2. 1 PREAMBLE

Oil palm has become the important crop of people and many countries. Palm oil is one of the edible vegetable oil that is originated from the palm fruit, grown on the oil palm tree. Oil palm is an important oil crop consumed by people throughout the world. It grows in wild, semi-wild and cultivated areas in the regions of equatorial tropics which can flourish in plenty heat and rainfall area. Nowadays, palm oil is grown throughout Africa, America, and South-east Asia including Thailand. 85% of all palm oil globally produced and exported from Indonesia and Malaysia. In Thailand, palm oil is one of the most important economic oil crops since ancient times. Demand for palm oil as an edible vegetable oil has grown strongly in current decades and palm oil plantations have expanded rapidly in number and size to meet the global demand.
2.2 HISTORY OF PALM OIL

“Oil palm, in scientific name of Elaeis Guineensis, is a species of palm that produces fruit bunches by hybrid of Tenera for commercial purpose (Ministry of Agriculture and Cofunctioning, 2010).” Human use of oil palms since last 5,000 years. “The history of palm oil spreads back for thousands of years, with the oldest record of its use dating from 30th century (Kiple, Kenneth F. et al, 2000).” Mass of several kilograms of palm oil found in a vessel enclosed in a tomb at Abydos. In the middle 15th century, the written records that palm oil are being used as a local food of European travelers to West and central Africa. European uses palm oil as cooking oil in their daily life so that palm oil became a primary agricultural product that can be bought and sold by British traders during Britain’s Industrial Revolution. Palm oil can be produced in form of soap products, such as Lever Brothers’ (now Unilever) “Sunlight” soap, and the American Palmolive brand (Mary Bellis, (2015). After 16th and 17th century, the red palm oil became an important crop in the developing trade network supplying caravans and ships of the Atlantic slave trade. By around 1870, palm oil is customary to be the primary export of some West African countries such as Ghana and Nigeria.

In the late 1800s the prehistoric people discovered palm oil in a tomb located in Abydos, Egypt. It was believed that Arab traders had brought the oil to Egypt and produce candle from palm oil. This was supplied by a modest export trade from West Africa.

In the early 19th century, European-run plantations were set up in Central Africa and Southeast Asia. Thus, palm oil was introduced into Malaysia in 1910 by a Scotsman named William Sime and an Englishman by the name of Henry Darby. In 1968, oil palm was introduced to Thailand after the successful of planting in Indonesia and Malaysia (Thiam and Thongpan, 1986). It was found that oil palm is the oil crops that gives the high yield production and can be well cultivated in the tropical region like Thailand. Most oil palm plantation areas were in the south of Thailand. Oil palm has been one of the most important commercial oil crops due to its multiple utilities. It is used in a wide variety of products such as food items (i.e. cooking oil, margarine, sweets, biscuits, breads, breakfast cereals, instant noodles, chocolates and ice
creams), industrial commodities (i.e. cosmetics, soap, shampoos, lipsticks, candle, and detergents), and an alternative fuel source (biodiesel). “Thailand is the third largest world oil palm producers following Indonesia and Malaysia. In 2011, Thailand produced 10.78 million ton, 4.61 percent of the world oil palm production (Office of Agricultural Economics, 2012). Over the past 35 years (1977-2011), oil palm plantation areas in Thailand have increased continuously. The upward trend exhibits an average annual growth rate of 13.41 percent (about 59 times more than the area in 1977) (Purawich Phitthay et al, 2012).” Based on the report of the Office of Agricultural Economics (2012), the oil palm plantation areas increased to 661,629 hectares. Palm oil became an economic crop since it is a major food, a raw material for several processing industries, an ingredient in a number of items, and a raw material for biodiesel production. The reform, it can be considered that the oil palm has become a noteworthy economic crop of Thai economy. Palm oil helps in the rising of Thais’ living standard in terms of per capita income. It ensures that palm oil can be the food and energy securities of Thai people in today and future.

2.3 PALM OIL FACTS

Palm oil made from the fruit of the oil palm tree. It is one of a tropical oil, growing only within 10 degrees north or south of the equator, where rainfall is spread throughout the year, sufficient sunshine and temperatures of 25-33ºC (Gunstone, 2011). These growing regions areas of tropical rainforest are rich in biodiversity on the continents of Southeast Asia, Africa, and South America. Palm oil is an important vegetable oil which is used as a raw material for food production and non-food industries. Some of the uses of red palm oil include: (Mercola, J. M., 2016).

Cooking oil: Cooking oil which produces from palm oil is similar to coconut oil but more resistant to heat compared to other vegetable oils. It can easily store at room temperature for many months.

Tasty ingredient: Palm oil is used as an ingredient of several food items such as margarine, biscuits, breads, toffee, breakfast cereals, instant noodles, chocolates, caramel, and ice creams).
Dietary supplement: Palm oil has a superior nutrient profile that makes it useful for supplementation.

Personal care and household products: Palm oil is added to many personal care products and household products such as soaps, detergents, and cosmetics.

Skin moisturizer: As palm oil is beneficial for skin health, it is added to a number of skin care products.

“Sun block”: Due to its high startums of carotenoids, red palm oil provides protection as a commercial sun block with SPF15.

Bibful: Palm oil is an important raw material for biodiesel production. So, it is fast becoming a resource for biodiesel and as a fuel in electrical stations.

Best source of beta-carotene and alpha-carotene: Palm oil contains about 50 percent saturated fat, 40 percent monounsaturated fatty acids, and 10 percent polyunsaturated fatty acid. Palm oil gets its reddish color from the carotenoids beta-carotene and lycopene, the same nutrients that give color to carrots and tomatoes. Its carotene startums are 15 times higher than carrots and 300 times higher than tomatoes. This is why palm oil is hailed as the best source of beta-carotene and alpha-carotene, both of which are precursors to vitamin A. Palm oil also contains 20 other carotenoids, as well as the nutrients i.e. Vitamin E, particularly tocotrienol, Vitamin K, CoQ10, Squalene, Phytosterols, Flavonoids, Phenolic acids, and Glycolipids.

“Life cycle of palm oil: Palm oil trees can grow up to 20 meters tall with an average life cycle of 25 years (Gunstone, 2011).” “The oil palm tree starts to bear fresh fruit bunches after three years. It can be harvested 12 months of the year but its peak in the middle of 9 and 12 year old (Hasnah Fleming and Coelli, 2004).” “Each individual piece of fruit on fruit bunch contains 50% oil. Each tree can produce 10 tons of fresh fruit bunches per hectare. On average 3.9 tons of crude palm oil and 0.5 tons of palms kernel oil can be extracted per hectare. Fiber from the palm kernel mill process provides a product called palm kernel expeller. This is used in animal feed, paper and fertilizer.

High oxidative stability: The palm oil has a high oxidative stability that can be used at high temperatures and support long shelf life of products (Foster, Williamson & Lunn, 2009). The oil consists of a small fraction of non-triglycerides, where β-carotene, sterols and tocopherol are included. These have assorted positive effects on human health, such as being...
antioxidants; have anti-cholesterol effects and forming assorted vitamins.

Unique feature: A unique feature of the oil palm is that it produces two types of oil – palm oil and palm kernel oil. Palm oil is extracted from the flesh of the fruit, is edible and used primarily in food products. Palm kernel oil is extracted from the seed of the fruit and is used mainly in the manufacture of soups and cosmetics, while palm kernel expeller is used as a feed for livestock and as biofuel for generating electricity (Office of Agricultural Economics, 2012).

Least expensive vegetable oil: Oil palm tree is highly productive, capable of yielding more oil from less land than other vegetable oil. It needs less than half the land required by other vegetable oil to produce the same amount of oil. This makes palm oil is the least expensive vegetable oil in the world.

It can be said that palm fruit oil has been used in cooking applications since the beginning of record history. Palm oil is an important commercial oil crops which is used as a raw material for food production and non-food industries over several decades. By 2020, the worldwide demand for palm oil is expected to more demand, as the world’s population increases and as people become wealthier and consume more goods which contain palm oil.

2.4 PALM OIL IN THAILAND

Thailand is the third largest palm oil producer in Asia after Indonesia and Malaysia. Indonesia is the largest palm oil producer in the world, followed by Malaysia and Thailand (Foreign Agricultural Service, 2012). Indonesia and Malaysia together produced over 85% of the world supply of palm oil.

In Thailand, palm oil is the most important vegetable oil in terms of consumption and production. “The palm oil becomes the attractive choice for planters investing the oil crop and the best alternative for many farmers to invest as compared to other crops such as rubber, fruit trees and rice. The prices of palm oil are currently high if compare with a few years. This encourages the farmers to expand the oil palm plantation areas to be larger for the demand of domestic and international industries. In 2010 production of crude palm oil reached 1,287,509 tons of which 65,942 tons were exported (5.1% of cumulative production) (Jonas Dallinger, 2010).” “Palm oil is a major source of sustainable and renewable raw material for food, oleochemical and biodiesel production (Barison, 2007)."
More than 120,000 Thai farmers are involved in oil palm cultivation, either on small or medium and large size farms. Small farmers owning less than fifty hectares manage approximately 70% of the cumulative area planted with oil palm and they have a similar share in cumulative production. Many recruits in the Southern of Thailand prefers to work in palm oil industries. The palm oil industries have offered wealth to their recruits, especially, the opportunities to increase income of many rural people who work in large and small extent palm oil mills. The principal product of oil palm in Thailand is the palm fruit, which is processed to get hold of commercial products. For food productions, palm oil is used for producing margarine, vegetable ghee, frying fats, sweet, chocolate, toffee, and ice cream. Several blends have been developed to produce solid fats with a zero content of trans-fatty acids. Palm oil is the largest natural source of essential vitamin E, and is high in vitamin K and dietary magnesium. For non-food productions, the palm oil is use for preparing soap, detergent, and cosmetic. They are also used in the chemical industry for plasticizers and coatings. A recent trend is the usage of palm oil, as energy sources for electricity plants and increasingly as biofuel and biodiesel.

Due to the heavy monsoon rains in Thailand’s southern region in January 2017, various areas of southern Thailand were suffered from floods. This sudden event has come at great losses to the palm oil producing, palm oil business and Thai economy. Thai government tries to develop palm oil plantation area into the formal situation and improve the livelihoods of palm oil farmers. Thai government concentrates on palm oil processing, marketing, and technical supervision. Since ASEAN Economic Community (AEC) was effectual, Thailand encounters a big challenge regarding the country’s competitiveness in producing palm oil as compared to other countries, such as Malaysia and Indonesia.

2.5 PALM OIL INDUSTRY

Palm Oil has been essential components of human life for thousands of years, whether as a source of food or non-food. “In the 21\textsuperscript{st} century, improvements in refining technologies and long distance transportation turned palm oil into a globally traded commodity and a dominant force in the global palm oil market. The palm oil contributed about 32.7\% of the world vegetable oil supply (Hiroko Shimizu, 2012).” Palm oil is a unique ingredient in many products because it has great cooking properties. It maintains its properties even under high temperatures. It is smooth, creamy texture and absence of smell which makes it a perfect
ingredient in many recipes. It is the vegetable oil crop that needs less than half the land required by other crops to produce the same amount of oil. This makes palm oil the least expensive vegetable oil in the world. It is estimated that one person consumes on average about 2kg of palm oil per year, or about 6% of cumulative fat consumption (Thai Oil Palm and Palm Oil Association, 2016).

Palm oil is one of the most successful agricultural products after rice. It has the potential to generate noteworthy economic and social advancement in Thailand. It provides a reliable form of income and economic advancement to a large number Thai’s rural poverty. Palm oil industry is noteworthy contributor to palm oil production in Thailand. The palm oil products have increased noteworthy due to increase the country and global demand. The Thai palm oil industry is expected to rapid growth in recent decades with the best quality of palm oil production. Currently, Thai palm oil industry is one of the world’s producers and exporters of palm oil, producing over 11 million tons, annually. The palm oil industries provide economic benefits and improvements in living values to Thai’s population who lives in southern Thailand. Currently, Thailand ranks number three in the world market for palm oil technology. World demand for palm oil is more increasing, as it develops economics of countries. Palm oil is expected to offer the most promising economic prospects for Thailand in future (Asia Palm Oil Report, 2016).

Many economies are currently adopting policies that encourage the use of palm oil. For the last decade, palm oil has been the one of Thai’s noteworthy agricultural export. The Thai palm oil industry has noteworthy growth in recent years with approximately 1.8 million tons. It was found that agricultural GDP growth in Thailand is beneficial in reducing poverty of the people in rural areas. Noteworthy growth in the palm oil industry, has led to palm oil becoming component of economic stir in regional economies. Palm oil not only provides employment for many Thais but the palm oil industry makes a substantial contribution to rural incomes. The importance of the palm oil industry to rural advancement has been recognized by both the Thai Government and the private sector (Ministry of Agriculture and Cofunctioning, 2016).

Thai and foreign investors are encouraged to invest in the palm oil industry to meet with global consumption in the next decade. By 2020, global consumption and production of
palm oil is expected to increase to almost 60 million tons. Growth in the palm oil industry has been contributed to by the production cost advantages in oil palm cultivation. In addition to being cost competitive, palm oil is considered to be advantageous for human lives. It can be said that palm oil has benefited for people in the world, due to its relatively to daily living. It is hoped that future economic growth in Thailand will increase the demand for imported palm oil.

2.6 ECONOMIC, NUTRITION AND HEALTH, SOCIAL AND ENVIRONMENT IMPACT OF PALM OIL

Economic impact of palm oil
Agriculture is the major occupation of Thais and it is a noteworthy component of Thai economy. Agricultural advancements like oil palm plantations are important for poverty alleviation as it is one of the main export earner products for the national economy. Due to the population is growing rapidly with a large proportion relying on rural sector advancements for employment or income generating occupations. Global demand of palm oil continues to strengthen and Thailand has an opportunity to benefit from this growth. Palm oil production became a vital for the Thai economy. Thai government trust with confidence on tax revenues derived from exports of palm oil products. The palm oil has demonstrated potential to drive the economic growth of Thailand since last three decades. The Thai palm oil industry has recorded noteworthy economic accomplishments and then it has been expanding rapidly in recent times. Harvest areas of palm oil have doubled since 1990 and palm oil productions has been making larger day by day. Thai government recognized palm oil industry advancement as a vehicle for export earnings and rapid improvements in rural living values. Palm oil has become a major component of economic strength in the regional economies where the industry is located (Ministry of Agriculture and Cofunctioning, 2016).

Nutrition and Health impact of palm oil
All around the world, palm oil consumption is increasing day by day. Palm oil is an important source of calories and highly controversial food. It provides several health benefits but some time it may pose risks to heart health. Several medical studies reported that palm oil may create health risks of cardiovascular disease.
According to studies reported by the Center for Science in the Public Interest (CSPI), it was found that palm oil increases blood cholesterol startums and may contribute to heart disease (Brown, Ellie, 2005). The World Health Association and the US National Heart, Lung and Blood Institute have encouraged consumers to limit the consumption of palmitic acid and foods high in satufigned fat because it may increases risk of developing cardiovascular diseases (WHO, 2003). However, a 1993 cram published by the United Nations University Press found that consumption of palmitic acid appeared to have no impact on cholesterol startums when daily intake is below 400 mg per day.

A cram supported by the National Institutes of Health and the USDA Agricultural Research Service (2006) over & done with that palm oil is not a safe substitute for partially trans fats(hydrogenated fats) in the food industry, because palm oil results in adverse changes in the blood concentrations of LDL cholesterol and a po-lipoprotein B just as trans-fat does. However, according to two information published in 2010 by the Journal of the American College of Nutrition, palm oil is an customary replacement for hydrogenated vegetable oil sand a natural replacement for partially hydrogenated vegetable oils, which are a noteworthy source of trans-fats (Hayes, K.C., 2010).

Social impact of palm oil

“The palm oil industry has had positive and negative impacts on recruits. In the positive impacts, palm oil production provides employment opportunities, and has been shown to improve infrastructure, social services and reduce poverty of people in local communities (Ismail, 2012).” Palm oil industry creates jobs and income earning opportunities for people. It enhances regional economic advancement as well as supporting downstream job creation and earning export income. This approach can also be highly beneficial for social wellbeing such as the provision of roads, bridges, hospital, community centers, health and education services and communication infrastructure. These reduce the financial burden on the government to provide social service. However, in negative impacts, oil palm plantations have developed lands without consultation or compensation of the indigenous people occupying the land, resulting in social conflict.
Environmental impact of palm oil

“Palm oil cultivation has been criticized for impacts on the natural environment, including deforestation, loss of natural habitats, which has threatened critically endangered species such as increased greenhouse CO2 emissions (Foster Joanna, 2012).” Environmental clusters such as Greenstillness and Friends of the Earth states that the deforestation caused by oil palm plantations is more damaging for the climate than the benefits (Andra, 2007). Environmental NGOs have been running against the palm oil industry because oil palm plantations are causing widespread deforestation in South East Asia which accounts for 20% of the world’s GHG emissions. They have claimed that oil palm plantations have been the leading cause of destruction of animals’ habitats (Friends of Earth, 2005).

2.7 POLICY AND PLAN OF PALM OIL PRODUCTIONS

Oils have been consumed by human in several decades, whether as a source of food or non-food. Palm oil is now starting to be used as an ingredient in bio-diesel and as a fuel to be burnt in power stations to produce electricity. This causes for the increasing of palm oil consumption. Due to the importance of palm oil, the palm oil industry advancement plan was developed by the Ministry of Agriculture and Cofunctionings in cooperation with the Ministry of Energy. The Thai Renewable Energy Policy is an important instrument to support the price of palm oil market.

Thailand still has vast tracts of land for future advancement of oil palm plantations. It is expected that the increasing of oil palm productions could create new jobs for many households, implying that Thailand could reduce the number of poor people who lives in the family under the poverty line. At the same time, the government would receive revenue from tax and foreign exchange from CPO exports. The increasing of economic not only reduce people’s poverty but improve people’s wellbeing. It is the challenge tasks of the government in developing acceleration, especially if it wants to realize the commitment to reduce poverty and improve public wellbeing. Palm oil will become a strategic sector in economic advancement in Thailand, supported by the needed infrastructure, including ports, roads and promotion of foreign markets. Thailand's palm oil industry is expected to be a much brighter in future.
2.8 SUMMARY

Palm oil is the most widely consumed vegetable oil on the planet, and it is in about half of all packaged products sold in the supermarket shelves, including food and non-food items. Human use of oil palms may date as far back as 5,000 years. Palm oil is used as a cooking oil, cosmetics, animal feed, biofuel and energy.

Palm oil grows in tropical rainforests, growing only within 10 degrees north or south of the equator, where rainfall is spread throughout the year, sufficient sunshine and temperatures of 25-33°C. These growing regions house vast areas of tropical rainforest rich in biodiversity on the continents of Southeast Asia (Indonesia, Malaysia and Thailand), Africa, and South America. The palm fruit produces two distinct oils: palm oil and palm kernel oil. Palm oil is extracted from the pulp of the fruit, is edible and used primarily in food products. Palm kernel oil is extracted from the seed of the fruit and is used in the manufacture of soaps and cosmetics, while palm kernel expeller is used as a feed for livestock and as biofuel for generating electricity.

The palm oil industry has positive impacts on economic and social advancement of Thailand. It becomes an important source of income of the country and lift people out of poverty. The global market for palm oil has experienced rapid growth in recent decades and Thailand is one of the world’s producers and exporters of palm oil.

More consumption of palm oil may increase blood cholesterol startums and may contribute to heart disease. Palm oil industry has had certain negative environmental impacts, such as environmental degradation and greenhouse gas emissions.

However, Thai government aims to expand the oil palm plantation for increasing of economic, reduce people’s poverty, and improve people’s wellbeing. It is the challenge tasks of the government in developing palm oil industry to be a much brighter in future.