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SOCIO-ECONOMIC IMPACTS OF OIL PALM PLANTATIONS IN MALAYSIA: A REVIEW OF ECONOMIC AND ENVIRONMENTAL PERPECTIVES

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Abstract:

Oil palm has a significant role in the Malaysian economy, contributing 2.7% of the national gross domestic product (GDP) in 2020. This crop creates job opportunities, produces stable income, and improves the socio-economic status of the farmers. Despite the good impacts on economic and social perspectives, oil palm upstream activities were linked to various environmental impacts such as deforestation, fragmentation of tropical forests, soil erosion, wildlife habitat destruction, carbon and methane emissions, and peatland conversion. The goal of this study is to review the existing studies and findings on the impacts of oil palm plantation activities on Malaysian socio-economic status for the last decade (2011 - 2024). This paper focuses on the economic and environmental impacts of oil palm plantation activities. We applied the desktop study method to search for secondary data such as academic papers and reports from online databases. Most papers opined that oil palm upstream activities have positive impacts on the economy of Malaysia but are linked with negative impacts from environmental perspectives. Most papers also proposed that sustainable practices and certification in oil palm upstream activities are important approaches to reducing and managing environmental impacts. Strong commitment from the government and stakeholders was needed to tighten the policies on oil palm expansion, sustainable plantation practices, and forest conservation.

Keywords:

Oil Palm, Socio-Economic, Economic, Environmental

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Introduction

The success of Malaysia's oil palm (*Elaeis guineensis*) started in 1870, after the first seeds were brought from Ceylon (currently known as Sri Lanka). The first estate was established in Selangor by a Frenchman in 1917. Rising global demands for inexpensive vegetable oil have contributed to the expansion of oil palm in Malaysia, leading the size of oil palm lands to rise from only 0.57 million hectares in 1974 to 5.87 million hectares in 2020. The country is the world's second-ranked producer of palm oil, with a production of around 18.12 million metric tonnes in 2021. Malaysian-based palm oil products are currently exported to 150 countries across the globe (Othman, Yusop, Huay, & Azhar, 2022).

However, oil palm downstream activities are always criticised due to their negative impacts on the environment and wildlife habitat. Massive natural forest conversion to industrial oil palm caused forest fragmentation, soil erosion, peat land degradation, carbon emissions, and wildlife habitat loss. The European authorities and their environmental activists have been vocal in accusing palm oil production of accelerating deforestation and other environmental damages (Othman et al., 2022). They imposed various trade barriers to pressure the producers to stop deforestation and apply sustainable practices to plantation operations. These barriers, such as the import ban and high tax rate, have affected the marketability of palm oil products and threatened the revenue of planters, especially smallholder farmers.

It is proven that oil palm activities are always associated with various socio-economic benefits. Involvement in oil palm cultivation will benefit communities by creating job opportunities, providing stable income, and alleviating poverty among the growers. Oil palm also plays a significant role in improving the socio-economic wellbeing of small-scale farmers since more than 40% of the total global palm oil supply is produced by smallholder growers. In 2022, 5.67 million hectares of Malaysian land will have been cultivated with oil palm, with the large-scale plantation making up 4.19 million hectares (MPOB, 2022). The independent smallholder's group accounted for 0.82 million hectares, while the organized smallholder's group contributed to the remaining 0.67 million hectares of the balance. Thus, it is illogical to reduce or shut down the oil palm industries since these activities have a significant impact on the socio-economic wellbeing of rural farmers and non-farm stakeholders.

To measure the contribution of oil palm on socio-economic development, it is insufficient to count or measure the incomes and profits of farmers without calculating the non-farm household's incomes. Non-farms also gain economic benefits from oil palm plantations by working as plantation laborers, supplying agricultural inputs to the farmers, or providing support services such as transportation. In addition, oil palm activities also support other economic activities, including small businesses, food and beverage, food processing, and agricultural services.

Socio-economic is a term that is used to describe the position of an individual or family in a social system in which individuals are ranked based on their access to or control over wealth, power, and status (Muller & Parcel, 1981). Most scholars grouped the socio-economic impacts into three sub-categories: (1) economy; (2) social; and (3) environmental. On the other side, sustainable development also applies a three-dimensional approach that refers to economic, social, and environmental aspects. This paper aims to review recent studies and findings on the socio-economic impacts of oil palm in Malaysia. Moreover, this paper focused on the economic and environmental aspects. This review also provides recommendations and suggestions on

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socio-economic status enhancement among small-scale growers and sustainability in oil palm cultivation.

This paper is organized into four sections. The first section is the overview and objective of the study. The following section is about the method of review. The third section contains a discussion on the impacts of oil palm plantation activities on Malaysian socio-economic. This section is organized into two sub-sections. The first sub-section discusses the impacts of oil palm plantation activities from an economic perspective, while the other sub-section reviews the environmental impacts. The last section is the conclusion of this study and suggestions to the related stakeholders.

Methods

This review covered the socio-economic impacts of oil palm expansion in Malaysia and focused on the economy and environmental dimensions. We searched the articles in electronic databases, including Science Direct, Scopus, ProQuest, and IOP Science. The articles are eligible to be reviewed in this study if they meet the following criteria: (1) they were analysed on oil palm studies in Malaysia; (2) they highlighted outcomes linked to socio-economic status or impacts; and (3) they were published between the years 2010 and 2024. There were 96 articles analysed, of which 29 were included in this paper, while the literature that was not related to the economy or environmental dimensions was excluded.

Results and Discussion

The performance of oil palm on the improvement of living standards can be measured in several ways: either by counting the direct income from selling FFB or by making deep measurements of additional factors like assistance or incentives from authorities, participation in other income-generating activities, and the impacts on non-farm households. Most scholars address the contributions of oil palm to socio-economic impacts on rural livelihood. For this study, we focused on the impacts on the economy and environmental dimensions.

Economy Impacts

Most scholars and economists acknowledged that oil palm contributed positively to rural communities, which mainly depend on the agricultural sector as their primary source of income. Revenue from oil palm activities helped reduce poverty incidents among oil palm growers and boost local economic development, mostly in the countryside. Previous studies suggested that the cultivation of oil palm creates jobs, provides stable income, and alleviates poverty. In addition, oil palm plantations also spurred downstream industries such as palm oil packaging, cooking oil processing, palm oil transportation, and other related industries. Oil palm was considered the most profitable crop compared to other oilseeds.

Despite positive impacts, some scholars suggest that oil palm also has negative impacts on the economy. In a study in Sabah, it is suggested that a smallholder's average income is not enough to support their monthly expenditure. The average income of smallholders in Sabah is around RM1,600, a monthly income below the national poverty line (Rahman, 2020). In another aspect, smallholder farmers are not enjoying much economic benefit since they are buying fertilisers at a high price due to a lack of bargaining power, small-scale purchasing quantities, and buying from small retailers (Othman et al., 2022). Because of the same reason, small-scale farmers also paid a low selling price when they sold the FFB to the mills.

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The economic impacts of oil palm and other crops are also vulnerable to external threats such as natural disasters, political instability, epidemics, and pandemics. For example, the smallholder's farmers were affected by the COVID-19 pandemic (Rahmat et al., 2022). The enforcement of the Movement Control Order (MCO) during the pandemic made it not easy for them to buy the agriculture inputs, delaying farm operation activities and affecting the schedule to deliver the FFB to the mill. The other issue is a labour shortage due to migrant workers who return to their country of origin and cannot re-enter the Malaysian border because of international travel restrictions. Some workers are also subjected to mandatory quarantine due to being contaminated by the virus. The outbreaks of the COVID-19 pandemic led to some mills' closures, while low demand from export markets has dropped palm oil prices (Ashaari, Abdullah, & Fuzi, 2022).

Some papers addressed the difficulty of measuring the actual impact of oil palm activities since both independent and organized smallholders are provided with various technical and financial incentives from the government. The positive or negative impacts on the economy depend on how the researchers examine the impacts. The oil palm is more profitable if planted with financial support from the authorities. Incentives such as subsidies and free agricultural inputs will reduce the cost of plantations.

Government involvement and intervention are essential for socio-economic development (Hidayah, Mahphoth, Bachri, & Ramadhita, 2023). Both the federal and state levels have developed oil palm plantation schemes to create employment, boost income, and reduce the poverty rate among rural communities, especially the farmer group. The primary objective of the establishment of the Federal Land Development Authority (FELDA) in 1956 was to improve rural vicinities by overcoming the farmer's landless problem, resolving unemployment issues, increasing rural income, and improving the living standard (Rashid et al., 2022). Since the establishment of FELDA, a hundred smallholder's schemes have been developed, mainly with oil palm cultivation. The settlers are given a piece of oil plantation land and a house, with the requirement of repaying the development costs to the FELDA. The FELDA settlers also generate additional income by cultivating other crops, poultry and livestock farming, ventures into small businesses, food processing, beverage production, and baking. In addition, 84% of FELDA's oil palm settlers agreed that their social status had improved after joining FELDA's smallholding scheme.

The integration of oil palm with other crops and participation in other businesses create additional income for small-scale cultivators. A study among FELDA settler in Terengganu who integrate their oil palm farm with cattle found that 92.6% of them spent their own money to fund their cattle integration project (Ayob et al., 2016). Moreover, 100% of the farmers involved in that project stated that the project contributed extra income to them. The success story of FELDA settlement schemes shows that oil palm plantation activities changed the livelihood of settler families by becoming valuable landowners, providing housing and employment opportunities, and generating income (Barau & Said, 2016). Despite the success story of using oil palm to improve the socio-economic situation, it is suggested for FELDA to avoid single-crop farming and diversify their agriculture activities by focusing on a variety of crops (Omar, 2020).

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Another example of government involvement in the oil palm smallholding scheme is the South Kelantan Agropolitan Project, launched in 2009 and funded by the East Coast Economic Region Development Council (ECERDC) (Ahmad et al., 2014). This project was successfully implemented by the South Kelantan Development Authority (KESEDAR) in Gua Musang with the goal of boosting the monthly income of rural farmers from only RM1,000 to RM5,000 by the year 2019. In addition to the monthly income, the participants were also provided with a new housing scheme and a water treatment plant. Table 1 shows the comparison of monthly income before and after involvement in the project. Before participation in this project, 29% of the settlers earned below RM300, and most of them (64%) earned between RM301 and RM600. The remaining 7% of settlers recorded a monthly income of more than RM600, with no participant earning more than RM1,200. After joining this project, the settler's monthly income increased, with no more settlers earning below RM300 and only 5% of them earning below RM601. Most of the settlers (92%) recorded monthly income between RM601 and RM1,200, and the remaining 3% of them gained more than RM1,200 per month.

Table 1. Income Improvement Among South Kelantan Agropolitan Projects Settlers

Range of Income (RM)	Percentage of Participants Income	
	Before joining the project	After joining the project
<300	29%	0%
301 - 600	64%	5%
601 - 900	5%	30%
901 - 1,200	2%	62%
1,201 - 1,500	0%	3%
Total	100%	100%

Source: (Ahmad et al., 2014)

Several studies have proposed that sustainable plantation practices have a positive impact on revenue and profit. The Malaysian Sustainable Palm Oil (MSPO)-certified independent smallholders (ISHs) generate more revenue than uncertified ISHs (Bok et al., 2022). The uncertified ISHs life cycle cost (LCC) for a 3.94 ha oil palm plantation with a 25-year life cycle is US$ 91,017.84, 39% less than the LCC for MSPO-certified ISHs (US$ 127,092.56), indicating increased profitability for certified ISHs. In terms of yield, the average FFB yield for MSPO-certified ISHs was recorded at 21.24 t/y, higher than that of non-certified ISHs, with an average of 17.88 t/y (Ashrad et al., 2020).

Environmental Impacts

Several authors proposed that oil palm expansion caused bad impacts on our ecosystem and environment. Land clearing for oil palm cultivation caused forest fragmentation, wildlife habitat destruction, soil erosion, and riverbank damage. Moreover, the establishment of oil palm plantations in peatlands has contributed to peat degradation, carbon emissions, and peat fire. Deforestation and forest fragmentation due to oil palm plantations have put orangutans, Sumatran rhinoceros, Malayan tigers, elephants, and sun bears on critical endangered lists. By

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the early 2000s, 46 species of peat swamp forest birds were also declared extinct in Peninsular Malaysia (Koh, Miettinen, Liew, & Ghazoul, 2011).

However, the contribution of oil palm plantations to deforestation remains unclear and is still debated. Some authors suggested that oil palm plants are not necessary to be cultivated on deforested land but may be planted on existing agricultural lands like rubber estates, paddy fields, and tapioca fields. Before gaining independence from the British, Malaysia was already in advanced stages of land development that required forest clearing, such as logging, rubber plantations, and tin mining, before the Malaysian government diversified its agricultural sectors, primarily oil palm. Estimated 300,000 hectares of existing plantation lands (mostly rubber estates) were replaced by oil palm plantations between 1990 and 2004, resulting from the low price of rubber in the global market (Byerlee, 2014). The cultivation areas for rubber were dropped from 1.8 million hectares in 1990 to only one million hectares in 2019. It is proven that large areas of oil palm plantations in Malaysia were established on existing agricultural lands and did not replace the natural vegetation.

Oil palm is recorded to have the highest land productivity compared to other crops and is currently recognized as the biggest source of vegetable oil. Table 2 proved that oil palm requires less land to produce the oil, while mustard, rapeseed, sunflower, and other crops occupy more land to produce the oil (Hassan et al., 2024). Each ha of land can produce 2.9 mt of palm oil, while the same land size can produce only 0.47 mt of soybean oil and 0.28 mt of olive oil. Land used by oil palm is one of the lowest, with 8.5 million ha across the world, while soybeans require huge land use, with over 58 million ha (Alam et al., 2015). These findings show that oil palms use less land compared to other vegetable oil crops, especially soybeans.

Table 2: Global Oilseeds Yield, Production & Land Use

Type of Vegetable Oil	Global Oil Yields (Mt/ha)	Global Oil Production	Global Land Use
Palm oil	2.90	41.37%	9.05%
Sunflower oil	0.72	9.87%	8.71%
Rapeseed oil	0.71	12.16%	10.92%
Soybean oil	0.47	28.64%	38.71%
Olive oil	0.28	1.55%	3.58%
Coconut oil	0.27	1.58%	3.70%
Groundnut oil	0.14	2.11%	9.50%
Cottonseed oil	0.12	2.22%	11.70%
Sasemeseed oil	0.08	0.50%	4.14%

Source: (Hassan et al., 2024)

Carbon and methane emissions are considered as notable negative impact from oil palm plantation activities. Research at Sebaju and Sebungan palm estates in Sarawak found that annual peat carbon losses were recorded at 24.9 Mg CO2-C ha−1 year−1 over the first six years of plantations (McCalmont et al., 2021). The other major environmental issue with oil palm is

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soil erosion, which normally occurs in the early stages of plantation development. The soil and debris are shifted from the plantation areas to the river and sea. The conversion of peat swam forests to oil palm resulted in a net carbon loss of 155.5 ± 39.2 Mg/ha and would cause net peat carbon emissions of 5.2 ± 1.1 Mg/ha-y¹ (Koh et al., 2011).

In addition to soil erosion, another impact of oil palm is peatland conversion and drainage. Until 2019, an estimated 27% of peatlands in Malaysia had already been converted to oil palm plantations, with the largest conversion areas recorded in Sarawak. An observation over the 28-year period from 1990 to 2018 proved that Sarawak already converted about 657,273 ha of their peatland areas to oil palm, equivalent to 20.5% of their peatland areas, while Sabah only converted about 35,627 ha, or 19.1% of their peatland (Jaafar et al., 2020).

The environmental impacts of oil palm plantations raise concern, critics, and responses from European authorities and environmentalist bodies. The import ban and other trade barriers were imposed on palm oil products and palm-based biodiesel to prevent them from entering the European market if the products are produced from unsustainable sources. These negative responses may threat the farmers income and oil palm business chain. In addition, European Union Deforestation Regulation (EUDR) was enforced as a commitment to promote deforestation-free on the European markets. The implementation of EUDR requires due diligent by the operators, involving the details analysis on the source of the products.

Primary oil palm producing countries like Malaysia and Indonesia criticize the EUDR and other barriers as baseless and unfair treatment for the oil palm plantation industries. The enforcement of EUDR will affect the marketability of palm oil products that are produced by smallholder farmers. Some of the issues are misunderstandings and outdated information about the oil palm industry, which is always linked to massive deforestation and other environmental damages (Kannan et al., 2021).

The Malaysian government, at a United Nations conference in 1992, pledged to maintain at least half of their forest cover. In addition, various efforts at the state level have been made to protect the remaining pristine forests. It includes the increase of permanent forest reserves, additional areas for wildlife habitat, and regulating new policies to protect our peatlands. The Federal Government launched the National Action Plan for Peatlands (NAPP) in 2011 with the goals to sustainably manage the Malaysian tropical peatland areas in an integrated manner, create benefits for current and future generations, conserve natural resources, and prevent degradation and fires (Hamid, 2019). The NAPP promises to maintain the peatland area gazetted under permanent forest reserves, apply zero-burning approach for commercial agriculture activities, and enhance enforcement in peatland areas (NRE, 2011). This policy has been guided by the ASEAN Agreement on Transboundary Haze Pollution (AATHP) and the associated ASEAN Peatland Management Strategy (APMS) 2006 – 2020 (Hamid, 2019).

Sustainable plantation is a major factor that influences the marketability of Malaysian palm oil products. The federal government of Malaysia launched the MSPO certification scheme in 2013, as a national initiative to assist farmers and producers who might lose their income due to the continuous EU's banning, discrimination, and restriction on unsustainable palm oil products (Rahmat et al., 2022).

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Most smallholder farmers intend to implement sustainable practices that require them to reduce their consumption of chemicals, including herbicides, insecticides, and pesticides (Saadun et al., 2018). It is includes using the spot spray method on poisoning and fertilizing activities, disposed the empty chemical containers with proper procedures, and stop open burning the plantation areas. There are six factors pertaining to smallholder farmers to compliance with MSPO standards (Rahmat et al., 2022). First, better knowledge about MSPO increases the level of compliance by smallholder farmers. Second, elderly smallholders are associated with a lower tendency towards MSPO compliance. Third, the smallholder's farmers are willing to comply with MSPO if they are provided with any kind of incentive or aid. Fourth, the higher level of education resulted in a higher level of MSPO adaptation. Fifth, the higher the sustainable operation and certification cost, the lower the level of MSPO compliance. Lastly, the higher the perceived benefit, resulted the higher the level of MSPO adaptation.

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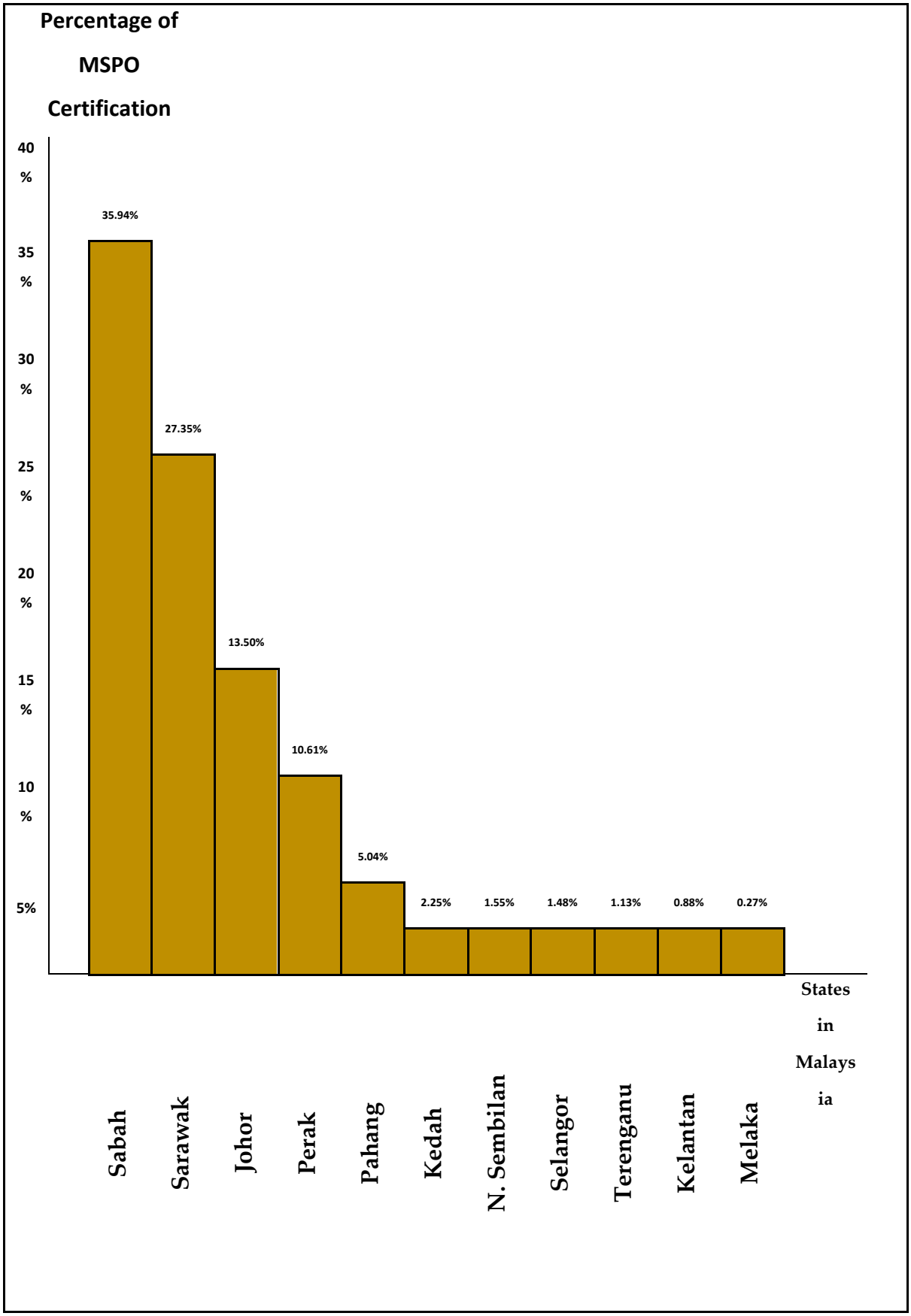

Figure 1 MSPO Certification Progress By States In Malaysia.

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Despite the aggressive efforts taken to boost sustainable practices among small-scale oil palm growers, participation in sustainable oil palm certification remains low, with only 30% of smallholder's farmers certified with MSPO. Figure 1 shows the progress on MSPO certification among smallholders nationwide. As of 31st May 2020, Sabah became the leader in sustainable plantation among small-scale cultivators, with 35.94% of their smallholders obtained MSPO certification. Sarawak is in the second ranking with 27.35% of certification, followed by Johor (13.50%) and Perak (10.61%) (Yap et al., 2021).

The future expansion of oil palm should be targeted on the areas with highly suitable climates and soil (Saadun et al., 2018). The land with poor soil can remain in natural condition to support the ecosystems. Studies proved that major environmental problems from oil palm could be resolved if the expansion of the plantation is followed by increasing productivity (Ibragimov, Sidique, & Tey, 2019)

It is necessary to adopt agricultural innovation and environmentally friendly practices in the future. The application of sustainable practices among oil palm smallholders will increase their income and automatically improve their socio-economic wellbeing (Suib et al., 2023). The transition towards sustainable and modern agriculture requires innovation, new knowledge, and skills, mostly related to digital technologies without denying smallholder farmer's informal knowledge (Rashid, Muhamad, Rashid, Ahmad, & Azman, 2021). The most challenging part in promoting the sustainable oil palm certification is educating smallholders about the need to stop the existing practices that they have been applying for a long time (Rahmat et al., 2022).

Conclusion

This review tries to explore the oil palm impacts on smallholder's livelihood and the surrounding communities. The socio-economic impacts from oil palm activities are positive for economic perspective but more negative effects are highlighted on environmental side. The sustainable plantation in oil palm industries is crucial to reduce or manage the impacts on environmental and biodiversity. Efforts to improve the sustainability in palm oil production also important to ensure competitive advantages in this industry, since this crop played significant role in socio-economic development of Malaysia. We believe this review will increase the knowledge on oil palm cultivation impacts and explore potential strategies to enhance the sustainability in oil palm cultivation. From the review, we recommend that yield improvement in oil palm production and the selection of appropriate soil resulted the increasing on oil palm production without sacrifice our high value tropical forests. In addition, the latest technology applications, such as drone technology, automated plantation practices, and other effective approaches, are necessary to enhance the FFB yield, observe the plantation impacts, and improve the monitoring process. The biggest challenge of sustainable agricultural production is the readiness to accept new plantation approaches and the willingness to pay the costs for sustainable certification and compliance among smallholder farmers. It is high time to solve related issues and challenges in the sustainability of oil palm for a better future.

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