | .065 | .948 |
| 2.2 Fertilizer | 1,929.28 | 1,431.51 | 1.516 | .135 |
| 2.3 Organic fertilizer | 225.89 | 31.94 | 2.100 | .040* |
| 2.4 Dolomize | 82.17 | .00 | 1.877 | .066 |
| **Total cost** | 4,028.48 | 3,304.77 | 1.381 | .172 |

* Statistical significance 5%

Table 4 exhibited the comparison of costs and returns on oil palm production of LAPS member and non-LAPS member farmers in Bang Saphan Noi district, Prachuap Khiri Khan Province during the period of

January to June 2017. The results showed that the total return of LAPS member farmers was 25,873.78 THB or 4.89 THB per kilogram, when the cash cost of 3,156.99 THB per Rai was deducted; the return over cash cost was 22,716.78 THB per Rai. The total return of non-LAPS member farmers was 20,527.69 THB or 3.97 THB per kilogram, when the cash cost of 2,375.68 THB per Rai was deducted, the return over cash cost was 18,152.01 THB per Rai. The comparison of costs and returns showed that the product prices were different with statistical significance at the 0.05 level. However, the other costs and returns were not statistically differed.

**Table 4.** Comparison of costs and returns on oil palm production of LAPS member farmers and non-member farmers in Bang Saphan Noi district, Prachuap Khiri Khan Province

| cost and return | member | non-member | t-test | P-value |
|---|---|---|---|---|
| Total cost | 4,028.48 | 3,304.77 | 1.381 | .172 |
| Total variable cost (THB per Rai) | 3,528.48 | 2,805.17 | 1.381 | .173 |
| Total fix cost (THB per Rai) | 500.00 | 500.00 | 1.000 | .321 |
| Cash cost (THB per Rai) | 3,156.99 | 2,375.68 | 1.533 | .131 |
| Return over cash cost (THB per Rai) | 22,716.78 | 18,152.01 | .888 | .378 |
| Product (kg./Rai) | 1,107.60 | 1,408.20 | -1.262 | .212 |
| Product price (THB per kg.) | 4.89 | 3.97 | 6.490 | .000* |
| Total return (THB per Rai) | 25,873.78 | 20,527.69 | 1.039 | .303 |

* Statistical significance 5%

## Discussion

The results of the comparison of costs and returns on oil palm production of a member and non-member farmers under LAPS during January to June 2017 revealed that the cost of planting materials of the LAPS farmers was 2,283.71 THB per Rai, which was higher than that of the non-LAPS farmers at 1,509.50 THB per Rai. Especially, the cost of organic fertilizer of LAPS farmers was 225.89 THB per Rai, but that of the non-LAPS member farmers was only 31.94 THB per Rai. This was because most the LAPS member farmers used more organic fertilizer in combination with chemical fertilizer in palm oil plantations than non-LAPS member farmers did. Organic fertilizers would yield long-term results by making the soil fertile and oil palm more productive and reducing the cost of using chemical fertilizer in the subsequent years. This finding was similar to the previous research (Wannawiriwut, 2002) on the analysis of costs and returns of sweet corn indicating that farmers with agreement contract had higher total cost of production than that of farmers who did not have an agreement contract at 3,362.47 and 3343.72 THB per Rai, respectively.

In Addition, the results exposed that the total returns of LAPS member farmers was 4.89 THB per kilogram higher than that of non-LAPS member farmers at 3.97 THB per kilogram, with the difference between the selling price at 0.92 THB per kilogram. The yields of the LAPS member farmers were higher than those of the non-LAPS member farmers, which probably resulted from the integration of farmers can increase negotiate power with a palm oil factories. This result confirmed the previous research of Benchasri *et al.* (2014) that the return over total costs, farmers with standard of Roundtable on Sustainable Palm Oil (RSPO) earned more than those without RSPO standard.

## Conclusion

Large Agricultural Plot Scheme (LAPS) was launched in order to assist small–sized oil palm farming in Thailand to reduce their farming costs. This study compared costs and returns on oil palm production of the LAPS member and non- LAPS member farmers in Bang Saphan Noi District, Prachuap Khiri Khan Province. The result revealed that the total production costs of the LAPS member farmers was 4,028 THB per Rai, higher than the total production costs of the non-LAPS member farmers at 3,304.77 THB per Rai. The fixed cost of the LAPS member farmers was equal to the cost of the non-LAPS member counterparts at 500 THB per Rai, which land use was a major cost accounting for 99%. Moreover, the variable cost of the LAPS member farmers was 3,528.48 THB per Rai, comprising of materials and labor costs at 64.72% and 35.28%, respectively; these figures were higher than that of non-LAPS member farmers at 2,805.17 THB per Rai. The cost of materials and labor were also the majority costs accounting for 53.81% and 46.19% respectively. Regarding the return, the return over cash cost of LAPS member farmers was 22,716.78 THB per Rai, higher than that of non-LAPS member farmers at 18,152.01 THB per Rai.

The oil palm production costs of the LAPS member and that of non-LAPS member farmers were different in the cost of planting materials namely organic fertilizer with statistical significance at the .05 level (P-value = .047, 0.04), whereas the other costs were not statistically different. Regarding production returns, the product prices were different with statistical significance at the .05 level (P-value = .000).

The oil palm production cost of the LAPS member farmers was higher than that of the non-LAPS member farmers. Most of the member farmers under LAPS used organic fertilizers to improve soil and oil palm plantations resulting in high-quality palm oil, and the product could be sold at a higher price than those of the non-member farmers.

## Acknowledgement

The authors would like to express deeply sincere appreciation to all oil palm farmers in Bang Saphan Noi district, Prachuap Khiri Khan Province for fruitful collaboration.

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(Received: 15 August 2017, accepted: 25 November 2017)