CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

FACULTY OF ECONOMICS AND MANAGEMENT

DEPARTMENT OF ECONOMICS

Diploma thesis

The Analysis of palm oil production in Indonesia

Bc. David Komárek

CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Economics and Management

DIPLOMA THESIS ASSIGNMENT

Bc. David Komárek

Economics and Management

Thesis title

The Analysis of palm oil production in Indonesia

Objectives of thesis

Nowadays there is a big issue with deforestation to obtain palm oil. This thesis is focused on Indonesia where this problem is. Indonesia is the biggest exporter of the palm oil and for this reason the economic analysis is used. The work is focused on the production and cost of palm oil and what benefits it bring to country economy. The output of the thesis should give us global overview of the given topic from the economic point of view and also give us recommendation for production of palm oil for future years

Methodology

Theoretical part is based on obtaining knowledge from the academic articles, scientific works and other documents and sources. This part includes global overview about our topic. Practical part observes and analyse the given state Indonesia. Impacts of palm oil on environment and flows in economy are analysed after gathering primary and secondary data. The last part is focused on interpretation of outputs and findings from the thesis. Comparative and descriptive methods of research will be used in the thesis.

The proposed extent of the thesis

60 – 80 pages

Keywords

palm oil, Indonesia, production, analysis, environment, deforestation

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Recommended information sources

CASSON, A., GASKELL, J., KANNINEN, M., MEIJAARD, E., NOORDWIJK, M.,SHEIL, D., SUNDERLAND-GROVES, J., WERTZ, K. 2009. The impacts and opportunities of oil palm in Southeast Asia: What do we know and what do we need to know? Center of International Forestry Research (CIFOR), Bogor, Indonesia. 58 p. ISBN: 978-979-1412-74-2.

Salwi, B.L., Panwar, N.L. (2012), 'Biodiesel resources and production technologies – A review', Renewable and Sustainable Energy Reviews, 16(6), 3680–3689.

SCRAGG, Alan (2009). Biofuels, production, application and development [online]. Cambridge: Cambridge University Press. Cambridge,

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The Diploma Thesis Supervisor

doc. Ing. Mansoor Maitah, Ph.D. et Ph.D.

Supervising department

Department of Economics

Electronic approval: 14. 3. 2017

prof. Ing. Miroslav Svatoš, CSc.

Head of department

Electronic approval: 14. 3. 2017

Ing. Martin Pelikán, Ph.D.

Dean

Prague on 29. 03. 2017

I declare that I have worked on my diploma thesis titled "The Analysis of palm oil production in Indonesia" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the diploma thesis, I declare that the thesis does not break copyrights of any their person.

In Prague on 31st of March 2017

Bc. David Komárek

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Analýza produkce palmového oleje v Indonésii

Abstrakt

Palmový olej je jedlý, rostlinný olej získávaný z palmy olejné a je nejpoužívanější na světě. Díky jeho vyjímečnému využití neexistuje v současné době na světě žádná náhražka této plodiny. Tato plodina se stala nejrychleji se rozšiřujícím produktem na trhu. Z důvodu vysoké poptávky po této komoditě se tento olej stal předmětem mnoha diskuzí. Indonesie představuje největšího producenta a také exportéra palmového oleje na světě.

Diplomová práce se zaměřuje na Indonésii z důvodu jeho vysokého podílu na celosvětové produkci této plodiny. Cílem práceje je analyzovat a zhodnotit pěstování této komodity a identifikovat jeho dopady na Indonésii z pohledu sociálního a ekonomického. Dopady na životní prostředí daného státu hrají také významnou roli a jsou zahrnuté do této práce.

Klíčová slova: palmový olej, Indonésie, produkce, plodina, certifikace, RSPO, životní prostředí, odlesňování, pěstování, zemědělství, využití země, ekologie

The Analysis of palm oil production in Indonesia

Abstract

Palm oil is edible, vegetable oil obtained from palm oil tree and the most used oil in the world. Thanks to its exceptional utilization there is currently no substitute in the world of this crop. This crop has become the fastest growing product in the market. Due to its high demand for this commodity this oil became the subject of many discussions. Indonesia represents the biggest producer and also exporter of palm oil in the world.

Diploma thesis focuses on Indonesia because of its large share in the global production of this crop. Aim of this thesis is to analyze and evaluate growing of this commodity and identify its impact on Indonesia from social and economic point of view. Environmental impacts on the given state play important role as well and they are included in the thesis.

Keywords: palm oil, Indonesia, production, certification, RSPO, environment, deforestation,growing, agriculture, land use, crop, ecology

1 Table of Contents

2 Introduction

In the last decades the demand for palm oil is increasing due to its exceptional utilization. According to data in the EU palm oil is contained in more than half of the products offered by retailers. Globally its share on the market is about 40% and it is the most used vegetable oil on the market. Its consumption is increasing every year because it replaces more costly subsidies. It is an inseparable part of products from food, cosmetics and chemistry industry. Due to increasing world's population there is also increasing demand for renewable energy sources where palm oil certainly belongs.

During the second half of 20th century the sharp development of industries related to the palm oil production and processing occurred in many tropical countries that has been motivated by its high productivity. This commodity accelerates important and significant social and economic growth especially in countries in region of South-east Asia. Consequences of palm oil production are lately widely discussed topic due to its importance and ecological impacts. Its growing is in close relationship with wide number of environmental issues such as CO_2 emissions, deforestation and many others. Nowadays there are many campaigns related to this problem due to fact that palm oil plantations are establishing in areas with virgin forests. Many institutions, governments and NGOs are involved in this issue and try to find solutions. One of the main problem is in unethical way of growing this crop in monoculture plantations.

Despite these facts industry of palm oil represents economic growth of economics involved in its production especially Indonesia. Indonesian share of total production of palm oil is more than half, by its total share in world's production it provides supply of workplaces and arranges country's development from social and economic perspective.

By its unique position in international market palm oil is attracting many investors into this industry. One of the organization that supports certification of sustainable palm oil production is RSPO. This group of many companies, retailers, governments and smallholders try to provide sustainable development of this crop and minimize negative impacts of its production.

The diploma thesis provides global overview of palm oil production in the world. The work consists of theoretical part where palm oil growing and its process is included and how this crop is produced in the whole world. The practical part analyzes process and environment of palm oil growing in

Indonesia. Supply chain and companies involved in the whole process of the production of this crop. Economic and social benefits of the production are evaluated in the thesis followed by social and environmental costs for local inhabitants in Indonesia.

3 Objectives and methodology

3.1 Objectives

Main objective of the thesis is to make an analysis of production and situation of the palm oil in Indonesia and its importance for the country. The small objectives in the thesis will help to understand and observe the main goal. Identify positive social and economic benefits that provide this industry. Describe negative costs related with production of this crop on rural population in Indonesia. As the last objective the environmental impacts have been chosen.

3.2 Methodology

Methodology of the thesis is based on obtaining knowledge from the academic articles, scientific works and other documents and sources. This part includes global overview about our topic. Practical part observes and analyze the given state Indonesia. Impacts of palm oil on environment and flows in economy are analyzed after gathering primary and secondary data. The last part is focused on interpretation of outputs and findings from the thesis. Comparative and descriptive methods of research will be used in the thesis

3.3 Research questions

- What are the economic benefits of palm oil production in Indonesia?
- What are social benefits of palm oil production for people from rural areas?
- Which consequences of growing are understood as economic costs?
- Which negative impacts have to face people from rural areas due to expanding of plantations?
- What are environmental impacts of palm oil production?

4 Theoretical part

4.1 Palm oil

4.1.1 History of palm oil

Palm oil can be considered one of the earliest traded commodities in the world. The oil palm (Elaeis guineensis) originated from West Africa where evidence of its use had been found. This evidence goes back about 5,000 years to ancient Egypt where palm oil has been brought by Arab traders as it is believed. Palm oil has been representing high social status of people in the past, several kings have been buried with barrels of palm oil and in late 1800's archeologist discovered palm oil in a tomb at Abydos in Egypt. Palm oil has been long recognized in African countries and is widely used as a cooking oil. Red palm oil became an important item in the developing trade network supplying caravans and ships of the Atlantic slave trade. The use of this oil on the international market expanded rapidly during British Industrial Revolution and the expansion of overseas trade. From industrial lubricant to candle-making, palm oil stood and was a driving force behind this expansion of industrial production. The nutrient rich red palm oil became a vital asset on long sea-faring voyages. The result of this was increasing demand for this commodity, next steps had led to increasing investment into palm oil production. The modest supply from West Africa could not fulfill this demand. The Europeans answered with setting up their own plantations in Central Africa and then expanded to Southeast Asia.

4.1.2 Basic information about palm oil

Palm oil is the most widely-used vegetable oil in the world. Palm fruit oil, generally known as palm oil, is produced from the pulp of the fruit of the oil palm tree (Elaeis Guineensis). This tropical fruit is reddish in color because of a high beta-carotene content. The fruit is about the size of a large olive. The fruit has a single seed or kernel, which is used to produce palm kernel oil. Palm fruit oil and palm kernel oil differ significantly in their fatty acid composition, but have the same botanical origin. The oil palm tree is a tropical tree with leaves about 5 meters long. The best conditions for its production lie around the equator in tropical zone. The most important factors are sun and high humidity. It relies on temperature ranging between 23 and 32 degrees centigrade and distributed rainfall throughout the year (Corley and Tinker, 2003).

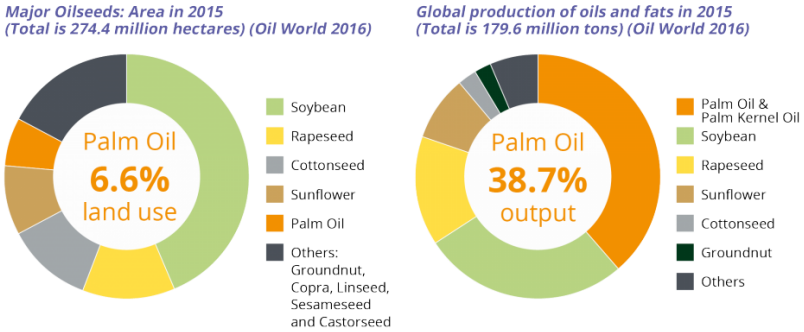
Palm trees may grow up to 25 meters in height. The trunks of young and mature trees are wrapped in fronds which give them a rather rough appearance. The older trees have smoother trunks apart from the scars left by the fronds which have withered and fallen off. It will start to bear fruits usually after 2.5 years and it produce fruits for the next 25 – 30 years, for this reason it belongs to the perennial plants. During its existing period it ensures a consistent supply of oil (Casson, 2009).

Figure 1: Palm oil tree

Source: agrifarming, 2015

Flower fruits contains from 800 - 2000 individual fruits and its weight can reach up to 80 kg. Average weight is usually about 25 kg. The palm oil trees are typically planted in rows and with 8 meter distance between one another. That means about 148 plants per 1 hectare. In other words plants from 1 ha are able to produce about 0.5 tons of kernel oil and 4,500 tons of crude palm oil. This plan is the most efficient oil crop in terms of land use with the highest yield compared to other oil crops per hectare of land- see this on Figure 2.

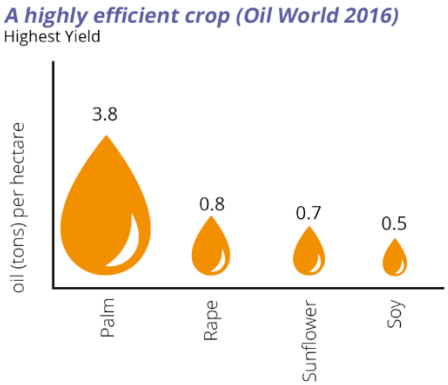
Figure 2: Oil seeds by its production



Source: Oil World 2016

The oil palm is the most efficient oil-bearing tree in the world. It requires only 0.25 ha of land to produce 1 ton of oil while rapeseed, sunflower and soybean need 1.52, 2 and 2.22 ha of land to meet the same yield as palm oil (Corley and Tinker, 2003).

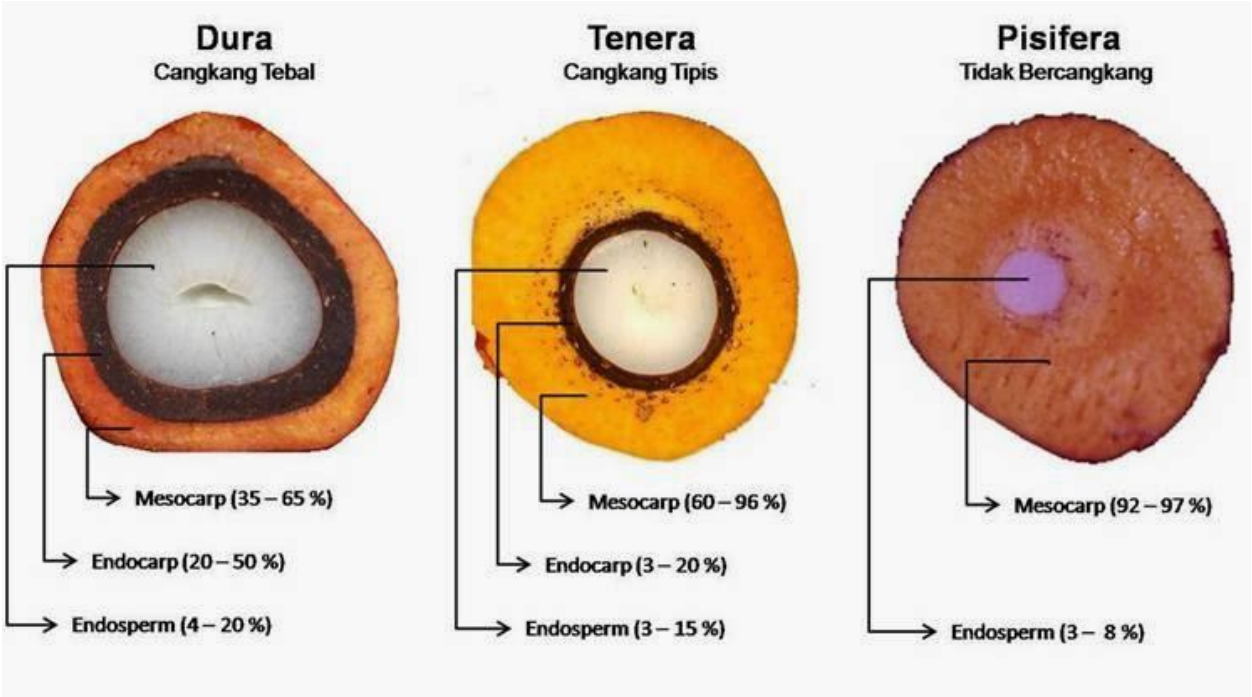
Figure 3 Yield of crop per hectare



Source: Oil World 2016

The fruits of all palm oils are not the same. The pulp is not equally thick in all of them and the shell differs as well. Some kernels have no shell at all. Based on this it has to be mentioned that there are three varieties of oil palm: Dura, Tenera and Pisifera.

Figure 4: Types of oil palm



Source: RSPO, 2016

Dura palm has kernel with a thick shell, extraction of oil is between 15 – 18%. Tenera palm has kernel with a thin shell, extraction of oil is between 20 – 32 %. This palm serves for commercial use. The last palm is Pisifera and it has no shell at all, the extraction of palm oil is about 40%. Types of palm can be seen in Figure 4.

4.1.3 Production process

Research and development are included in the process of palm oil production. Many disciplines are involved in the process such as chemical and mechanical engineering and biochemistry. Establishing of plantation provides opportunity for large scale fully mechanized processing which resulted in the evolution of processing steps designed to extract, from a harvested oil palm bunch, a product of acceptable quality for the international consumable oil. The production process involves in summary these steps: fresh fruit bunches got from the plantations, threshing and sterilizing of bunches to extract palm oil, mashing the fruit and pressing out the crude palm oil. These steps are followed by purifying and drying for the store and as the last part of this processes it has to be mentioned the logistic, export. The whole cultivation includes direct and indirect activities. Production process of palm oil is highly dependent on labor work which includes activities as preparing the land, building infrastructure, growing palms in kindergarten and then planting them into plantation, fertilization and pruning palms.

Before taking any steps of production it is important to keep in mind that building an infrastructure and creating plantation are the first necessary parts in the whole process and the most costly parts in the process. Plantations are usually set up in the area where rainforests used to be. Cleaning soil means mostly the technique that uses slush and fire setting. This technique reduces diseases and pests and in most cases the soil fertility increases. It has to be mentioned that using this kind of technique increases the chance of losing nutrients and possibilities of soil erosion. Another technique is with machinery but it is less cost-effective. Whole logistic systems belongs in this part as well. This can be divided into transportation and drainage infrastructure. Building new roads serves only for plantation purposes. Drainage systems is used to control water level in plantation, usually it holds water about 1 meter under the ground. During building those systems it is important to have a research about given soil and then react with appropriate answers. Example is topography of the area, rainfall distribution and soil type. Every plantation has its own drainage system (Simorangkir, 2006).

4.1.3.1 Harvesting technique

During the early stages of fruit formation the oil content of the fruit is very low. After reaching maturity the formation of the fruit increases rapidly, about 50% of mesocarp weight. In fresh type in un-bruised fruit the free fatty acid content of oil is below 0.3%. However, in the ripe fruit the exocarp becomes soft and is more easily attacked with lipolytics enzymes, usually at the base when the fruit becomes detached from the bunch. This enzymatic attack results through hydrolysis into huge increase of free fatty acid (FFA). This FFA in the damaged part of the fruit increases to almost 60% in one hour. In other words we can say that there is a wide spectrum with variations of quality within the bunch depending on how much it has been bruised. Part of harvesting is also cutting of the bunch and allowing it to fall on the ground by gravity. Other damages of the fruit are connected with handling and transportation processes. Usually the FFA adds only small portion to the oil flavor but at worst the high FFA has laxative effects. This is not the issue for people who consume the crude oil directly but it is the issue for refinery which has problem to neutralize the high portion of FFA in palm oil (Poku, 1993).

4.1.3.2 Bunch reception

Fresh fruit usually arrives from plantation as bunches or loose fruit in the wooden boxes suitable for weighting process on scales. This serves to computing amount of fruit arriving for the process. The quality highly depends on the arriving fruit from the plantation. The mill by itself cannot improve the quality but it is able to avoid any further deterioration. The factors that affect the quality of the fruits are age of the palm, genetic, agronomic, environmental factors, harvesting technique and also handling with transportation.

4.1.3.3 Threshing

The bunch consists of fruit embedded into spikelets growing on a main stem. Manual threshing usually occurs only in small farms. It is achieved by cutting the spikelets from the bunch stem with an axe or machette and it is followed with separating the fruit from the spikelets by hand. In larger farms we normally can find this system in a mechanized form. In this system a rotating drum or fixed drum with rotary beater bars detach the fruit from the bunch, in the same time leaving the spikelets on the stem. High pressured steam is highly effective in heating bunches without a great loss of water, this system requires to thresh bunches after heating to loosen the fruits.

4.1.3.4 Sterilization of bunches

This step serves for several purposes. There are two ways how to fulfill this step - by cooking or using pressurized steam. Cooking usually requires hot water and sterilization uses pressurized steam.

- Treatment by heat destroys oil-splitting enzymes and also takes care about hydrolysis with autooxidation.

- In larger-scale installations the bunches are cooked as a whole and removing the fruit becomes easy.

- Heat provides the protein solidification, it allows cells to come together and after that flow more easily when applying pressure.

- Heating process helps to break down gums and resins which caused the oil to foam during frying.

- High pressure steam is used to for sterilization, the heat causes the moisture in the nuts to expand, after reducing the pressure the contraction of the nut leads to the detachment of the kernel from the shell wall. It is obvious that sterilization is one of the most important operations in oil processing.

- On the other hand it is highly important during sterilization to ensure elimination of air from the sterilizer. Air acts as a barrier for heating and also oil oxidation increases considerably at high temperatures, hence oxidation risks are high during sterilization. Crossing the limits of sterilization also leads to poor bleach ability of resultant oil and reduction of the protein value.

4.1.3.5 Digestion of the fruit

Digestion means the process of releasing the palm oil in the fruit through the rupture or breaking down of the oil-bearing cells. The digester has steam-heated cylindrical vessel with rotating shafts. In this process the fruit is pounded. Pounding in high temperature helps to reduce viscosity of the oil, destroys the exocarp and finishes the disruption of the oil cells. In this step the contamination of iron is really high and this also brings the risk of oil oxidation.

Extracting the palm oil

To extract palm oil the two methods are used. There is one system that uses mechanical presses which is called dry method. The other one is called wet method where hot water is used to leach out the oil. The objective of the dry method is to squeeze the oil out of a mixture of oil, moisture, fibre and nuts by applying mechanical pressure. There is a wide spectrum for different presses but the operation is similar for every single one. The presses are designed for batch or continuous operations.

- **Batch presses**

  Material is placed in a heavy metal vessel and a plunger applies the pressure to press the material. The plunger can be moved manually or by a motor. Motorized method is faster and more effective but it is also more expensive. There is important thing with hydraulic plungers that they need to be more maintained due to fact that hydraulic fluid do not contact the raw material.

- **Continuous systems**

  This system consists of a cylindrical perforated cage where the closely fitting screw is running. The fruit is continuously conveyed through the vessel directly to an outlet restricted by a cone that creates the pressure to expel the oil through the drilled holes. Those kind of presses are act as additional digester and are really effective in oil extraction. High pressing pressures have an adverse effect on the bleach ability and oxidative conservation of the extracted oil.

Clarification

At this point the impurities are being separated from the oil. The fluid coming out from the previous process is a mixture water, palm oil, fibrous material, cell debris and non-oily solids. Non-oily solids in the mixture make it viscous. Adding hot water in the mixture is a way how to balance it and make it thin. This step also provides a barrier that causes the heavy solids to fall down to the bottom of the container while the oil which is lighter flow through the mixture to the top when the whole mixture is heated. Water added in the mixture is in a ration 3:1 and makes it more diluted, this mixture is filtering through the screen to remove the fibres. This filtered mixture is boiled for an hour and then it allowed by gravity to settle in the large tank. This means that the palm oil is lighter than water and rises to the top. Into another tank the clear oil is poured. Even when this oil is clarified it still contains dirt and small traces of water. Re-heating the decanted oil and skimming off the dried oil from any dirt removes any residual moisture.

Oil storage

Usually dry and purified oil is put into a tank for storage before logistic action comes to play. The rate of oxidation increases with a temperature which is maintained around 50 °C. In case of preventing fractionation and solidification using hot water or low-pressure is required. Contamination by iron can occur when the tanks are not well maintained and not covered with suitable coating.

Kernel recovery

The residue from the press is a mixture of fiber and palm nuts. In this process the nuts are separated from the fiber. Using its own exothermic reaction the sorted fiber is heating for a few days. The fiber is then pressed in the spindle presses to recover the second hand oil, usually called technical oil. This oil is used mostly in soap making. The mills normally nutshells and recovered fiber to fire up the steam boilers. Thanks to well-heated steam the turbines are driven to generate electricity for the mill. From the economics point of view it makes sense to recover the fiber. In the kernel recovery process the nuts are separated from the fiber, then they are cracked and dried in centrifugal crackers to release the kernels. The kernels are usually separated from the shell and then dried in silos to a moisture content of 7% before packing. Some of the kernels might be broken during the nut cracking. The rate of FFA increase is much faster in the broken ones than in the whole kernels.

In this case it is highly important to have the rate of broken kernels as low as possible (Corley and Tanker, 2003).

4.1.4 Utilization of palm oil

4.1.4.1 Traditional uses of palm oil

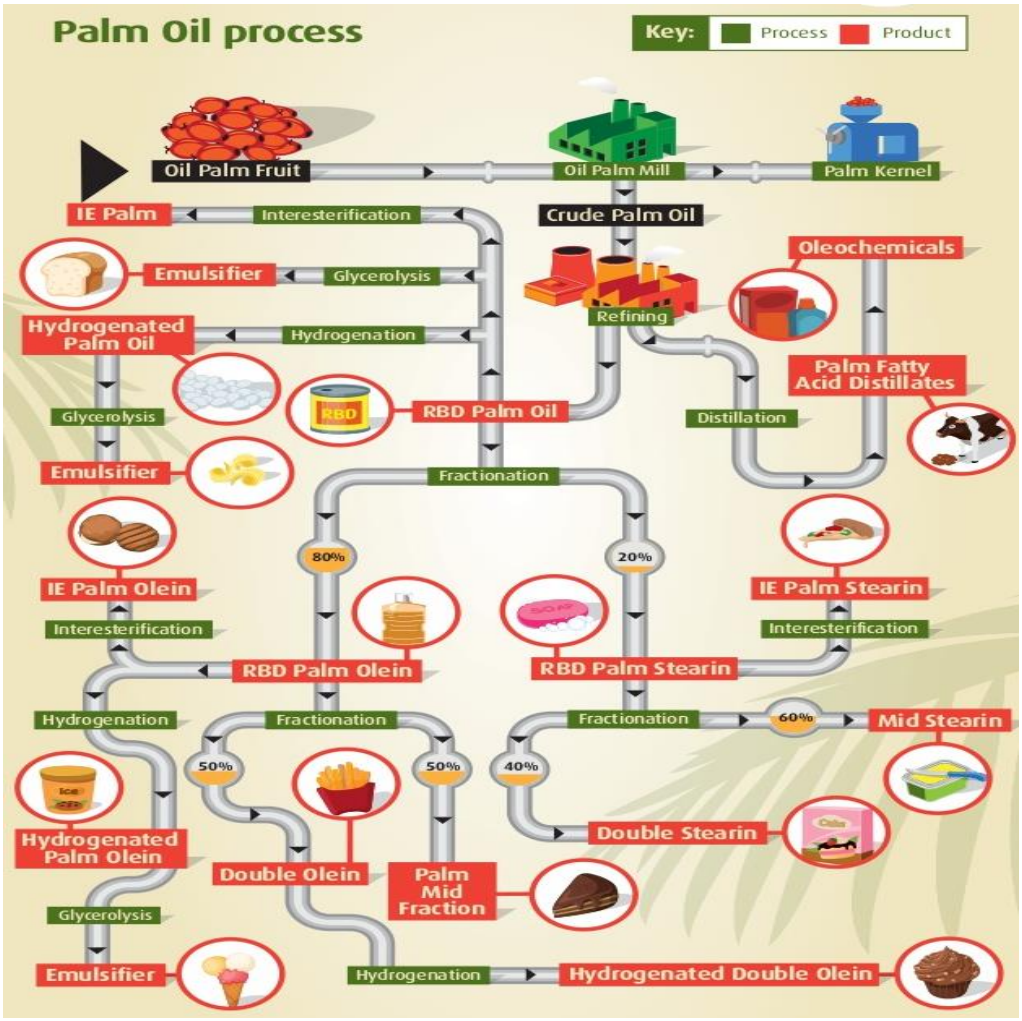
We can find two oils that can be extracted from the oil palm fruit palm kernel - oil from the seed of the kernel and also palm oil from the mesocarp. Traditional way of palm oil usage we usually understand production of margarine, soap and the most important cooking fat. In this section belongs technical and also food product uses. Main use of palm oil belongs into food product where it is used primarily. On the other hand the palm kernel oil is used in chemical production where it in belongs soap-making, toiletries and cosmetics. It is important to mention that those ingredients can be processed to produce a wide range of products which have different characteristics. It ranges from use of domestic cooking to large scale production of different goods.

Usually the low quality oils are used in candles, glycerol and cosmetics. In cosmetics production it is meant as the household products for personal care. Palm oil can be found also in medical treatment, this is because it is a rich source of antioxidants, especially vitamin C. It has been found that it is really reach for vitamin E also, for this attribute it is used during diets. Nowadays for its increasing quality the oil is used mostly in production of food. It serves many purposes during cooking, deep-frying or with potatoes, crisps, snacks, bakery products and also sweets. One of the biggest advantages is that every single part of palm oil fruit is possible to use, every part has different utility. This we are not able to say about other vegie oils (Corley and Tanker, 2003).

Important thing is that palm oil is cholesterol-free, composition of this oil is that it contains a balanced level of saturated and mono-saturated fatty acids. There is also following nutrients vitamin K, phytosterols, flavonoids, phenolic acids and glycolipids. Studies have found that unrefined palm oil plays a role during promoting our cardiovascular health. The tocotrienols help to support heath against stress and heart disease. Other vascular benefits are improving blood circulation, regulations of cholesterol levels and reducing blood pressure. Scientists suggest that antioxidants in palm oil help to prevent different kinds of cancers. The mentioned tototrienols above have impact in preventing development of stomach, lung, liver, pancreas, skin, breast and other cancers. Protection against diseases like Parkinsons’s, Alzheimer’s and other mental

conditions can be also found in palm oil's antioxidants supply which help to prevent neurological degeneration. It has been stated that this vegie oil has also positive impact and it can help to strengthen immune system and support bone, oral, eye, skin and liver health. As a rich supplier of fat rich oil it helps to provide energy (Kaatz, 2014).

Figure 5: Palm oil process



Source: Greenpalm, 2015

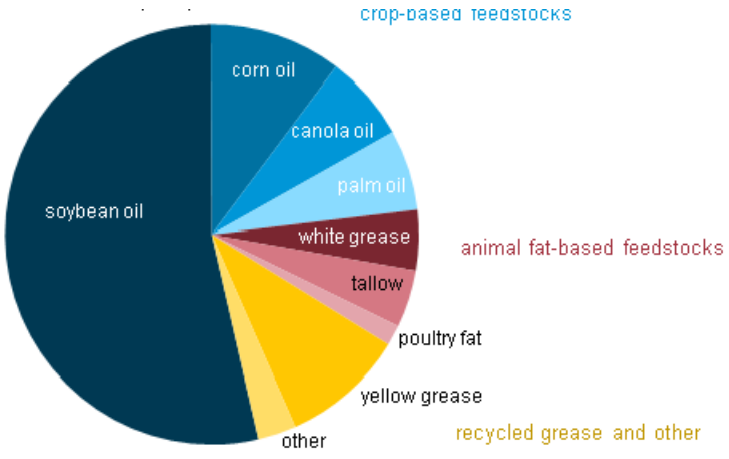
4.1.4.2 The use of palm oil as biofuel

In the last decade the palm oil started to be used also as a biofuel for automobiles. Biofuels are liquid or gas fuels that are renewable used for transportation and made directly or indirectly from biomass. Bioethanol and biodiesel takes about 10 % of global energy production. Biofuels are a new generation of fuels that derive their energy from carbon that is fixed in vegetation. Palm oil offers an alternative source of energy that reduces usage of fossil fuels. By reducing fossil fuels we are able also to reduce greenhouse gas emissions. On the other hand is it important to know that use of palm oil as biofuel is really controversial because it usually occurs in the world's most biodiverse areas. Clearing the forest and land for new plantations impact biodiversity and also carbon in the forest vegetation is released back to the atmosphere (Scragg, 2009).

Main utilization for liquid fuels are heat production, generation of electricity and as a source of energy for vehicles.

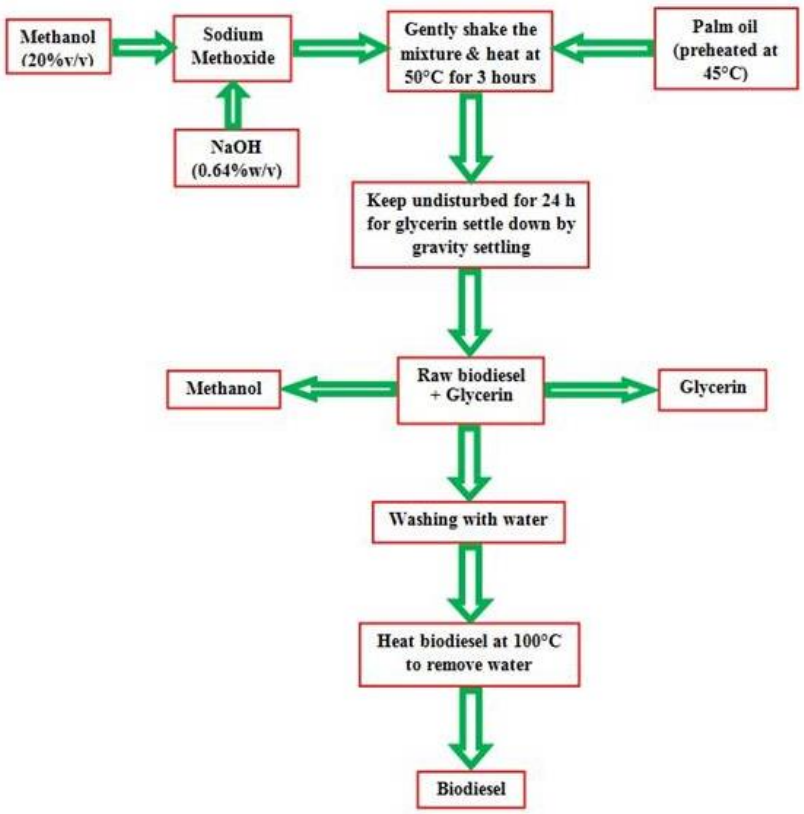
Demand for biodiesel and ethanol increased sharply in the last years. It is a fresh market for palm oil and its using. By 2020 it is expected that global production for biodiesel will grow, that is caused by the major reason. Developed countries, especially USA, China and EU have target to involve biomass based fuels. This is causing a great increase in demand for palm oil. Even when the palm oil remains as the lowest price vegie oil the prices are going up with increasing demand.

Figure 6: Biofuels feedstock



Source: Elia, 2016

Figure 7: Biodiesel production process



Source: Mamun, 2015

Production of biodiesel uses a chemical organic process that is called transesterification. During this process the oil chemically reacts with an alcohol for production of fatty acid. Co-product is in this reaction glycerol which is used in pharmaceuticals and cosmetics. Biodiesel as the output of this chemical process can be made by a wide spectrum of esterification technologies. Filtration of fats and oils is for the reason to remove water and contaminants if they are present. Usually methanol is mixed with the pretreated oils and then catalyst. The molecules of oil are broken apart to formed glycerol and esters. As an output there are two products which are separated and purified to gain the final product (Salwi and Panwar, 2012).

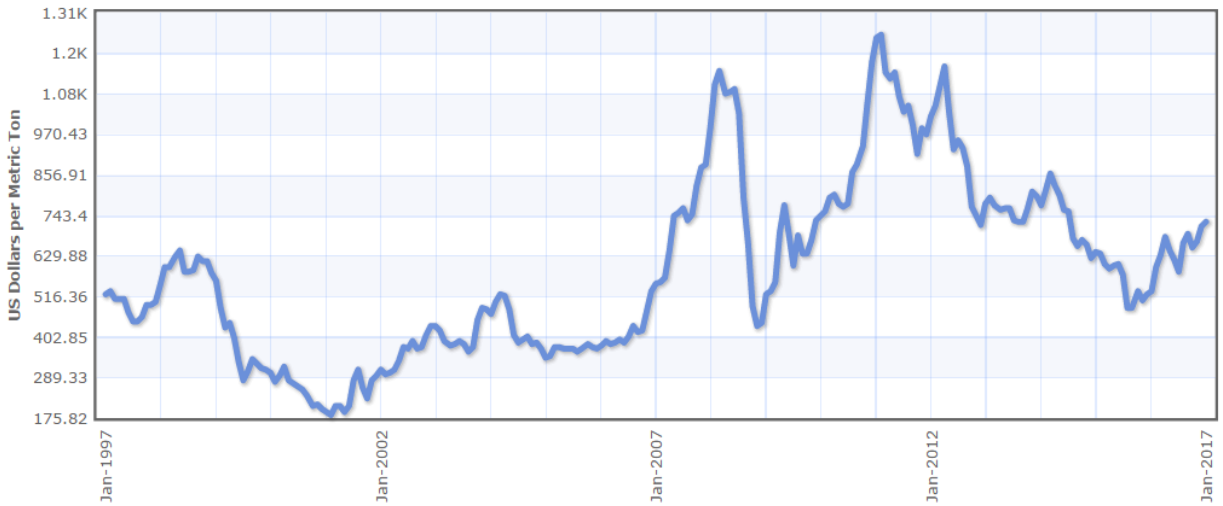
4.2 Global trade with palm oil

In the beginning of the 20th century the first plantation was established in Asia by Europeans. Right away it started to be an exported commodity. Main production has been foundded in Malaysia where palm oil replaced the previous commodity that had been rubber. During 70's the Malaysia overcame Nigeria in production of the palm oil. Since the 60's Indonesia was trying very hard to walk the same path as Malaysia with production of this commodity. The real expansion was in late 80's when the production had increased by 25%. By 2005 Indonesia was producing more palm oil than Malaysia. Due to the fact that production of palm oil in Africa is stagnating those two countries produce more than 80% of palm oil in the world (Berger, 2005).

In the last two decades demand for palm oil increased mostly in the developing economies, especially in China and India. It is due to fact of its evolution and increasing number of people in the middle class. The sharp increase in demand originated mainly from India. In the last two decades it increased more than 41 times. Palm oil is part of Indian cuisine. Almost the same can be said about China where the usage of palm oil is about 1/4 for preparation the noodles. Global consumption of palm oil since year 2004 increased up to 60%. Usually the usage of palm oil is from 60% in food, 30% into biofuels and the last 10% in energetics. The global market for palm oil is expected to exceed 72 million m^3 tons by 2020 (Wakker, 2005).

4.2.1 Prices for palm oil

Figure 8: Palm oil price for metric ton



Source: Indexmundi, 2017

Prices for palm oil have been increasing till January 2008 when the economic crises in European countries began. The reason was for higher demand for biofuels on the market. Price for palm oil is slightly decreasing because the supply from countries as Indonesia and Malaysia overcame the demand. It is also the reaction on the biggest importers of palm oil China and India because their economies slowed down. Nowadays the increase in prices can be seen again.

Table1: Prices of palm oil

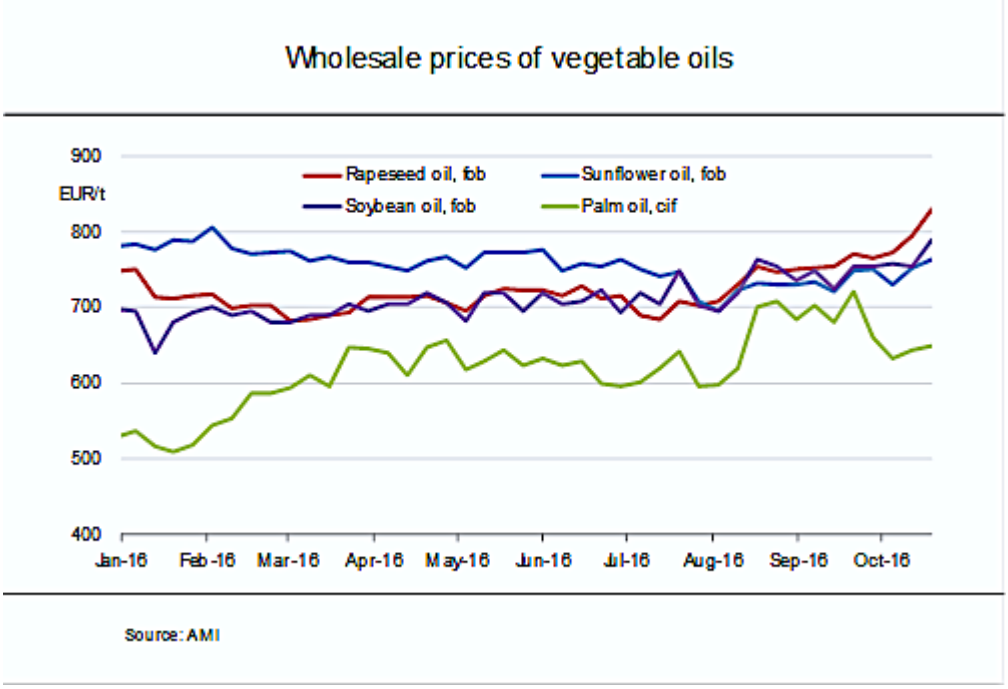
Year	Price in USD per metric Ton	Change from previous month
Dec-97	498.67	1.13%
Dec-98	579.74	-5.97%
Dec-99	312	-1.26%
Dec-00	199.18	-7.49%
Dec-01	295.47	4.96%
Dec-02	433.56	5.75%
Dec-03	478.47	-1.27%
Dec-04	370.09	-4.29%
Dec-05	368.9	-1.88%
Dec-06	528.24	10.80%
Dec-07	883.45	0.70%
Dec-08	440.38	1.68%
Dec-09	727.6	7.90%
Dec-10	1,171.22	10.60%
Dec-11	969.07	-1.69%
Dec-12	713.94	-3.93%
Dec-13	795.27	-1.85%
Dec-14	624.54	-5.72%
Dec-15	520.6	3.47%
Dec-16	711.76	6.23%

Source of data: Indexmuni, 2017

In Table 1 are shown the real values for one metric ton of palm oil in US dollars during years 1997-2016. Reliable data has been obtained from database of indexmuni.com.

During year 2014 is possible to see that palm oil gained attractiveness as the price difference with the other vegetable oils increased. Because the supply of the other vegetable oils is forecasted to decrease, the price gap with palm oil is expected to remain the same.

Figure 9: Prices of vegetable oils



Source: AMI, 2016

4.3 Certification of palm oil and organizations

In the last decade people around the world are starting to be interested not only in quality of food but also in its history and food sustainability. Palm oil is an agricultural crop and as many other agricultural foods it belongs with its production under World Trade Organization. As a member state of WTO there is no possibility to put some kind of restriction on the certain product even when it is socially or ecologically harmful. That is where the conflict occurs. As a solution for those kind of conflicts the certification of imported products was introduced. The main idea is to motivate the market to agree with standards in ecological and social aspects. One of the primary organizations for certification is RSPO. RSPO stands for The Roundtable of Sustainable Palm Oil which is a non-profit association and was established in 2004. The main objective of this organization is developing and implementing the global standards for sustainable palm oil (Maritz, 2014).

It brings together the stakeholders of the palm oil industry - producers, traders, consumer goods, manufacturers, retailers, investors, banks and environmental conservation NGOs and also social and developmental NGOs. In year after this association had been established the set of indicators and criteria were developed. It address the economic, legal, social and environmental requirements for producing sustainable palm oil. The criteria were designed around the following principles:

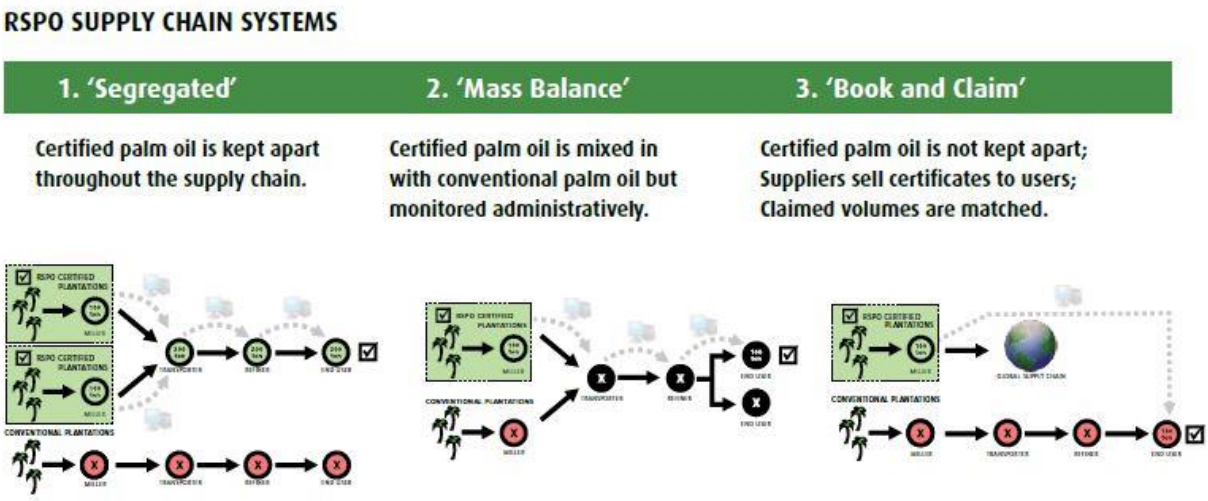
- Commitment to transparency
- Compliance with applicable laws and regulations
- Commitment to long-term economic and financial viability
- Use of appropriate best practices by growers and millers
- Environmental responsibility and conservation of natural resources and biodiversity
- Responsible consideration for employees and for individuals and communities affected by growers and mills
- Responsible development of new plantings
- Commitment to continuous improvement in key areas of activity

That is the set of environmental and social criteria which companies/producers must comply with in order to produce in accordance with the Certification standards for Sustainable Palm oil (CSPO). According to the RSPO principles and criteria about 12.9 million metric tons were certificated. There are many other associations focused on the palm oil production. Other certification standards for sustainable palm oil are offered by the International Sustainability and Carbon Certification (ISCC) and Rainforest Alliance. Both main Asian producers developed their own standards certificated sustainable palm oil. Those are important steps towards more sustainable production. With support of European national initiatives ESPO instigated the 'Commitment to Support 100% Sustainable Palm Oil in Europe by 2020. To support this idea the governments of the main EU countries declared to support this project by signing the Amsterdam Palm Oil declaration. Declaration was signed by Denmark, France, Germany, the Netherlands, Norway and the Great Britain (RSPO, 2016).

The RSPO has created RSPO Next. With mother association RSPO Next now incorporates criteria such as no deforestation, no peatland use and traceability. This kind of voluntary standard should

be supported by both palm oil producers and downstream manufactures to build upon already existing RSPO certification.

Figure 10: RSPO Supply chain systems



Source: RSPO, 2016

4.3.1 Palm oil in Europe

The largest market for certificated sustainable palm oil (CSPO) is in Europe which imports over 12% of the global palm oil production a year. This situation put Europe into an important role to transform palm oil supply chain. Reports shows that in last two years over 57% of the physical palm oil flowing into Europe was certificated as sustainable palm oil. To increase the improvement in the supply chain of sustainable palm oil certification it is highly demanded to join forces of different associations and alliances. Through the west and north Europe those kind of associations are widespread. National alliances in the south are also merging around Italian Union for Sustainable Palm Oil that is operating since 2015. All national alliances have commitment to use 100% certificated sustainable palm oil. A lot of those members are moving forward to improve and add a new criteria for certifications standards. All commitments were combined in the Commitment to Support that was presented in Amsterdam during the conference in 2015.

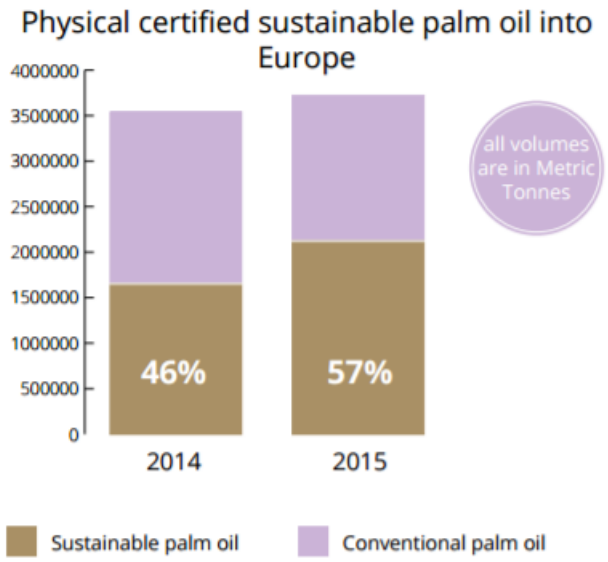
Its main aim is to increase the demand for sustainable palm oil in Europe with co-working with European Sustainable Palm Oil Advocacy Group (ESPOAG) and certification standards such as the RSPO. Governments play an important role in supporting and motivating the palm oil industry.

Application of biofuels criteria for sustainable palm oil are outlined in the EU Renewable Energy Directive (RED), those are mandatory rules and guidelines for companies using vegetable oils to produce biofuel.

The ISCC stands for International Sustainability and Carbon Certification, it is the main system used. Civil society organizations have also important role in establishing the RSPO and continue supporting and pursuing the companies to use more sustainable palm oil. A great number of civil society organizations are involved in taking part in discussions to improve sustainable criteria (RSPO, 2016).

Monitoring of the sustainable palm oil is not straightforward. A wide spectrum of products and their variety make it difficult how much certificated palm oil is used. Monitoring methods and scope may be differing but the outcomes give a good overview of the progress of sustainable palm oil in Europe (RSPO, 2016).

Figure 11: Certified sustainable palm oil in Europe

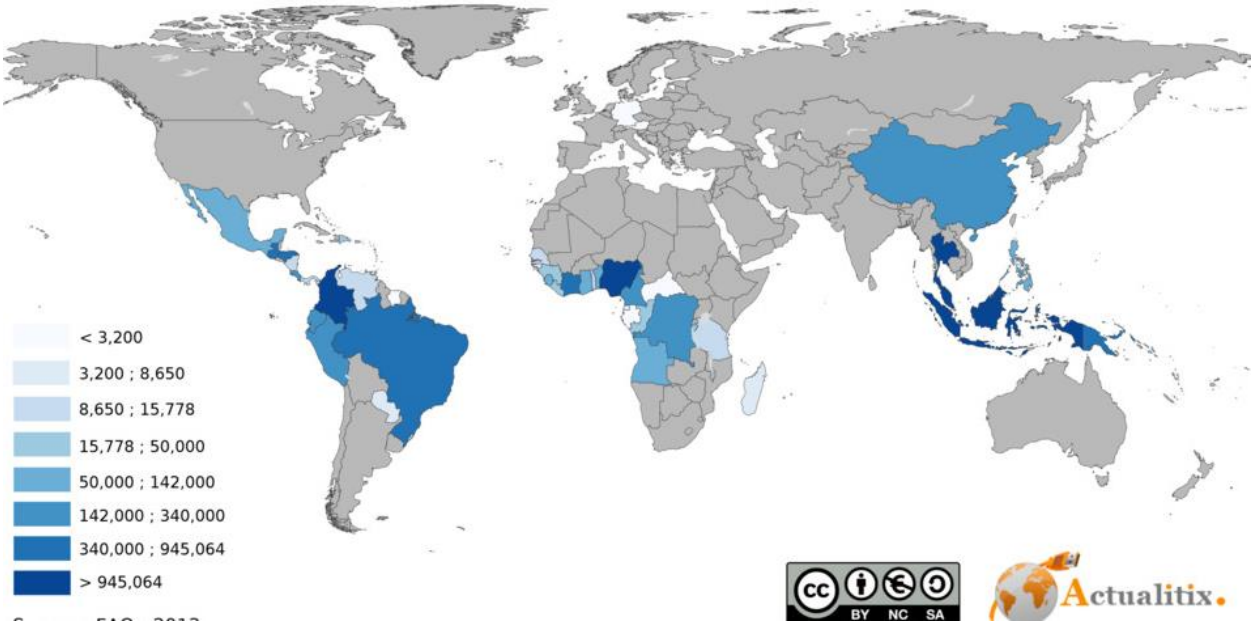


Source: European Palm Oil Alliance, 2016

4.4 Palm oil around the world

Palm oil as the most commonly used vegetable oil is a global traded commodity. Since the last three decades the production of palm oil increased several times. By estimates it is forecasted that production will increase by roughly 50% by 2050. The production of this commodity occurs usually around the tropical belt where it is grown. During 2015 it was estimated that the area for palm oil cultivation takes almost 10% of the global arable land. To saturate the global demand for this vegetable oil the total area for cultivation has been increased, not the higher yields how it was expected. Usually it is said that cultivation area increases by 3% every year, in last three decades this area expanded more than three times. By estimations there is about 1.1 billion hectares of land which is suitable for palm oil cultivation globally. Due to fact that palm oil needs special requirements it is obvious that it can be planted only in certain countries around the equator (Corley, 2003).

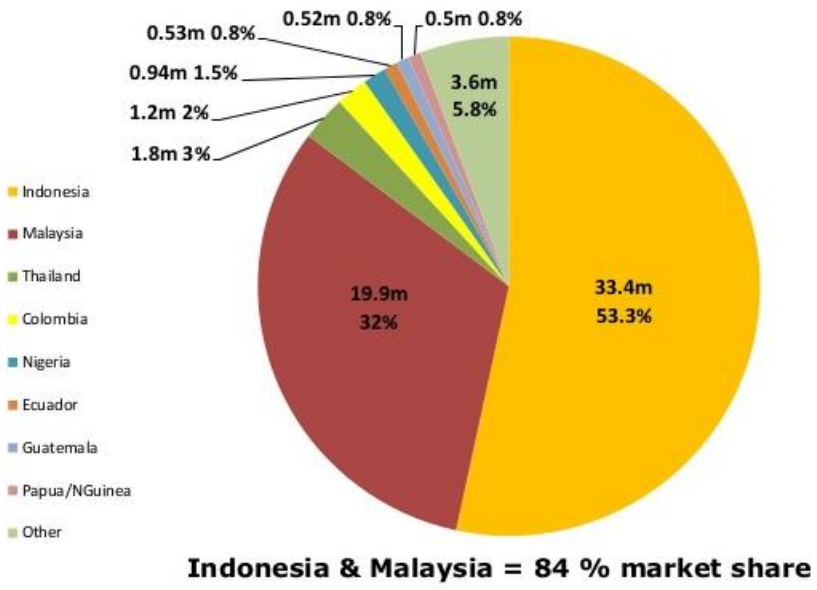
Figure 12: Palm oil production in tons



Source: FAO, 2016

In figure 12 can be seen that nowadays is palm oil commercially grown in at least 42 countries. Usually it is around the equator but by many observations the area is limited by 10 degrees south or north from the equator (van Gelder, 2004).

Figure 13: Global palm oil producers in 2015



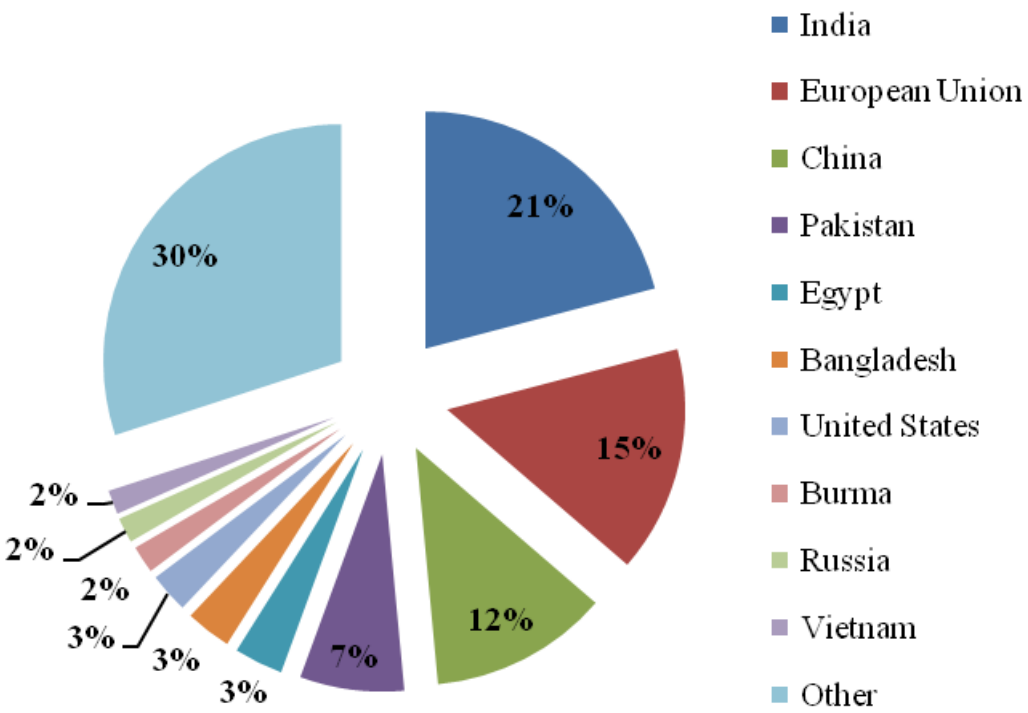
Source: data from Oil World, 2016

Figure 13 shows the global palm oil producers and their share on the global market in year 2015. The biggest producers of this commodity are located in Asia, especially in south-east Asia. Indonesia is the biggest exporter of palm oil and its share is slowly increasing. The biggest portion of pie in Figure 13 is taken by Indonesia and Malaysia. Both those countries are really unique in the way that they focused their production on export of this commodity. Even when there are many countries involved in the palm oil production but there is only Indonesia and Malaysia that are net exporters of palm oil (Berger, 2005).

4.4.1 Demand for palm oil

Still increasing demand for palm oil resulted in the global consumption per capita being almost 6.8 kilograms per year. Modern palm oil industry is pushed hard, most of the developing countries are motivated by its positional productivity. The advantage of palm oil is its low cost and also the fact that it is the most cost competitive vegetable oil for production biodiesel (RSPO, 2010).

Figure 14: Country-wise share to the total Palm Oil Import



Source: FAO, 2016

During year 2009 the share of importing countries had changed. The United States used to be one of the major importers and as well Japan but situation on the market with palm oil has changed. This could be caused by developing countries which started to be able to directly consume the processed palm oil. This action helped palm oil to expand into those countries and again to increase demand. The main consumers are India, EU and China. Palm oil in China is used in 60% for food consumption from its total domestic demand. The biggest problem that RSPO has to face lately is that the biggest importers such as India, Indonesia and China are countries for non-critical market for uncertificated palm oil. On the other hand it has to be mentioned that the middle-class in those states is growing and with it the interest of people in responsible consumption of goods, which is indisputably a very positive effect (WWF, 2013).

4.4.2 Palm oil in Africa

So many companies that already have running plantations with other investors are looking nowadays into this region to meet the growing demand for palm oil. Even when the yield in Africa is much lower than in south-east Asia there is still big expectation from this continent for a future production. Nowadays Africa is a net importer of palm oil, many of African governments see a potential source of tax and export revenue in the oil palm development. An increasing number of investors, some of which are the world's largest companies, are looking for areas easier to secure in Africa than in other parts of the world. Projects about sustainable palm oil are not fully evolved and for this reason it is easier for companies and investors to use African land without facing so many obstacles. APOI stands for Africa Palm Oil Initiative which brings together TFA 2020 and collaborators within companies, government, civil society and local people to help with transitioning the palm oil sector into a sustainable driver of long-term, low-carbon development in the region in a way that is socially beneficial and protects tropical forests of the region. Ten palm oil producing countries (Cameroon, Central African Republic, Côte d'Ivoire, Democratic Republic of Congo, Gabon, Ghana, Liberia, Nigeria, Republic of Congo, and Sierra Leone) are currently engaged in the APOI (TFA, 2016).

Driven by the international demand for palm oil and more recently for biofuels, African communities are facing the large scale palm oil plantations. Many governments are opening doors to international corporations and investors for planting vast areas of land for palm oil production. This recent trend does not occur only in West Africa but also in central countries and also it is expanding to some parts of Eastern Africa (Dolan, 1999).

Most African economies remain largely agrarian, dependent on natural resources and agriculture as the major source of foreign exchange and employment. Opportunities for investment and trade in Africa can be found across various sectors. Incomes are growing in many African countries and on the other hand slower increase in prices makes this continent a place for a stable environment for investments and partnerships (Dolan, 1999).

Nigeria

Nigeria is the largest palm oil producing country in Africa, located in the west part of this continent. Palm oil originated in the tropical rainforest of West Africa. In last decades the domestic production of palm oil in West Africa has increased more rapidly than its consumption. In the 1650s Nigeria was the world leader in the palm oil production. The country has about 43% of global market share, providing almost 645,000 metric tons of palm oil annually. However, following national independence, as was the case with most other African nations, Nigeria was forced to liberalize its economy. This move was accompanied by the abolishment of the commodity marketing boards, the removal of subsidies and an overall pullout of government support to smallholder agriculture. Following the civil war, the 'petroleum boom' continued to take precedence over agricultural production since crude oil was more economically valuable. Relatively small investments were made in agriculture. Nigeria has a land area 923,708 km^2, where is about 31% arable land, while only 15% is covered by forest. Production in this state is around 970,000 metric tons per year. The estimation shows that it is 55% of the African output. As with all cases also in Nigeria grows national demand for this commodity much faster than the domestic supply. Thus, Nigeria is forced to import palm oil to satisfy the local demand. The production of this commodity provides employment and income for more than 4 million people. The volume of palm oil exported from this country is very low due to the lack of production surplus and quality. Due to these facts it makes Nigeria palm oil less competitive on the global market (RSPO, 2016).

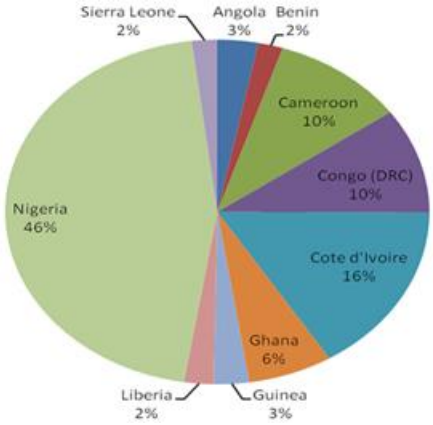
Democratic Republic of Congo

Almost 47 million hectares of the Democratic Republic of Congo are ecologically suitable for cultivation of palm oil. Nowadays there is a huge interest in establishing large palm oil palm plantations in the region to meet not just domestic but as well the international demand. 85% of the whole production is represented by dominating smallholders. National production of DRC is estimated at level of 300,000 tons. To meet its total domestic demand of 350,000 tons each year there is missing 50,000 tons which must be imported. By prediction the grow rate of demand for this country is about 5%. In the next twenty years at this rate the domestic demand will exceed a million tons (RSPO, 2016).

Cameroon

One of the main players in the palm oil sector in Cameroon is the French Bolloré group which produces 80% of national production. Through other small companies its holding is about 40,000 hectares of plantations. This company has industrial future plans, has recently declared its interest in biodiesel production. In year 2000 the company got another 43,000 hectares for establishing palm oil plantation. 12 years later the US-based company withdrew its application for RSPO certification of a 70,000 hectares plantation in Cameroon. The company was forced by complaints filed by RSPO and many of non-governmental organizations. The company and its subsidiary Sithe Global Sustainable Oils Cameroon have been accused of violating both Cameroonian law and the RSPO Principles and Criteria (RSPO, 2016).

Figure 15: African palm oil production by states



Source: Hardman, 2016

4.4.3 Palm oil in Americas

Canada and the US represent two of the world's major consumer markets for palm oil, on the other hand their palm oil consumption is low due to fact that on the market are dominating other vegetable oils such as domestically produced soybean and corn oil. Among consumers there is relatively low level of awareness of the impacts of palm oil production. Latin America can be seen as a new frontier for expansion of palm oil. Cultivation has already increased rapidly in this area during last decade, around 3.6% in most countries. Central and south part of this continent holds

more than one quarter of the world's forest area, more than 60% is a tropical rainforest. It is important that this part of the world adopts practices for sustainable palm oil production to avoid the numerous negative impacts connected with its cultivation (Faostat, 2015).

North America

Canada had domestic palm oil consumption about 88,000 in year 2015 metric tons which is really a small amount. This country is aware sustainable palm oil production and accepts some steps to avoid its big consumption. One of these steps is stated by law that states that for food products which contains palm oil is not acceptable the general term "vegetable oil" between listed ingredients, the vegetable oil has to be specified deeply as palm oil.

The US became the 7th largest member for RSPO in 2011. This step brought a wide spectrum of goods manufactures, the financial sector, retailers and NGOs. Many environmental organizations have also joined. United States play important role as a mediator. Many companies joined RSPO such as PepsiCo, Avon, Walmart Johnson & Johnson, Kellogg's, Kraft Foods and Mars, this is just short list of them. Total domestic consumption for palm oil commodity represents 2% of global consumption, only 1 million metric tons. Palm oil share in consumption of other vegetable oils is only 8%. There is also chance to see here food labeling regulations for listed ingredients such as in Canada (RSPO, 2015).

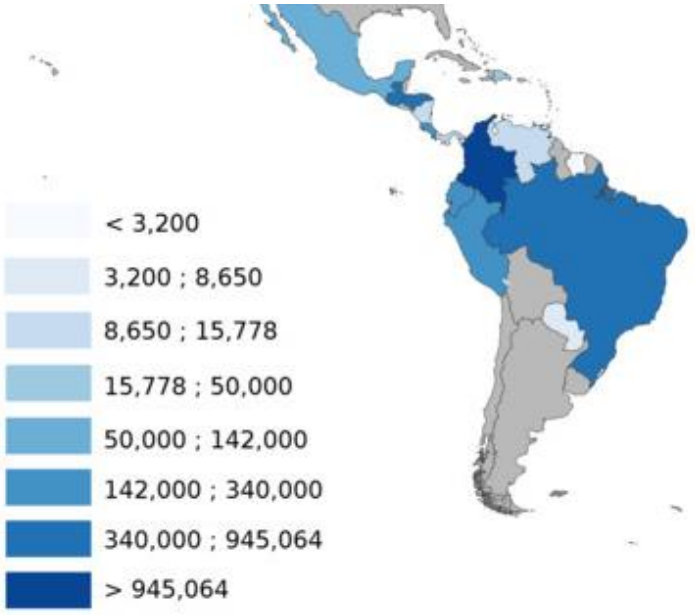
Latin America

Palm oil has become lucrative subsidy, even when it is relatively new crop in this region, for many farmers who traditionally cultivated other agriculture products. All of the states in Latin America grow palm oil for commercial use. This production represents share of 6% of global palm oil production per annum. History of its production were established 50 years ago. Due to lack of cooperation between governments and private and social there is a great amount of conflicts about providing social and environmental protection and care. One of the main challenges that Latin America has to face is a massive deforestation in this region. Brazil and Mexico have decreased level of deforestation, despite the increase of palm oil cultivation. Many other countries do not act like those two and the total deforestation is a real problem. People in this region face often the problem with income inequality, income distribution, which makes social gaps and creates poverty. Many governments find positive way how to solve this problem by palm oil cultivation. While there are low prices for palm oil and high production cost, there is also growing interest for

sustainable palm oil development in the region with increasing demand for Certificated Sustainable Palm Oil is able to promise the potential economic and social growth (RSPO, 2015).

Columbia belongs between the five top producers in the world and it is the largest producer of palm oil in the region. Country has high expectations from palm oil producers and it is expected that in a few years the area for plantations will require almost 2.8 million hectares. Brazil land for palm oil purpose is expected to be 680,000 hectares in 2020 which is more than three times more than in year 2012. Ecuador production has usually grown 7% per year with area of 300,000 hectares. RSPO has about 65 members in this region and the production of certificated palm oil has reached about 250,000 metric tons which is about quarter of the total production from this region (Faostat, 2015).

Figure 16: Production of palm oil (in tons)



Source: FAO, 2014

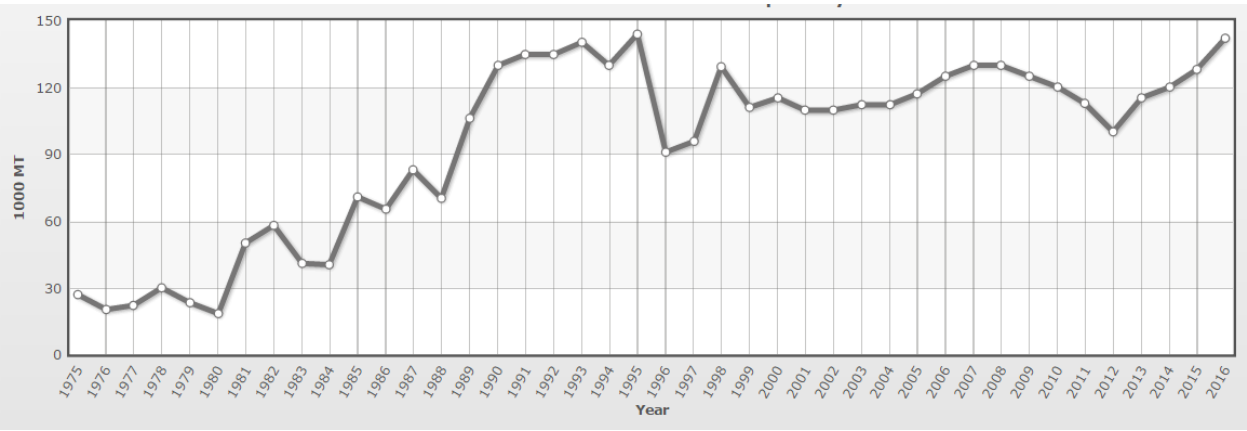
In Figure 16 we can see range of production in Latin America during year 2014 in tons. Production is increasing sharply in this region with the biggest producers such as Brazil, Columbia, Ecuador and Honduras.

4.4.4 Palm oil in Oceania

Oceania region can be described as a producer and also an importer of palm oil. The import to Australia and New Zealand is a relatively small amount, on the other hand it is quite large due to the fact that the area is inhabited by only a small population. Many major companies in this region have already made commitments towards sustainable palm oil production and to become the major actors in the supply chain, however the whole region has still long journey to completely fulfill these criteria. Many companies have already shifted their oil concerns away from palm oil. Papua New Guinea is really significant and one of the biggest producers of Certificated Sustainable Palm oil in the world (Faostat, 2015).

Australia is market which represents significant manufacturing place, however with its given small population. Annual import of this commodity is approximately 14,000 metric tons. New Zealand imports really small amount of palm oil at only 1,000 tons per year. Ingredients listing of goods does not occur with palm oil, only the generic term vegetable oil, in both countries till 2011. Due to this fact we can see degreasing in total consumption in year 2012 in Figure 17. Many companies that operate here label goods with their private labels where the palm oil is mentioned. Nowadays both of the countries have about 140 RSPO members (RSPO, 2016).

Figure 17: Australian palm oil consumption in years



Source: US department of Agriculture, 2016

The last country in this region is Papua New Guinea which is an important palm oil producer. On the global scale this country takes place as the 3rd largest producer of Certified Sustainable Palm Oil that is 7% of worldwide production. Nowadays there is more than 160,000 hectares with RSPO certification. About third of the country producers are independent smallholders which stands for smallholders that are not bound to a particular mill, they are characterized by their freedom to choose how to do the whole production. This third represents more than 8,100 smallholders and with two RSPO- certificated growers stands behind certificated palm oil production in this country (RSPO, 2015).

4.4.5 Palm oil in Asia

In Asia continent we can find two from the top importers of palm oil worldwide, those countries are China as the 3rd largest importer and India being the 1st one. Even when in this region occur main importers of palm oil Asia as a continent is the leader of the total world's production. This whole region stands behind the production of 85% worldwide palm oil. Introduction of oil palms in this region were through European traders during early 19th century. Palm oil is not original commodity in this continent but it has to be mentioned that it has become one of the main monocultures in many countries around. South-east Asia is nowadays a cradle for palm oil cultivation (Dolan, 1999).

China, India and Pakistan

China imports usually about 6.1 million tons annually. Forecast expects the growing demand every year by 10%, it is caused by rising standards of people. Main purpose of palm oil in this country is more than 70% share in edible oils consummation. Many companies and stakeholders operating on China market are highly involved and integrated in palm oil supply chain. Those stakeholders represent all activities connected with its importing, processing and distribution. It operates in the way where the prices of goods make market highly sensitive.

India represents the largest importer of palm oil in the world, annual import of this commodity exceed over 10 million tons in year 2015. Almost all of imported palm oil is used as edible oil for domestic and as well for commercial consumers. The whole Indian market is highly influenced by restrictions and governments import tariff policies. As well as China the market in India is highly

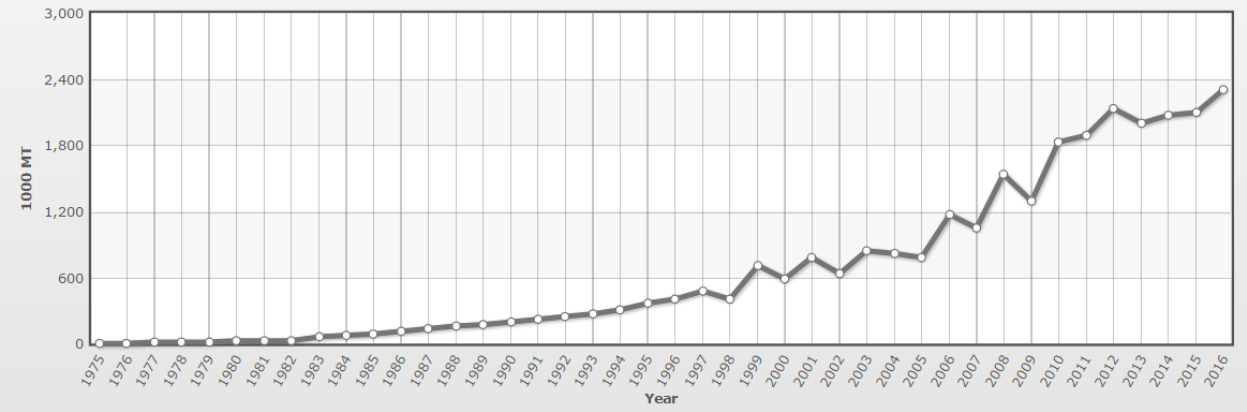
price sensitive. For this reason it is unable to find enough demand for sustainable palm oil, and therefore not so many stakeholders are willing to pay a higher price for certificated palm oil. In both states we can find only over hundred RSPO members distributed between processors, traders and manufacturers.

The 4th place between the global largest importers takes Pakistan with its import around 3 million tons. This value of imported palm oil is still increasing caused by rising demand from food industry. From total imported vegetable oils palm oil has share more than 95%. This means palm oil is the primary cooking oil, followed by usage in other food products (Faostat, 2015).

Thailand

Thailand is one of the most important countries in the world with relation to palm oil production. Thailand is palm oil growing, processing and trading country. In the production of this commodity it takes 3rd place in the world. 98% of growers in the country are represented by smallholders with area about 50 hectares of plantations. Total area for palm oil plantations was over 710,000 hectares in year 2016. RSPO certificated land has size of 13,000 hectares in total and there is a big possibility that the total size will expand more in future years. Figure 18 shows the production of this crop in years 1975 to 2016 and increasing output of this country (Faostat, 2015).

Figure 18: Palm oil production in Thailand



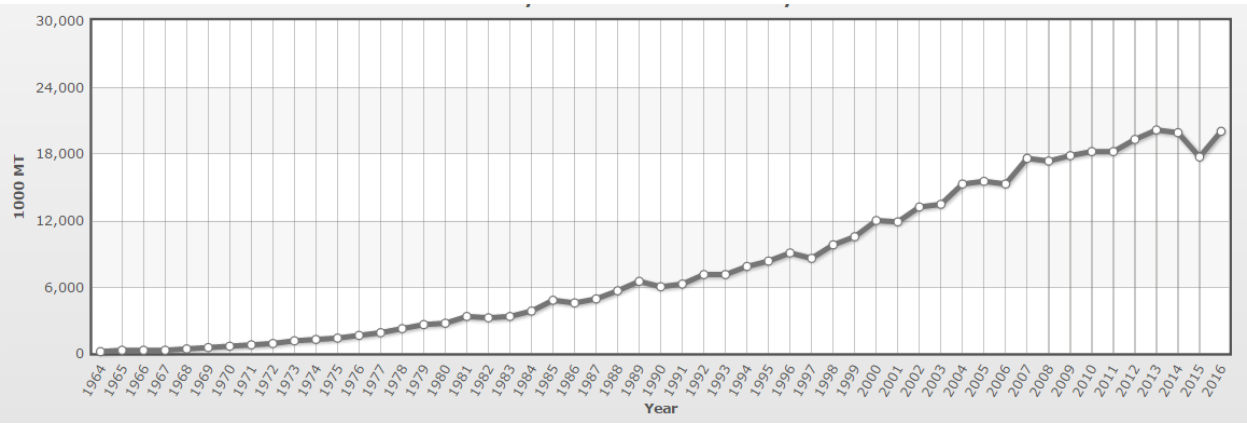
Source: Indexmundi, 2017

Malaysia

Malaysia plays an important role in fulfilling the growing global demand for palm oil. It is taking part in processing, growing and trading of this commodity. The economy stands on the 4th place in the region of South-east Asia. This is caused by a wide production of palm oil with share of 74.1% of all exported products from Malaysia. Production in this country has been increasing over the years. For many decades it was the largest producer of palm oil in the world till 2006 when Indonesia has overtaken the throne. The production started in early 60's with production value of 151,000 metrics tons and the value in 2016 was 20,000,000 metric tons. This production is equal to 32% of global palm oil production (indexmundi.com, 2016).

Consumption of palm oil in Malaysia is about 4.8% of world's consumption. Apart from palm oil being used in the food industry and as a frying oil, the government of Malaysia established the B5 mandate in 2006 which requires that diesel sold in the country must contain 5% of biodiesel made from palm oil. For this reason the consumption in Malaysia is relatively high compared to the size of the country and its inhabitants. Total planted area of palm oil is 5.3 million hectares which stands for 15.8% of total land area in Malaysia. RSPO certificated area consists of 735,310 hectares. Nowadays the number of members in RSPO is about 132 (RSPO, 2016).

Figure 19: Palm oil production in Malaysia



Source: Indexmundi, 2017

5 Practical part

5.1 Indonesia

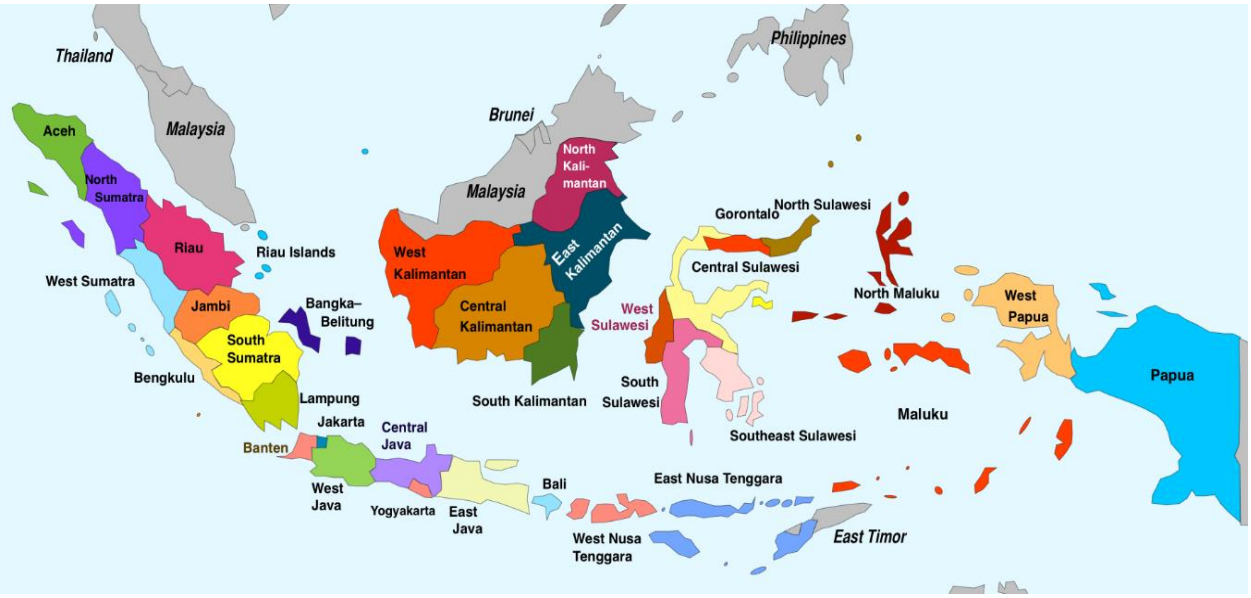
5.1.1 Basic info

The official name of this country is the Republic of Indonesia. Indonesia still belongs among developing countries. It is an island state on the boarder of the Indian and the Pacific Ocean. This country is located in the South-east Asia consisting of 17,000 islands around the equator with the largest islands Java and Sumatra. Total area of the country is 1.905 million km^2 with more than 250 million inhabitants, population growth is 1.9% which makes Indonesia the 4^{th} most populated country in the whole world. The largest city and also the capital is Jakarta with population reaching 11 million people. Many religions can be found in this country, Muslims with 86% followed by Christians with 8%, Hinduist 2% and Buddhists with 1%. Population density is 100 people/km^2, on the island of Java it is 1000 people/km^2. Distribution of ethnic groups is quite wide where major group is Javanese with 40.1% (indexmundi, 2016).

Education system in Indonesia belongs among the biggest ones in the world but country must face many issues connected to this. Low qualified teachers, really low investments into education and great number of students compared to low number of teachers. Lack of education in the country causes worse competitiveness of people on the global market. Language of international market is English, even when government started to focus more on this in the recent years, the whole education system and language learning in the country is on a really low level. This is also caused by the fact that responsibility for education is divided between Ministry of Education and Culture and Ministry of Religious Affairs which shields the Islamic schools in the country where students are focused mainly on spiritual and religious part of a life. Literacy in the country is 93.9%.

Location of Indonesia is in the ring of fire, the largest number of active volcanoes can be found here. The main variable in Indonesia is rainfall which is linked with the monsoons. In other words there are two seasons, dry and rainy. In this country typhoons can occur as well but usually they are not really strong ones. Almost the whole country is in tropical climate with mean temperature 28°C. Range of humidity is usually between 70 and 90%. Those conditions makes from Indonesia a specific environment for agriculture.

Figure 20: Map of Indonesia



Source: Geocurrents, 2016

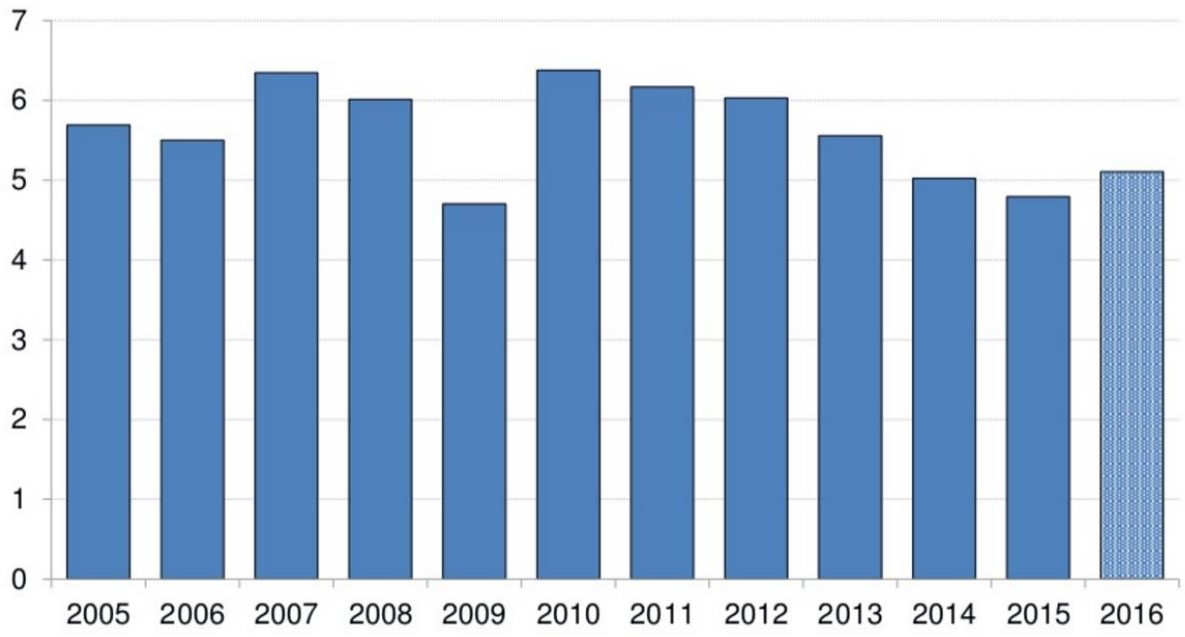
Indonesia has form of republican government with an elected president and legislature. In the past many of the political cultures could be found in the country. During 1990's there were wide spectrum of political subcultures judging politics: military, intellectuals, commercial, bureaucratic and many others but all of them have successfully taken part in the new politic system in the country. During forming the politic system the major goals were set where country should point to development and stability. It is important to mention that government is more interested and focused on foreign than domestic policy. There are many reports on judicial branch in Indonesia that it is not free of corruption at all. There is quite high corruption from the politics parties, those issues reflect the fact that Indonesia democracy is still forming (The World Bank, 2016).

Indonesia consists of 34 provinces where 5 of them hold a special status. Administrative divisions are split into provinces, each province has different governor and legislature. Every province is then divided into smaller parts such as cities, areas and the smallest ones are villages. The 5 provinces with special status have higher autonomy from the central government and also some legislative privileges. Above all provinces stands capital city Jakarta which is unique region (Faostat, 2016).

5.1.2 Characteristics of Indonesian economy

Over the past few decades the Indonesian economy has expanded rapidly. This large increase of growth has seen Indonesia become an increasingly important part of the global economy. The country represents the 15th largest economy in the world. Strong growth in economy has been accompanied by steady inflation. A process of industrialization and urbanization of the country began in the late 1960's, in next 20 years the trade barriers were reduced and the economy became more globally integrated. Total share of population living in urban areas has changed several times and the value is currently at 53%. Even though industrialization occurred in this country, agriculture still remains an important part of the Indonesian economy. About half of the population live in the rural areas, about 40% employment comes to agricultural industries. Income in these regions is much lower in comparison with urban areas and cities such as Jakarta. It is closely linked with low labor productivity in agricultural sector. Manufacturing sector in the country has developed differently to similar secotrs elsewhere in the whole region of South-east Asia. The whole production of Indonesia is mainly focused on food, tobacco and textiles rather than transformation manufactured goods (OECD, 2012).

Figure 21: GDP growth (%)



Source: OECD, 2016

Asian financial crisis caused decrease in real GDP of Indonesia about 13.6% in year 1998 and drop in GDP per capita of 56.4%. The slowing growth of GDP could be found also in year 2001 due to the world crisis, since 2003 the chart shows again sustainable development of the index till the present with only the exception of year 2009 when the growth was slower caused by world's economy crisis. GDP per capita in year 2016 was 3,636 U.S. dollars. Strong macroeconomic performance and regeneration of the economy has been caused by government reforms thus successfully leading the state to liberalized Indonesian international trade.

The whole economy is supported by dynamics of small and middle size companies that mainly represent the biggest demand for workforce and boosters of growth of real GDP since 2008. Important to mention is structure of workforce inside the country where 71.5% represents population older than 15 years old. In the last years the distribution of the working people is as follows: agricultural and forest industry 34.5%, hospitality industry 21.8% and 13% in manufacturing. The biggest development is currently in the financial and service sector. The country's unemployment rate reached 5.6% in year 2016 (The World Bank, 2016).

Table 1: Indonesian GDP per capita

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Value (U.S. dollars)	1,765	2,064	2,418	2,465	3,178	3,689	3,745	3,676	3,532	3,362	3,636

Source: Indexmundi, 2016

One of the biggest barriers for foreign investments into Indonesia is really poor infrastructure in the country. To improve quality of infrastructure government announced the large investments into this sector which will decrease transportation costs and support the economy. Higher demand for better infrastructure is also supported due to the fact of urbanization. Structural changes have taken part during the years and by doing that Indonesia became very industrialized. With plans of investing into an infrastructure in relation with demographics, state's economy is expected to grow over the next decade. On the other hand the policies will play an important part in it and they can be a huge challenge for implementing plans of the country's growth (Businessinfo, 2016).

Indonesia belongs between the largest exporters of goods globally, taking 26th place and has share of 1% of global export. The biggest exporter partner for Indonesia is Japan which represents the biggest subscribe of petroleum, natural gas and copper ore. Relationship between these countries was supported by membership in ASEAN- China Free Trade Area where Indonesia plays a role of supplier of coal, nickel, aluminum ore, natural rubber and palm oil. The third most important country for export is Singapore where Indonesia supplies natural gas, petroleum, a crude tin and some electronics. Share of country's exports to the USA is constantly decreasing where crucial commodities were mainly from the clothing industry. The biggest importer of Indonesian goods is India with demand for coal and palm oil.

Indonesia is really popular for its natural resources such as timber, rubber, copper and nickel. From edible products the most important are tea, coffee and fish. One of primary goods to export is from textile industry is concentrated primarily around the city of Bandung. Those products are usually exported to China, US, Japan, South Korea and Singapore. Around the second largest city in the country, Surabaya, are concentrated producers of goods such as tobacco, sugar and coffee.

The largest importer of goods for Indonesia is China, which is mainly due to ACFTA. This step is a big barrier for domestic manufactures and producers that are unable to compete with cheap goods imported from China. The most imported goods and products from China are devices for phone network, goods from iron and steel and chemicals. Since its entrance to ASEAN group the share of imported goods from Singapore is slightly decreasing, mostly imported products are for example electronic devices, machinery, plastic goods and organic chemicals as well. Thailand and Japan play the role of the largest suppliers in automobile industry. Natural gas is mainly imported from the United Arab Emirates.

During the last decade a strong pressure to increase factory workers wages has been felt in the country. The industry is continentally under pressure due to wage increase demand from union groups where Indonesia belongs. Many companies that serve as providers for the high-end market in other countries want to increase production in Indonesia. Usually way how to satisfy the bigger production is to upgrade machinery but this is not the way of solving things in Indonesia. A lot of manufactures do not upgrade machineries in fear that workers will ask in the future for bigger salaries. Nowadays the minimum salary in Bandung is about 86 US dollars and in capital city Jakarta is it at least 211 US dollars (Businessinfo, 2016).

One of the biggest problem in Indonesian economy is corruption. This fact Indonesia has to face to satisfy the companies that struggle for efficiency. Other problem is the great lack of education among workers.

Inflation

Trend of Indonesian inflation highly correlated with administered price adjustments - electricity and fuel prices are set by the government. This strictly limited the natural flow of the market conditions. This old government program makes a huge deficit in the state budget balance. The World Bank and International Monetary Fund often criticized the Indonesian government for providing such cheap prices for fuels and electricity. The fact is that the country has a great share of middle-class population and many people from this class live just little bit above poverty line, a small swing in inflation can push these people under that line. Volatile rate of inflation causes often bigger deviation from the projections of Bank of Indonesia. Impact of this inflationary uncertainty is creating economic costs, higher borrowing cost in comparison with other markets around. In case of establishing the meeting for annual inflation targets, bigger credibility of monetary policy will follow. Elimination of subsidized fuel prices will lead to lesser deviation between inflation targets and real values of inflation (The World Bank, 2016).

Table 2: Inflation of Indonesia and target of Bank Indonesia

	2008	2009	2010	2011	2012	2013	2014	2015	2016
Inflation (annual % change)	**9.8**	**4.8**	**5.1**	**5.4**	**4.3**	**8.4**	**8.4**	**3.4**	**3.0**
Bank Indonesia target (annual % change)	**5.0**	**4.5**	**5.0**	**5.0**	**4.5**	**4.5**	**4.5**	**4.0**	**4.0**

Source: The World Bank, 2016

Prices of food are volatile in the country which caused a big burden for households that live around poverty line. Those kinds of households spend more than half of the income in the food sector. Higher prices of food are creating poverty basket inflation that is increasing the level of poverty.

International relationships

Indonesia is a member of many significant international organizations which includes WTO, WB and IMF. In the WTO it takes places in negotiation groups Asian developing members, Asia-Pacific Economic cooperation, Cairns Groups, G-20, G-33, AESAN and NAMA-11. International importance and global integration of Indonesia is still increasing. Integration in group AESAN is one of the main ones. The AESAN Economic community (AEC) implies stronger cooperation and integration between all 10 member states located in South-east Asia. The prediction for the AEC group is really positive in a way of global economic integration, the united market is highly competitive with orientation towards production and overall supports economic growth.

Plans for boosting Indonesian economy and increasing country's development

The Masterplan for Acceleration and Expansion of Indonesia's Economic development is established plan by Indonesia's government and approved by president Yudhoyono. Plan's main goal is to increase speed and boost the transformation process of Indonesia to become a developed country by year 2025. By this plan Indonesia should reach with its total GDP value of 4-4.5 billions US dollar. This aim is in close relationship with decreasing inflation to a level of 3%. In case of aiming those goals the government of Indonesia is focusing on those following steps.

- Increase value-adding with expanding the value chain for production of industrial process and overall increase in efficiency of the distribution network. Improving access to human and natural resources which will improve economic activity inside the region and also between international centers.
- Improve efficiency in production and marketing efforts for larger integration of the domestic market to strengthen domestic economy and increase competitiveness.
- Improving Indonesia's innovation system in production processes, processing, stating the product into the market and marketing focusing on the overall sustainable competitiveness in the global range of economy based on innovations.

Among the factors that should support development of the country it is important to include Indonesia's potential in demographics, own natural resources and many geographical advantages. The first point among competitive benefits of the country is demographic composition, the great increase of purchasing power among this huge population is creating very important and significant market. In the following years country expects to reach the lowest point of dependency index which will increase the production labor force of Indonesia. It is important if this condition is fulfilled, that creation of jobs takes place and increasing in quality of education which will give people better opportunity on the labor market. The second point is natural resources and reserves which are really rich in the country. The last point is about location of Indonesia. The country's advantage lies in its position between two great economies and also that through the country one of the most important sea trails goes which serves for naval logistics.

5.1.3 Palm oil in Indonesia

Indonesia is the number one between the largest producers of palm oil in the world and at the same time it belongs among the biggest consumers of industrial processed palm oil. The country's industry has been the economy's most valuable agricultural export sector over the last few decades, it is a significant contributor to production in Indonesia. This production industry provides a reliable form of income for rural areas but it will be described and analyzed later.

Due to increasing demand over the years the plantation of palm oil has occurred in the Asian continent as well. In the beginning of the 20th century the first plantations of palm oil have been established in region of South-east Asia by Dutchmen on island of Sumatra in 1910 and by the Great Britain in Malaysia in the next decade. Right away after planting the first palms it has been considered that palm oil will be understood as an export commodity. Since the late 60's Indonesia copied the plan of Malaysia of vision where palm oil represented the valuable commodity, in 1987 the biggest expansion of production occurred in the country where the production increased by 24.1%. The year 2005 was the first year when Indonesian production was bigger than Malaysian. Due to the fact that production in Africa is stagnating and industry sector of palm oil production in Latin America is not fully evolved it is obviously understood that primary global production of this commodity is taking place in South-east Asia, especially in Malaysia and Indonesia. Nowadays both countries produce more than 80% of global palm oil.

Nowadays the Indonesian palm oil industry has recently come under fire from a large number of NGOs that have campaigned against the industry and its contribution to deforestation, biodiversity loss and carbon emissions. As a result, there have been wide complaints that palm oil production is not sustainable.

Table 3: Palm oil production in Indonesia in years

Year	Production	Unit of Measure	Growth rate
1964	157	(1000 MT)	-
1970	248	(1000 MT)	14.29%
1975	434	(1000 MT)	5.60%
1980	752	(1000 MT)	7.12%
1985	1280	(1000 MT)	8.02%
1990	2650	(1000 MT)	17.78%
1995	4850	(1000 MT)	14.12%
2000	8300	(1000 MT)	15.28%
2005	15560	(1000 MT)	14.5%
2009	22000	(1000 MT)	7.32%
2010	23600	(1000 MT)	7.27%
2011	26200	(1000 MT)	11.02%
2012	28500	(1000 MT)	8.78%
2013	30500	(1000 MT)	7.02%
2014	33000	(1000 MT)	8.20%
2015	32000	(1000 MT)	-3.03%
2016	35000	(1000 MT)	9.38%

Source: Indexmundi, 2016

Table 3 shows the production of palm oil in Indonesia over the years. Growth rate in last column is annual percentage change from previous year. This global key industry is sharply expanding in total planted area and as well with total production of this commodity over the years. It is a reaction to an increasing demand for palm oil, since year 2004 the global demand increased by more than 58% and the aim is to increase the whole production to 40 million tons by year 2020.

Share of palm plantations in Indonesia is quite complicated. Almost 50% of total planted land is owned by private companies, 10% is owned by government of Indonesia and the last 40% belong to smallholders and local farmers. In the past Indonesia government has demanded to influence the share of land owned by private companies and decrease it to 30%. Decreasing ownership of those big players would lead to decreasing interest of investing into palm oil production in Indonesia and investors would find other country with a more open policy. Otherwise from decreasing share of a plantations Indonesian government has found a solution through policies and regulations. Also support of smallholders had finally taken place in Indonesia.

In this program the relationship between big private companies and smallholders is the most important. Local farmers have many benefits (credits for better rate, fixed prices, technical support and the ability to use the infrastructure of the big companies), it is understood here that big company plays a role of an umbrella for smallholders. As it has been mentioned above local farmers own significant share of palm oil plantation in the country which is crucial for big players. On the other hand this supporting program is not fully efficient due to fact of existing corruption in the country which is damaging it.

Presently a large number of operating refineries in this industry exists. The biggest player on the field of palm oil production in the country is Wilmar International which is in the same time the worst company in the world that is ignoring environmental issues. According to many NGOs and other environmental organizations this refinery starts forest fires in the national parks and violates the rights of local population. This status lasts over last decade. This leader of Asia's agribusiness operates in whole Indonesia and as well in other part of the world to supply demand of many companies for palm oil. Other big companies are Sawit Sumbermas Sarana, United Plantations, IOI Corporation, Univanich Palm oil etc...

5.1.3.1 Certification of palm oil in Indonesia

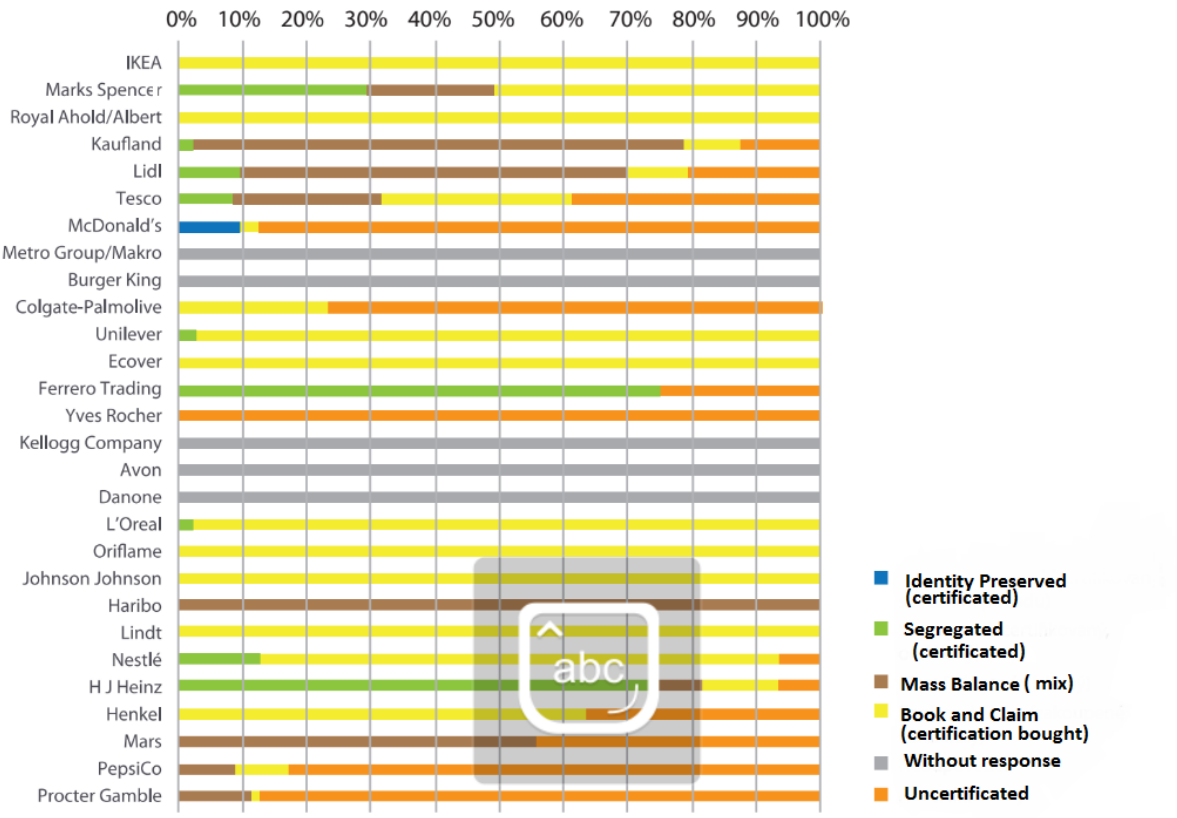
Due to the fact that many countries are members of World Trade Organization they are not able to put restrictions on imported products even if those goods are socially and environmentally unfriendly. As a reaction to this the idea of certifications was born. Certification can be found also in Indonesia. System RSPO is the most important certification standard for palm oil production and usage as it was mentioned before. Many companies that do not follow rules set by certification organization are criticized. In Indonesia occurs next to RSPO also a certification plan from the government named Indonesian Sustainable Palm oil- ISPO.

It is not an international organization as many others but it stands only on national level. This program aims to provide support for achieving goals of the country's government in relationship with emissions of green gases and overall environment, improving competiveness of Indonesian palm oil on the global market. This non-profit organization has been established on 6th July 2009. Accepting ISPO is obligatory for all palm oil producers in the country. Ignoring the rules of ISPO from the producers will be strictly punished by penalties. ISPO is based on Indonesian legislative and it should ensure that all growers in the country will produce palm oil with agriculture standards. Organization on national level such as this is the first one of its kind in the country.

ISPO principles are compliant with the legal licensing regulation, responsibility to implement palm oil plantation management, implementation of best practices in oil palm plantations and mills, responsibility to implement regulations on environmental and conservation of natural resources, responsibility to the individuals affected by oil palm plantations and mills and long-term commitment to improve the economy.

Like other markets, the palm oil market is characterized by information asymmetries. When producers own the whole production process, palm oil buyers with end-consumers have only incomplete information about their respective environmental and social impacts. Given that neither buyers nor consumers are able to verify the authenticity of a producer's sustainability claims in this scenario, they would not be willing to pay a higher price for sustainable palm oil. Accordingly, market failure would occur and a market for sustainable palm oil would not emerge. Credible product serves consumer for purchasing decision based on his preferences for environmental and social characteristics. Those kind of certification processes and NGOs have led big producers like Nestlé and Unilever to cancel multi- million dollar contracts in Indonesia (RSPO, 2016).

Figure 22: Retailers and manufacturers using certificated palm oil from Indonesia



Source: WWF, 2015

WWF has done a research of retailers and manufactures using certificated palm oil from Indonesia which is possible to see in Figure 22. This research has been done in year 2015 which is the most reliable till present. On the other hand it is important to know that retailers are facing the market behavior so the approaches change quite often.

5.1.3.2 Export and taxes

Country kept its export tax for crude palm oil shipment at 18 US dollars per metric ton during February and March 2017. Export tax is determined by price level of crude palm oil. Usually are three ranges for determining the export tax level. When crude palm oil price is set below 750 US dollars, the export tax is scrapped. When the prices reach the second level where the range is set to 750-800 US dollars, then Indonesian government takes 3 US dollars per ton as an export tax. The last possibility of export tax occurs between the values of 800-850 US dollars per ton where the

value is 18 US dollars per metric ton. In Table 4 is possible to see how Indonesia government works with export taxes for its commodities (May, 2012).

Table 4: Indonesia's reference crude palm oil price

Month	2015 price (in USD/ton)	2016 price (in USD/ton)	2017 price (in USD/ton)
January	669.4	557.2	788.3
February	678.5	628.9	815.5
March	662.0	618.8	825.8
April	654.6	713.1	-
May	653.2	703.1	-
June	665.0	689.5	-
July	630.6	658.0	-
August	593.3	734.8	-
September	526.9	768.6	-
October	578.2	722.0	-
November	552.2	743.2	-
December	560.2	749.5	-

Source: Trade Ministry of Indonesia, 2017

Value of Indonesian export of crude palm oil has been consistently increasing, main role here played India as the biggest importer of this commodity from Indonesia. Since year 2012 the export value of crude palm oil is decreasing. One of the main reasons is high export tax of crude palm oil, Indonesian government wants to support processing of oil in domestic economy before exporting abroad. The rising export tax may encourage producers to sell more of crude palm oil to domestic buyers, it is like telling companies not to export. Any kind of sign that export of the largest palm oil exporter is being reduced would support other exporters such as the number 2 Malaysia.

Prices of crude palm oil are influenced by 5 factors: supply/demand, competitive vegie oil prices, weather, importing policies of importing countries and changes in taxation with import duties. Indonesian government has started to use palm oil export tax income to fund the biodiesel program in the country. Government policy for amount of palm blending in diesel changed from 7.5% to 10%. Reinvesting money from this should be understand as increasing domestic demand for this commodity, supporting domestic economy. In 2016 Indonesia started applying a 20% biodiesel blending (May, 2012).

Table 5: Indonesian export statistics

	2008	2009	2010	2011	2012	2013	2014	2015	2016
Production (million tons)	**19.2**	**19.4**	**21.8**	**23.5**	**26.5**	**30.0**	**31.5**	**32.5**	**33.0**
Export (million tons)	**15.1**	**17.1**	**17.1**	**17.6**	**18.2**	**22.4**	**21.7**	**26.4**	**25.7**
Export (in USD billion)	**15.6**	**10.0**	**16.4**	**20.2**	**21.6**	**20.6**	**21.1**	**16.5**	**17.8**

Source: Indonesian Ministry of agriculture, 2017

In Table 5 data of Indonesian export are observed. The prediction for next year 2017 is a small decrease in export about 22.5 million tons. Supply to China should increase again after one year of stagnation. The total palm oil production in the country is expected to increase and reach 35 million tons in year 2017, as the negative impacts of El Nino weather fully disappeared. According to governments calculations the El Nino has damaged production almost by 8% in last year 2016.

5.1.4 Impacts of palm oil production

Palm oil represents right after rice the most important agriculture product in the country. Indonesian production is continuously increasing. Total production over the years has increased more than 12 times. In last three decades the country's production had to face only few times a problematic issues with production that has been caused by El Nino weather and Asia Financial Crisis.

5.1.4.1 Positive socio economic impacts for Indonesia

Workforce

From macro-economy point of view palm oil plantation has a great advantage over other agro cultivations. The large number of agro products are harvested by using heavy equipment but palm oil is harvested manually. Production of this commodity requires a large number of workers. This high demand for workers is understand as 5 or 6 workers per hectare. This demand does not require a skilled workforce which is used for planting, cultivating and harvesting. A reliable workforce is the main key for industry challenge, Indonesia has a large supply of workers (Sheil, 2009).

By many research it has been estimated that country's labour force in agriculture represents over 41% of total population where just palm oil sector employs directly 15 million people and the value is still increasing, this number stays behind the 14.5% of total employed population in Indonesia. The share of people indirectly involved in this industry is more than directly involved.

Those work opportunities are needed for rural unemployment. On the other hand it does not mean escaping the poverty, the core problem is extremely low wages for plantation workers. A wide range of working conditions for workers can be found here. In year 2015 the study for North Sumatra estimated that more than 65% of workers does not belong into group of "daily workers" and their wage rate is between 1 and 2 US dollar per day. Agriculture of palm oil still brings a positive impact on economic and social stability in rural areas.

Work on the plantations are highly distributed by gender. Men dominate with physical power are more demanded in the palm oil industry. Hard harvesting work is higher paid and also increase a chance to have a permanent contract for work. Women miss out some social benefits such as insurance and pensions, also their pay checks are much lower. Typically "women's work" is a spreading fertilizers and herbicides. Even by this gender disparity it is still step forward and it arrange also the work place for women. This job supply is significant and performs country's better macro-economy indicators.

Figure 23: Unemployment rate in Indonesia (%)

Source: Statistics Indonesia, 2017

Since year 1986 till 2005 the unemployment rate increased to 11.5%, many factors influence the unemployment rate in the country but Indonesia during this era had the biggest boom with the total palm oil production. This should be understood that many industries has changed orientation to palm oil industry. Nowadays the rate is decreasing due to fact of already implemented system and harvesting of this crop. The extreme demand for workforce in palm oil industry is still increasing which should have positive impact on unemployment rate but forecast for future years is that rate should be higher caused by increasing country's population (Sheil, 2009)..

Income of palm oil smallholders and employees on the plantations are much higher in comparison with other agricultural production such as rice, sugarcane and rubber. In year 2008 there was a large scale study about income of smallholders in palm oil industry that has been done by the World Agroforestry Centre. This study was based on the sample of 456 families in 8 provinces around Indonesia. Methodology in the study was used a personal interviews. Output of this study was that after 5 years of growing oil palm 18% of the families have increased their income more than three times, 35% families have increased their income in range between four to ten times more and in 45% cases the income after 10 years has increased almost twenty-five times (Budidarsono, 2012).

Rural development

Rural economic growth is an important aspect of country's economic growth. Improving wealth and rural development is secondary aim of every country. The research done by the World Agroforestry Centre had estimated also the rural development. By this research it has been estimated that in the villages specialized on the palm oil production have significantly lower score of undernutrition. Average lifetime of locals in those villages is not really different from other ones. Distance to public services such as schools and hospitals is higher due to fact that is far more from the civilization. On the other hand there is significant increase in numbers of stores with consumer goods and increasing number of hospitality industry occurs here (Susanti, 2012).

Increasing of income and more accessible consumer goods and foodstuffs corresponds with the fact that almost 65% of famers swapped subsistence farming for paid work on palm oil plantations. In regional economies we can find some multiplier effect where occurs a higher trade with goods and development of monetary economy, this also can have a negative impact on non-monetary economies, culture and self-sufficiency.

Infrastructure and other benefits

Palm oil production brings roads, schools and other infrastructure into rural communities. In the past the rural area has been overlooked by government. Even when in last decades the authorities in Indonesia started support infrastructure development country still faces a serious infrastructure crisis. Nowadays there is only 81% of all households have access to electricity and 61% have access to clean water. Production of palm oil needs electricity, social facilities and logistics infrastructure for transportations (Van der Schaar, 2011).

There is possibility to see some kind of improvement in this relationship with the local communities but higher share of infrastructure development is mainly constructed for palm oil industry. Local communities benefit from this just in a small amount. Many studies that are focused on implementing new infrastructures and investment into infrastructure in Indonesia are limited. Investments into local public infrastructure highly depends on local resources and the companies operating in the region (Levin, 2012).

In Indonesia occurs a huge lack of coordination between agencies and different levels of government in case to improve total infrastructure. In the past many companies have identified a

location of areas of production and to increase their total production they have invested into a total infrastructure. Improving in supply chains is also understood improving the country's infrastructure not only with roads but also with other social needs. Increasing efficiency of roads brings lower costs for transportation for a big players in palm oil industry. Large-scale plantations need also settlements for staff and workforce which also provides opportunities for many other services in a given area which leads to implementation electricity infrastructure. In other words the establishment of large-scale palm oil plantations and processing units is a huge economic activity and strongly influences the total infrastructure in the given region. Local communities benefit mostly just through the palm oil industry.

In year 2016 the World Bank's Board of Executive Directors approved 216.5 million US dollars in financing to support a project that will improve infrastructure in Indonesia's rural and slum areas. Organization with country's government are promising from this project to supply millions of people with access to sanitation and safe water. Education services should be the next step in this project. Reducing the bad conditions of roads and improving access to electricity should address problem of poverty (Van der Schaar, 2011).

Expansive sector of palm oil industry brings also other positive socio and economic benefits. Increasing supply of foreign currency in the country's economy, increasing of income through the export fees and taxes, increasing of income in rural areas and increasing price of the land. Lately the rural areas are finally starting to be important zone for the country due to fact that it has been overlooked for a long period of time.

5.1.4.2 Negative socio economic impacts in Indonesia

Land ownership

Cultivation of palm oil and its trade brings also many negative impact into Indonesia. Nowadays a share of people living outside the cities is between 70 – 90 million in area called "State forest areas" which covers about 69% of total country's area. The great portions of this area are no more areas of origin forests but areas where primary and secondary rainforest are disturbed by small or big plantations and fields. This is a place where aborigines, usually members of original tribes live. Those people often live in a way of nature friendly agroforestry but mainly without legal, hereditary and only poorly accepted land rights (Marti, 2008).

Nowadays interests of people can be easily changed into interests of private companies. In president's regulation from year 2005 has occurred definition that changed everything. It allows that projects of private and international companies could be classified as public interest.

Many conflicts between companies operating in palm oil industry and local communities are occurring. Indonesian poor legal system is in this case still unclear. Country's legal system usually operates with land decision making in relation with old Agriculture law and additional regulations done in 60's. By this it is understood that legal rights to land has state but with respecting the original rules of the indigenous communities that have settled there and live there. Many institutions operate on this and their rights are not clear. Public administration mainly fails in regulations of land laws and land ownership in practice. Main problem is the absence of efficient and understandable system of land. Implementing the system for land ownership would be a very problematic due to fact of ineffective administration in each region (Levin, 2012).

In practice it means that local communities are usually pushing away from their land caused of missing legal rights to their land. High corruption between people working in institutions and local governments provides legal documents for the land to the companies after accepting a small bribe. Local communities are hopeless against this due to fact of missing education and absence of documents (Marti, 2008).

For long time was development of palm oil industry directed by state. Development of this industry was a crucial tool in plan for population distribution and its main goals such as political and macro-economy stability in the country, rural development and decreasing unemployment rate. In second part of 20th century many conflicts occurred between the government and local communities caused by land ownership. This process has been supported by army that violently pushed local communities from their lands. Since year 1998 the total decentralization in the whole palm oil industry came on the scene, cancelling government support of smallholders and changing the whole production to neo-liberal model which started immediately massive production and increasing area of plantations.

In this thesis several times a term “smallholders” has been mentioned but this term is not really clear. Indonesian law rejects the situation where private abroad company can own the agriculture land in the country. In practise it means that big abroad companies and investors have to cooperate with smallholders or state owned companies. Those kind of investors buy yields from smallholder plantations and lend capital or machinery for the palm oil process. This systems is very important for smallholders but really often it is criticized for big debt for smallholders before the harvest (Levin, 2012).

During decentralization of the palm oil industry the decision making about land and plantations belongs to hands of state local officials. The total web of corrupted officials and palm oil companies are crucial for the total palm oil sector in the country. The World Bank has done the research where it has been found that Indonesian companies use about 5% of their total profits as bribes.

Land use

Main problem here are predator techniques of government and investors from private companies. By ignoring rights of communities and taking their lands leads this problem to eliminating many variations of land use. Those communities see in the land more than just rich and unique source, they live together with the nature. During many generations their land has been used effectively without negative impacts to nature. Land is essential part of their identity and integrity. Rotary agriculture system, picking and fishing were transferred through many generations. The way of their life is from ecological point of view sustainable even when the communities are dependent on season conditions. After losing their land those communities do not have many options for the future, food insecurity. Without sources from the forest and fishing there is not possible way how to live in the given areas. A lot of people are under the pressure moved to the slums around the big cities or to areas with poor land. Some share of people are hired to work on the new plantations.

“Forest gave us a lot of opportunities to make money: fish, honey, rubber, oil, venison… Now there is no land, all our rice fields, orchards, everything left by our grandparents, it's gone.”

Pak Jamalunin, chieftain of the tribe in Borneo Island (RAN, 2009).

Working conditions and human rights

This is the crucial point between negative impacts of palm oil industry on working population involved in its production. Key stone is production of this crop with violations of human rights. The numerous issues occur in the press and in the headlines of many international NGOs with relationship of violation of human rights but many stories of workers will stay in the plantations forever. In Indonesian palm oil industry many forms of employment practices of the workers who performed core plantation work can be found. The main works are focused on harvesting, gathering loose fruits and applying fertilizers and pesticides. These workers usually have to face concerns with no job security, small wages and increased risks of safety and health (Mamun, 2013).

Cash obtained from performing work on the big plantations are below minimum wage. Workers has no space for negotiating about the wages. Nowadays there is a much pressure from consumers and overall civil society so many retailers adopted policies to avoid the situation where they could be criticized for violations of human rights. As in many others policies also here can be found a gap which can be misused. This gap allows joint venture partners of the retailers to use opportunity to not meeting the same requirements as the retailers. By fixing gap or loophole the violation of human rights should be avoided. Many form of contracts forms differences between wages. Causal daily worker without written contract and wage slip usually have between 50% to 75% lesser wage than permanent worker. In many cases the minimum wages are not able to cover costs of living at all. Minimum wage during year 2016 in Jakarta was set at IDR 3,100,000 and in region of central Java IDR 980,000. Often phenomenon is migration of workers to Malaysia with vision of better wages and better living standards (Wakker, 2005).

Children were observed working on the plantations in age of 13 years. In palm oil industry often occur children work. By research of Ministry of Labor and Migration in Indonesia has been observed that 85% of the children working on plantation are used mainly for heavy work such as fruit picker where heavy weight have to be lifted and moved, usually the talk is about 10 kilos. Almost 100% of children workers are without training and protecting gear. Work day for children has been set to 4 hours without permanent breaks. Many injuries and exhaustions are on daily basis. More than 90% of these young workers are forced to work by their parents. This is understood as helping and assisting family (Levin, 2012).

Trafficking of people is another important issue in palm oil industry. Indonesian government with cooperation with many NGOs documented an increase number of undocumented workers working on the plantations. Undocumented workers are at a higher risk of becoming trafficking victims than documented workers. According to reports of NGOs many institutions operates without fear of being caught and with believe in escaping punishment because of the great corruption among officials and the government's lack of effectiveness (Susanti, 2012).

Trafficking victims often accumulate debts with labor recruiters that make victims vulnerable to debt bondage. Licensed and unlicensed companies used debt bondage, withholding of documents, and threats of violence to keep Indonesian migrants in situations of forced labor, modern slavery.

Especially women are facing the low health and protection standards. In many families women have to help men on the plantations without performing any profit or if they are paid the wages are much lower. Usually women work on the plantations with pesticides and fertilizers and that means facing greater health threats than men. Many women working here are without educations, inability to read a warning signs on chemicals. Plantations are usually without protection gear and facilities providing some supporting services. The last issue that women have to face is sexual violence and harassment (Mamun, 2013).

5.1.5 Environmental impacts

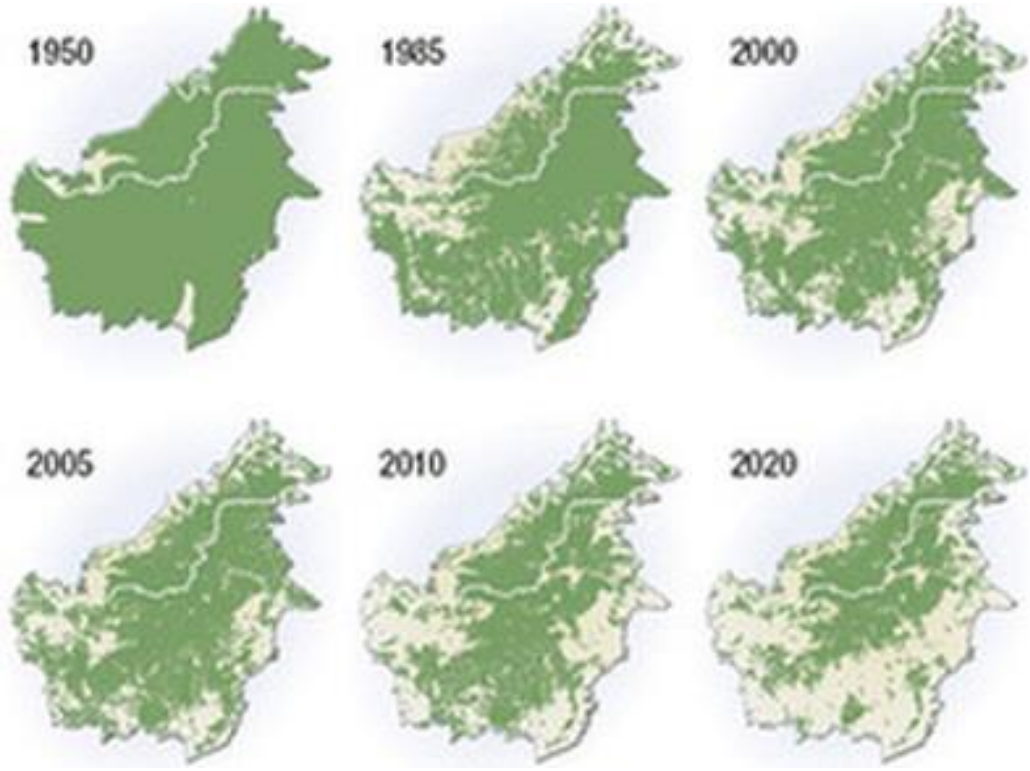
5.1.5.1 Deforestation

Production of palm oil is often criticized for causing many environmental problems. International and Indonesian NGOs have created recommendation which are not implemented at all. Palm oil grows best in low-lying, humid, tropical areas where location of rainforests is. Indonesia is the country with the highest share of indigenous forests. In the beginning of 20th century Indonesia represents the country with 84% of forests. During the last 25 years of 21st century Indonesia has lost more than 30% of original and rainforests, many factors have caused this deforestation such as illegal logging and agricultural on plantations mainly for palm oil production. Harvesting of palm oil is on area of 10.8 million hectares and in the past increasing this area meant also reducing area of the forests, almost in 56% of all cases (Wakker, 2005).

Special case is the island Borneo which lost between years 1975 to 2010 about 30% of original forest. Expansion of plantations between years 2000 to 2010 reached total 278%, 90% of these plantations were set on the area where original forest had taken place before.

In areas where increasing area of palm oil plantations occurs deforestation. Data about the total deforestation in Indonesia are inaccurately due to fact of different understanding of term "forest" and as well the fact that Indonesian database with maps are mainly incomplete.

Figure 24: Deforestation on the Borneo Island, Indonesia



Source: WWF, 2015

In Figure 24 is possibility to see a deforestation on the Borneo Island in Indonesia during the years with projections towards year 2020. Indonesia has nowadays greater deforestation that Brazil. This kind of massive forest loss is causing more environmental issues where belongs carbon emissions and biodiversity loss (Wakker, 2005).

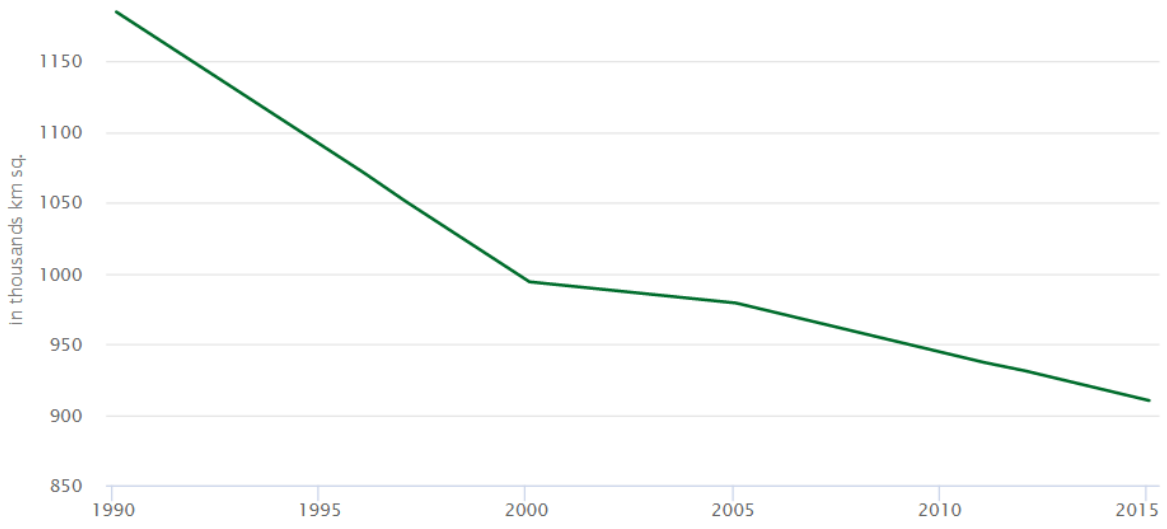
Deforestation can have a significant consequences on climatic conditions in local, region and global scale. One of the phenomenon is intensification of erosion processes which means that soil from deforested areas is unable to absorb water. Inability to absorb water is a big issue where this water is able to create a huge floods and other hand increasing area of wasteland.

Share of degraded land is increasing also due to setting a fire in forests as a results of illegal logging and in behalf of new plantations. Among the hidden movers can occur public policy and financial factors such as the financing of international debt repayments through the extraction of natural resources, privatization of forestry and plantation companies, corruption and as well as illegal logging. Palm oil in last decades was the most spreading agriculture crop in Indonesia and its growing belongs between the main reasons to deforestation (Susanti, 2012).

There are four main ways how palm oil participates in deforestation according to Fitzherbert research which is from year 2008 (Fitzherbert, 2008).

- Setting new plantations are the main motive for deforestation of origin forest
- Forest plantations replace the forest affected by logging
- Combined economic plan where profits from the sales of wood cover the costs for establishing of the new plantations
- Plantation contributes to deforestation indirectly, through the building of roads and paths necessary to achieve it or that plantations displace other crops in forests

Figure 25: Indonesia forest area 1990-2015



Source: The World Bank, 2016

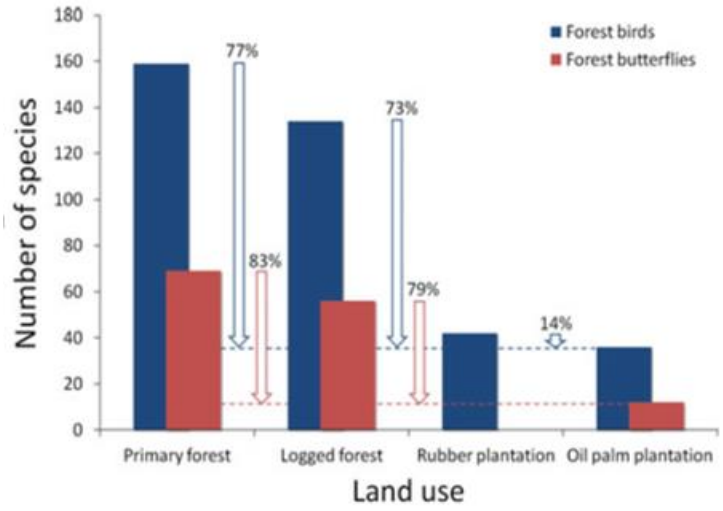
Indonesia has lost almost a quarter of its forest area in the past 25 years as it is possible to see in Figure 25.

5.1.5.3 Biodiversity loss

Tropical deforestation has devastating impact on the number of animal and plant species. Indonesia belongs between the countries with the highest biodiversity in the world and takes the third place of the largest area covered by original forest and rainforest. According to Fitzherbert only 15% of all biological species that could be found in the primary forest occur on palm oil plantations, in other words the overall biodiversity loss is 85% (Fitzherbert, 2008).

Indonesia represents the country with the highest number of species of parrots (75 kinds), palms (477 kinds) and butterflies (144 kinds, more than half live only in Indonesia). Indonesia takes 2nd place in the world with its 515 species of mammals and the 4th place country with more than 511 kinds of reptile. More than 40 thousands of high plants and about 1531 kinds of bird. It is obvious that country of Indonesia gives great opportunity to live for a great number of different species from fauna and flora.

Figure 26: Tropical biodiversity and oil palm agriculture



Source: Koh, 2008

Impact on biodiversity loss have also human interventions, using of pesticides, fungicides and insecticides. Also problem is in expelling, catching and hunting animals on the plantation by its workers. Frequently mentioned problem highly effects the higher mammals.

Between the most vulnerable mammals belongs orangutans that take place in many campaigns. Orangutans have been classified as the most endangered animal in Indonesia. Those mammals are highly dependent on areas covered by forest. During searching for food they often got lost on palm

oil plantations where are looked at them as pests. According to WWF the overall population of orangutans has more than 230 thousands individuals, nowadays their population reach less 45 thousands. The biggest threat for orangutans is loss of habitat. Massive areas of forest have been removed by logging, land conversion for oil palm plantations and agricultural land (Foster 2011).

Other critically endangered species are Sumatran tiger, Sumatran rhino, Kahu nosed, Malayan bear and Sumatran elephant. These animals are not only threatened by the loss of their natural environment but also by building paths and ways which is used by poachers (Butler, 2009).

5.1.5.4 Greenhouse gas emissions and forest fires

The big issue with relationship to setting palm oil plantations are forest fires and emissions of CO_2. Forest fires for establishing of plantations sometimes last several months and each year affects primary local residents. According to Butler the forest fires during year 1997 when the biggest fires were set was equal to three packs of cigarettes per day. During the last big fires in 2015 more than 2.6 million hectares of forest were destroyed. Many health issues in relation to these fires occur in Indonesia, about 500,000 infectious diseases of the airways and uncounted unwanted abortions. The worst places were in areas rich on bogs and wetlands. These soil represents just 15% of total burnt area but it creates almost 60% of total greenhouse gas emissions in Indonesia (Balch, 2015).

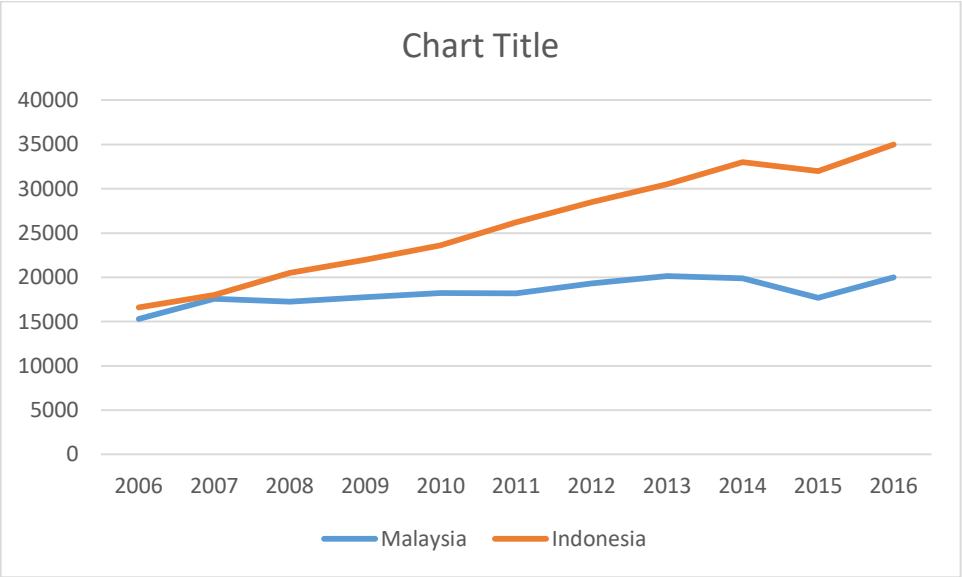
Problem is not only the forest fires but also the fact that oil palm tree is not able to hold as much carbon as forest. It is almost 5 times less than primary forest is able to hold. During year 1997 when Indonesia fires were on the peak it has been created in two months more CO_2 than the United States produced in the whole year (WRI, 2014).

5.1.6 Comparison of Indonesia and Malaysia

Malaysia is the second largest exporter of palm oil in the world. It represents the best candidate to compare its production with Indonesia. Both countries has almost the same environment for the production of this golden crop. Indonesia and Malaysia have 84% of total market share of palm oil production in the world (May, 2012).

In Figure 27 is graph representing the total production of palm oil for both countries, since year 2006 when Indonesia has overpassed Malaysia with its total production. One of the biggest barriers for Malaysia is the fact that this state does not have so much land compared to Indonesia.

Figure 27: Malaysia and Indonesia palm oil production (1000 MT)



Source: Indexmundi, 2017

The research study that has been applied on both states shows output of the oil palm cultivation sector and palm oil processing sector to assess the importance of these sectors on other production sectors of the Malaysian and Indonesian economies. Findings from this study shows several differences and similarities in sectoral linkages between industry of palm oil in Indonesia and Malaysia. It is important to be mentioned that many private companies from Malaysia operate in palm oil industry sector in Indonesia which means a small lowering the production in Malaysia and bigger concentration on Indonesian production. In the case of Malaysian companies operating in Indonesia the main motivation is the fact that the physical impossibility of further expansion of plantations in Malaysia (Susanti, 2012).

Analyses of palm oil production sector in both countries shows that in both cases it is highly backward and forward linked to the sector of manufacturing. It means that palm oil industry has strong economic pull on the sector of manufacturing but also it represents really strong economic push on this sector. According to results palm oil industry in Malaysia has a bigger interconnection to other sectors than Indonesia (May, 2012).

Overall output shows that palm oil economy plays more significant role in the total economy of Malaysia but does not say that importance of this industry does not have significant impact on Indonesian economy.

The total importance of this industry from the Indonesian whole production sector seems small due to fact that Indonesia as the state has a larger economy. Small direct and indirect economic pull is a result of low securing domestic intermediate inputs from its upstream sectors, in other words Indonesia palm oil sector is still on the low level. This is also the problem at the same time that possibilities for further processing.

It is important to be mentioned that less corruption in Malaysia has significant impacts that influence more positively its population than in Indonesia. The key stone and final note as well is the fact that palm oil industry in Malaysia is more interconnected with other industries and rest of the economy than it is in Indonesia which is the great opportunity in the total economy for other economic indicators.

6 Conclusion

World demand for palm oil continues to grow in correlation with population, the growing economic power of the world and the lack of oil resources. Palm oil in Indonesia is an extremely important commodity due to fact that only Malaysia is able to be only one competitor. The main purpose of the thesis was to analyze the production sector of palm oil industry and its impacts on the development of Indonesia. Firstly what extent and severity of environmental changes are associated with the production of palm oil in the country of Indonesia. And secondly what was the development of the expansion of this sector, what were its economic and social benefits or costs. According by many researches it has been observed that establishment of palm oil plantations was the main reason for deforestation in Indonesia with its share of 16% but also it is important to not forget that indirect deforestation caused by this has almost the same volume as the direct one.

Regarding social factors we can say that it was palmar-oilseed sector in the past often a source of many conflicts, mainly with indigenous inhabitants of the areas exposed to the expansion of this sector. These conflicts were mainly before 1997, internal migrants from other parts of Indonesia and since 1997 to this side of the conflict has been added a private plantation companies.

Palm oil is for Indonesia, as the largest producer and exporter of palm oil in the world many economic and social benefits among which we can surely include increasing employment and creating new jobs especially in rural areas, growth in land prices and wages, increased income of the state through taxes and duties and also to improve state services, including much-needed infrastructure, education and health care. Economic benefits of palm oil industry on the Indonesian economy is disputed. According to many researches the share of this industry supports the GDP by 2% and export taxes for crude palm oil were at the minimum for long time period. On the other hand by many researches it participates in land grabbing and overall destruction of local subsistence production systems and cultural heritage of indigenous peoples.

The main problem is that unsustainable practices in the industry is one of the reasons for its financial advantages, especially logging concessions granted it is an important source of income for the establishment of plantations. Cheap labor is another important factor that plays its role.

Indonesia has a strong general legal framework on labor rights, though the government needs to urgently address the critical gaps in protection around forced labor, casual workers and other issues. The government is failing to adequately monitor and enforce labor laws and to prevent and remedy abuses. Obligation to protect people from abuses of their rights. It must Increase the number and capacity of labor inspectors to monitor abuses. RSPO certification system has therefore been developed in order to ensure sustainability of this sector. This system serves as an instrument for nature friendly palm oil production and to increase the overall violations of human rights. RSPO system has a wide spectrum of members that advocate and protect social and environmental values.

Main problem with Indonesian production is with certification of this crop due to fact that about 85% of palm oil is without certification, founders are able to behave unsustainably instead of RSPO members. Other problem is in high share of corruption in the sector and in government. To increase the better efficiency of the system it would be demanded greater involvement of farmers and greater law enforcement in Indonesia.

Development of economic activities of palm oil sector will also depend on research that seeks to achieve higher productivity of oil palm seedlings, financial support and training for small farmers and the establishment of research centers and national control systems of quality palm oil.

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