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## **Economic and Social Factors Affecting Oil Palm Products in the Upper Southern Region: A Case Study of Prachuap Khiri Khan Province, Thailand**

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Oil palm is an important economic crop in Thailand. It has a very high potential to create value added in terms of both products and energy. This objective of this study was to find out economic and social factors affecting oil palm products in the upper southern region: A case study of Prachuap Khiri Khan Province. Three hundred and fifty respondents in the year 2013 were selected from predominant oil palm producing areas in Prachuap Khiri Khan Province through simple random sampling technique. Descriptive statistics were used for data analysis including frequencies, percentage, and mean. Multiple regression analysis was also employed to determine factors affecting oil palm products. The results showed that 67.7 % of oil palm farmers were male, 43.7 % of respondents graduated from the primary education level, 63.7 % have 5-10 year experiences in oil palm plantations, oil palm farmers have 2.824 hectares of oil palm plantations on average, 64.9 % were the member farmer groups, and 74.3% of workers in oil palm growing were hired. Regression analysis revealed that three variables namely experience in oil palm plantations, primary education level, and gender were predicted to have a significant relationship with yields of oil palm. This research finding provided some economic and social factors that related organizations can use them to encourage farmers to increase oil palm production.

**Keywords:** Economic and social factors, oil palm products, upper southern, Prachuap Khiri Khan

### **Introduction**

The oil palm (*Elaeisguineensis*) is one of the important economic crops in the tropical region. 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 a versatile tree crop with almost all parts of the tree being useful and of economic value (Adegbola,

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*et al.*, 1979). Oil Palm is also used to extract oil for consumption. All parts of the palm trees, waste stems, leaves, bark, fruit bunches, and palm fiber can be utilized. Palm oil waste water from the factory can be used as biofuel or biomass energy for producing electricity. Oil palm has a very high potential to create added value both in terms of products and energy (Pitag, 2011).

Oil palm is the one of important economic crops in Thailand (Department of Agriculture, 2011). In 2012, Thailand has 720,000 hectares of oil palm plantation areas. There are the areas of 636,800 hectares yielding the products. (Office of Agricultural Economics, 2012). By the year 2013, domestic crude oil palm consumption accounted for 42 percent, 33 percent for biodiesel, and the rest of 25 percent for export (Yuwanannon, 2012). More than 120,000 farmers are involved in oil palm cultivation, mostly on small to medium sized farms (Dallinger, 2011). Recently, the government developed oil palm strategy policy under the ASEAN Economic Community (AEC) (European Centre for International Trade, University of the Thai Chamber of Commerce, 2013). The strategy includes development of oil palm production in Thailand to reinforce the foundation for efficient oil palm production, for instance low production costs, high yield and quality of product, and regular yield of product, etc. Additionally, this strategy supports specialists to provide assistance in the research and development of oil palm breeds that can yield products equivalent to those of the major manufacturers, as well as publish and promote farmer to grow oil palms.

For plantation area, the south of Thailand is the main area for growing oil palm. Surat Thani has the largest oil palm plantation areas. This is followed by Krabi, Chumphon, Nakhon Si Thammarat and Prachuap Khiri Khan that contributed more than 12.52 million tons of total crude palm oil in the country. Oil palm as the main economic crop of Prachuap Kiri Khan which has appropriate areas for oil palm plantation. The production of oil palm in this area is increasing progressively since it is alternative energy crop for a farmer (Prachuap Khiri Khan Governor's Office, 2016). In 2012, oil palm plantation area in Prachuap Khiri Khan Province accounted for 33,260.8 hectares. The total product of oil palm was 528,960 tons, and oil palm yields were 2.545 tons/ha (Office of Agricultural Economics, 2012).

The demand for oil palms is stimulating rapid expansion of areas used for oil palm plantations in Thailand (Unjan *et al.*, 2013). In order to promote farmers to plant oil palms in the country, related stakeholders need to concern about factors affecting oil palm production. Farmers make a decision based a range of social, economic and environmental factors. Economic and social factors can affect oil palms production both increasing and decreasing. There are a lot of studies regarding social and economic factors affecting oil palm production, such as Ibitoye, *et al.* (2011) who investigated the factors influencing oil palm production in Ondo State, Nigeria. The result revealed that educational level and training were predicted to have a

significant relationship with the yield of oil palms. Namson, A. (2000) who studied the factors affected the oil palm production of the small farmers in Tambon Huaynamkhao, Amphur Klongtom, Changwat Krabi. The result indicated that production costs, land, and farm management affected the oil palm product. Phitthayaphinant *et al.* (2013) also studied on factors determining farmer's decision on area expansion of oil palm plantation in Aoluek district, Krabi province. The result showed factors affecting farmer's decision namely education level, experiences in oil palm farming, farm debt, a cost of oil palm production, oil palm production system, and being a member of a group.

An increase in demand of palm oil will lead to increase in oil palm product, and from previously mentioned literature studies still lack of the study related to the factor influential palm production in Prachuap Khiri Khan Province, the one of largest oil palm plantations in Thailand. Therefore, this study aimed to 1) to examine economic and social factors affecting oil palm production in the upper southern region, and 2) to investigate economic and social factors affecting oil palm production in the upper southern region: A case study of Prachuap Khiri Khan Province. This research finding can provide some economic and social factors that affecting oil palm production which related organizations can use them for encouraging farmers to grow oil palm and contribute to develop appropriate plan for oil palm production.

## **Materials and methods**

### ***The study area***

The study area was conducted in Prachuap Khiri Khan Province, in the south of Thailand. In the year 2012, oil palms were cultivated highly in Prachuap Khiri Khan Province accounting for totally 33,260.8 hectares of oil palm, and 528, 960 tons of yields. (Office of Agricultural Economics, 2012)

### ***Population and Sample Size***

The study population included 2,737 oil palm growers in the province (Prachuap Khiri Khan Provincial Agricultural Extension Office, 2012). Taro Yamane's formula was used for calculating sample size (Yamane, T., 1973). Three hundred and fifty respondents in the year 2013 were selected from predominant oil palm producing areas in Prachuap Khiri Khan Province

through simple random sampling technique. 
$$n = \frac{N}{1 + N(e)^2}$$

n = A sample size

N = Size the total population of the study.

e = Examples of acceptable tolerances

$$n = \frac{2,737}{1+2,737(0.05)^2} = 349.99 \text{ or } 350$$

### ***Data collection***

Primary data was collected for the study by using a structured questionnaire administered to 350 oil palm farmers. The data were collected during March-July 2013.

### ***Data Analysis***

The descriptive statistics such as frequency, mean, standard deviation and percentage were employed for data analysis. Regression analysis was used to determine the significance of relationships of several factors affecting the yield of oil palm in the study. The analytical model is presented below:

$$Y = \beta_0 + \beta_1 (X_1) + \beta_1 (X_2) + \dots + \beta_1 (X_n)$$

$\beta_0$  = Weighing the relative importance of independent variables of the variance

$X_1$  = Gender

$X_2$  = Age (year)

$X_3$  = Education level

$X_4$  = Experiences in oil palm plantations (year)

$X_5$  = Cultivated areas (hectare)

$X_6$  = Member of farmer groups

$X_7$  = Workers in growing oil palm

### **Results**

Economic and social status of oil palm farmers in Prachuap Khiri Khan Province were demonstrated in Table 1. Oil palm farmers were classified by the size of cultivated area holding in hectares (ha), small farm (less than 3.2 ha), medium-sized farm (3.2 to 8 ha) and large farm (more than 8 ha) (Sansompron, N., 2011). According to the classification, of the 350 respondents, 234

(66.86%) had small farms, 101 (28.86%) had medium-sized farms, and 15 (4.28%) had large farms.

**Gender:** overall, the majority of the farmers (67.7%) were male. Similarly, when classified by sizes of cultivation areas, a majority of the farmers in small farms (63.2%), medium-sized farms (77.2%) and large farms (73.3%) were male.

**Age:** overall, most of the oil palm farmers (26.7%) were 41-50 years old. The majority of the farmers in small farms (28.0%) were 41-50 years old, and that majorities of the farmers in medium-sized farms (28.8%) and large farms (33.2%) were 51-60 years old.

**Education level:** the majority of the farmers (43.7%) graduated from primary education. The majority of the farmers in small farms (44.9%) graduated from a secondary education. While majority of the farmers in medium-sized farms (48.5%) graduated from the primary education, and that farmers in large farms (40.0%) mostly graduated from tertiary education.

**Membership of farmer group:** most respondents (64.9%) were a member of the farmer group. The majority of the farmers in small farms, medium-sized farms and large farms (60.3%), (72.3%), and (86.7%) respectively, were the members of the group.

**Experiences in oil palm plantations:** the result showed that the majority of the respondents (63.7%) had experiences in oil palm plantations between 5-10 years. Similarly, the majority of the farmers in small farms (69.7%), medium-sized farms (50.5%) and large farms (60.0%) had the same range of experience in oil palm production.

**Workers in growing oil palm:** the result showed that the majority of the respondents (74.3%) were hired workers, Likewise, the majority of the farmers in small farms, medium-sized farms, and large farms (65.8%), (91.1%), and (93.3%) respectively, were also hired workers.

**Table 1** Economic and social status of oil palm farmers

Economic and social status	Small (n=234)		Medium (n=101)		Large(n=15)		Total(n=350)	
	n	(%)	n	(%)	n	(%)	n	(%)
Gender								
male	148	63.2	78	77.2	11	73.3	237	67.7
female	86	36.8	23	22.8	4	26.7	113	32.3

Age (year)								
< 21	4	1.7	-	-	-	-	4	1.2
21-30	31	13.2	12	12.0	2	13.4	45	13.0
31-40	60	25.7	22	22.2	2	13.4	84	24.0
41-50	66	28.0	24	24.0	4	26.6	112	26.7
51-60	47	20.0	29	28.8	5	33.2	81	23.0
>60	26	11.1	14	14.0	2	13.4	42	12.1
Education								
Primary education	100	42.6	49	48.5	4	26.7	153	43.7
Secondary education	105	44.9	37	36.6	5	33.3	147	42.0
Tertiary education	29	12.4	15	14.9	6	40.0	50	14.3
Membership of farmer groups								
Don't Belong								
Belong	93	39.7	28	28.3	2	13.3	123	35.1
	141	60.3	73	72.3	13	86.7	227	64.9
experiences in oil palm plantations (year)								
< 5	30	12.8	13	12.9	-	-	43	12.3
5-10	163	69.7	51	50.5	9	60.0	223	63.7
11-15	38	16.2	29	28.7	5	33.3	72	20.6
16-20	2	0.9	7	6.9	1	6.7	10	2.8
>20	1	0.4	1	1.0	-	-	2	0.6
workers in growing oil palm								
Plantation owners	79	33.8	9	8.9	1	6.7	89	25.4
harvest	154	65.8	92	91.1	14	93.3	260	74.3
hired workers								
workers and								
Plantation owners	1	0.4	-	-	-	-	1	0.3
harvest								

Source: Computed by the authors from survey data analysis, 2013

**Productivity:** overall, the oil palm farmers can produce averagely 0.24 ton/ha. When classified by size of cultivation areas, it was found that the farmers in small farms, medium-sized farms and large farms can produce averagely 0.22 ton/ha, 0.27 ton/ha, and 0.25 ton/ha respectively. As showed in table 2.

**Table 2** productivity classified by size of cultivated areas

variables	Small (n=234)		Medium (n=101)		large (n=15)		Total (n=350)	
	$\bar{X}$	S.D.	$\bar{X}$	S.D.	$\bar{X}$	S.D.	$\bar{X}$	S.D.
Productivity (ton/ha)	0.22	276.54	0.27	234.54	0.25	44.32	0.24	259.46

Source: Computed by the authors from survey data analysis, 2013

**Sources for selling oil palm product:** The result showed that the majority of farmers (60.6%) sold their product to cooperatives. The majority of the farmers in small farms, medium-sized farms and large farms (57.3%), (93.1%), and (66.7%) respectively, sold their product for agricultural cooperatives.

**Revenues from the oil palm farm:** The result showed that the majority of the farmers (30.3%) received revenues from the oil palm farms (2013) more than 100,000 THB. Farmers in small farms (33.8%) received the revenues from oil palm farms (2013) 30,001-50,000 THB. The majority of the farmers in medium-sized farms (67.2%) gained revenues from oil palm farms (2013) more than 100,000 THB, and the majority of farmers in large farms (80.0%) earned revenues from the oil palm farm (2013) more than 100,000 THB. (Table 3)

**Table 3** Sources for selling product of oil palm and revenues from the oil palm farm (2013)

	Small (n=234)		Medium (n=101)		Large (n=15)		Total (n=350)	
	n	(%)	n	(%)	n	(%)	n	(%)
sources for selling product								
factory	17	7.3	7	6.9	2	13.3	26	7.4
agricultural cooperative	134	57.3	68	93.1	10	66.7	212	60.6
oil palm middlemen	94	40.0	30	29.7	6	40.0	130	37.2
revenues from the oil palm farm								
<30,000THB	78	33.3	4	4.0	-	-	82	23.4
30,001-50,000THB	79	33.8	5	5.0	-	-	84	24.0
50,001-70,000THB	28	12.0	9	8.9	3	20.0	40	11.4
70,001-100,000THB	23	9.8	15	14.9	-	-	38	10.9
>100,000THB	26	11.1	68	67.2	12	80.0	106	30.3

Source: Computed by the authors from filed survey in 2013

The analytic result of the economic and social factors affecting oil palm products and multiple regression economic and social variables: gender ( $X_1$ ), age ( $X_2$ ), the education level ( $X_3$ ), experiences in oil palm plantations ( $X_4$ ), cultivation areas ( $X_5$ ), membership of farmer groups ( $X_6$ ), and workers in

growing oil palm ( $X_7$ ) in Table 4 revealed that the population variation was statistically significantly different at the 0.05 level (F-ratio = 5.971).

In Table 4,  $R^2$  (0.109) indicated that the independent variables can explain the variation in the dependent variable for 10.9%. The results of the regression analysis indicated that only experiences in oil palm plantations and education level were significant at the 0.01 level of probability; gender was significant at the 0.05 level of probability. It demonstrated a very high positive contribution to the yield of oil palm.

**Table 4** Regression analysis results of the economic and social factors affecting oil palm products in the upper southern region: A case study of Prachuap Khiri Khan Province

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	$\beta$	Std.Error	Beta		
Constant	-.057	.123		-.467	.641
Gender ( $X_1$ )	.062	.029	.111	2.148	.032*
Age ( $X_2$ )	-.001	.002	-.038	-.517	.605
Education level ( $X_3$ )	.069	.026	.186	2.654	.008**
Experiences in oil palm plantations ( $X_4$ )	.019	.004	.269	4.720	.000**
Cultivated areas ( $X_5$ )	2.971E-05	.001	.002	.030	.976
Member of farmer groups ( $X_6$ )	.045	.028	.082	1.583	.114
Workers in growing oil palm ( $X_7$ )	-.060	.031	-.105	-1.929	.055
$R^2$	0.109				
Adjusted $R^2$	0.091				
F-ratio	5.971**				

\*\* statistical significance 1%, \* statistical significance 5%

## Discussion

The majority of oil palm farmers in the study area represented a smallholding, male-headed and middle aged. It indicated that the male was stronger and had more energy for farming with expectation to enhance family livelihood. This result was consistency with Phitthayaphinant *et al.* (2013) concluded that farmers were late middle-aged male, similar study was conducted by Ibitoye, *et al.*, (2011) discovered that majority of oil palm farmer in Nigeria were middle-aged male .

Similarly to another sector of farming, oil palm smallholding farmers graduated from primary level. However, the majority of those in medium-sized farms graduated from the secondary education, and the majority of those in

large farms graduated from tertiary education. It may be stated that farmers with higher education can learn more to plan and carry out management to expand larger farms. This result confirmed to the previous research (Afolami, *et al.*, 2012) which showed that (38.9%) of rice farmers graduated from primary education and (27.4%) graduated from secondary education.

Regarding the experience in oil palm plantation, the results revealed that the respondent had 5-10 years of experience in oil palm plantation, because farmers who have experience in oil palm farming are more likely to obtain output. This result seemed that the oil palm farmer in Prachuap Kirikhan had less the experience in oil palm plantation which found in the previous research (Phitthayaphinant, 2013) indicating that an experience in the oil palm plantation relatively high at 17.71 years, on average.

Moreover, the result from regression showed that experience in oil palm plantations had significant relationship with the yield of oil palm, which conformed to the previous research (Usman, *et al.*, 2011) revealed that experienced farmers rarely involved in groundnut production. Additionally, the study of Phitthayaphinant, (2013) also revealed the result of the multiple regression analysis that statistically variables determining the economic efficiency were oil palm farm experience. It could state that when oil palm farmers have more experience in palm growing, they will observe and learn the nutrient of oil palm required for yielding high products. Oil palm farmers will study increasingly to gain knowledge for developing and improving how to increase oil palm productivity.

The education level also affected oil palm product with statistical significance at the 0.01 level. This result confirmed to previous researchers (Ibitoye, *et al.*, 2011) revealed that only two variables: level of education, and times the respondents attended training were predicted to have significant relationship with the yield of oil palm. In addition, the socio-economic factors, namely education level, marital status, and household size positively also affected rice production (Nwibo, *et al.*, 2012). The oil palm farmers who had knowledge can learn more and use their knowledge in developing their oil palm plantation. Lastly, Gender was another factor affecting oil palm product with statistical significance at the 0.05 level, and, the majority of oil palm farmers were male. This finding may imply that male farmers were strong enough to effectively work in oil palm growing. This result confirmed to the previous research (Chidi, *et al.*, 2015) that gender factors can affect rice production of minor farmers in Ebonyi State with statistical significance.

## **Conclusion**

The study of economic and social factors affecting oil palm products in the upper southern region: A case study of Prachuap Khiri Khan Province, found that the majority of oil palm farmers were male, aged 41-50 years, graduated from primary education level, were members of farmer groups, had experiences in oil palm plantations for 5-10 years, and were hired workers in growing oil palm. The majority of the farmers can overall produce oil palm for 0.24 ton/ha in average. The majority of the farmers sold their products to cooperative and revenues from the oil palm farm (2013) were more than 100,000 THB per year. The regression results revealed that factors affecting the oil palm products were experiences in oil palm plantations, education level, and gender, which had been developed and promoted in order to increase products.

This research finding provided recommendations that the farmers with experience should be invited to share their learning experience with oil palm plantation management with other oil palm farmers or growers of oil palm with less experience in order to enhance their skills and experience to increase productivity. In terms of educational level, the majority of oil palm farmers were primary education. For this reason, relevant authorities should invite knowledgeable, skilled, or expert farmers on oil palm production to educate these farmers or farmer groups in order to be able to adapt the knowledge in the oil palm plantation to increase productivity. Besides, while most farmers were strong and energetic male for gardening, this suggested that farmers should be grouped together in the oil palm plantations and should assist each other in harvesting oil palm products in order to reduce hire cost of harvesting.

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