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The Role of the Palm Oil Industry in Malaysia's Socioeconomic Development: Challenges and Educational Implications

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Abstrak

Pohon kelapa sawit berasal dari Afrika Barat dan diperkenalkan ke Malaysia pada awal tahun 1870 oleh seorang pria Inggris. Pada tahun 1917, seorang Prancis bernama Henry Fouconnier menjadi orang pertama yang menanam kelapa sawit secara komersial di Tennamaram, Selangor. Produksi kelapa sawit sejak saat itu telah menjadi pilar penting dalam pembangunan sosial ekonomi Malaysia. Kelapa sawit menjadi salah satu sumber pendapatan utama negara, mendorong pertumbuhan ekonomi, menghasilkan pendapatan, dan mengurangi kemiskinan. Makalah ini mengeksplorasi peran penting industri kelapa sawit dalam lanskap sosial ekonomi Malaysia, meskipun terdapat tantangan seperti keterbatasan lahan untuk ekspansi. Penelitian ini menggunakan pendekatan kualitatif, dengan menganalisis dokumen dan wawancara semi-terstruktur untuk mengumpulkan data. Analisis tematik induktif dilakukan dengan bantuan perangkat lunak Atlas.ti untuk menganalisis data. Temuan penelitian ini menunjukkan kontribusi signifikan industri kelapa sawit, antara lain menyediakan makanan untuk konsumsi manusia, menciptakan lapangan pekerjaan, menghasilkan pendapatan bagi petani, memasok bahan baku untuk industri, mengurangi kemiskinan, meningkatkan standar hidup, mendukung sektor energi terbarukan, dan berkontribusi terhadap pertumbuhan ekonomi. Kesimpulannya, industri kelapa sawit memainkan peran vital dalam pembangunan sosial ekonomi Malaysia. Temuan ini juga menekankan pentingnya memasukkan kontribusi industri ini dalam kurikulum pendidikan untuk membangun pemahaman yang komprehensif tentang praktik ekonomi yang berkelanjutan.

***Kata kunci*:** *Sosial Ekonomi, Kelapa Sawit, Industri Kelapa Sawit, Peran*

Abstract

The oil palm tree originates from West Africa and was introduced to Malaysia in the early 1870s by a British individual. In 1917, a Frenchman named Henry Fouconnier became the first to plant oil palm commercially in Tennamaram, Selangor. The production of palm oil has since become a cornerstone of Malaysia's socioeconomic development. It serves as one of the nation's primary income sources, driving economic growth, generating revenue, and alleviating poverty. This paper explores the pivotal role of the palm oil industry in Malaysia's socioeconomic landscape, despite challenges such as limited land for expansion. The study employs a qualitative approach, utilizing document analysis and semi-structured interviews for data collection. Inductive thematic analysis was conducted using Atlas.ti to analyze the data. The findings highlight the significant contributions of the palm oil industry, including providing food for human consumption, creating employment opportunities, generating income for farmers, supplying raw materials for industries, alleviating poverty, enhancing living standards, supporting renewable energy sectors, and contributing to economic growth. In conclusion, the palm oil industry plays a vital role in Malaysia's socioeconomic development. These findings underscore the importance of incorporating such industrial contributions into educational curricula to foster a comprehensive understanding of sustainable economic practices.

Keywords: Socio-economy, Palm Oil, Palm Oil Industry, Roles

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1. INTRODUCTION

Malaysia achieved a significant economic development based on Mahathir foreign policy from 1981 to 2003. It gained global recognition due to certain changes on its economic contributing factors. This made Malaysia more economic sound and prominent than before Mahathir period (Jie & Jiahui, 2023; Kehinde et al., 2016). Palm oil is a crop found from agricultural sector in Malaysia with the highest value. This valuable crop as well as its palm-based products accounted for eight percent (8%) of GNI per capita. It is ranked as fourth major contributing sector to Malaysian national economy. In 2011, its exports annually reached a USD 27 billion. Private sector mainly controls the palm oil industry towards

activities of upstream which is related to plantations and mills (Kunyanti et al., 2021; Muchlis & Nurcholis, 2018). In Malaysia, the palm oil industry became part of the twelve national key economic areas (NKEA) of Economic Transformation Program designed to make Malaysia by 2020 a country with high income. The government plans on growth are mainly on productivity gains, to reduce the yield gaps between the plantations with high performance and the smallholders, as well as large companies involved in the activities of downstream, which included processing of foods, bio-diesel and oleo chemicals (Manzoor et al., 2019; Mogas et al., 2022). Technological advancement contributes a lot and enhances sustainable practices in industries. It assists in consuming energy efficiently, and it regulates emissions which pollute the environment (Besson et al., 2021; Zaman, 2014).

In December 2013, the areas planted with oil palm was matured to 5.2 million ha. The areas with the largest plantations were located in Sabah with 1.5 million ha and Sarawak with 1.2 million ha. The 2.6 million ha was recorded from 11 states of peninsula Malaysia, private owners are from Johor with 0.73 million ha and Pahang with 0.71 million ha (Ginoga et al., 2019; Tohiran et al., 2023). The two aforementioned states attached with Perak planted 70% of the oil palm areas in Peninsula Malaysia. The expansion of plantations is possibly restricted to 1.3 million ha, of which 1 million ha was situated in Sarawak. Oil palm occupied 71% of the total agricultural land in Malaysia and 90% is in Sabah (Febrian & Yuza, 2023; Muchlis & Nurcholis, 2018). The main purpose of this paper is to explore the palm oil industry role in the socio-economy of Malaysia.

The private plantation controls 62%, state scheme 60%, federal government land settlement scheme controls 18%, and independent smallholders 14% (MPOB, 2014). In 2007 in Sabah, the private estates owned 74% of oil palm land, which largely exceeded the national average (Alam et al., 2020; Tolppanen et al., 2023). However, in 2007 independent smallholders increased their plantation in the overall land proportion from 11% to above, while there are some signals of decline indicated in that of government schemes. Previous study exposed the situation in which Guthries and Sime Darby were British plantation and trading companies, were ‘Malaysianized’ in 1970s (Corsini & Giannelli, 2021). Sime Darby is the largest plantation company whereby the Federal government owned significant share, together with *Tabung Haji* Plantations Berhad (THP) as a Government-Linked Company (GLC) which is regarded as “almost untouchable” (Ritonga, 2021; Simnica, 2021).

Palm oil became a vital source for sustainable and renewable energy, this made it different from other vegetable oils. Since 1996 Malaysia started using biodiesel and substituted diesel (Foteinis et al., 2020; Wong et al., 2020). In Malaysia, in recent time there is a shortage of land which caused some companies relocated to other countries. Such companies are: Sime Darby which expanded to Liberia to look for lands, while Wilmar has interests in oil palm plantations in African countries which included Cross River State, Nigeria, Gabon, Ghana, Ivory Coast and Uganda.

In Latin America, Singapore-based American Dennis Melka, with big plantation in Sarawak, established his foothold of oil palm in some areas of the Peruvian Amazon, while Felda Global Ventures purchased a land in Pará state, Brazil. In Europe, IOI established downstream processing plants, while other companies have interests in opening chemical plants and refineries in China and India. Malaysia companies owned 25% of Indonesian oil palm plantations in 2009 (Amusan et al., 2005; Hosseinzadeh-Bandbafha et al., 2022). This paper tries to bridge the gap and add to the body of knowledge by exploring the palm oil industry role in the socio-economy of Malaysia. This paper objective explores the palm oil industry role in the socio-economy of Malaysia, regardless of land limitation on expansion of oil palm.

2. METHODS

Research is conducted in general for developing the proper assertions to explain a particular situation. This research methodology explains how the data is collected and analyzed. This research is a qualitative exploratory design. Qualitative research uses exploratory and realistic approach to investigate the nature and analyze the data in a systematic method (Meixner & Hathcoat, 2019). This study employs document analysis to clearly explore, analyse and conclude. This paper used primary and secondary data. The primary data were collected from interview, and the secondary data were collected from documents such as; books, journals, dissertations, newspapers, magazines, seminar papers, and articles. The primary data were based on semi-structured interview. The interview was based on face-to-face. Three participants from Malaysia were interviewed face-to-face. The research is based on non-probability (purposive sampling). This research applies inductive thematic analysis for analyzing the interview data. The data were analyzed and critically interpreted. The analysis data steps include: data editing, data coding, and data entry. This research used Atlas.ti software used by a researcher to analyze qualitative research, organize, manage and code a qualitative data efficiently.

3. RESULTS AND DISCUSSION

Results

This research paper used semi-structured interview to explore the role of palm oil industry in the socio-economy of Malaysia, there are three educated participants based on profession. Their ages ranged from 40 to 50 years. The first participant is Master's degree holder and Deputy Director-General Services, Malaysian Palm Oil Board (MPOB), Ministry of Primary Industry. The second is a Master's holder and Director, PROFES LIPID SDN BHD, Malaysia. And the third participant is a lecturer and PhD holder from University of Sultan Zainal Abidin, Terengganu, Malaysia. This is selected based on the participants' knowledge and will of participating in this research paper. The role of palm oil industry on the socio-economy of malaysia is show in Figure 1.

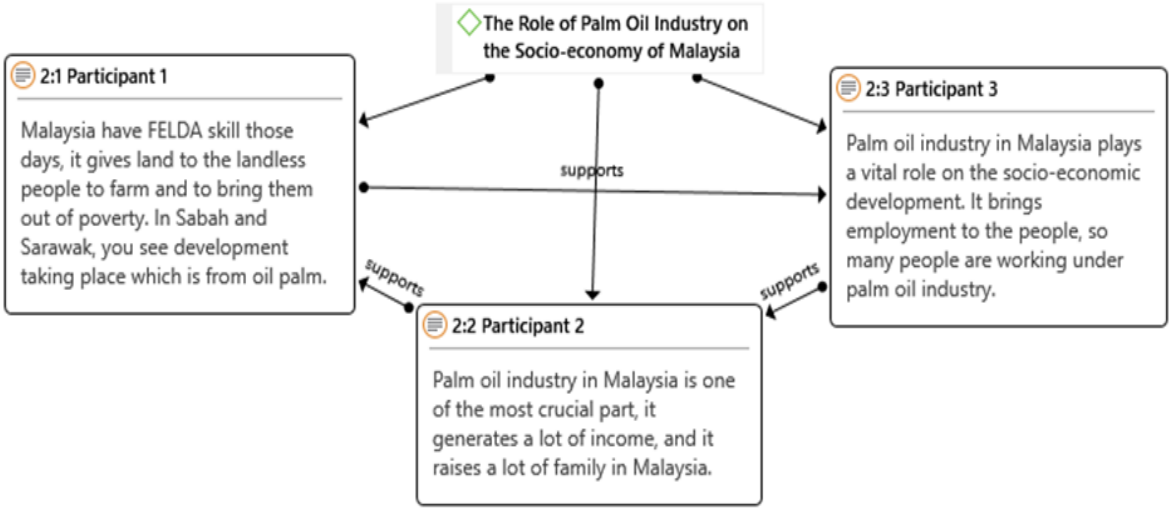

Figure 1. The Role of Palm Oil Industry on the Socio-economy of Malaysia

In Figure 1, the first participant stated, palm oil industry plays a vital role in Malaysia through the use of FELDA, and it gives land to landless people to farm in order to bring them out of poverty, it brings development throughout the country. The participant two said that,

palm oil industry is one of the most crucial part, it generates a lot of income, and it raises a lot of family in Malaysia. And the participant three said, palm oil industry plays a vital role in the socio-economy of Malaysia, and it employs people. All the three participants confirmed that, palm oil industry plays vital roles in the socio-economy of Malaysia ranging from employment, generating income, raising a lot of family to a better standard of living, eradicating poverty, contributing to socio-economic development of Malaysia as well as food security for human consumption.

Discussion

Socio-Economy of Malaysia

The Malaysian socio-economic history among developing countries is very marvelous, due to its sustainable development stage by stage with good innovation, technological advancement, policy formulation and implementation. These made it unique and globally recognized as a peaceful country. In 1957, Malaysia obtained its Independence from Britain, it was considered as primary commodity-based economy, which heavily depended on rubber and tin, it contributed to almost seventy per cent (70%) of total earnings from the export (Abdinoor, 2020; Mitter et al., 2020). Malaysia has been recognized due to its economic record as one of the Asian best countries . This growth reached to peak in 1980s and 1990s with annual growth of 8% which the Malaysian economy experienced. In 2006, the economy faced a little decline as a slide difference if compared to the previous year of 2005, whereby in 2006 the GDP grew at 5.9% (Lim, 2020; Sułkowski et al., 2021). However, under as the long serving prime minister with good political atmosphere, Malaysia achieved a conducive economic growth with different economic policies adopted since independence.

As the U.S.D.S (2007) exposed the polices implemented by the Malaysia, these included the formation of New Economic Policy (NEP) in 1970, with the goals of eradicating poverty regardless of human race or structure of the society, and to abolish race identity attached to economic activities (Burki et al., 2021; Hill, 2021). NEP creation solved problems of regional and ethnic differences and confirmed national unity. Malaysia in 1990 improved NEP through the mission of strategic planning to accomplish economic goals, social transformation, to reduce the poverty incidence and to confirm life quality. The policy was to make Malaysia a developed country in 2020. These national plans diversified and transformed Malaysian economy especially in 1980s, and achieved a major structural transformation in manufacturing sector (Urwick, 2022; Uwizeye et al., 2022).

Oil Palm and Palm Oil

Oil palm plays a vital role in the socio-economy of Malaysia which included food production for human consumption, employing people, generating income to farmers and government, raw materials for industrial uses. This oil palm is a crop called monocious which has been categorized into 2 group of male and female (Ginoga et al., 2019; Tohiran et al., 2023). Oil palm trees used to start yielding fruits when it reached twenty-four (24) to thirty (30) months after planted and stay productive up to the next twenty (20) to thirty (30) years (Medeiros et al., 2023; Tohiran et al., 2023). Palm oil is extracted from oil palm, it is vegetable oil, and consumed in food and applied in non-food uses. Palm oil is exactly vitamin E which is tocotrienols and is rich in carotenoids. Oil palm products are used in many applications which included biomass products such as fibre boards and plywood are being produced from oil palm trucks, wastes of oil palm are produced as fertilizers and animal feed (Ginoga et al., 2019; Tohiran et al., 2023).

Food and Non-Food Application of Palm Oil

Palm olein and refined palm oil are being applied in food cooking, and at frying temperature it resists to oxidation. In food industries, refined palm oil, palm olein and palm stearin are the key ingredients applied in the food production of margarine and fats. Palm stearin is a full component of natural hard fat for margarine production. Vanaspati is a vegetable ghee made from refined palm oil. Palm olein is perfectly blended with other vegetable oils such as groundnut oil and rice bran (Ginoga et al., 2019; Tohiran et al., 2023). Palm kernel stearin, palm kernel olein and Palm kernel oil are applied in margarine ingredients and non-hydrogenated trans-fat free margerine, coffee whitener confectioneries, filled milk, coating fats and biscuit cream. The expensive cocoa butter is substituted with Palm kernel stearin. The milk fats in the ice cream production, is replaced with palm oil and palm kernel oil combination (Hosseinzadeh-Bandbafha et al., 2022; Sritabutra et al., 2011).

Palm oil application in non-food segment are largely in the biofuel production and oleo chemical industry. Palm oil produces, especially palm kernel oil in the oleo chemical industry became the major feed stocks. The basic oleo chemical produces are fatty acids, alcohols, esters, glycerol and nitrogen compounds. Oleo chemical produces are applied in the manufacturing of other products such as pharmaceutical, candles, cosmetics, detergents, soaps, antifreeze and lubricants (Anggraini et al., 2017; Foteinis et al., 2020). Palm oil can also be used to produce soaps directly. Fatty acids are used in the production of candles and soaps, the flavour and fragrance industries, the manufacture of cosmetic products and as processing aids for rubber products. Fatty esters are used in the pure soap production and for washing and cleaning products serve as active ingredients. Diesel fuel is substituted with palm-based methyl esters for engines and vehicles (Foteinis et al., 2020; Hosseinzadeh-Bandbafha et al., 2022). Fatty alcohols are applied in the production of washing and cleaning products. Fatty nitrogen compounds are used in rust prevention products and in producing softeners. Glycerol are used as solvent for pharmaceutical products, stabilizers, humectants in cosmetics and tobacco, lubricants and antifreeze.

Palm Oil Industry in Malaysia

Oil palm tree originally came from West Africa and was grown and cultivated for hundreds of years in West Africa. Britain took it to Malaysia in 1870s as plant for ornament. A French man firstly planted it in commercial quantity in 1917 at Tennamaram Estate. There was a considerable increase in oil palm cultivation in the early 1960s, due to government programme which diversified agriculture and improved the oil palm plantation for reducing dependence of the economy on natural tin and rubber (Asad et al., 2019; Xu et al., 2018). The government purposely came up with a scheme of land settlement for the cultivation of oil palm, this was to eradicate poverty among the landless and poor communities. FELDA in 1961 in such scheme, began to cultivate oil palm on 375 hectares. The plantations were mostly meant for smallholder schemes and estate management system. Malaysia surpassed Nigeria in 1966 as the main exporter of palm oil globally (Gonzaga et al., 2020; Hosseinzadeh-Bandbafha et al., 2022).

Palm oil industry expansion began in 1970s in Sarawak and Sabah with large scale plantation. Malaysia has been transformed from the exporter of CPO into stage of refined products producing and exporting country (History of the Malaysian palm oil industry, n.d.). During 1980s, the government adopted a policy to malaysianize the largest three plantation companies which included Harrison, Guthrie and Cross-field (which later was named Golden Hope Plantations) and Sime Darby. European planters formed these companies from 19th to 20th centuries. First Industrial Master Plan (IMP) was introduced from 1986 to 1995, it put much emphasis to rationalize refining and fractionation for global competition. As a result of this, Malaysia became downstream processing centre (Mande & Diokno, 2023; Sutiman et

al., 2022). Malaysian companies were stimulated to produce and develop more value added downstream produces under the second IMP (1996-2005). This industry was focused to give much of its effort on oleo chemicals, biomass, biodiesel, biogas and explore market for palm oil under the third IMP (2006-2020). Palm oil was carefully chosen under the economic transformation programme (ETP) (2011-2020), to be among the 12 national key economic area.

Food for Human Consumption and Employment

The oil palm fruit yields the most important oil manufactured worldwide as vegetable oil, generating nearly sixty percent of global vegetable oil trade, and occupied one third of vegetable oil consumption. Palm oil is extracted from oil palm and is used worldwide in making numerous goods which included sweets, margarine, baked goods, detergents and cosmetics. Almost seventy-four percent of palm oil globally is used in making consumable goods, and twenty-four percent is used in industries (Handrianto et al., 2021; Muchlis & Nurcholis, 2018). From 1990 to date, due to high demand of palm oil in the EU, China, and India, the palm oil production has extended globally by around 43%.

Palm oil is imperative and highly multipurpose commodity, it is obtained in the majority of goods which were packaged in shopping centres, supermarkets, mall, markets etc. The products are ice cream, cooking oil, chocolates, margarine, cookies, soaps, detergents, cosmetics etc., and other products which included KitKat, Flora, Dove and Persil contained palm oil as part of their ingredients (Rieckhof & Guenther, 2018; Sudarto et al., 2023). The oil palm is a tree which originated from tropical forest of west Africa, over many decades, it has been gradually becoming a key of economic growth for developing economies. It is the most significant vegetable oil in terms of production, supply to global markets, and use in industries. Initially, it is applied in food and non-food uses, but now it is developed for biofuel, biogas, and biodiesel (D'amore et al., 2022; Rezzoug et al., 2019).

The palm oil industry contributes a lots to socio-economy of Malaysia such as: job opportunities, poverty eradication, income to farmers, good living and working condition. The industry employs five employees per hectare. There are 590,000 direct employees working under this industry in Malaysia which includes various Indonesian labourers, and the smallholders account for thirty-five percent of the manufacture. The palm oil industry in Indonesia employed 3.7 million workers working in downstream and the smallholders manufacture forty percent (Asad et al., 2019; Tohiran et al., 2023).

Income to Farmers and Raw Materials for Industries

Smallholders benefit significantly from oil palm production globally, as a result of its higher yields from its common products, labour and lands. The plantation of oil palm may serve as a choice for investment to farmers. This helps farmers not to destroy forest for pasture to feed their cattle, but to invest and benefit more dividend from the plantation (Alighiri et al., 2017; Hosseinzadeh-Bandbafha et al., 2022). Larger oil palm areas (4 ha) in Malaysia, yield fully and generates income of over 2.5 times more than minimum wages. In 2008 from oil palm plantation, the smallholders that were settled, manage and earn RM1386 as monthly income regardless of other incomes which were not included. This income exceeded RM529 as the line of national poverty ('Iffah et al., 2023; Kamara & Dadhabai, 2022).

Palm oil is very profitable and suitable for biodiesel and biofuel globally. It is among the most yielding and productive oil. The oil palm is able to provide ten percent of the entire dry biomass manufactured, while the 90% which remained may be used to produce biofuel. The biodiesel manufacturing from oil palm has been growing, predominantly in Latin America and Africa (Foteinis et al., 2020; Wong et al., 2020). As part of its main role, this

industry became a promoter of palm-based industries such as manufacturing of special fats, cocoa butter substitutes, oleo-chemicals, household detergents, soaps, nutraceuticals and extra in recent times as a feedstock for bio-energy. Sime Darby Berhad is the major palm-based biofuel producer in Malaysia and Netherland with production capacity of 290,000 tonnes annually (Dauer et al., 2021; Haj Kacem et al., 2018).

Poverty Alleviation and Rising Standard of Living

The price booming of palm oil commodity recently flooded, palm oil is aiding millions of people in Malaysia and Indonesia to move out from poverty, and assisting thousands of middle class in Indonesia in 2009 (Febrian & Yuza, 2023; Ginoga et al., 2019). According to previous study Malaysia government launched a new policy of land enlargement system called 'New Concept'. This policy was meant to grow oil palm plantation on land of 'Native Customary Rights' (NCR). In Sarawak, NCR lands were developed and expanded for oil palm plantation through the use of this investment (Febrian & Yuza, 2023; Muchlis & Nurcholis, 2018).

Palm oil is a vegetable oil extracted from the oil palm fruits. This oil palm became a foremost crop globally which originated from west Africa. Its products are applied in food consumption and other non-food use. The goods are advertised as favorable for making biofuel. Most of the oil palm production takes place in tropical areas of developing countries. Oil Palm production serves as a key source of income for the industry through exports and leads to economic development. Oil palm production helps in eradicating poverty, providing food security, raising rural community living standard, and promoting economic development (Asad et al., 2019; Hosseinzadeh-Bandbafha et al., 2022). Government provides the rural communities with supports and loans up to the maturity of their oil palm. After that, they are able to sell out their products, settle the loans and continue supporting their daily life needs. Government uses oil palm as a vehicle in the rural areas to improve their standard of living. This policy was applied and the level of poverty in agriculture was decreased by 21.2% (Dahliah & Nur, 2021; Krisnawati, 2022).

Renewable Energy Sector

Renewable energy sector obviously became an advantage to be constructed in the world due to its importance. From 2006 to 2016, the sources of renewable energy indicated a significant result, and it increased with big capacity. The contemporary renewable energy namely winds, solar, etc., generated about ten percent of global energy, while the biomass is utilized primarily for cooking and eating in faraway, especially in rural areas in developing countries, and is equal to 9.1% (Jemal & Haile, 2019; Mao et al., 2019). Palm oil could be processed to produce bio-fuel. It is perfect position for Malaysia to be a major global front-runner and generator of renewable energy. These biofuel and renewable energy are significant on Malaysian economy and environment. Due to the increasing needs of energy necessitated by increase in world population, this completely became important for the people to use renewable energy. Palm oil helps to alleviate energy problem (Anggraini et al., 2017; Foteinis et al., 2020). Palm oil became a vital source for sustainable and renewable energy, this made it different from other vegetable oils.

The quality of B5 is recognized as 'Envo-Diesel' as pure biofuel which could compete with diesel fuel. Whereas relating the two, biodiesel contained oxygen which reduces volatility, higher viscosity, and it has a narrow boiling range, while diesel fuel does not have (Hosseinzadeh-Bandbafha et al., 2022; Wong et al., 2020). According to research, diesel could be mixture with palm oil. Biodiesel was confirmed that, it could substitute diesel and perform almost equal without alterations in a variable compression ratio engine (Hosseinzadeh-Bandbafha et al., 2022). According to other research conducted used biodiesel

instead of diesel, this indicated B5 made a slightly lower brake power than normal diesel, less CO, HC, Nox emissions, and slightly higher CO2 emissions (Foteinis et al., 2020). Consequently, biofuel performance is equal with diesel fuel. Currently biodiesel can be a substitute for traditional diesel fuel. The main benefit is unnecessary to mention; this could be manufactured for long. Biodiesel has assessable advantages of reducing emitted levels of CO2, CO and THC, which are common greenhouses gases, if compared with traditional diesel fuel (Hosseinzadeh-Bandbafha et al., 2022).

Contribution to Economic Development

The global palm oil manufacture enlarged to 45.1 million tonnes from 1980 to 2009 as a result of supplying to key markets. The top ten plantation companies in Malaysia owned 2.3 million hectares of plantations and US$79.1 billion capital (Bek-Nelson, 2010). The oil palm-based agricultural growth in Southeast Asia, in particular Malaysia and Indonesia became a key driver of agricultural diversification and development. Malaysia and Indonesia are the largest producers of palm oil globally, and in 1960 they were dependent on rubber production. Nevertheless, resulting in decline of rubber prices, the economy of Malaysia was diversified from rubber to palm oil production (Ginoga et al., 2019; Tohiran et al., 2023). The World Bank mission recommended this diversification which led to FELDA formation in July 1956. This came with twin goals of diversifying the economy and relocating poor and landless native communities. Nowadays, FELDA has oil palm plantations with 720,000 ha, and resettled 112,635 landless people. Palm oil industry is the fourth major contributing sector to Malaysian economy with RM53 billion as GNI.

Palm oil industry also played major roles in the socio-economy of Malaysia. It became the fourth main contributing sector of the gross national income, as it contributed RM63 billions of GNI in 2015. As stated earlier, Malaysian palm oil exports in 2016, generated the sum of revenue of RM67.6 billion. Palm oil industry serves as a leading driver in Malaysia, and it became the fourth major sector which contributes to the socio-economy of Malaysia (Magomedkhan & Sadovoy, 2021; Malik & Janowska, 2018). Hundreds years ago, the plantation expanded and initiated manufacturing of oil palm. Malaysia produces the highest yielding FFB annually. The Malaysian Palm Oil Board (MPOB) regulates the industry with policies, guidelines and practices. Government and big private plantation companies control the palm oil industry. In 2009, there were 4.7 million hectares of oil palm plantations. The smallholders independently possessed an important segment of oil palm estate correspondingly (Hosseinzadeh-Bandbafha et al., 2022; Lee et al., 2013).

Palm oil industry serves as a key contributor to gross domestic product in Malaysia. In Malaysia and Indonesia, oil palm production is very significant to economy especially to native communities in rural areas. It accounts to 3.2% to GDP in Malaysia, and 6% to GDP in Indonesia. It contributes to economic development through exports to global palm oil markets. Palm oil industry plays a main role and became the promoter of growth of palm-based industry in manufacturing of special fats, cocoa butter substitutes, nutraceuticals, oleo-chemicals, household detergents, soaps, and feedstock for bioenergy (Asad et al., 2019; Xu et al., 2018). In Malaysia and Netherlands, Sime Darby Berhad is major palm-based biofuel producer with manufacturing capacity of 290,000 tonnes annually.

The findings of this research have significant implications for both policymakers and education systems. By highlighting the central role of the palm oil industry in Malaysia’s socioeconomic development, it underscores the need to incorporate this sector into educational curricula, particularly in economics, sustainability, and agricultural studies. Educating students about the industry’s economic, environmental, and social impacts can foster a deeper understanding of sustainable development practices and encourage critical thinking about balancing industrial growth with environmental conservation. Additionally,

the challenges related to land constraints and sustainability in palm oil production emphasize the importance of preparing future generations to innovate solutions that mitigate negative effects while maximizing the sector's benefits. Ultimately, this research advocates for a more integrated approach to education, equipping students with the knowledge to contribute to both economic progress and environmental sustainability.

4. CONCLUSION

In conclusion, one can understand the role of the palm oil industry in the socio-economy of Malaysia. The Malaysian economy has been diversified and industrialized, especially in agriculture, capital goods, refined crude oil, machines, and electrical appliances, which it exports to other countries. This paper attempts to bridge the gap and add to the knowledge of the palm oil industry's role in the socio-economy of Malaysia, such as food security, rising standards of living, employment, poverty alleviation, raw materials for industries, renewable energy, contributions to gross domestic product, gross national income, as well as national economic development, among others. The findings have significant implications for education systems, suggesting the need to integrate the palm oil industry's contributions into curricula, particularly in fields like economics, sustainability, and agriculture. Educating students about the industry's economic, environmental, and social impacts can foster critical thinking on sustainable practices while preparing them to address the challenges of land constraints and sustainability in palm oil production. Ultimately, this research advocates for a more integrated approach to education that equips students to contribute to both economic development and environmental sustainability. In recommendation, this paper emphasizes the importance of sustainability and best management practices, which would further improve the palm oil industry in Malaysia.

5. REFERENCES

'Iffah, A., Suliyanto, S., Sediono, S., Saifudin, T., Ana, E., & Amelia, D. (2023). Poverty Modeling in Indonesia: a Spatial Regression Analysis. *Economics Development Analysis Journal*, *12*(4). https://doi.org/10.15294/edaj.v12i4.66027

Abdinoor, N. M. (2020). Socio-economic status, career decision-making self-efficacy, career maturity, and gender with secondary school students in northern Kenya. *International Journal of Multidisciplinary and Current Educational Research*, *2*(4), 160–167. https://www.ijmcer.com/wp-content/uploads/2020/08/IJMCER_S02401600167.pdf

Alam, M. N., Alam, M. S., & Chavali, K. (2020). Stock market response during COVID-19 lockdown period in India: An event study. *Journal of Asian Finance, Economics and Business*, *7*(7), 131–137. https://doi.org/10.13106/jafeb.2020.vol7.no7.131

Alighiri, D., Eden, W. T., Supardi, K. I., Masturi, & Purwinarko, A. (2017). Potential Development Essential Oil Production of Central Java, Indonesia. *Journal of Physics: Conference Series*, *824*(1). https://doi.org/10.1088/1742-6596/824/1/012021

Amusan, A., Idowu, A., & Arowolo, F. (2005). Comparative toxicity effect of bush tea leaves (Hyptis suaveolens) and orange peel (Citrus sinensis) oil extract on larvae of the yellow fever mosquito Aedes aegypti. *Tanzania Journal of Health Research*, *7*(3), 174–178. https://doi.org/10.4314/thrb.v7i3.14256

Anggraini, A., Yuningsih, S., & Sota, M. M. (2017). Pengaruh pH Terhadap Kualitas Produk Etanol Dari Molasses Melalui Proses Fermentasi. *Jurnal Reka Buana*, *2*(2), 99–105. https://doi.org/https://doi.org/10.33366/rekabuana.v2i2.725

Asad, M. M., Hassan, R. Bin, Sherwani, F., Abbas, Z., Shahbaz, M. S., & Soomro, Q. M. (2019). Identification of effective safety risk mitigating factors for well control

drilling operation: An explanatory research approach. *Journal of Engineering, Design and Technology*, *17*(1), 218–229. https://doi.org/10.1108/JEDT-04-2018-0068

Besson, M., Berger, S., Tiruta-barna, L., Paul, E., & Spérandio, M. (2021). Environmental assessment of urine, black and grey water separation for resource recovery in a new district compared to centralized wastewater resources recovery plant. *Journal of Cleaner Production*, *301*(1), 126868. https://doi.org/https://doi.org/10.1016/j.jclepro.2021.126868

Burki, M. A. K., Burki, U., & Najam, U. (2021). Environmental degradation and poverty: A bibliometric review. In *Regional Sustainability* (Vol. 2, Issue 4, pp. 1–21). https://doi.org/10.1016/j.regsus.2022.01.001

Corsini, L., & Giannelli, G. C. (2021). Economics education and financial literacy acquisition: Evidence from a field experiment. *Journal of Behavioral and Experimental Finance*, *32*. https://doi.org/10.1016/j.jbef.2021.100556.

D'amore, G., Di Vaio, A., Balsalobre-Lorente, D., & Boccia, F. (2022). Artificial Intelligence in the Water–Energy–Food Model: A Holistic Approach towards Sustainable Development Goals. *Sustainability (Switzerland)*, *14*(2), 1–16. https://doi.org/10.3390/su14020867

Dahliah, D., & Nur, A. N. (2021). The influence of unemployment, human development index and gross domestic product on poverty level. *Golden Ratio of Social Science and Education*, *1*(2), 95–108. https://doi.org/10.52970/grsse.v1i2.84

Dauer, J. M., Sorensen, A. E., & Wilson, J. (2021). Students' Civic Engagement Self-Efficacy Varies Across Socioscientific Issues Contexts. *Frontiers in Education*, *6*(May), 1–14. https://doi.org/10.3389/feduc.2021.628784

Febrian, R. A., & Yuza, A. F. (2023). Plantation Sector Policy Governance by the Regional Government of Riau Province (Leading Commodities Study). *Jurnal Ilmiah Peuradeun*, *11*(1), 345. https://doi.org/10.26811/peuradeun.v11i1.802

Foteinis, S., Chatzisymeon, E., Litinas, A., & Tsoutsos, T. (2020). Used-cooking-oil biodiesel: Life cycle assessment and comparison with first- and third-generation biofuel. *Renewable Energy*, *153*, 588–600. https://doi.org/https://doi.org/10.1016/j.renene.2020.02.022

Ginoga, L. N., Santosa, Y., & Mutmainnah, A. R. (2019). The loss, gain, and diversity of butterfly species due to the development of PT PKWE oil palm plantation, West Kalimantan Province. *IOP Conference Series: Earth and Environmental Science*, *336*(1). https://doi.org/10.1088/1755-1315/336/1/012025

Gonzaga, M., Manda, A., Pawirodiharjo, L., & Hb, S. (2020). Pemanfaatan Energi Angin akibat Laju Kendaraan Berbasis Pengembangan Inovasi Teknologi Hybrid Vertical Axis Wind Turbine sebagai Penghasil Listrik untuk Mewujudkan Ketahanan Energi Nasional. *Jurnal Offshore: Oil, Production Facilities and Renewable Energy*, *4*(1). https://doi.org/10.30588/jo.v4i1.721

Haj Kacem, S., Galai, S., Pérez de los Ríos, A., Hernández Fernández, F. J., & Smaali, I. (2018). New efficient laccase immobilization strategy using ionic liquids for biocatalysis and microbial fuel cells applications. *Journal of Chemical Technology and Biotechnology*. https://doi.org/10.1002/jctb.5337

Handrianto, C., Rasool, S., Rahman, M. A., Musta`in, M., & Ilhami, A. (2021). Teachers` Self-Efficacy and Classroom Management in Community Learning Centre (CLC) Sarawak. *SPEKTRUM: Jurnal Pendidikan Luar Sekolah (PLS)*, *9*(2), 154. https://doi.org/10.24036/spektrumpls.v9i2.111963

Hill, H. (2021). What's happened to poverty and inequality in indonesia over half a century? *Asian Development Review*, *38*(1), 68–97. https://doi.org/10.1162/adev_a_00158

Hosseinzadeh-Bandbafha, H., Nizami, A.-S., Kalogirou, S. A., Gupta, V. K., Park, Y.-K.,

Fallahi, A., Sulaiman, A., Ranjbari, M., Rahnama, H., Aghbashlo, M., Peng, W., & Tabatabaei, M. (2022). Environmental life cycle assessment of biodiesel production from waste cooking oil: A systematic review. *Renewable and Sustainable Energy Reviews*, *161*, 112411. https://doi.org/https://doi.org/10.1016/j.rser.2022.112411

Jemal, A. N., & Haile, M. G. (2019). Comprehensive Review of Pump as Turbine. *Renewable Energy and Sustainable Development*, *5*(2), 68. https://doi.org/10.21622/resd.2019.05.2.068

Jie, G., & Jiahui, L. (2023). Media attention, green technology innovation and industrial enterprises' sustainable development: The moderating effect of environmental regulation. *Economic Analysis and Policy*, *79*, 873–889. https://doi.org/10.1016/j.eap.2023.07.003

Kamara, S. S., & Dadhabai, S. (2022). Assessment Factors Influencing Students' Academic Achievement. *Journal of Management Information & Decision Sciences*, *25*(1), 1–13. https://search.ebscohost.com/login.aspx?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=15247252&AN=154576612&h=ate4EgdNeUzun3NoY3nNY0tEgVjhF6fm3v0HYb3vIlcWV6K3eWLgp48qK6Q1WS2PyhfKlS%2B1milUG7TfVCwZSQ%3D%3D&crl=c

Kehinde, O. J., Abiodun, A. J., Adegbuyi, O., & Oladimeji, H. (2016). Small and Medium Scale Enterprises: Pivotal to Sustainable Economic Development: The Nigerian Experience. *International Journal of Current Research*, *8*(1). https://www.ajol.info/index.php/afrrev/article/view/60249/48494

Krisnawati, E. (2022). Meritokrasi Dalam Film Parasit. *Jurnal Komunikatif*, *11*(1), 104–117. https://doi.org/10.33508/jk.v11i1.3387

Kunyanti, W. R., Anah, S., & Mujiono, M. (2021). Community Empowerment-based Corporate Social Responsibility Program in Panglima Raja Village. *International Journal on Social Science, Economics and Art*, *11*(1), 12–19. https://doi.org/10.35335/ijosea.v10i1.2

Lee, L. S., Huang, S. L., & Hsiao, S. Y. (2013). Consumer perceived service quality of essential oil stores. *The Journal of Human Resource and Adult Learning*, *9*(2), 184. https://search.proquest.com/openview/af100cf8da9cbe86a798ed68a590d251/1.pdf?pq-origsite=gscholar&cbl=406315

Lim, J. A. (2020). The Philippine economy during the COVID pandemic. *Ateneo Center Econ Res Dev*, *16*, 1–28. https://www.ateneo.edu/sites/default/files/2022-06/ADMU WP 2020-16.pdf

Magomedkhan, M. M., & Sadovoy, A. N. (2021). Ethno-social consequences of the depopulation of mountain regions: Dagestan and North Ossetia. In *History, Archeology and Ethnography of the Caucasus* (Vol. 17, Issue 2). https://doi.org/10.32653/CH172507-522

Malik, R., & Janowska, A. A. (2018). Megatrends and their use in economic analyses of contemporary challenges in the world economy. *Prace Naukowe Uniwersytetu Ekonomicznego We Wrocławiu*, *523*, 209–220. https://doi.org/10.15611/pn.2018.523.18

Mande, R. C., & Diokno, J. P. (2023). Vision, Mission, Goals and Objectives of Bachelor Of Industrial Technology And Graduate School Programs Of Marikina Polytechnic College: Stakeholders Awareness And Acceptability. *International Multidisciplinary Research Journal*, *5*(1), 76–81. https://doi.org/10.54476/ioer-imrj/558148

Manzoor, F., Wei, L., Nurunnabi, M., Subhan, Q. A., Shah, S. I. A., & Fallatah, S. (2019). The impact of transformational leadership on job performance and CSR as mediator in SMEs. *Sustainability (Switzerland)*, *11*(2), 1–14. https://doi.org/10.3390/su11020436

Mao, Y., Liu, K., & Zhou, J. (2019). Evolution of green industrial growth between Europe and China based on the energy consumption model. *Sustainability (Switzerland)*, *11*(24), 1–15. https://doi.org/10.3390/SU11247168

Medeiros, K. E., Damadzic, A., & Tromp, C. (2023). A sociocognitive perspective of constraints and creativity. In R. Reiter-Palmon & S. Hunter (Eds.), *Handbook of Organizational Creativity (Secon Editon)* (pp. 161–170). Academic Press Inc. https://doi.org/https://doi.org/10.1016/B978-0-323-91841-1.00008-7

Meixner, C., & Hathcoat, J. D. (2019). The nature of mixed methods research. In *Handbook of Research Methods in Health Social Sciences* (pp. 51–70). https://doi.org/10.1007/978-981-10-5251-4_76

Mitter, H., Techen, A. K., Sinabell, F., Helming, K., Schmid, E., Bodirsky, B. L., Holman, I., Kok, K., Lehtonen, H., Leip, A., Le Mouël, C., Mathijs, E., Mehdi, B., Mittenzwei, K., Mora, O., Øistad, K., Øygarden, L., Priess, J. A., Reidsma, P., … Schönhart, M. (2020). Shared Socio-economic Pathways for European agriculture and food systems: The Eur-Agri-SSPs. *Global Environmental Change*, *65*(December 2019), 102159.1-13. https://doi.org/10.1016/j.gloenvcha.2020.102159

Mogas, J., Palau, R., Fuentes, M., & Cebrián, G. (2022). Smart schools on the way: How school principals from Catalonia approach the future of education within the fourth industrial revolution. *Learning Environments Research*, *25*(3), 875–893. https://doi.org/10.1007/s10984-021-09398-3

Muchlis, D., & Nurcholis. (2018). Sustainable Livestock Development in the Border of Merauke Region Based on Environment. *E3S Web of Conferences*, *73*. https://doi.org/10.1051/e3sconf/20187303010

Rezzoug, M., Bakchiche, B., Gherib, A., Roberta, A., Guido, F., Kilinçarslan, Ö., Mammadov, R., & Bardaweel, S. K. (2019). Chemical composition and bioactivity of essential oils and Ethanolic extracts of Ocimum basilicum L. and Thymus algeriensis Boiss. & Reut. from the Algerian Saharan Atlas. *BMC Complementary and Alternative Medicine*, *19*(1), 1–10. https://doi.org/10.1186/s12906-019-2556-y

Rieckhof, R., & Guenther, E. (2018). Integrating life cycle assessment and material flow cost accounting to account for resource productivity and economic-environmental performance. *International Journal of Life Cycle Assessment*, *17*, 1725–1737. https://doi.org/10.1007/s11367-018-1447-7

Ritonga, Z. A. (2021). The Impact Of Manpower Education And Government Expenditure On Education Sector On Economic Growth Of Labuhanbatu Regency. *Quantitative Economics Journal*, *9*(2). https://doi.org/10.24114/qej.v9i2.23576

Simnica, M. (2021). The role of behavioral economics on consumption and consumer choice behavior. *The Behavior Analyst / MABA*, *10*(1), 83–89. https://doi.org/10.0001/IJLLIS.V10I1.2159.

Sritabutra, D., Soonwera, M., Waltanachanobon, S., & Poungjai, S. (2011). Evaluation of herbal essential oil as repellents against Aedes aegypti (L.) and Anopheles dirus Peyton & Harrion. *Asian Pacific Journal of Tropical Biomedicine*, *1*(1), S124-S128. https://doi.org/10.1016/S2221-1691(11)60138-X

Sudarto, G., Santoso, M. T., & Kusuma, H. O. (2023). *Advanced Development of PLC Trainer Products as Facilities in the Control Engineering Laboratory* (Vol. 1). Atlantis Press SARL. https://doi.org/10.2991/978-2-38476-008-4_114

Sułkowski, Ł., Kolasińska-Morawska, K., Seliga, R., & Morawski, P. (2021). Smart learning technologization in the economy 5.0—the polish perspective. *Applied Sciences (Switzerland)*, *11*(11). https://doi.org/10.3390/app11115261

Sutiman, S., Sofyan, H., Arifin, Z., Nurtanto, M., & Mutohhari, F. (2022). Industry and Education Practitioners' Perceptions Regarding the Implementation of Work-Based

Learning through Industrial Internship (WBL-II). *International Journal of Information and Education Technology*, *12*(10), 1090–1097. https://doi.org/10.18178/ijiet.2022.12.10.1725

Tohiran, K. A., Nobilly, F., Zulkifli, R., Yahya, M. S., Norhisham, A. R., Rasyidi, M. Z., & Azhar, B. (2023). Multi-species rotational grazing of small ruminants regenerates undergrowth vegetation while controlling weeds in the oil palm silvopastoral system. *Agricultural Systems*, *210*(September), 103720.1-12. https://doi.org/10.1016/j.agsy.2023.103720

Tolppanen, S., Kang, J., & Tirri, K. (2023). Climate competencies of finnish gifted and average-ability high school students. *Education Sciences*, *13*(8), 1–15.

Urwick, J. (2022). Dimensions of inequality in children's literacy and numeracy in Uganda: Evidence from a household-based assessment. *International Journal of Educational Development*, *88*. https://doi.org/10.1016/j.ijedudev.2021.102525

Uwizeye, D., Irambeshya, A., Wiehler, S., & Niragire, F. (2022). Poverty profile and efforts to access basic household needs in an emerging city: A mixed-method study in Kigali's informal urban settlements, Rwanda. *Cities & Health*, *6*(1), 98–112. https://doi.org/10.1080/23748834.2020.1764301

Wong, C. Y., Lim, J. W., Chong, F. K., Lam, M. K., Uemura, Y., Tan, W. N., Bashir, M. J., Lam, S. M., Sin, J. C., & Lam, S. S. (2020). Valorization of exo-microbial fermented coconut endosperm waste by black soldier fly larvae for simultaneous biodiesel and protein productions. *Environmental Research*, *185*, 109458. https://doi.org/10.1016/j.envres.2020.109458

Xu, M., David, J. M., & Kim, S. H. (2018). The fourth industrial revolution: Opportunities and challenges. *International Journal of Financial Research*, *9*(2), 90–95. https://doi.org/10.5430/ijfr.v9n2p90

Zaman, A. U. (2014). Measuring waste management performance using the "Zero Waste Index": The case of Adelaide, Australia. *Journal of Cleaner Production*, *66*, 407–419. https://doi.org/10.1016/j.jclepro.2013.10.032