

# Malaysian Palm Oil Industry

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Oil palm is a highly productive oil crop as it produces up a yield up to ten times higher than other oilseed crops, such as soybean, sunflower and rapeseed, and has a productive life span of over 20 years. As such, oil palm plantations record the highest land productivity. With the growth in population and the surge in renewable energy, palm oil can address those demands by increasing the yield from the existing plantation areas.

Keywords: palm oil ; oil palm ; sustainability ; trade ; European Union ; stakeholder agencies

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## 1. Introduction

The rapid growth in the world population and the increase in demand for renewable energy, particularly towards mitigating greenhouse gas (GHG) emissions, have resulted in the rise in demand for oilseeds. This situation has contributed towards the expansion of oilseed cultivation, especially oil palm, in the tropical producing countries. As one of the major exporters of palm oil, Malaysia's oil palm plantation area reached 5.87 million hectares, which supplied 34.3% of the total palm oil trade and constituted 18.3% (17.37 million tonnes) of the global oils and fats industry last year <sup>[1]</sup>. With the anticipated increase in the global population to nine billion by 2050, the demand for oils and fats is expected to reach 35 million tonnes annually <sup>[2]</sup>. In addition to food, new uses of palm oil, such as for industrial applications and biodiesel, have further strengthened the demand to cultivate more oil palm.

However, as the total land area available is fixed it means that more crops have to be produced within the same area. In order to fully optimize land usage for oil palm crops, palm oil research has been focused on sustainable plantation and development. Despite various efforts made in research advancements and sustainable practices, oil palm cultivation has been exposed to increasing controversy and scrutiny over the years. The oilseed crop has been associated with environmental degradation, such as peatland conversion, tropical rainforest deforestation, loss of biodiversity, reduced carbon sink source, flood regulator, and the carbon footprint <sup>[3][4][5][6][7]</sup>. The industry has also been plagued with social issues, such as the violation of human rights, the rise in crime, the influx of foreign labor, conflicts over land rights, labor management, and the displacement of local and indigenous communities <sup>[8][9][10]</sup>. Moreover, concerns over the safety and the quality of palm oil contaminants, such as 3-monochloropropane-1,2-diol (3-MCPD) and glycidyl esters (GE) in the food sector have continued to be present over the past decade <sup>[11][12]</sup>.

These negative perceptions have created concerns about the sustainability of the commodity, especially in the developed economies such as the European market. The European Union (EU) established certified and sustainable palm oil standards as part of its importation requirements, which started in 2015, for a completely sustainable palm oil supply chain in Europe by 2020 <sup>[13]</sup>. Furthermore, the European Parliament agreed that the main criteria for biodiesel are set for no deforestation and voted to ban biodiesels from palm oil beginning in 2021 and to completely phase them out by 2030 in adherence to the EU Renewable Energy Directive (RED) II <sup>[14][15]</sup>. In addition to the restriction of palm oil-based biodiesel, the European Commission (EC) implemented the maximum limits on 3-monochloropropane-1,2-diol esters (3-MCPDE) and GE in edible oils and fats in January 2021 and March 2018, respectively <sup>[16]</sup>. Apart from these interventions, non-governmental organizations (NGOs) and consumers advocate boycotting palm oil through palm oil-free campaigns, while private companies promote the use of certified and sustainably produced palm oil through labels on their products <sup>[17][18]</sup>. The imposed restrictions and the increase in public awareness could suppress the utilization of palm oil in the transportation and food sectors in Europe. It may jeopardize the market share of Malaysian palm oil in the European oils and fats sector if palm oil is continuously viewed as unsustainably produced.

By elucidating the discourse on palm oil concerning key sustainability issues, this entry aims to bridge the gap between the issues of the misconceptions, the allegations, and the realities of palm oil. The critical review also intends to contribute intelligibility and coherently to the existing body of knowledge in the palm oil sector. This is important as policymakers could use the information at governmental agencies to develop effective sustainable palm oil strategies, and academicians and researchers could use it for further studies in the field.

## 2. Analysis on Research Results

The following four sub-sections highlight the issues of palm oil sustainability based on the environmental, social, economic, and health perspectives.

As a measure to increase the sustainability criteria to take into account member-state grievances, the resolution to eliminate palm oil in biofuel starting in the year 2021 was made a part of the EU RED II renewed policy framework. Palm oil has been classified as a high Indirect Land Use Change (ILUC) risk biofuel, whereby an increase in the demand for palm oil will lead to the indirect conversion of forest into land for biodiesel feedstock to meet the raw materials required for the European market and hence will be phased out by 2030 <sup>[17]</sup>. Moreover, the risk in ILUC needs to be assuaged as the GHG savings are set at 65% and would impact the GHG balance of biofuels, if unaddressed <sup>[19]</sup>. Classifying palm oil for biofuel as unsustainable will not be factored into the EU renewable energy target as it is not considered green fuel. Therefore, it is evident that palm oil is specifically targeted due to its high ILUC risk.

In spite of the assertion that the consumption of a high amount of saturated fats from palm oil is linked with cardiovascular diseases, studies revealed that there is no concrete evidence associating palm oil intake with the risk of heart disease or the negative impact on children's health <sup>[20][21]</sup>. Furthermore, the link between the dietary intake of palm oil and obesity, in comparison with other vegetable oils, is not supported by adequate evidence <sup>[22][23][24]</sup>. There is also no scientific proof to validate the association between palm oil intake and the incidence of cancer <sup>[25]</sup>. In fact, the nutraceuticals and phytonutrients from palm oil reduce cholesterol and diabetic levels in adults <sup>[26][27]</sup>. Research on the effects of palm oil tocotrienol as an antioxidant in the prevention and treatment of bone-related illness was conducted <sup>[28]</sup>. In addition, the anti-inflammatory effect of oil palm phenolics may prevent the formation of neurodegenerative diseases such as Alzheimer's and Parkinson's <sup>[29][30]</sup>. The findings by these scholars have strengthened the neutral and positive effects of palm oil intake in the context of obesity and non-communicable diseases in humans.

Thus, this review postulates that the nutritional content of palm oil has contributed significantly to improving the health of the global population. Existing literature and studies conducted on the health aspects of palm oil indicate that there are potential benefits that require further scientific investigation. As palm oil is essential in developing good human health, this review suggests the need for more research to gather concrete evidence to support the industry and invalidate adverse claims regarding palm oil safety and quality. The most pertinent question is the relationship between the type and quantity of oils and fats with health, while taking into consideration other nutrients in the dietary intake as well as lifestyle habits.

## 3. Conclusions

It is evident that the oil palm tree is a highly productive and versatile crop that produces competitively priced oil. The broad functionality of the oil seed crop, which is achieved through the chemical modification process, has widened the application of palm oil in diverse industries. As such, the production and trade of palm oil are of great concern due to their socio-economic significance in national development. Hence, the sustainability issues need to be addressed effectively for the industry to remain resilient in the future.

Based on the discussion, concerns about palm oil sustainability, such as commodity-driven deforestation, which results in a loss of biodiversity and induces climate change, continue to dominate the discourse on palm oil cultivation. The increase in the crime rate, the high employment of foreign labor, and the violation of indigenous community land rights are some of the social issues that further place the entire industry in a bad light. On the economic front, the commodity has faced immense scrutiny from the international community despite its price competitiveness and high productivity rate. Emerging issues concerning palm oil quality and nutritional value have been extensively researched compared to other vegetable oils by scientists around the world. These challenges that confront the palm oil industry are multi-dimensional and involve numerous stakeholders at the national and international levels. The way forward to enhance the image and increase the competitiveness of Malaysian palm oil in the global market is through compliance with sustainability certification. The adherence will assist in positioning Malaysia as the preferred global supplier of CSPO.

This entry shows that the palm oil industry constantly faces pressure and challenges in conforming to sustainable production and development. This warrants further research using empirical data as issues on sustainability continue to evolve in the palm oil supply chain. Other emerging factors, such as advancement in the research, innovation, and development of new products and technologies and the requirements of importing countries can influence the criteria and principles of sustainability imposed on palm oil. Although this article provides an overall review of the palm oil sector, the study utilizes sources from the Scopus database only. Nevertheless, this research area on palm oil sustainability can

provide valuable preliminary insights to policymakers in developing strategies to manage disruption in the global palm oil trade. These strategies serve to safeguard the country's economic interest in the export market and protect the environment and ensure societal wellbeing.

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