CarakaTani
Journal of Sustainable Agriculture
ISSN 2613-9456 (Print) 2599-2570 (Online)

Caraka Tani: *Journal of Sustainable Agriculture*. 35(2), 157-167, 2020
URL: https://jurnal.uns.ac.id/carakatani/article/view/41091
DOI: http://dx.doi.org/10.20961/carakatani.v35i2.41091

Competitiveness of Palm Oil Products in International Trade: An Analysis between Indonesia and Malaysia

Muhammad Arsyad[1]*, Achmad Amiruddin[1], Suharno[2] and Siti Jahroh[2]

[1]Department of Agricultural Socio-Economics, Universitas Hasanuddin, Makassar, Indonesia;
[2]Department of Agribusiness, Bogor Agricultural University, Bogor, Indonesia

Corresponding author: arsyad@unhas.ac.id

Abstract

The supply of palm oil products is still a central issue in international trade. Indonesia and Malaysia are major suppliers, contributing around 85% of world palm oil. Hence, both countries have an important role, as well as competing with each other in international trade. The palm oil products usually in high demand worldwide include Crude Palm Oil (CPO), which is the main and its derivative products such as Refined Bleached Deodorized (RBD) palm olein and Palm Fatty Acid Distillate (PFAD). Therefore, the research aims at assessing the competitiveness of palm oil products between Indonesia and Malaysia in international trade. The Revealed Comparative Advantage (RCA) and products mapping methods were used in this assessment. The results show that, the value of RCA of Indonesian CPO showed a negative trend, although, still higher than Malaysia, though with positive trend. However, Indonesian RBD palm olein and PFAD have a positive trend compared with Malaysia. Upon using the method of products mapping, it was found that, the palm oil products of both countries were in group A. This is an indication that the products have comparative advantage and export specialization. Therefore, there is need for strategic policies, in both countries, for supporting oil palm activities at the downstream. This will enhance the production of derivative products with the capacity of also meeting demands in the international trade.

Keywords: competitiveness; downstream industry; international trade; palm oil products

Cite this as: Arsyad, M., Amiruddin, A., Suharno, & Jahroh, S. (2020). Competitiveness of Palm Oil Products in International Trade: An Analysis between Indonesia and Malaysia. *Caraka Tani: Journal of Sustainable Agriculture*, *35*(2), 157-167. doi: http://dx.doi.org/10.20961/carakatani.v35i2.41091

INTRODUCTION

Crude Palm Oil (CPO) is an important commodity in Indonesia. It contributes significantly in the non-oil exports, providing employment opportunities, rural development in sustainable agriculture (Amiruddin, 2017). According to Lam et al. (2019), products derived from this commodity are central in international trade, especially in the supply aspects, considering the fact that these derivatives are the most widely used oil products and also among the largest drivers of greenhouse gas (GHG) emissions from global land use and land cover change. Currently, the level of production in oil palm plantations has not been fully maximized, therefore, the need for various actions to improve this productivity (Adileksana et al., 2020). Aside being used as cooking oil, it is also a promising source of biodiesel and its demand has been increasing worldwide. However, there are still some concerns on the environmental and socio-economic sustainability of palm oil production. Since Indonesia is a major producing country, a study conducted by Afriyanti et al. (2016) reported capacity of its production in the country

* *Received for publication April 9, 2020*
Accepted after corrections April 18, 2020

till 2050, with a special focus on Sumatra, Kalimantan and Papua.

Additionally, palm oil plays an important role in the economies of Indonesia and Malaysia, as both countries export the commodity for the purpose of earning foreign exchange. According to Abdullah and Wahid (2010), these two countries are the main contributors of palm oil as both together constituted about 85% of the world production of the commodity itself and 23% of the world oils and fats production. Based on the production of large plantations in Indonesia by crops type, palm oil was ranked first in 2015 at 20,615.9 thousand tons, followed by palm kernel oil, sugar cane and rubber (BPS-Statistics Indonesia, 2015). The rapid growth of this commodity has elevated Indonesia's position on the world's palm oil market. The country displaced Malaysia in 2006 to become the largest producer of CPO worldwide and by 2015 the country's share reached 53% of world CPO production while Malaysia was second with 33% market share (Sipayung, 2016). The increase in palm oil production is as a results of some factors, such as efficiency in production, availability of harvested land, low production costs, promising domestic and international markets and government policies which encourage industrial development for economic growth (Casson, 2000).

Also, export competitiveness is vital for any country which need to compete in the international market. This is defined as the ability of a commodity to successfully enter the foreign markets. The resilience of a country's competitiveness is largely determined by the ability to utilize resource advantages to strengthen its position in global competition. This is also determined by the country's ability to explore its potential in promoting economic growth, improving people's welfare, as well as investing to renew the sustainable advantage of resources for development equality (Wijayanti et al., 2011). Nesti and Tan (2017) reported that Indonesian CPO competitiveness could be increased for more benefits from the ASEAN, considering the prospective future market marked by high demand for the commodity worldwide.

CPO became one of the mainstays of Indonesia and Malaysia exports with strategic role, for the fact it is one of the non-oil and gas mainstay commodities with good prospects as a source of foreign exchange. The palm oil industry in these two countries have some similarities and differences. According to Rifin (2011), both countries are relatively similar in terms of production with 6% companies owned by private and government sectors while 39% belong to the small scale farmers. The production process provides more job opportunities, thereby improving the welfare of the community. Additionally, CPO is an important raw material for producing cooking oil and also used in oleochemistry and biodiesel industries. Processed products from this commodity in Indonesia and Malaysia have reached other Asian countries, Europe, Africa, Oceania and America. However, Asia is the main export market for the palm oil products from both countries due to the high population growth in the region, which influences the level of consumption.

The need for CPO at the international level is increasing, especially as raw material in food and biodiesel industries. This is also due to the changes in world consumption patterns from the oil of corn, soybean, sunflower and canola to CPO. According to Alatas (2016), the area of plantations for cultivating this commodity in Indonesia and Malaysia is increasing yearly, which is directly increasing its level of production. Furthermore, it has advantages over other substitute commodities such as being relatively cheaper, abundant in supply and versatile in nature. In order to meet the increasing demand of CPO, there is need for the government policies to regulate downstream activities on the derived products. Downstream products such as Refined Bleached Deodorized (RBD) palm olein, is a common raw material for cooking oil and Palm Fatty Acid Distillate (PFAD) is commonly used in the oleochemical industry, due to the fact these products have higher added values. Also, to enhance sustainability of this sector, the government needs to focus on implementation of policies related to biodiversity conservation and benefits for certified producers, as well as improving engagement with stakeholders (Astari and Lovett, 2019). Therefore, the research aims at assessing the competitiveness of palm oil products between Indonesia and Malaysia in international trade.

MATERIALS AND METHOD

The competitiveness of a country's export commodities is analyzed using the RCA method,

initiated in 1965 by Bale Balassa. According to Muzendi (2014), RCA is an index used to measure the relative profit or loss of a particular commodity in a country which reflects in its trading pattern, such as the export market share. Also, Balassa (1965) explained RCA as a concept which compares relative export performance. Balassa further explained various international trade and the approaches to measure the RCA and factors affecting the pattern of comparative advantage and further proposed the export performance index.

The basic concept of this method is the comparative advantage of a nation represented by inter-country trade, which then reflects in its exports. Also, the use of relative export share is vital because import data tends to be more biased since governments often impose various rules to suppress imports, thereby making export data cleaner from various distortions and revealing clearly its comparative advantage. The measured variables include the export performance of a product in a region, with the total area of the region compared with the share value of the product in world trade. RCA is expressed by the following equation (Balassa, 1965):

$$\text{RCA} = \frac{X_{ij}/X_{it}}{W_{ij}/W_t}$$

Where, X_{ij} is value of commodity j export from country *i*, X_{it} is value of total export commoditiy in country *i*, W_{ij} world export value of commodity *j* and W_t is value of all world commodity export. The RCA values range from zero to infinity and when RCA > 1, the country has a comparative advantage and a strong competitiveness. However, when RCA < 1, it means the country has no comparative advantage and a weak competitiveness.

Another means of analysis was the use of products mapping. According to Widodo (2009), product mapping determines the main product for exporting based on its high measured parameters in both the local and international markets. It is conducted using two analytical tools, namely, comparative advantage and trade balance. The method of comparative advantage used is the Revealed Symmetric Comparative Advantage (RSCA) proposed by Dalum et al. (1998). The RSCA index is a decline in the simple monotonous transformation of RCA's comparative advantage, which is calculated as follows:

$$\text{RSCA}_{\text{ij}} = \frac{(RCA_{ij} - 1)}{(RCA_{ij} + 1)}$$

The RSCA_{ij} index values range from -1 to 1 ($-1 \leq \text{RSCA}_{\text{ij}} \leq 1$). When the RSCA_{ij} value of a country *i* is above zero, it means that the country have a comparative advantage for product *j*. However, when the RSCA_{ij} value is below zero, that is negative, it means the country does not have a comparative advantage for product *j*. Meanwhile, Trade Balance Index (TBI) is the analysis tool used in measuring the trade balance, introduced by (Lafay, 1992). Basically, it analyzes the trade specialization of a country, in export (as net-exporter) or in import (as net importer). The formula of TBI is as follows:

$$\text{TBI} = \frac{(X_{ij} - M_{ij})}{(X_{ij} + M_{ij})}$$

Where, X_{ij} is value of product *j* group export from country *i* and M_{ij} is value of product *j* group import from country *i*. Its values range from -1 to +1 and when TBI = -1, then the country is an importer (net-importer). However, when TBI = +1, then the country is an exporter (net-exporter). Then, when the value is between -1 to +1, it is an indication that the country is simultaneously exporting and importing a commodity. In summary, a country is considered a net-importer on a particular product group when the value of TBI is negative and net-exporter when it is positive.

Based on the results of both analyses, the palm oil products could be categorized into four groups namely A, B, C and D on products mapping shown in Figure 1. Group A consists of products with comparative advantage and with export specialization, Group B consists of products with comparative advantage but without export specialization, Group C consists of products without comparative advantage but with export specialization while Group D consists of products without comparative advantage and without export specialization (Widodo, 2009).

Two indicators are required to represent both point of views, domestic trade-balance and international competitiveness. The RSCA by

Dalum et al. (1998) and Laursen (2015) was used as the indicator of comparative advantage and TBI by Lafay (1992) was used as the indicator of export-import activities. The research products were CPO HS 151110, RBD palm olein HS 151190 and PFAD HS 382319.

RSCA > 0	**Group B:** Comparative Advantage Net-importer (RCSA > 0 and TBI < 0)	**Group A:** Comparative Advantage Net-exporter (RSCA > 0 and TBI > 0)
RSCA < 0	**Group D:** Comparative Disadvantage Net-importer (RSCA < 0 and TBI < 0) TBI < 0	**Group C:** Comparative Disadvantage Net-exporter (RSCA < 0 and TBI > 0) TBI > 0

Figure 1. Products mapping

RESULTS AND DISCUSSION

Competitiveness of Indonesian and Malaysian CPO

Indonesia and Malaysia are the largest producer and exporter of CPO in the world. Based on the Index Mundi Data, both countries were the largest CPO producers with a total of about 85.36% of total world CPO production in 2015 (Indonesia 52.65% and Malaysia 32.71%) (Hudori, 2017). Also, exports in that same year were put at 91.20% of total world CPO exports (Indonesia 52.39% and Malaysia 38.81%). This is also shown by the high values of RCA of both countries for a period of 14 years (2002-2015). The high values also reflect the ability of both countries to compete in international trade. The graph of Indonesian CPO RCA value movement is shown in Figure 2.

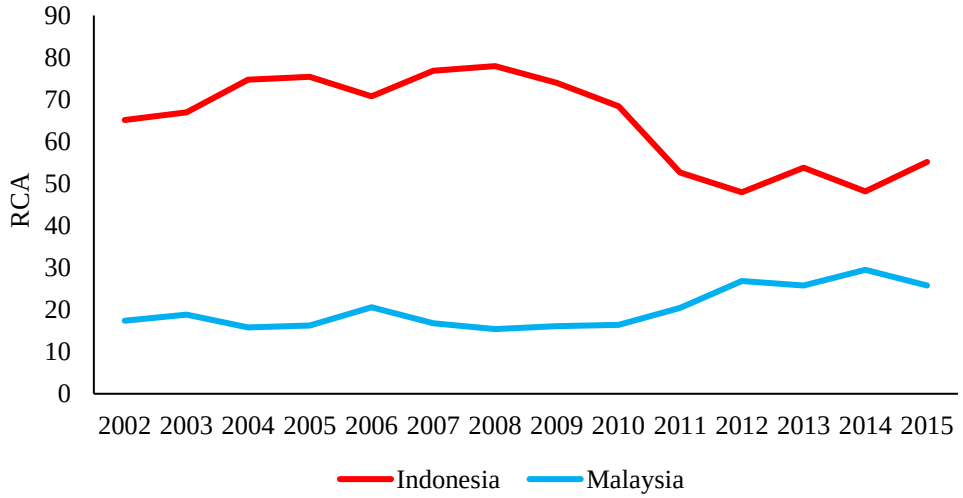

Figure 2. RCA value of Indonesian and Malaysian CPO

Indonesia has a higher comparative advantage over the world average. The research conducted by Turnip et al. (2016) also showed that the RCA value of Indonesia's CPO was 66.12, showing a

higher comparative advantage compared with Malaysia with RCA of 19.81 and Thailand with 1.91 from 1999 to 2014. According Arifin (2013), the RCA of Indonesia's CPO was more than 40, meaning it was the most competitive agricultural export commodity in the country. Nayanta-kaningtyas and Daryanto (2012) also reported that the RCA value of Malaysian CPO was below that of Indonesia between 2001 and 2011, because Malaysia was more focused on the export of CPO within downstream industries. The commodity has a significant impact on the economic well-being of both countries through private corporations, state-owned companies and smallscale stakeholders, with the two countries supplying 85% of the global CPO (Purnomo et al., 2020). Another study as well reported that the Indonesian government imposed export tax policy in September 2004 which led to a decline in the country's export competitiveness of the commodity, thereby making negatively impacting the producers while the consumers were better off. However, Rifin (2010) and Rifin (2014b) reported that the policy increased the refined palm oil for export and also stabilised the cooking oil price.

This paper also reports that the RCA value of Indonesian CPO is still higher than Malaysia. The supporting conditions for this competitiveness include condusive factors of production, human resources and government policy. This is consistent with the results of Alatas (2016), as the RCA and ISP analyses showed the biggest comparative advantage for Indonesia's CPO, due to the country's maturity in the international market compared with Malaysia and Thailand. In contrast, based on RCA analysis, Ermawati and Saptia (2013) showed a lower performance in Indonesia's CPO and PKO exports compared with those of Malaysia and Thailand, but still similar to that of Colombia. Also, the analysis of average RCA in 2007-2014, according to Widyaningtyas and Widodo (2017), indicated a lower performance of Indonesia's CPO exports compared with other main exporters, such as Malaysia.

The favorable geographical conditions and cost of production in Indonesia contributed to the increase in CPO production every year. Based on BPS (2015), the land area for its plantation was 1,126,677 ha in 1990, with a production of 2,412,612 tons, however, these increased to 11,300,370 ha and 31,284,306 tons respectively in 2015. Therefore, since 2006, Indonesia has become the largest CPO producer with a total share of 53%. Despite being the largest producer, the movement of Indonesian CPO competitiveness was not stable from 2002 to 2015. The highest RCA was recorded in 2008 at 77.96 after which it declined to the lowest in 2012 at 47.94. This was due to the contribution of the country's CPO exports to the total exports of all commodities produced which only amounted to 3.51%. Its export level increased significantly between 1999-2001 and 2005-2007. According to Rifin (2011), this was due to the increase in demand of the palm oil as well as its derived products, making it gained more export competitiveness compared to Malaysia.

However, the later experience was due to the export duty policy which came into effect in 2009, and negatively affected which the export of the commodity. The purpose of the policy was to meet domestic demand of CPO for downstream industries which use it as the main raw material. In contrast, Rifin (2014a) reported that the export tax on the commodity did not affect its export and domestic prices while implementing the policy. The export duty policy was also expected to drive the national economy with the creation of new jobs in the palm oil industry. Then, the competitiveness rate of Malaysian CPO took a positive upward trend from 2002 till 2015, though with its competitiveness still far from that of Indonesia. In addition, as the largest producer, Malaysia is also one of Indonesian CPO exporting countries. Malaysia focused more on derivative products from palm oil, thereby developing the downstream industries and palm oil research institutions compared to Indonesia. Another research by Abdulla et al. (2014), however, showed that with low CPO export duties, its domestic price, profitability of plantation owners, immature and matured crops, total area of plantation, its production and exports increased, but the exports of processed palm oil decreased.

Some of the factors that determines the competitiveness are the price of the commodity and consumer behavior. In general, the price of CPO tend to be cheaper, ranging from 400 to 1000 USD per ton, which prevented an excessive increase in the prices of other oils such as soybean and sunflower which cost between 1200 to 1800 USD per ton. In terms of consumer behavior, there has been a change in global vegetable oil

consumption patterns within 1965 and 2014. In the comparison of four vegetable oils which include CPO, sunflower, rapeseed and soybean, the level of consumption of CPO increased from 22% in 1980 to 39% in 2015. The export of CPO by Indonesia and Malaysia is also supported by the acceptance from the world community of its products. The two countries are the largest producers and exporters of the commodity. According to Jayed et al. (2011), it is growing at the highest rate among other biodiesel feedstock, making palm based biodiesel a top exported product for these regions.

Competitiveness of Indonesian and Malaysian RBD palm olein

RBD palm olein is one of the derivative products of oil palm which has been completely refined. It has free fatty acid content of about 0.15% with maximum soft point of 24°C. It is mainly used as raw material for cooking oil and in food processing industries. It is also relied upon as major export product in both Indonesia and Malaysia. There are also some level of similarities in the competitiveness of RBD palm olein products between Indonesia and Malaysia, as shown in Figure 3.

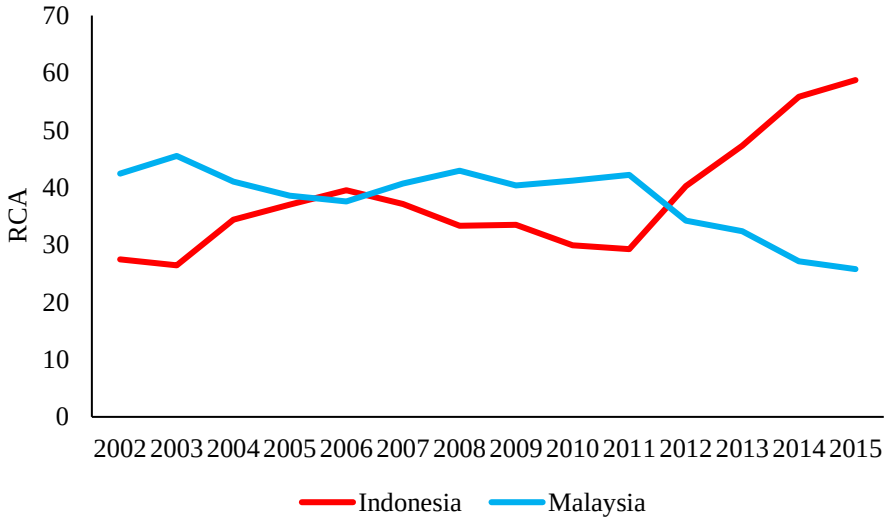

Figure 3. RCA value of Indonesian and Malaysian RBD palm olein

RBD palm olein is one of the superior export products in Malaysia, which is shown by its high competitiveness until 2011. Malaysia became one of the major suppliers in the global market due to its export orientation policy which allowed companies to solve inefficiency issues. A study also showed an increase between 2006 to 2010 in the Indonesian RBD olein exports on an average of 10.7% yearly and the export volume is an indication of its acceptance in the global market (Rifai et al., 2014). The increase in the competitiveness of the product in Indonesia from 2011 to 2015 has a direct link with the downstream policy made by the government. The high rate of development in the downstream of Indonesian reflected in the increasing use of RBD palm olein at the domestic level. Its production in Indonesia was 25 million tons in 2016 and its domestic consumption from the oleofood, oleochemical and biodiesel industries have significantly increased. The use of CPO as raw material in 2011 for the domestic downstream industry was 7.8 million tons for cooking oil and 6.2 million tons for margarine, while oleochemicals and detergents were 1.2 million tons and biodiesel 0.4 million tons. Then, its domestic consumption increased rapidly in 2016, in which margarine was 7.8 million tons, oleochemicals and detergents 1.7 million tons and 4 million tons for biodiesel (PASPI, 2017).

The competitiveness of RBD palm olein between Indonesia and Malaysia has some similarities, as the average RCA value of Indonesian RBD palm olein was 38.48 compared with 38.27 in Malaysia. The competitiveness in Indonesia followed a positive trend with an average export value of 6,037,958,190 USD. However, Malaysia, which previously was in control, was displaced by Indonesia due to the decline in the Malaysian RCA from 2011 to the

lowest in 2014, with an average export value of 7,414,757,051 USD. It showed a higher average export value of Malaysian palm olein RBD compared to Indonesia.

The competitiveness of palm oil products is also determined by its demand in the world market. For example, it is highly imported into Netherlands due to the high demand of its derivative products as raw materials by some European companies. One of such companies is Wilmar International, which is involved in the planting, milling, refining and trading of palm oil and its various products. The company also operates four refineries in the Netherlands and Germany. In addition, the Rotterdam Port in Netherlands is the point where Indonesian and Malaysian palm oil products enter the European market.

Competitiveness of Indonesian and Malaysian PFAD

According to Fry (2010), the general price of CPO could increase, despite being the most competitive feedstocks for biodiesel production, since it is linked with crude petroleum. However, during the refining of palm oil, a lower-value by-product known as PFAD is generated in the fatty acid stripping and deodorization stages. According to Cheah et al. (2010), PFAD is a valuable, low-cost feedstock used in the production of biodiesel. It is made from refining CPO and widely used in the soap, animal feed, chemical and biodiesel industries. PFAD is also regarded as a superior export product in international trade for Indonesia and Malaysia and its competitiveness is shown in Figure 4.

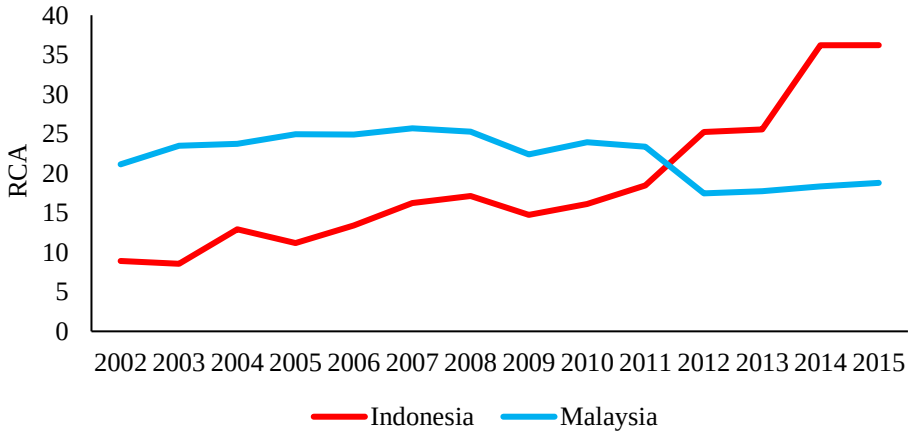

Figure 4. RCA value Indonesian and Malaysian PFAD

Malaysia focused on developing the downstream industries of palm oil derivatives products, as shown in its level of competitiveness. The Malaysian PFAD competitiveness was comparatively more in 2002, which was 21.15. The growing processing industries in Malaysia are those of Palm Kernel Oil (PKO) and oleochemicals. The Malaysian CPO industry has a strong legal foundation, listed in the third national agriculture policy 1998-2010 (NAP3) and the second industrial master plan 1996-2005 (IMP2).

However in Indonesia, there was increase in the downstream activities since 2011 through the oleofood, oleochemical and biofuel downstream industries. Also, the domestic consumption of palm oil in these three industries showed a relatively rapid increase. The CPO consumption in 2011 in the domestic downstream industry was 7.8 million tons for cooking oil and 6.2 million for margarine, 1.2 million tons for oleochemicals and detergents and 0.4 million tons for biodiesel. Similarly, the domestic consumption increased rapidly in 2016, with 7.8 million tons for cooking oil and margarine, 1.7 million tons for oleochemicals and detergents and 4 million tons for biodiesel (PASPI, 2017).

Products mapping of Indonesian and Malaysian palm oil products

The products mapping method was also for assessing the competitiveness of the palm oil products. The method uses two indices namely RSCA and TBI to determine the comparative advantage of products on a chart consisting of four groups.

Table 1. RSCA of Indonesian and Malaysian palm oil products

Year	CPO		RBD palm olein		PFAD	
	Indonesia	Malaysia	Indonesia	Malaysia	Indonesia	Malaysia
2002	0.969	0.891	0.929	0.953	0.797	0.909
2003	0.970	0.899	0.927	0.956	0.790	0.918
2004	0.973	0.880	0.943	0.952	0.856	0.919
2005	0.973	0.889	0.947	0.949	0.835	0.922
2006	0.972	0.907	0.950	0.948	0.861	0.922
2007	0.974	0.887	0.947	0.952	0.883	0.925
2008	0.974	0.877	0.941	0.954	0.889	0.923
2009	0.973	0.883	0.941	0.951	0.872	0.914
2010	0.971	0.885	0.953	0.952	0.883	0.919
2011	0.962	0.906	0.953	0.953	0.897	0.917
2012	0.959	0.928	0.951	0.943	0.923	0.891
2013	0.963	0.925	0.958	0.940	0.924	0.893
2014	0.959	0.934	0.964	0.928	0.946	0.896
2015	0.968	0.941	0.970	0.934	0.953	0.911
Average	0.968	0.902	0.946	0.947	0.879	0.912

Table 2. TBI of Indonesian and Malaysian palm oil products

Year	CPO		RBD palm olein		PFAD	
	Indonesia	Malaysia	Indonesia	Malaysia	Indonesia	Malaysia
2002	0.996	0.518	0.997	1.000	0.745	0.953
2003	0.999	0.551	0.996	0.999	0.889	0.944
2004	0.998	0.206	0.999	0.999	0.916	0.953
2005	0.999	0.575	0.995	0.997	0.922	0.951
2006	0.999	0.596	0.995	0.975	0.939	0.946
2007	0.999	0.717	0.999	0.975	0.961	0.946
2008	1.000	0.582	0.998	0.974	0.945	0.946
2009	0.999	0.421	0.994	0.993	0.900	0.931
2010	0.999	0.393	0.988	0.984	0.939	0.950
2011	0.994	0.399	0.999	0.986	0.952	0.761
2012	1.000	0.698	0.999	0.846	0.968	0.560
2013	1.000	0.839	0.991	0.938	0.950	0.603
2014	1.000	0.876	0.999	0.964	0.981	0.391
2015	1.000	0.753	0.999	0.921	0.980	0.457
Average	0.998	0.580	0.996	0.967	0.927	0.806

The RSCA results in Table 1 clearly presented, Indonesia and Malaysia have comparative advantages of palm oil products, indicated by the positive values, which are quite high and even close to 1. Indonesia is the largest CPO exporter in the world, which is seen from its average RSCA. This is even higher compared with Malaysia, the nearest competitor. However, for the CPO derivative products, namely, RBD palm olein and PFAD, Malaysia has higher RSCA average compared with Indonesia. Hence, there is need for Indonesia to increase the production and competitiveness for these derivative products. Also, palm oil producing countries regularly promote the positive impact of oil palm agriculture on poverty alleviation, despite the limited evidence showing the contribution of this crop on village well-being (Santika et al., 2019).

Furthermore, the TBI results in Table 2 show the average for Indonesian CPO as 0.998. Based on this, the country is a net exporter of CPO. Similarly, the RBD palm olein also has a superior TBI rate compared with Malaysia, which was increasing continuously every year. This is an indication that Indonesia focused on developing

its downstream industry, thereby making the derivatives become superior products of exports. The RSCA and TBI results are further used for the products mapping as shown in Figure 5.

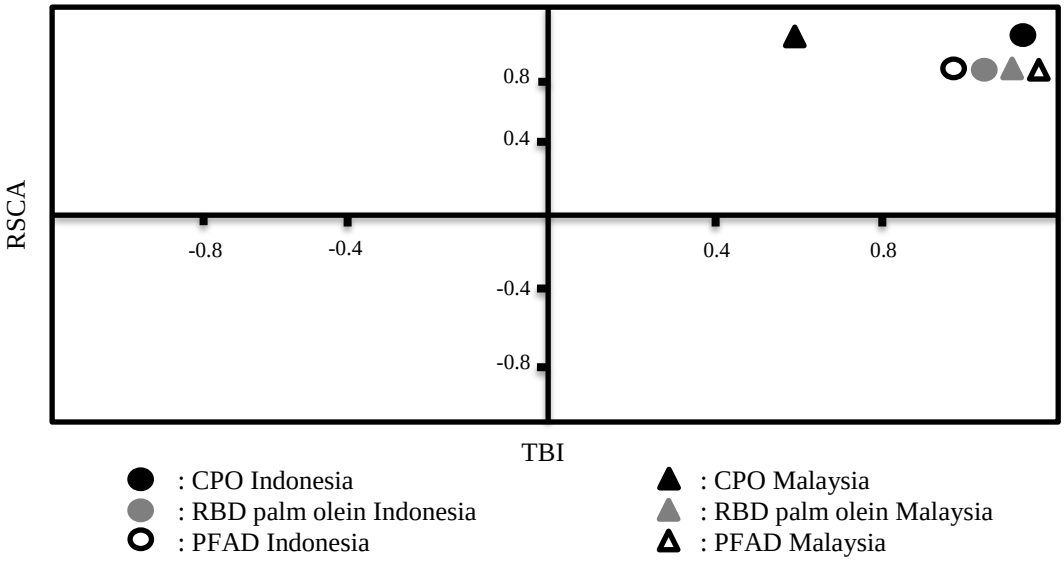

Figure 5. Products mapping Indonesian and Malaysian palm oil products

Based on the map, all the Indonesian and Malaysian palm oil product were in group A, indicating that these have comparative advantage and used for exporting within the period, 2002 to 2015. However, the position of Indonesian CPO was higher compared with other commodities with high competitiveness. Furthermore, despite the fact that Malaysian products were also in group A, the RSCA and TBI values have a negative trend every year.

CONCLUSIONS

There was a decline in Indonesian CPO exports, as well as its competitiveness in the international trade. However, the highest competitiveness of Malaysian CPO was recorded in 2014 as 29.49. The palm oil derivative products examined, both showed an increasing trend of competitiveness from 2002 to 2015. Therefore, there is need for the two largest palm oil producers to take advantage of the geographical environment in producing palm oil not only for export activities, but also for domestic and industrial use in the downstream.

REFERENCES

Abdulla, A., Arshad, F. M., Bala, B. K., Noh, K. M., & Tasrif, M. (2014). Impact of CPO export duties on Malaysian palm oil industry. *American Journal of Applied Sciences, 11*(8), 1301–1309. http://doi.org/10.3844/ajassp.2014.1301.1309

Abdullah, R., & Wahid, M. B. (2010). World palm oil supply, demand, price and prospects: focus on Malaysian and Indonesian palm oil industry. *Oil Palm Industry Economic Journal, 11*(2), 13–25. Retrieved from http://palmoilis.mpob.gov.my/publications/OPIEJ/opiejv11n2-ramli2.pdf

Adileksana, C., Yudono, P., Purwanto, B. H., & Wijoyo, R. B. (2020). The growth performance of oil palm seedlings in pre-nursery and main nursery stages as a response to the substitution of NPK compound fertilizer and organic fertilizer. *Caraka Tani: Journal of Sustainable Agriculture*, *35*(1), 89–97. https://doi.org/10.20961/carakatani.v35i1.33884

Afriyanti, D., Kroeze, C., & Saad, A. (2016). Indonesia palm oil production without deforestation and peat conversion by 2050. *Science of the Total Environment, 557-558*, 562–570. https://doi.org/10.1016/j.scitotenv.2016.03.032

Alatas, A. (2016). Trend produksi dan ekspor minyak sawit (CPO) Indonesia. *AGRARIS: Journal of Agribusiness and Rural Development Research*, *1*(2), 114–124. https://

doi.org/10.18196/agr.1215

Amiruddin, A. (2017). *Analisis daya saing dan dinamika ekspor produk kelapa sawit Indonesia dalam perdagangan Internasional* (Thesis). Sekolah Pascasarjana Institut Pertanian Bogor. Retrieved from https://repository.ipb.ac.id/handle/123456789/90926

Arifin, B. (2013). On the competitiveness and sustainability of the Indonesian agricultural export commodities. *ASEAN Journal of Economics, Management and Accounting*, *1*(1), 81–100. Retrieved from http://repository.lppm.unila.ac.id/8432/1/6.pdf

Astari, A. J., & Lovett, J. C. (2019). Does the rise of transnational governance 'hollow-out'the state? Discourse analysis of the mandatory Indonesian sustainable palm oil policy. *World Development*, *117*, 1–12. https://doi.org/10.1016/j.worlddev.2018.12.012

Balassa, B. (1965). Trade liberalisation and "revealed" comparative advantage 1. *The Manchester School*, *33*(2), 99–123. https://doi.org/10.1111/j.1467-9957.1965.tb00050.x

BPS–Statistics Indonesia. (2015). *Indonesian oil palm statistics* 2015. Retrieved from https://www.bps.go.id/publication/2016/09/01/46fb78d0ed1431d79cf94e2c/statistik-kelapa-sawit-indonesia-2015.html

Casson, A. (2000). *The Hesitant boom: Indonesia's Oil Palm sub-sectorin an era of economic crisisand political change*. Center for International Forestry Research (CIFOR), Bogor. https://doi.org/10.17528/cifor/000625

Cheah, K. Y., Toh, T. S., & Koh, P. M. (2010). Palm fatty acid distillate biodiesel: Next-generation palm biodiesel. *Inform AOCS International News on Fats, Oils, and Related Materials*, *21*(5), 264–266. Retrieved from https://www.lipochem.com.my/pdf/INFORM_264-266_May%202010.pdf

Dalum, B., Laursen, K., & Villumsen, G. (1998). Structural change in OECD export specialisation patterns: de-specialisation and 'stickiness.' *International Review of Applied Economics*, *12*(3), 423–443. https://doi.org/10.1080/02692179800000017

Ermawati, T., & Saptia, Y. (2013). Kinerja ekspor minyak kelapa sawit Indonesia the export performance of Indonesia's Palm Oil. *Buletin Ilmiah Litbang Perdagangan*, *7*(2), 129–148. Retrieved from http://jurnal.kemendag.go.id/bilp/article/view/104

Fry, J. (2010). *Is it smooth sailing or choppy waters ahead ?* Conference & Exhibition Price Outlook (POC), Kuala Lumpur, Malaysia, March 8–10, 2010. Retrieved from https://www.aocs.org/?SSO=True

Hudori, M. (2017). Perencanaan kebutuhan kendaraan angkutan tandan buah segar (TBS) di perkebunan Kelapa Sawit. *Industrial Engineering Journal (IEJ)*, *5*(1), 23–28. Retrieved from https://journal.unimal.ac.id/miej/article/view/147

Jayed, M. H., Masjuki, H. H., Kalam, M. A., Mahlia, T. M. I., Husnawan, M., & Liaquat, A. M. (2011). Prospects of dedicated biodiesel engine vehicles in Malaysia and Indonesia. *Renewable and Sustainable Energy Reviews*, *15*(1), 220–235. https://doi.org/10.1016/j.rser.2010.09.002

Lafay G. (1992). *The measurement of revealed comparative advantages*. in: Dagenais, M. G., & Muet, P. A. (Eds.). *International Trade Modelling*. Chapman & Hill, London. pp. 209-234.

Lam, W. Y., Kulak, M., Sim, S., King, H., Huijbregts, M. A. J., & Chaplin-Kramer, R. (2019). Greenhouse gas footprints of palm oil production in Indonesia over space and time. *Science of the Total Environment*, *688*, 827–837. https://doi.org/10.1016/j.scitotenv.2019.06.377

Laursen, K. (2015). Revealed comparative advantage and the alternatives as measures of international specialization. *Eurasian Business Review*, *5*(1), 99–115. https://doi.org/10.1007/s40821-015-0017-1

Muzendi, A. S. (2014). *Integrasi pasar dan dampak kebijakan non tarif terhadap permintaan ekspor dan daya saing kopi Indonesia di pasar Internasional* (Thesis). Sekolah Pascasarjana Institut Pertanian Bogor. Retrieved from https://repository.ipb.ac.id/handle/123456789/70817

Nayantakaningtyas, J. S., & Daryanto, H. K. (2012). Daya saing dan strategi pengembangan minyak sawit di Indonesia. *Jurnal*

Manajemen & Agribisnis, *9*(3), 194–201. Retrieved from https://journal.ipb.ac.id/index.php/jmagr/article/view/7893

Nesti, L., & Tan, F. (2017). The competitiveness of crude palm oil in West Sumatra in the domestic and the world market. *Proceedings of ICoChEA (International Conference On Chemistry And Engineering In Agroindustry)*, *1*(1), 67–70. Retrieved from http://ejurnal.poltekatipdg.ac.id/index.php/icochea/article/view/37

PASPI, Palm Oil Agribusiness Strategic Policy Institute. (2017). *Kemajuan kelapa sawit hilir Indonesia.* PASPI, pp 11.

Purnomo, H., Okarda, B., Dermawan, A., Ilham, Q. P., Pacheco, P., Nurfatriani, F., & Suhendang, E. (2020). Reconciling oil palm economic development and environmental conservation in Indonesia: A value chain dynamic approach. *Forest Policy and Economics*, *111*, 102089. https://doi.org/10.1016/J.FORPOL.2020.102089

Rifai, N., Syaukat, Y., Siregar, H., & Gumbira, E. (2014). The development and prospect of indonesian palm oil industry and its derivative products. *IOSR Journal of Economics and Finance*, *4*(5), 27–39. Retrieved from https://www.iosrjournals.org/iosr-jef/papers/vol4-issue5/D0452739.pdf

Rifin, A. (2010). The effect of export tax on Indonesia's crude palm oil (CPO) export competitiveness. *ASEAN Economic Bulletin*, *27*(2), 173–184. Retrieved from https://www.jstor.org/stable/41317117?seq=1

Rifin, A. (2011). *The role of palm oil industry in Indonesian economy and its export competitiveness*. Tokyo University. Retrieved from https://repository.dl.itc.u-tokyo.ac.jp/?action=repository_action_common_download&item_id=4186&item_no=1&attribute_id=14&file_no=1

Rifin, A. (2014a). The effect of crude palm oil export tax on export and prices. *ASEAN Journal of Economics, Management and Accounting*, *2*(1&2), 82–95. Retrieved from https://fem.ipb.ac.id/miicema/e-journal2/wp-content/uploads/2015/09/AJEMAV2N12Art6.pdf

Rifin, A. (2014b). The effect of progressive export tax on Indonesian palm oil industry. *Oil Palm Industry Economic Journal*, *14*(1), 1–8. Retrieved from http://palmoilis.mpob.gov.my/publications/OPIEJ/opiejv14n1-amzul.pdf

Santika, T., Wilson, K. A., Budiharta, S., Law, E. A., Poh, T. M., Ancrenaz, M., … Meijaard, E. (2019). Does oil palm agriculture help alleviate poverty? A multidimensional counterfactual assessment of oil palm development in Indonesia. *World Development*, *120*, 105–117. https://doi.org/10.1016/j.worlddev.2019.04.012

Sipayung, T. (2016). Mitos vs fakta-industri minyak sawit Indonesia dalam isu sosial, ekonomi dan lingkungan global. *Bogor-Jawa Barat: PASPI-Palm Oil Agribusiness Strategic Policy Institute*. Retrieved from https://agroklimatologippks.files.wordpress.com/2016/02/mitosfakta.pdf

Turnip, S. M. L., Suharyono., & Mawardi, M. K. (2016). Analisis daya saing crude palm oil (CPO) Indonesia di pasar Internasional. *Jurnal Administrasi Bisnis (JAB)*, *39*(1), 185–194. Retrieved from https://media.neliti.com/media/publications/87429-ID-none.pdf

Widodo, T. (2009). Comparative advantage: theory, empirical measures and case studies. *Review of Economic and Business Studies (REBS)*, *4*, 57–82. Retrieved from https://www.researchgate.net/publication/227367489_Comparative_Advantage_Theory_Empirical_Measures_And_Case_Studies

Widyaningtyas, D., & Widodo, T. (2017). Analisis pangsa pasar dan daya saing CPO Indonesia di Uni Eropa. *Jurnal Manajemen Dayasaing*, *18*(2), 138–145. https://doi.org/10.23917/dayasaing.v18i2.4510

Wijayanti, R., Irham, I., & Hardyastuti, S. (2016). Dampak kebijakan tarif dan non-tarif terbadap permintaan dan daya saing tuna Indonesia di pasar Uni Eropa, Amerika dan Jepang. *Agro Ekonomi*, *18*(1), 9-20. Retrieved from https://jurnal.ugm.ac.id/jae/article/view/16703