PALM OIL INDUSTRY

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Demand for palm oil is forecast to increase gradually but over the next three years, the Thai palm oil sector will face increasing risk of excessive growth in supply caused by the government-supported expansion of the area given over to palm oil cultivation that has taken place over the past five to six years. In addition to this, stock levels are high and this is putting downward pressure on the price of Thai palm oil, a situation which will take some time to resolve. As a consequence, opportunities for profit-taking will be limited, especially for growers and crude palm oil extraction mills.

Overview

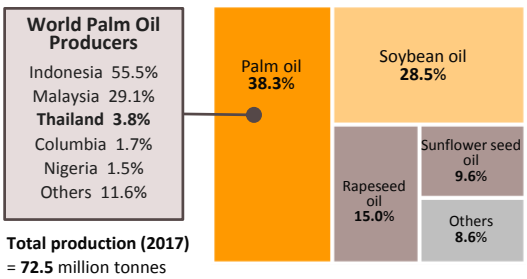
Palm oil [1/] **has yields per unit of land which are 6-10 times higher than that of other vegetable oil crops** such as soybean, rapeseed, sunflower, coconut and olive, and so when compared to these, palm oil has the lowest production costs. [2/]

In 2017, global production and consumption of palm oil came to 72.5 million tonnes and 68.8 million tonnes, respectively. These figures represent 38.3% and 37.3% of global vegetable oil production and consumption.

The world's principal palm oil producing region is the ASEAN area, and Indonesia and Malaysia are the most important producers. Together, these two countries account for approximately 85% of combined global output and so they play an important role in determining price movements on world exchanges. Of the two, Indonesia is the more important, outputting 36.0 million tonnes per year and Malaysia, with an annual production of 18.9 million tonnes, sits in second place. These two countries are also the world's major exporters, producing over 90% of the palm oil bound for international markets. In terms of imports, India is the single biggest market, taking 20.3% of the world total in 2017. India is followed in importance by the European Union (15.8%), China (10.6%), and Pakistan (6.7%), all of which are net importers of palm oil. Over the past five years, global demand for palm oil has grown by an average of 4% per year, with demand for palm for both direct consumption and for production of energy increasing. Meanwhile, production has grown at a slightly greater pace, averaging annual growth of 4.5%.

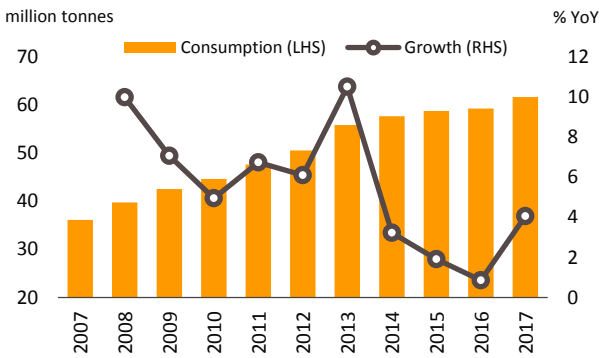
Thailand is in third place in the palm oil production rankings, but its output comes to only 3.8% of the global total production and so Thai influence on the prices on world markets is negligible. 85% of Thai oil palm plantations and their associated processing facilities are in the south of the country[3/] and are clustered particularly in the provinces of Krabi, Surat Thani, and Chumphon. The remaining 15% are found in the center, the north and the north-east of the country, areas in which oil palm cultivation has expanded in the past decade. The total area of oil palm

Figure 1: World Vegetable Oil Production



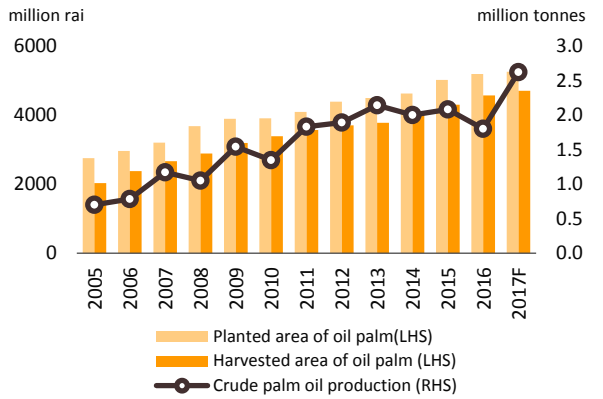
Source : U.S. Department of Agriculture (USDA)
Note: Others include coconut oil, cottonseed oil, olive oil, peanut oil

Figure 2: World Palm Oil Consumption



Source : U.S. Department of Agriculture (USDA)

Figure 3: Thailand's Palm Oil Production



Source : U.S. Department of Agriculture (USDA)

1/ Palm oil may be extracted both from the oil palm fruit and from the oil palm seeds, although at present, extraction of oil from palm fruit accounts for 90% of world palm oil production.

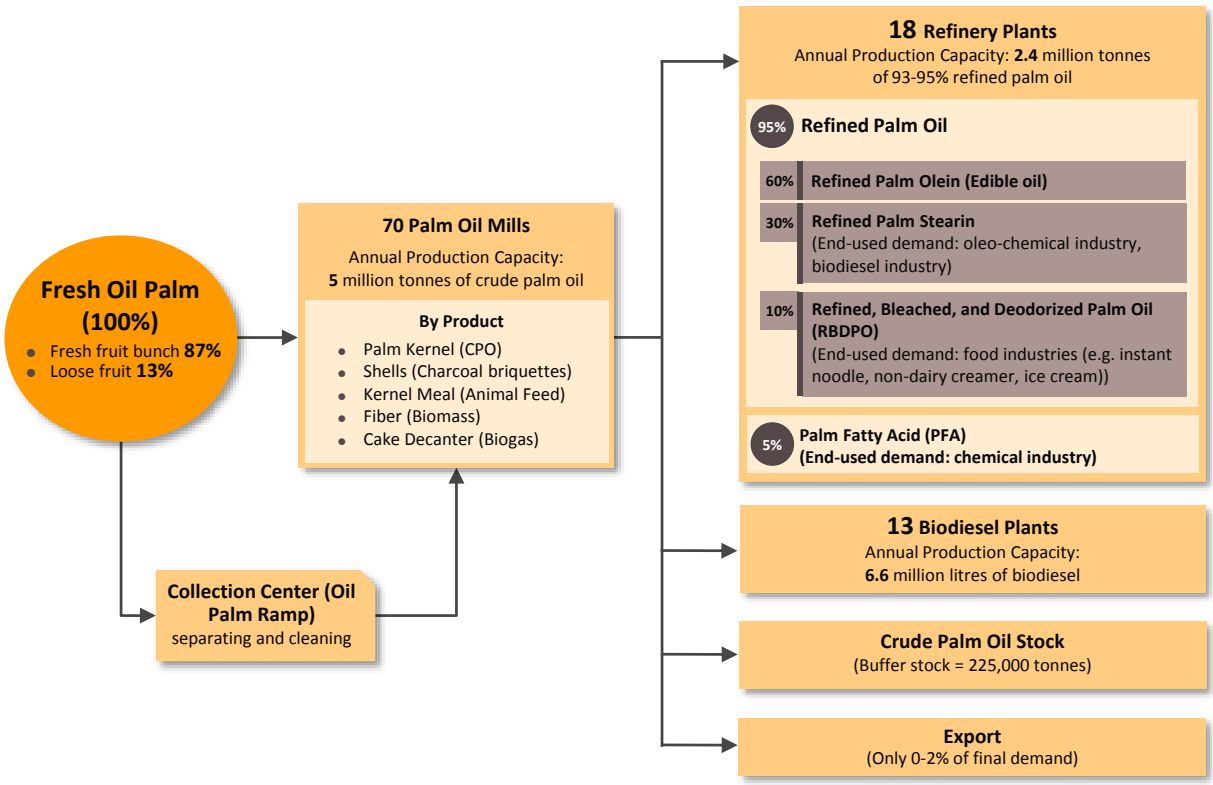
2/ Yields for particular types of vegetable oil are: oil palm fruit: 512 kg/rai; oil palm seeds/kernels: 73 kg/rai; rapeseed: 89 kg/rai; sunflower seed: 81 kg/rai; coconut: 54 kg/rai; soybean: 52 kg/rai; and peanut: 51 kg/rai.

3/ Generally, crude palm oil extraction mills are located close to plantations since the oil palm needs to be processed within 24 hours of harvesting to guarantee high-quality oil.

cultivated in Thailand has risen in the recent past as a consequence of government support for palm production. This occurred as part of the government's strategy for developing alternative energy supplies and in 2017, the total area of oil palm came to 5.3 million rai, with 4.7 million rai actually producing oil palm. National output totaled 13.5 million tonnes[4/] of oil palm products, which was refined into 2.5 million tonnes of crude palm oil (source: USDA and the Office of Agricultural Economics).

The Thai oil palm sector benefits from having a supply chain that stretches from production of raw materials through to finished products (Figure 4). **(i) Upstream production consists of over 200,000 households** across the country that grow oil palm, the majority of which are small growers. Large growers may be commercially connected to mills that process oil palm and these are usually examples of backwards integration with crude palm oil extraction mills processing their own raw materials. **(ii) Midstream production is based on crude palm oil extraction mills.** Currently there are 70 of these in Thailand and these have a combined production capacity of around 5 million tonnes. Most of these operators have been in business for an extended period of time and have established good relationships with their agricultural suppliers. Large operators may also have invested in their own oil palm production. For example, Univanich Palm Oil Public Company Limited has invested in its own oil palm plantations and also in breeding oil palm cultivars. Crude palm oil extraction mills also produce a wide range of by-products from the milling of palm and these may also be used to generate income; kernel meal is used as an animal feed and empty fruit bunch, fiber and kernel may be used for the production of biomass energy. **(iii) Downstream production centers on palm oil refinery plants**, of which there are 18 in Thailand and these have an annual production capacity of 2.4 million tonnes. Large operators are usually connected through their investments with other parts of the palm supply chain so, for example, Lam Soon Public Company Limited (the manufacturer of 'Yok' brand cooking oil) operates both crude palm oil extraction mills and palm oil refinery plants. However, at present, domestic palm oil refining capacity is insufficient to absorb all domestic output and so crude palm oil extraction mills are reliant on a number of other related industries to take up the slack in demand but the development of these industries and the expansion of their capacity and marketing has been managed by different government offices. Thus, those parts of palm oil production which are connected with food production and the oleochemical industries (i.e. those which use chemical processes to produce consumer products from palm oil) have been placed under the Ministry of Industry, whereas biodiesel industries operate under the Ministry of Energy and this division has meant that development of the oil palm and palm oil industry has not been as efficient as it might have been.

Figure 4: Supply Chain of Thailand Palm Oil Industry



Source : Office of Agricultural Economics (OAE), Office of Industrial Economic (OIE), Department of Alternative Energy Development and Efficiency (DEDE), Department of Industrial Works (DIW), Krungsri Research

4/ Typically, harvesting can begin when oil palms are 3.5-4 years old. Yields peak at 8-12 years old and then decline, although production can continue for a quarter of a century.

Beyond this, though, the productivity of the Thai palm oil sector is relatively low and its ability to compete on world markets is limited. This is partly because capacity utilization of crude palm oil extraction mills runs to only 45-50%, while the costs of oil palm and palm oil production in Thailand are higher than those in Indonesia and Malaysia. In detail, (i) yields per rai of oil palm are somewhat low in Thailand, coming to 2.9 tonnes/rai, compared to 3.3 tonnes/rai in Malaysia and 2.6 tonnes/rai in Indonesia; (ii) the Thai oil extraction rate (OER) is 17-18%, less than Malaysia's (21%) and Indonesia's (22%)[5/]; and (iii) 75% of Thai oil palm growers are small scale working plots with an average size of 20-25 rai each, whereas over 80% of production in Malaysia and Indonesia is by large growers with plantations averaging over 200 rai each. These three factors conspire to make **the costs of palm oil production in Thailand higher than in Malaysia and Indonesia**, while the efficiency of production, from selecting palm seeds, preservation of oil palm fresh fruit bunch, through harvesting and storing (Thai growers often harvest oil palm before it is fully ripe, resulting in lower OER) to selling, is lower. In the latter case, the sale of oil palm fresh fruit bunch is often made through middlemen at local collection centers since individual producers have relatively low total yields and so it is not cost effective to send these small quantities directly to crude palm oil extraction mills[6/]. **Given these structural weaknesses, Thailand has as yet been unable to liberalize trade within the palm oil sector in line with the ASEAN free trade agreement** (palm oil is in fact one of twenty-three items on the 'sensitive list') **and Thai government continues to manage the sector as they attempt to build competitiveness among oil palm growers and crude palm oil extraction mills.** As part of this effort, the government has established the National Oil Palm Policy Committee, which has responsibility for managing policy and development plans for the domestic oil palm and palm oil industry, allocating oil palm production for consumption and for use in industry, and controlling imports of oil palm and palm oil[7/]. The Committee also buys up surplus oil palm when the market is facing a supply glut and prices are low. Meanwhile, the Department of Internal Trade, operating under the Ministry of Commerce, is responsible for setting the purchase price of oil palm and of palm oil at all stages of the supply chain. In detail, these are:

1) **The purchase price of oil palm fresh fruit bunch from growers** is set by the Department of Internal Trade, which specifies a general reference price for oil palm fresh fruit bunch, quoted without consideration of the grade of the product. In the past, the assumption was that the OER was 17% but through an announcement of the Central Committee on the Prices of Goods and Services, from mid-2017, this has been raised to 18%. This was done with the intention of developing the quality of Thai palm oil, since harvesting fully ripe oil palm fruits will help to increase the oil extraction rate and to help growers sell their oil palm fresh fruit bunch at a higher price.

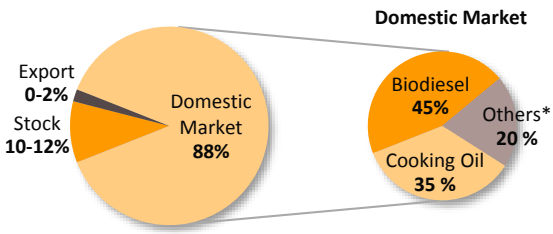
2) **A price floor for crude palm oil** is set with reference to the cost of inputs (i.e. the domestic cost of fresh oil palm) and trends in the price of crude palm oil on world markets. Currently, (in an announcement dated 21st March 2018) the Department of Internal Trade has set a floor of THB 19/kg for the factory gate price of crude palm oil; this is thus how much palm oil refiners and biodiesel manufacturers have to pay for their inputs.

3) **The retail price of bottled refined palm oil** is also set by the Department of Internal Trade when it is sold domestically. At present, this is at a rate of no more than THB 42 for a one-liter bottle.

This government interference in the market has, however, led to the costs of producing palm oil in Thailand being some 10% higher than in Indonesia and Malaysia [8/]. This clearly restricts the ability of Thai products to compete effectively on export markets and so most Thai production is consumed domestically, while exports of crude palm oil from Thailand have accounted for only a small fraction of total output and have tended to fluctuate year to year, with the quantity exported depending on the level of surplus production. Imports are usually of crude palm oil and are low and limited to particular periods, such as when stocks of crude palm oil fall below the domestic buffer level of 225,000 tonnes.

Domestic demand for palm oil originates in two main areas (based on data from 2017). (Figure 5) **The first of these is for refined palm oil, a downstream part of the palm oil industry. This refining of palm oil takes 35% of all Thai output of crude palm oil. The other 65% of demand is used in a number of other industries** including: (i) food industries such as snacks, instant noodles, sweetened condensed milk, creamer, margarine, shortening, ice cream, and food supplements such as vitamins (9% of the total); (ii) oleochemicals (the production of chemical products from oil palm fats) which are used in manufacturing consumer goods such as soap, cosmetics and

Figure 5: Thailand's Domestic Crude Palm Oil Market (2017)



Source : Department of Internal Trade (DIT), Krungsri Research
Note: Others include food and oleochemical industries

5/ Data from the analysis in 'Thailand and building stability in agricultural goods' by Associate Professor Dr. Aat Pisanwanich, Center for International Trade Studies (CITS), University of the Thai Chamber of Commerce.

6/ Analysis of data shows that generally, oil palm collection centers will deduct THB 0.1-0.15/kilogram for transport and THB 0.05/kilogram for services from their purchase prices.

7/ The National Oil Palm Policy Committee has appointed the Public Warehouse Organization, a state industry operating under the Ministry of Commerce, as the sole importer of palm oil for when shortages are seen in the domestic market. Import duties are levied on palm oil at the rates of: (i) 20% for imports up to the quota limit of 4,860 tonnes, (ii) 143% for over-quota imports, and (iii) 0% for imports made under the ASEAN Free Trade Area agreement.

8/ Comparison of cost structure of crude palm oil in 2013 (source: Office of Agricultural Economics and Department of Internal Trade)

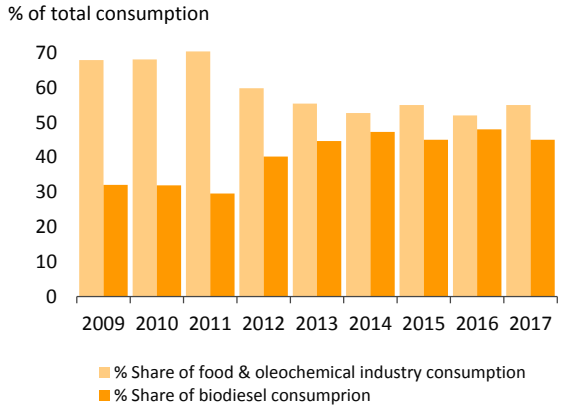
shampoo (11% of the total); and (iii) biodiesel (or B100) production (45% of the total). **Demand for crude palm oil for these other applications has tended to increase rapidly in the recent past**, especially for use in the production of biodiesel, with the proportion of crude palm oil destined for this market increasing from 32% of the total in 2009 to 45% in 2017. However, use in biodiesel production is dependent on their being a sufficiently large domestic supply of crude palm oil and officials will raise or lower the proportion of B100 used in the fuel mix by taking into account current domestic production of crude palm oil, although for some years now, output of palm oil has been insufficient to meet demand from these other areas and this has tended to hold back expansion in the consumption of crude palm oil by biodiesel producers.

Situation

Between 2012 and 2016, the Thai palm oil sector saw ongoing growth. The situation for individual parts of the palm supply chain was as follows:

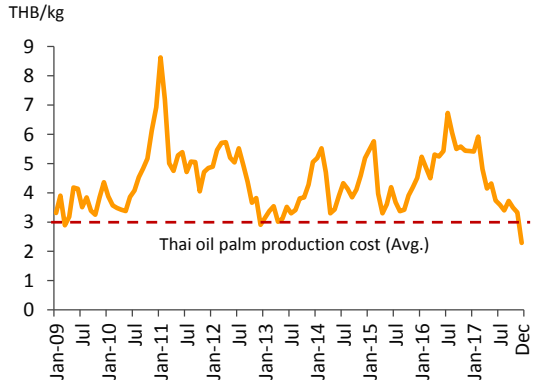
- **Growers of oil palm:** As a result of periodic government price support for oil palm and for the domestic use of palm oil (such as by increasing the proportion of B100 in fuel mixes), the price of oil palm fresh fruit bunch has risen faster than have costs, which have averaged around THB 2.94-3.06/kilogram[9/] over the period 2012-2016 and thus growers have typically remained in profit (Figure 7).
- **Palm oil extraction mills:** Business conditions for mills have remained positive on increasing demand for palm oil in Thailand. In addition, prices for crude palm oil have moved in line with changes in the costs of fresh oil palm, partly thanks to government intervention in the market and the setting of sales prices for oil palm and crude palm oil (see above for details in page 3)[10/]. These factors have helped to maintain profitability for palm oil mills.
- **Palm oil refinery plants:** Domestic demand has risen steadily as palm oil's cheaper price has helped it to replace other vegetable oils, especially soybean oil. In addition, although Thai refined palm is noticeably more expensive than Indonesian or Malaysian palm oil, on the domestic market, Thai products are perceived to be of a better quality and Thai customers do not like the red color, cloudiness and high fat content of the Indonesian and Malaysian products[11/]. Competition in this business in Thailand is limited. Therefore, income is still favorable. However, profits for palm oil refinery plants depend on the difference between the cost of crude palm oil and the price obtained distributing to the Thai market, and the price of bottled refined palm oil is controlled by a government agency, while the cost of crude palm oil has been pushed up by government interventions to support the price of fresh oil palm and through this, incomes for growers. In addition, operators also use pricing strategies to stimulate consumption of their products and these could periodically narrow profit margins.

Figure 6: Share of Domestic Consumption



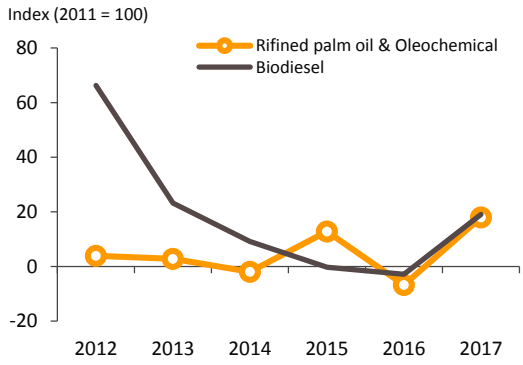
Source : Office of Agricultural Economics (OAE)

Figure 7: Farm Gate Prices of Thai Oil Palm



Source : Office of Agricultural Economics (OAE)

Figure 8: Thai Edible Palm Oil MPI



Source: The Office of Industrial Economics (OIE)

9/ Refers to average costs for oil palm tree of all ages, from data supplied by the Office of Agricultural Economics and the websites of a number of agricultural organizations.

10/ The domestic price of crude palm oil does not only move with the prices on world markets, it correlates with changes in the cost of oil palm fresh fruit bunch in Thailand. Analysis of prices between 2012 and 2016 shows that the price of crude palm oil and oil palm fresh fruit bunch is highly positively correlated (correlation = 85%).

11/ Manufacturers of refined palm oil in Thailand focus largely on production for household consumption in the form of cooking oil and this means that palm oil needs to compete in the market with soybean oil. Thai refining processes therefore need to produce a high-quality, yellow, clear product with low fat content and no impurities and so when compared to Malaysian and Indonesian refinery processes, Thai refining results in a product with lower fat levels, although Malaysian and Indonesian products are cheaper than Thai ones.

In 2017, the Thai palm oil sector was negatively affected by pressures from an oversupply to the market. The output of domestic oil palm and palm oil products rose, following two years of production problems triggered by the adverse climatic conditions of the 2015-2016 El Niño. Beyond this, the expansion of the total area of oil palm cultivated which the Thai government supported between 2008 and 2012 is also a source of oversupply, as produce from these new plantations has increasingly come to market and yields have been steadily rising. The outcome of this was that total Thai output of oil palm for 2017 came to 13.5 million tonnes, with average yields increasing from 2,605 tonnes/rai in 2016 to 2,831 tonnes/rai in 2017, and palm oil production increasing 18.4% YoY to 2.6 million tonnes.

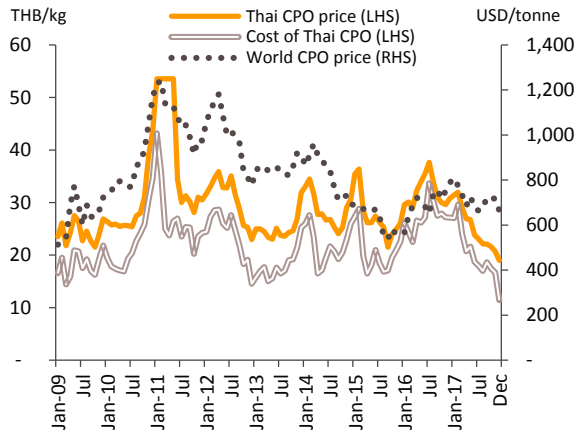
This domestic supply glut caused the price of oil palm fresh fruit bunch to fall sharply from 2Q17 (the second quarter is when most oil palm comes to the market) and this depressed the 2017 average price of oil palm fresh fruit bunch, which fell to THB 4.06/kilogram, a fall of -25.3% YoY. **The result of these falling input costs was that the price of crude palm oil declined too, though by a greater degree than did the cost of crude palm oil on world markets**; for 2017, the cost of Thai crude palm oil was THB 24.9/kilogram, down -22.1% YoY. However, the price of crude palm oil fell at a slower rate than the price of oil palm fresh fruit bunch, and this helped palm oil extraction mills maintain their marginal profit rates.

In terms of consumption, 2017 domestic demand for crude palm oil grew very healthily to 2.1 million tonnes, an expansion of 18.0% YoY and this growth was seen in all related industries, including the production of refined palm oil and oleochemicals, demand for which grew by 17.9%, in line with domestic consumption, and of biodiesel, which increased by 19.0%. The latter benefitted from generally strengthening economic conditions feeding into greater demand for transport fuels and from official measures to increase the consumption of B100, implemented through a May 2017 announcement increasing the proportion of biodiesel in the fuel mix from 5% (or B5) to 7% (or B7). Officials also requested that producers and sellers of B100 increase their stock holdings of B100 to help absorb the excess supply of crude palm oil and so stock holdings of crude palm oil were almost double the level of the buffer stock.

Exports of crude palm oil also rose as the government tried to reduce the domestic supply glut and in 2017, exports came to around 300,000 tonnes, a significant increase on the 2016 total of 55,000 tonnes. These went to markets in Asia, including China, India, Pakistan and the ASEAN region.

Despite growth in domestic demand and government measures to help supplies, though, this was insufficient to exhaust the expansion in supply and at the end of 2017, Thai stock holdings of crude palm oil came to 486,000 tonnes, a situation that may help to destabilize the market in the coming period (Table 1).

Figure 9: Crude Palm Oil (CPO) Prices



Source : Department of Internal Trade (DIT) and World Bank

Table 1: Thai Palm Oil Stock Balance

'000 tonnes

	2014	2015	2016	2017F	2018F
Production	**2,000.6**	**2,082.2**	**1,804.4**	**2,625.9**	**2,670.0**
Import	**0.0**	**51.7**	**13.6**	**5.8**	**0.0**
Domestic Consumption	**1,781.8**	**1,886.5**	**1,803.3**	**2,136.2**	**2,340.0**
-Refined Oil & Oleochemical	939.4	1,059.5	987.8	1,165.0	1,240.2
-Biodiesel Industry	842.4	839.9	816.0	971.2	1,099.8
Export	**255.3**	**67.4**	**55.5**	**302.7**	**480.0**
Ending Stock	**167.6**	**334.7**	**293.4**	**486.2**	**336.2**

Source: DIT
Note: Forecast by Krungsri Research

Industry Outlook

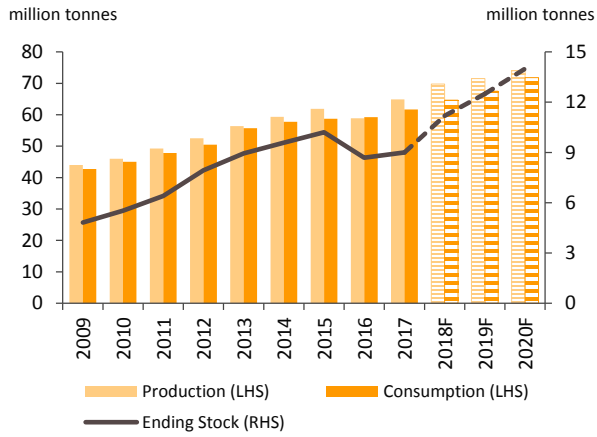
For the next three years, the expectation is that the climate will not be subject to extreme variations[12/] and so the global output of oil palm and palm oil will increase following the recent expansion of the total area given over to oil palm in Indonesia, Malaysia and Thailand. This will, in turn, **lead to high levels of oversupply to the market as the expansion in supply will outrun growth in demand** (Figure 10) **and as such, record levels of stock holding will likely be reached.**

Domestically, the situation with regard to production of oil palm and palm oil are forecast to worsen as oversupply to the market will rise. Indeed, the total harvest of oil palm in Thailand is likely to increase at a higher rate as the area of oil palm plantations increases and a greater number of oil palm trees in production edge towards being eight years old, the beginning of the period when their yields are at their highest.

Consumption, on the other hand, is not expected to expand significantly. The situation with particular areas of demand is detailed below.

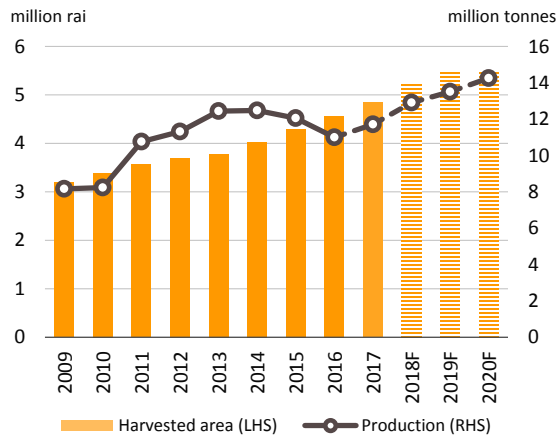
- **Refined palm oil industry:** It is expected that domestic demand for crude palm oil from producers of refined palm oil will grow at only a low rate. This is because the global output of soybeans remains high and so the cost of soybean oil is low and close to that of palm oil, weakening the tendency of consumers to switch to palm oil as a substitute product, as happened in the past. In addition, the current historically high levels of stocks of refined palm oil will discourage producers from repeating the speeding up of production which occurred in 2017.
- **Oleochemical industry:** Domestic demand for crude palm oil and oil palm fats (which come from the extraction of palm oil) from the oleochemical sector tend to rise in line with the expansion of the economy and the anticipated increase in exports of consumer items. It is likely that for their raw materials, oleochemical players will increasingly replace purchases on the domestic market with the import of semi-finished palm fats from Malaysia and Indonesia as a way of reducing the costs of production.

Figure 10: Global Palm Oil Production, Consumption, and Ending Stock



Source : U.S. Department of Agriculture (USDA)

Figure 11: Thai Oil Palm Plantation and Production



Source: Office of Agricultural Economics (OAE)
Note: Forecast by Krungsri Research

- **Biodiesel industry:** Demand for crude palm oil for the production of biodiesel in Thailand in expected to strengthen with increasing demand for oil from the transport sector, and in addition, biodiesel producers will continue to benefit from the Alternative Energy Development Plan, which aims to raise the proportion of B100 in the diesel mix to 10% (or B10). However, because of technical problems and a lack of support from vehicle manufacturers, B10 is not widely accepted for use in vehicles. Furthermore, because officials have already (in 2017) called for help from producers and distributors of biodiesel to increase their stock holdings, this will likely limit their ability to increase further their holdings of B100 because there simply is not much more storage space available; as of February 2018, holdings of B100 came to 60,256 tonnes, which represented some 90% of available storage facilities. Added to this is the fact that the high levels of B100 already in the system are leading to price competition among factory gate distributors and so biodiesel manufacturers are reducing purchases of crude palm oil for use in the production of B100 aimed for stock holding.

12/ Data from the National Oceanic and Atmospheric Administration (NOAA) shows that over the past 60 years, El Niños and La Niñas occur approximately every 12-15 years. The last strong La Niña was in 2010-2011 and the last strong El Niño was in 2015-2016.

Given the forecast for growth in the supply and demand of palm oil in Thailand between 2018 and 2020, Thai palm oil industry may be pressured by rising supply and the likely trend for declines in prices for crude palm oil on the domestic market.

Over the long term, output of oil palm and crude palm oil will tend to increase continuously which dampened palm oil prices particularly in the period that domestic demand for crude palm oil may be lower than the government target, and this poses a risk to the domestic sector, especially given the failure of demand from downstream domestic industries for crude palm oil to meet government targets. Currently, officials are reviewing their plans for the production of biodiesel in the national alternative energy development plans and it is expected that as a result of cuts to the forecast price of oil, the target for consumption of biodiesel will be slashed from 14 million liters per day by 2036 to 7 million liters per day. **Relying on exports to absorb excess production of palm oil will also become more problematic as importers are tightening their regulations of the palm oil market.** Recently, many European countries have instituted policies to increase checks over the source of palm oil and some countries, including Italy, France and Belgium, have put a total halt on the production and distribution of products manufactured from palm oil. This will likely lead to a steady reduction in demand for imports of palm oil on world markets and with that, a stiffening of competition.

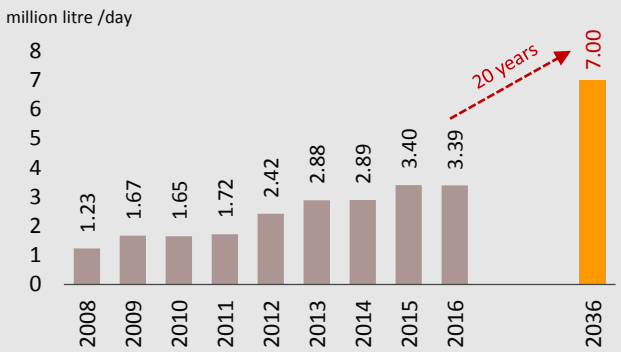
Development plan for the Thai oil palm sector

The 'Strategy for the Palm Oil Sector 2015-2026' carried out by the Office of Agricultural Economics operating under the Ministry of Agriculture and Cooperatives has the following objectives:

- **The area of oil palm under cultivation should be expanded and yields should be increased** by at least 10% from their current rate. To improve the standard of oil palm products and to help them to meet future demand, the efficiency of production and refining should also be raised such that oil extraction rate reaches 20%.
- **Domestic demand should be increased** through (i) increasing consumer demand for palm oil by 3% per year, and (ii) increasing the use of palm oil as a source of alternative energy, while maintaining exports at a level of 0.3-0.7 million tonnes per year.
- By 2019, the government plans to have issued the **ASEAN Sustainable Palm Oil standards** and to have pushed through measures to support a legal structure to drive forward research and development in the palm oil sector.

The Alternative Energy Development Plan (2015-2036), operated by the Department of Alternative Energy Development and Efficiency (under the Ministry of Energy), makes reference to the 'Strategy for the Palm Oil Sector 2015-2026' by considering both the output of oil palm given the total area of land in Thailand suitable for oil palm cultivation and the amount of palm oil remaining after domestic consumption to then estimate potential future biodiesel production capacity. It is expected that government will set a target output for biodiesel of 7 million tonne per day by 2036 on the revised assumption that the price of crude oil will average USD 50/barrel [13/].

Thailand Production of Biodiesel



Source: Department of Alternative Energy Development and Efficiency (2016), Local Press compiled by Krungsri Research

13/ Government is preparing to revise the Alternative Energy Development Plan, in particular by cutting the expected price of oil from USD 90-100/barrel to USD 50/barrel. The result of this will be to cut the 2036 target for biodiesel production from 14 million tonnes per day to 7 million tonnes to day. (Source: news reports).

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