

## FACTORS AFFECTING THE PALM OIL PRICE IN THAILAND

Pichamon Chansuchai

Suan Sunandha Rajabhat University, Bangkok, Thailand

*The paper studied the Factors Affecting the Palm Oil Price in Thailand. The purposes is to study structure factors of production and price of palm oil in Thailand and to find ways to enhance the productivity and cultivated area for palm oil in Thailand. This was a mixed method research, used both qualitative and quantitative techniques. Time series data were collected utilizing monthly data from January 2011 to December 2015. The variables included crude oil, soybean oil prices, crude palm oil prices, consumption of biodiesel, import of palm oil from foreign sources and the foreign exchange rate. Econometrics analysis was also used as a tool to analyze the factors that affected the price of oil palm model in the Multiple Regression. The study found that Thailand is shortage palm oil which results to fuel shortage crisis in the country. Due to price situation of drought has affect to higher price of palm oil and the end-product for consume not shifting as raw materials, because controlled product is in short supply. In term of output quality control is ensure to compliance with government policies. From research found increase the area under oil palm in right field, improved oil palm plantation by a thoroughbred and restructuring of the industrial production of palm oil and palm oil to the production efficiency.*

**Keywords:** Palm oil, Bio-Diesel, Energy, factors, Soybean oil

### Introduction

Palm oil is an important crop which is in global demand. It is used in a variety of industries such as the food processing industry and renewable energy, for examples. The production of oil palm fuel costs less than other crop oil fuels so the price was lower compared to other crop oils. The oil palm have less risk when facing usual natural disasters and able to grow in massive numbers to serve a future increasing numbers of world population. These reasons made the future of palm oil bright. The Oil Palm is a plant of the future and the global market's needs of palm oil trends to increase steadily. Indonesia and Malaysia are the two largest palm producing countries. World's oil palm major plantation areas are located in Southeast Asia; Indonesia and Malaysia have combined outputs of 52.5



**Pichamon Chansuchai**

Lecturer in Faculty of Management Science,  
Suan Sunandha Rajabhat University,  
Bangkok, Thailand

Research interests – national economy, functioning of local and world markets for agricultural products and natural resources, business administration, corporative management

E-mail : [pichamon1979@hotmail.com](mailto:pichamon1979@hotmail.com)

million tonnes or 85% of global production. Both countries thus play a significant role in directing and determining prices of palm oil in the world market. Thailand ranks third, in both plantation area and output. Thai oil palm production records approximately 11-13 million tonnes p.a., which can be extracted into palm oil of about two million tonnes p.a. or only 1.2% of world's share (Thailand Industry Outlook 2016-18, 2016).

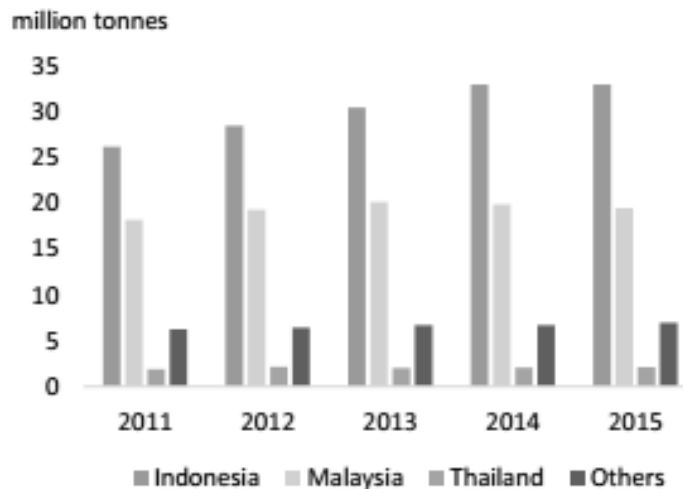


Figure 1 - World Palm Oil Producers (2015)

Palm oil can be referred to as one of Thailand's nationally important products which plays crucial roles in the economy, food security, and energy consumption of the country but since 2007, Thailand has a shortage of palm oil resulting in palm oil crisis in the country, there was a change of volume of crude palm oil in the country due to the government policy encouraging the production and use of biodiesel to replace imports of foreign diesel oil, and to overcome the shortage of oil in the future. Palm oil is a fuel that there is demand which is higher than other types of energy.

In 2015, Thailand's domestic usage of palm oil products and bio-diesel made of palm oil were about 91% of the total Thai production and 9% was given for export sale in order to maintain the balance of the fuel inventory of the country (Thailand Industry Outlook 2016-18, 2016).

Most oil palm plantations in Thailand are located in the south and the east of Thailand where it is suitable for oil palm plantations. However nowadays, there is expansion of cultivation outside the area.

Although Thailand is able to produce enough oil to meet the needs of local businesses, most of the production is from small gardens. Manufacturers are farmers and small entrepreneurs. Palm oil breed is less developed and there is a management and policy. Thailand makes the production of palm oil at a higher cost than the major manufacturers in Indonesia and Malaysia. This is a main weakness that will affect the ability for Thailand to

## FACTORS AFFECTING THE PALM OIL PRICE IN THAILAND

compete in the palm oil. Cause of the production of palm oil producing countries both have the potential to produce higher than Thailand. From both the arable crop plantation at large seed can make a unified planning and control costs more effectively. Especially, Malaysia has maximum production potential from weaknesses which will have effects on the competitiveness of the palm oil industry in Thailand has already mentioned above.

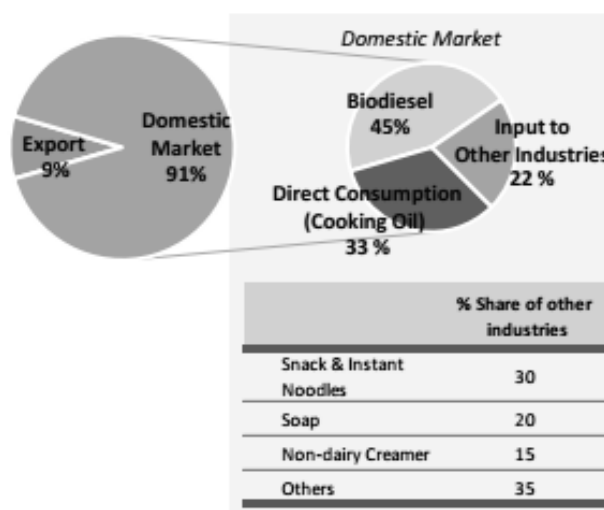


Figure 2 - Sales Volume Thai Palm Oil Industry (2015)

### **Generation of the data**

In this study, the materials were divided into 2 parts, using the Descriptive Method and Quantitative Method. First, the Descriptive method analyzed using spreadsheet and statistics in order to describe the condition in general, production structure and the market price of oil and future prospects of the refined palm oil industry. Second, the quantitative method used monthly data, from January, 2011 to December, 2015. Such as crude oil, Soybean oil prices, crude palm oil prices, consumption of biodiesel, imports of palm oil from foreign and exchange rate.

### ***Literature Review***

Arifin Indra Sulistyanto & Roberto Akyuwen (2011) The study is the analyzing factors affecting the performance of CPO export. It was found that government policies were not optimum in supporting CPO export, while export financing was the most important factor. The other factor was CPO price in the world market. Meanwhile, the black campaign has significant but negative impact. The prices of sunflower and soybean oil have had significant and positive impact on CPO export volume. Variables which have no impact were domestic

price, domestic consumption, CPO production volume, exchange rate, GDP per capita of export destination countries, crude oil price, and government policy. Although affected by global crisis, Indonesia's CPO export still has a very bright prospect in the future.

Arshad, Shamsudin, & Hameed (2011) The study is the soybean oil as a competitor to palm oil. This study found that soybean prices would have a positive relationship with world palm oil, and have prices of soybean and palm oil that are highly correlated.

Fadli Fizari Abu Hassan Asari, Nur Hayati Abd Rahman, Errie Azwan Abdul Razak, Bashir Ahmad Shabir Ahmad, Nurul Fahana Aini Harun & Kamaruzaman Jusoff. (2011) This study was conducted to analyze the relationship between total area planted and palm oil price with production of palm oil in terms of magnitude. The findings showed that the total area planted and palm oil price have negative relationship towards production of Malaysian palm oil. On the other hand, there is no causality relationship between total area planted and production of Malaysian palm oil in the short run. However, there is a unidirectional causality relationship between palm oil price and production of palm oil in Malaysia.

Anuman Chantawong (2004) The study is the demand of purified palm oil in Thailand case import tariff policy is dependent on the wholesale price of soybean oil at Bangkok market, the national income per capital import tax and dummy variable of the exchange rate, the most significant factor affecting the demand of purified palm oil in Thailand is the wholesale price of soybean oil at Bangkok market with elasticity of 5.304. The demand of purified palm oil in Thailand case free trade is dependent on the wholesale price of soybean oil at Bangkok market, the national income per capital and dummy variable of the exchange rate, the most significant factors affecting the demand of purified palm oil is the wholesale price of soybean oil at Bangkok market with elasticity of 5.305. The result of the study suggest that palm oil plantation and crude palm oil extraction plant should find some way to develop the knowledge and skill of production. The government should set the palm oil institution and support the current information for producer. It could make Thai palm oil industry compete with competitor in the world market place.

Nitipa Worrapantrakul (1998) The result of the study indicated that the market structure of soybean oil industry is oligopoly of which approximate 60% of its market share was owned by the 2 biggest firms. High capital of investment and limited of raw Material raising the barrier to entry of the new firm. Brandname was used to create the product differentiation. Sale promotion and size of packaging strategies were used at the retail level of the market where as price policy was conducted at the wholesale level to stimulate sale and liquidity of the firm. Firm which the highest market share had the highest profit 6.35% and the lowest net loss of 2.24% due to it was in expansion period.

Supakorn Kamlamlert (1998) This study use the time series secondary data during 1992-1996 to analyze the trade structure and factors affecting the price of diesel oil in Thailand by descriptive and quantitative method. The result revealed that the trade of diesel oil in Thailand has expanded largely according to the increasing of demand. The trade structure of diesel oil has changed to use domestic production more than import, that made

## FACTORS AFFECTING THE PALM OIL PRICE IN THAILAND

the proportion of domestic production by import increase to be 72.9 : 27.1 in 1996. For the sale of diesel oil has increased and have some export also. In the floating oil price system, the government has not determined the diesel oil price anymore and the diesel oil price have changed all the time. This study found that the main factors affecting the price of diesel oil is a precedent month of the world price of diesel oil and the exchange rate (Bath/US.dollar).

### *Methodology*

These econometric methods were tools to analyze the factors that affect the price of oil palm model in the Multiple Regression Analysis with the following steps.

1. Testing stability of data (Stationary). To test the stability of the data used to determine if there were problems with time series data. It was possible that time series data may have a relationship to each other. Therefore, prior to estimation in the model it must be tested by the Unit Root that all variables were Stationary or Non Stationary. If the time series data were Non Stationary, namely, mean and variance of data changes as period may cause problems of Multicollinearity. (Rungsun, 2538: 22-24). Variables were Stationary and Non – Stationary with 3 properties as follows.

Assume variable  $Y_t$  h the character of a Stationary, variable  $Y_t$  and has properties as follows.

$$\text{Mean: } E(Y_t) = \mu$$

$$\text{Variance: } \text{Var}(Y_t) = E(Y_t - \mu)^2 = \sigma^2$$

$$\text{Covariance: } E[(Y_t - \mu)(Y_{t+k} - \mu)] = \gamma_k$$

Assume variable  $Y_t$  is Non – Stationary, variable  $Y_t$  has properties as follows.

$$\text{Mean: } E(Y_t) = \mu$$

$$\text{Variance: } \text{Var}(Y_t) = E(Y_t - \mu)^2 = t\sigma^2$$

$$\text{Covariance: } E[(Y_t - \mu)(Y_{t+k} - \mu)] = t\gamma_k$$

For the hypothesis to be in denie or accepted testing the Unit Root, such a Test will consider from the Augmented Dickey-Fuller Test of Statistics and has criteria of considerations as follows.

If values of Augmented Dickey-Fuller Test of Statistics is more than to Critical Values, it will denies the main hypothesis showing that the variable were Stationary.

If values of Augmented Dickey-Fuller Test of Statistics was less than Critical Values, it will accept the main hypothesis shown that the variable were Non-Stationary.

2. Testing stability of data (Stationary). After the initial test of variable properties, the model will estimate the Coefficients using least squares to determine the direction and magnitude of the relationship between the independent variables and the dependent variables. If the sign of the coefficient of independent variables were positive then independent variables and dependent variables were correlated in the same direction. On the other hand, if the sign of the coefficients of independent variables were negative, then dependent variable and independent variables were correlated in the opposite direction.

An econometric model of factors that have affected palm oil price has been developed in term of types of crude oil in Multiple Linear Regression, from Demand and Supply theory, and from pricing by market forces.

$$PPO_t = \beta_0 + \beta_1 1PSO_t + \beta_2 2PF_t + \beta_3 3QS_t + \beta_4 4EX_t + \beta_5 5IM_t + \epsilon_t$$

Defined

PPO is price of pure palm oil (baht/kg.)

$\beta_0$  is constant

$\beta_1, \dots, \beta_5$  are coefficients

PSO is price of soybean oil size 1 L (baht/L)

PF is price of crude palm oil (baht/kg.)

QS is quantity of consume Bio-Diesel (L/day)

EX is exchange rate (baht per US. dollar)

IM is quantity of import palm oil (ton)

$\epsilon$  is error

t is period  $t = 1, 2, \dots, 48$

### ***Hypothesis of the model***

To study factors affecting the palm oil price in Thailand for finding the right equation from created models of any factors;

1. Price of soybean oil (DPSO). By making the other factors constant; rate of change of the price of soybean oil (DPSO) in relation to the direction of change in pure palm oil (DPPO).

2. Price of crude palm oil (DPF). By making the other factors constant; the change in the price of crude palm oil (DPF) was associated in the same direction of changes in pure palm oil (DPPO).

3. Consumption of biodiesel (DQS). By making the other factors constant; the change of use biodiesel (DQS) was associated in the same direction of changes in the price of pure palm oil (DPPO).

4. Exchange Rates baht per US dollar (DEX). By making the other factors constant; the change in exchange rate baht per US dollar (DEX) was associated in the same direction of changes in the price of pure palm oil (DPPO).

5. Palm oil imports from abroad (DIM). By making the other factors constant; the change of palm oil imports from abroad (DIM) was associated in the same direction of changes in the price of pure palm oil (DPPO).

### **Results**

Statistics were obtained on a monthly basis from January 2011 to December 2015, on pure palm oil (PPO), soybean oil (PSO), crude palm oil (PF), consumption of biodiesel (QS), import of palm oil from abroad (IM) and the exchange rate of baht per US dollar (EX). In

## FACTORS AFFECTING THE PALM OIL PRICE IN THAILAND

order to analyze by multiple regression analysis, Ordinary Least Square in a time series of data with macroeconomic variables were used.

### *Testing stillness of data on the Unit Root had stability Stationary data*

Tests showed that the ADF Stat of independent variables, in all variables failed to reject the null hypothesis that each variable was Non-stationary. It was shown that all variables were Non-stationary if the variable to be estimated coefficient crashes literally no relationship or Spurious Regression has upgraded the data into testing Unit Root. Tests then showed that the independent variables were all stationary, if the variable was estimated using least squares and did not entirely cause problems of no relationship.

Table 1- Testing Unit Root of Augmented Dickey-Fuller (ADF)

(Source: created by the author)

Variables	ADF Stat	
	Level	Percent Change From
Price of Pure palm oil (PPO)	-3.24	-3.93**
Price of soybean oil (PSO)	-2.92	-3.98**
Price of crude palm oil (PF)	-3.07	-3.87**
Quantity of consume bio-diesel (QS)	-2.65	-3.73**
Exchange rate of baht per US. Dollar (EX)	-2.39	-2.77*
Quantity of import palm oil (IM)	-0.96	-2.42*

For known values of  $R_0^2$  and  $k/n$ , the ratio  $R_p^2/R_0^2$  depends little on the values of k and n. We also note that the ratio is weaker for the low values of  $R_0^2$ . Finally, the use of variables selection tends to increase the ratio.

### *Testing properties of any variables in the basic model and evaluation coefficient in the model by Least Square*

The change of the dependent variable was the best because Equation 2 is the t-stat were statistically significant at a confidence level of more than 99 percent, while the Adjusted R-squared increases and the SE of Regression remained unchanged. The Log Likelihood values change very little from -109.63 to -112.40, which did not reflect the significant loss of variables in explaining changes in crude oil. In addition, the Akaike info Criterion higher from 1.63 to 1.68 indicated an equation that contains variables that were statistically significant. Based on the t-stat equation is more suitable as compared to Equation 1 to calculate the Q-stat, which is used to test the Autocorrelation. Found that the Q-stat of

changes in crude oil was at 2 and 4, so that not a problem in Serial Correlation. Therefore, estimating the coefficients of the least squares is a good method to estimate the change in crude oil.

Table 2 - Evaluation coefficient of factors influencing the price of pure palm oil

(Source: created by the author)

Method of Evaluation	OLS	
	Equation 1	Equation 2
C	0.17 (0.77)	0.05 (0.22)
PSO	0.22 (4.17)	0.22 (4.05)***
PF	0.59 (11.22) ***	0.57*** (10.6)
OS	-1.17 (-2.26)	-
EX	0.25*** (0.496)	0.06 (0.13) ***
IM	-4.82 (-0.33)	-
Adjusted R-squared	0.76	0.75
S.E. of regression	1.63	1.68
Log likelihood -	-109.63	-112.40
Akaike info criterion	3.91	3.94
F-statistic	38.51***	59.0***
Q – Stat (1)	1.81	1.56
Q – Stat (4)	1.98	1.73

Variation in pure palm oil (DPPO) by the appropriate factor is the change in the price of soybean oil (DPSO) changes in the price of crude palm oil (DPF) and changes in the rate of change is the change in the price of oil (DPSO) in relation to the direction of change in crude oil (DPPO) at a confidence level of 99%, matching the assumptions in the model. By making the other factors constant and rate of change of the price of soybean oil (DPSO) rising 1% would result in a change in crude oil (DPPO) rising 0.22%. The change in the price of crude palm oil (DPF) was associated in the same direction. Changes in pure palm oil (DPPO) at a reliability level of 99%, matching the assumptions in the model. By making the other factors constant, the rate of change in the price of crude palm oil (DPF), had an increase of 1%, would result in a change in crude oil (DPPO) increasing by 0.5. The change in use of biodiesel (DQS) is not statistically significant. Due to production of biodiesel using palm oil, the demand of palm oil is higher. Likewise, the amount of demand for bio-diesel is not very strong. Changes in exchange rates of baht per US dollar (DEX) were associated with a change in the same direction of pure palm oil (DPPO) at a confidence level of 99%,



## FACTORS AFFECTING THE PALM OIL PRICE IN THAILAND

matching the assumptions in the model. By making the other factors constant, the rate of exchange of baht per dollar US (DEX), an increase of 1% would result in a change in pure palm oil (DPPO) rising 0.25%. Change of palm oil imports from abroad (DIM) was not statistically significant, due to the volume of imports of palm oil from foreign countries increases on average about 2% compared with the volume of production within the country.

### **Discussion and Conclusion**

The results showed that the shortage of palm oil in the oil crisis in the country due to lack of rainfall. The effect was a higher palm oil price in the country. There palm oil prices to consumers but at its downstream palm oil consumption rose by raw material prices, not because it is used to control the products in short supply. Thai people have to queue to buy palm oil consumption and there were restrictions for the family. The output quality control was to ensure compliance with government policies. Research found an increase in the area at oil palm fields, improved oil palm plantations restructuring of the industrial production of palm oil, and palm oil in the manufacturing sector was more efficient and able to respond to demand. Energy policy was a key mechanism for maintain stability in the market and encouraged farmers to grow oil palm by providing a better understanding of how to produce and maintain suitable oil palms.

Factors that affect pure palm oil changed the price of soybean oil (DPSO) by making the other factors constant; the rate of change of the price of soybean oil (DPSO) affected the pure oil prices (DPPO), due to soybean oil being used to replace palm oil. If soybean oil prices rise, consumers adopt refined palm oil instead. When demand increased, the price increased to customers and changed the price of crude palm oil (DPF) will affect the level of crude oil (DPPO), due to palm oil being the main raw material used in the processing of pure oil. This was the cost of production, so if costs rise, it would affect the yield to rise accordingly. For 3 factors: the amount of biodiesel (QS), palm oil imports from abroad (IM) and the exchange rate baht per dollar US (EX) failed to explain the change in pure palm oil prices as statistically significant. This may be caused by biodiesel not being used much and oil palm being mainly used in food industry at 60%. In addition, the government had policies to support plantation areas for more production with amount of demand. The reference price for palm was higher in Malaysia, since Malaysia is a major manufacturer in the world. The exchange rate of baht per US dollar (DEX) and changes in the volume of imports of foreign oil (DIM) was not statistically significant.

The findings revealed that palm oil was demanded fuel higher than others energy. So there is a role for human life as an important factor. From study found that Thailand is shortage palm oil which results to shortage crisis in country. Due to price situation of drought has affect to higher price of palm oil and the end-product for consume not shifting as raw materials, because controlled product is in short supply. In term of output quality control is ensure to compliance with government policies. From research found increase the area under

oil palm in right field, improved oil palm plantation by a thoroughbred and restructuring of the industrial production of palm oil and palm oil to the production efficiency. The farmers and entrepreneurs in the business of oil palm Thailand need to improve the production of palm oil for whole system of Thailand since the growers, crushing and refining crude oil. And should have a strategy of focusing on cost reduction increasing the yield of production. Including creation of added value to keep prices competitive with imported palm oil and expand opportunities into the ASEAN community.

### References:

- Anuman, C. (2004). *Factors Affecting Demand and Supply of Purified Palm Oil Industry in Thailand*. Master of Economics (Business Economics) Major Field Business Economics, Department of Economics. Thesis Kasetsart University: 55-102.
- Arifin, I.S., Roberto, A. (2011). *International Conference on Economics and Finance Research IPEDR*, 4,5-18, IACSIT Press, Singapore.
- Arshad, F., Shamsudin, M.N. & Hameed, A.A. (2011). An Econometric Analysis of the Link between Biodiesel Demand and Malaysia Palm Oil Market, *International Journal of Business and Management*, 6(2): 35-45.
- Department of Agricultural Extension, (1994). *Palm oil, Ministry of Agriculture and Cooperatives* Academics document, Bangkok: Thailand.
- Global economic, (2011). World commodity forecasts: food, feedstuffs and beverages, *Economist Intelligence Unit*: 35-43.
- Nitipa, W. (1998). *An Analysis of Market Structure of Soybean Oil in Thailand*, Master of Science (Agriculture Economic), Major Field Agricultural Economic, Department of agricultural and Resource Economic. Thesis Kasetsart University: 98-167.
- Prachachat Busines (2007). *Palm oil shortage or on the rise*, 3-5.
- Prince of Songkla University, (1985). *Palm oil and palm oil industry*, Promotion project of small palm oil industry as the Royal Idea: 78-102.
- Supakorn, K. (1998). *A Study on Structure and Factors Affecting the Price of Diesel Oil in Thailand*. Master of Science (Business Economics), Major Field Business Economics, Department of Economics. Thesis Kasetsart University: 67-89.
- Wanruk, M. (2012). *Principle of Microeconomic, Office of Agricultural Economics*: 135-180, Bangkok: Thailand.
- Wareerat, P., (2016). Oil Palm Industry, Thailand Industry Outlook 2016-18, *Krungsri Reserch*: 1-6, Bangkok: Thailand.

<i>Paper submitted</i>	<i>21 April 2017</i>
<i>Paper accepted for publishing</i>	<i>16 August 2017</i>
<i>Paper published on-line</i>	<i>29 August 2017</i>