

HOW DOES

Malaysian Palm Oil  
SUPPORT THE UN SDGs



Malaysian Palm Oil (MPO)

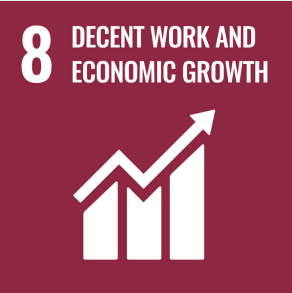


- Malaysia - second leading producer of palm oil worldwide.
- Palm oil is an edible vegetable oil extracted from the pulp of the fruit of oil palm species *Elaeis guineensis*.
- It is used in a lot of products such as foods, soaps, cosmetics and fuels.



- A universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030 [1].
- 17 SDGs are integrated.
- Development must balance social, economic and environmental sustainability.

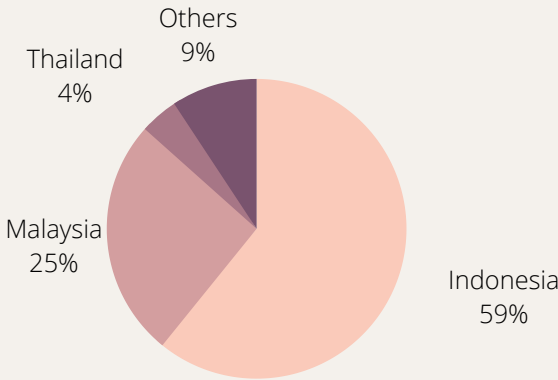
Contribution of MPO to UN SDGs



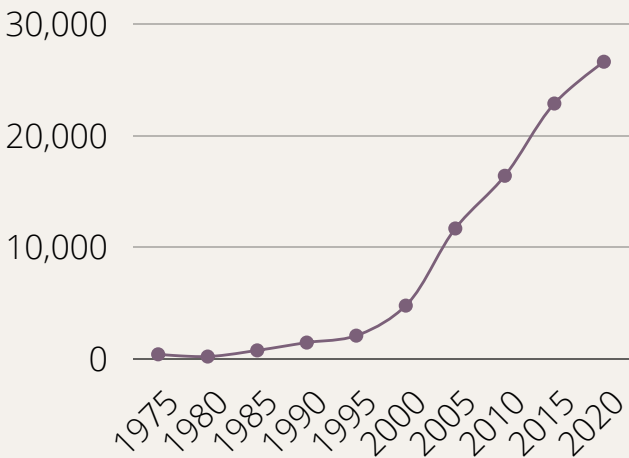
- Malaysia is the 2nd largest palm oil producer, with 25% of world total production in 2022 [2].
- Palm oil contributes 2.7% to Malaysia's overall GDP [3].
- Continuous increasing PO export value to around 26655 thousand million tons in 2020 [4].
- 90% of palm oil production is exported, making it the main source of foreign exchange earnings [4].



World Palm Oil Production 2022



Malaysia Palm Oil Exports (1000 MT)



- Malaysian palm oil industry bring better income to plantation owners and smallholders [5].
- 99.7% of palm oil smallholders have income above the national poverty level [6].



- Palm oil:
- The cheapest vegetable oil [7]
  - Good substitute for more expensive dairy fats [5]
- Improved income from MPO industry reduce poverty, thus eliminating hunger [8].

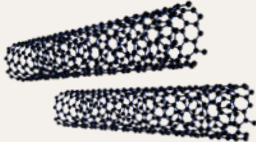


- Increase accessibility to education for children especially in rural areas resulted from [5]:
- Improved infrastructure development
  - Sustainable source of income
- Over 90% of oil palm smallholders attained at least primary education [6].

Potential of MPO Industry



- Graphene:
- Thin layer carbon material with excellent thermal conductivity, mechanical strength, and surface area.
  - 'Miracle material' that has applications in environment, energy, and biomedical fields.



It can be produced from palm kernel shell which cost significantly lower than current graphene production [9].

References

1. 2022 United Nations Development Programme. (n.d.). Sustainable development goals: United Nations Development Programme. UNDP. Retrieved from <https://www.undp.org/sustainable-development-goals>

2. Foreign Agricultural Service, U.S. Department of Agriculture. (2022). Palm Oil 2022 World Production. International Production Assessment Division (IPAD). Retrieved from <https://ipad.fas.usda.gov/cropexplorer/cropview/commodityView.aspx?cropid=4243000>

3. Hirschmann, R. (2022). Palm oil industry in Malaysia - statistics and facts. Statista. Retrieved from <https://www.statista.com/topics/5814/palm-oil-industry-in-malaysia/#dossierKeyfigures>

4. Ziaei, S. M., & Ali, I. (2021). Commodity exports and macroeconomic performance: The case of palm oil in Malaysia. Cogent Economics & Finance, 9(1), 1901388.

5. Azharuddin, A. Z. N. (2021). 9 UNSDG goals reinforced by MSPO. MPOCC. Retrieved from <https://www.mpocc.org.my/mpo-blogs/9-unsdg-goals-reinforced-by-mspo>

6. Applanaidu, S. D., Abidin, N. Z., Abdullahi, M. B., Mustapha, M., & Viandrito, J. (2022). The Oil Palm Industry and Sustainable Development Goals Agenda: Evidence from the Socio-economic Profiles of Smallholders in Johor, Malaysia. Journal of Positive School Psychology, 6(3), 9724-9740.

7. Mardiharini, M., Azahari, D. H., Chaidirsyah, R. M., & Obaideen, K. (2021). Palm oil industry towards Sustainable Development Goals (SDGs) achievements. In IOP Conference Series: Earth and Environmental Science (Vol. 892, No. 1, p. 012068). IOP Publishing.

8. Mohd Hanafiah, K., Abd Mutalib, A. H., Miard, P., Goh, C. S., Mohd Sah, S. A., & Ruppert, N. (2021). Impact of Malaysian palm oil on sustainable development goals: co-benefits and trade-offs across mitigation strategies. Sustainability science, 1-23.

9. Madurani, K. A., Suprpto, S., Nur Izzat, M., Bahar, S. L., Illiya, W., Kurniawan, F. (2020). Progress in Graphene Synthesis and its Application: History, Challenge and the Future Outlook for Research and Industry. ECS Journal of Solid State Science and Technology, Volume 9, Number 9.



UMS  
UNIVERSITI MALAYSIA SABAH



Transformation towards  
UNIVERSITY  
INDUSTRY 4.0

# Achieving SDGs through the Sustainable Transformation of Palm Oil Industry in Malaysia



## Background Profile

25.8%  
global production

34.3%  
global exports

5.83 mil  
hectare  
palm oil plantation

451  
palm oil  
mills  
across Malaysia

38.0%  
of national  
agricultural  
output

[1,2]

## Contributions towards Sustainable Development Goals



About  
500k  
employed labourers<sup>[3]</sup>



4<sup>th</sup> highest  
exported product  
contributing USD 7.8 bil<sup>[4]</sup>

Most  
efficient  
oilseed



in terms of oil yield & land utilization<sup>[4]</sup>

2  
ZERO  
HUNGER



12  
RESPONSIBLE  
CONSUMPTION  
AND PRODUCTION



Waste valorization in  
palm oil value chain  
reduces national palm waste  
(fuel pellets &  
bio-fertilizers)<sup>[5]</sup>



B10  
mandate  
for transportation sector

On average, Malaysia's  
palm biodiesel plants have  
90 ktonnes/year  
annual operating capacity<sup>[6]</sup>



7  
AFFORDABLE AND  
CLEAN ENERGY



13% GHG  
reduction

Biogas recovery from  
POME & palm  
biodiesel utilization  
for transportation<sup>[7]</sup>



13  
CLIMATE  
ACTION



15  
LIFE  
ON LAND



Conversion ban of  
forest reserved areas  
for palm cultivation

## Policies and Regulations for Circular Economy



ZERO  
burning policy  
in plantation



2014 Environmental  
Quality (Clean Air)  
Regulation  
mandated air  
pollution control



Environmental Quality  
(Crude Palm Oil)  
Regulations 1977  
standardized POME  
discharge limit



7 principles  
of MSPO  
standards

## Future Pathways for Sustainability Transformation



Governance

- Constant monitoring and auditing for best practices in palm oil industry
- Mandatory accounting for GHG emissions to lay foundation for carbon trading



Economy &  
Finance

- Encouragement of foreign direct investments and technology transfer
- Fiscal incentives on green technology application



Collective  
Action from  
Stakeholders

- Collective action plan layouts for inclusive social protection, just economy, and environmental protection
- Optimization of by-product utilization for resource efficiency and energy saving



Science &  
Technology

- Research improvement on gene pool variety of the oil palm crop, carbon sink potential of the plantation, and energy generation efficiency from palm waste
- Application of 4IR technology such as remote sensor device to trace burning activities

Phuang Zhen Xin & Hoy Zheng Xuan

School of Energy and Chemical Engineering

XIAMEN UNIVERSITY MALAYSIA

廈門大學馬來西亞分校

Scan to see  
references!



IPOSC  
INTERNATIONAL PALM OIL  
SUSTAINABILITY CONFERENCE 2022

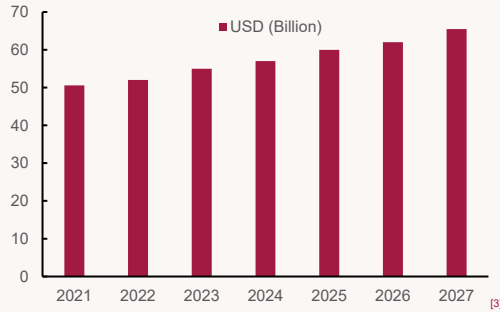
ICHEM E  
Palm Oil Processing  
Special Interest Group





# Sustainable Malaysian Palm Oil

**8 DECENT WORK AND ECONOMIC GROWTH**



Global Palm Oil Industry Market Size from 2021 – 2027 (CAGR of 4.3%) [3]

As the 2<sup>nd</sup> largest exporter of palm oil, Malaysia is expected to have a decent work and economic growth as the market size of palm oil industry continues to grow.

**1 NO POVERTY**



**27%** of the World Palm Oil Production (20 Million Tonnes Annually)

Contributed **2.7%** of Malaysia's GDP in 2020

Alleviating poverty among Malaysians especially in rural areas by providing **job opportunities** in the palm oil plantations and mills.

[10]

**7 AFFORDABLE AND CLEAN ENERGY**



**210 GWh** of Energy Produced from Biogas Plants

- Biogas produced through anaerobic digestion of POME (wastewater from palm oil mill) is a renewable energy.
- Mature and commercialized technologies lower the cost of biogas generation for palm oil mills and excess energy can be sold back to the grid.

[4]

**12 RESPONSIBLE CONSUMPTION AND PRODUCTION**



**62.5 Million m<sup>3</sup>**

Palm Oil Mill Effluent (POME) Generated Annually

- Circular economy in the palm oil industry can be adapted by using anaerobic digestion CSTR system for converting POME to biogas for electricity and sludge as biofertilizer.
- Composting 1.2kg of anerobic POME sludge per 1kWh of energy can prevent eutrophication.

[8]

**2 ZERO HUNGER**



Red Palm Oil is known to be rich with **Vitamin E (Tocotrienols)**

as it retains **80%** of its vitamins and carotenoids. Benefits of it on human trials still need to be studied.

[5]

**9 INDUSTRY, INNOVATION AND INFRASTRUCTURE**



Malaysia loss **RM10.86 Billion** in the first five months of 2022 due to **worker shortage**. **Automation** in plantation such using drones for surveillance and pest control could provide a solution while contributing to SDG 9.

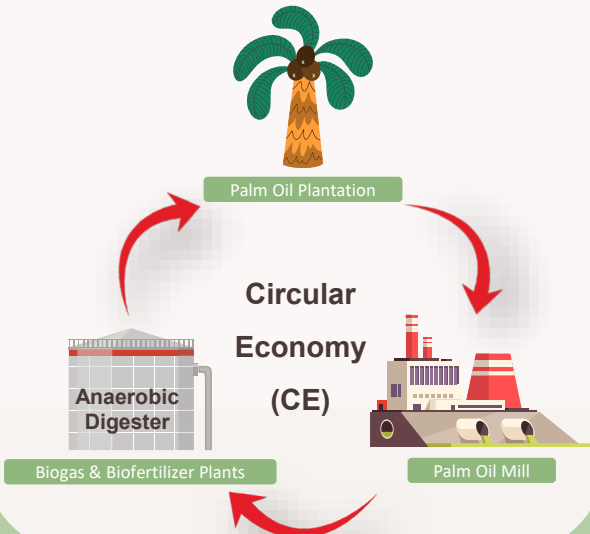
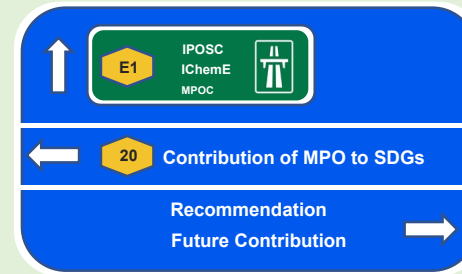
[1] [7]

**13 CLIMATE ACTION**



More detailed environmental and bioeconomic impacts of sustainable vs. conventional palm oil production are needed to access its sustainable management. Life Cycle Assessment (LCA) of the Palm Oil may not be sufficient as Palm Oil production's impact on the environment is harder to quantify.

[5]



## Examples of Malaysian Palm Oil Industrial Players Contributing to SDGs



**NDPE**

No Deforestation, no development of Peat for new planting and no Exploitation of human labour



First Plantation company in Malaysia to install a biogas plant and a biomass boiler



Malaysian Palm Oil Certification Council for MSPO certification

As in March 2021,

**6729 502.15 ha** of palm oil area are certified

involving **573** mills, refineries and plantations



[2] [6]

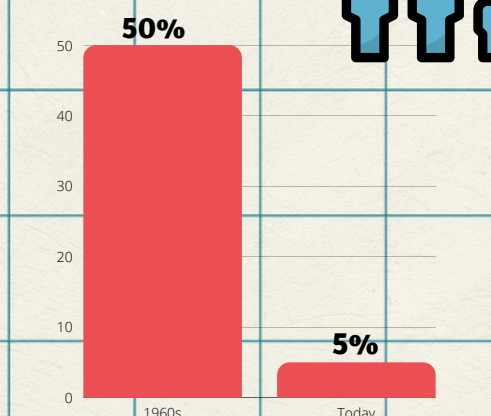
### References

- Bernama. (2022, June 18). Ministry: Increase automation in plantation sector to address labour shortage. *Malay Mail*. Retrieved August 25, 2022, from <https://www.malaymail.com/news/malaysia/2022/06/18/ministry-increase-automation-in-plantation-sector-to-address-labour-shortage/12960>.
- History and milestones at United Plantations. United Plantations Berhad. (n.d.). Retrieved August 26, 2022, from <https://unitedplantations.com/history-milestones/>.
- Imaregroup. (2021). Palm Oil Market: Global Industry Trends, Share, Size, Growth, Opportunity and Forecast 2022-2027. Retrieved August 25, 2022, from <https://www.imaregroup.com/palm-oil-processing-plant>.
- Jain, S. (2019). World Biogas Association Market Report Malaysia. Retrieved August 25, 2022, from [http://www.worldbiogasassociation.org/wp-content/uploads/2019/03/WBA-malaysia-dppad\\_v1.pdf](http://www.worldbiogasassociation.org/wp-content/uploads/2019/03/WBA-malaysia-dppad_v1.pdf).
- Mohd Hanafiah, K., Abd Mutalib, A. H., Mian, P., Goh, C. S., Mohd Sah, S. A., & Ruppert, N. (2021). Impact of Malaysian palm oil on Sustainable Development Goals: Co-benefits and trade-offs across Mitigation Strategies. *Sustainability Science*, 17(4), 1639–1661. <https://doi.org/10.1007/s11625-021-01052-4>.
- MPOCC. (n.d.). MSPO trace. Retrieved August 26, 2022, from <https://mspoctrace.org.my/>.
- Home Ong, S. (2022, July 19). Plantation industry suffers RM10.46 bl loss in five months due to lack of workers. *The Edge Market*. Retrieved August 25, 2022, from <https://www.theedgemarkets.com/article/plantation-industry-suffers-rm1046-bl-loss-five-months-due-lack-workers-text-KUALA%20LUMPUR%20July%2019%3ACommodities%20Minister%20Dua%20urad%20Kamarudin>.
- Sharvini, S. R., Noor, Z. Z., Stringer, L. C., Afonis, S., & Chong, C. S. (2022). Energy generation from palm oil mill effluent: A life cycle cost-benefit analysis and policy insights. *Renewable and Sustainable Energy Reviews*, 156, 111990. <https://doi.org/10.1016/j.rser.2021.111990>.
- United Nations. (2018). The 2030 Agenda and the Sustainable Development Goals: An opportunity for Latin America and the Caribbean (LCG, 2681-P/Rev. 3). Santiago. Retrieved August 25, 2022 from [https://repositorio.cepal.org/bitstream/handle/11362/40156/2/S1801140\\_es.pdf](https://repositorio.cepal.org/bitstream/handle/11362/40156/2/S1801140_es.pdf).
- Ritchie, H., and Roser, M. (2021). "Forests and Deforestation". Retrieved 25 August 2022, from: <https://ourworldindata.org/forests-and-deforestation>

SCAN FOR INTERESTING VIDEO



# PALM OIL: MALAYSIANS' HERO



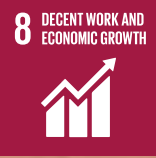
Palm oil has played an important role in reducing poverty in Malaysia from 50% in the 1960s to less than 5% today [1]



Small farmers who have benefited from oil palm cultivation account for 40% of all palm oil plantations in Malaysia [1]



The palm oil industry directly employs over 570,000 people, with another 290,000 employed downstream [1]



Malaysia's GDP

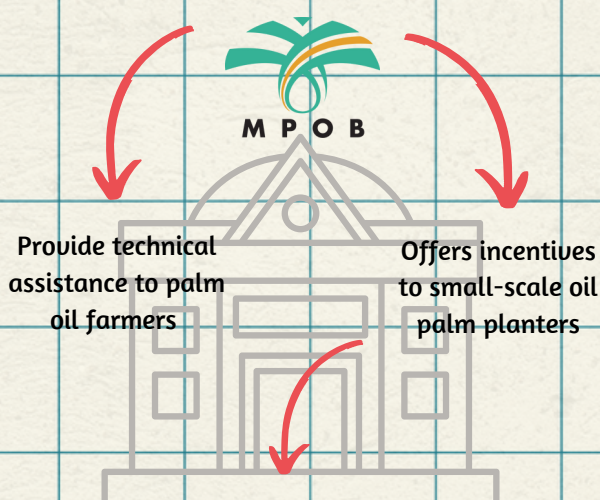
Agricultural GDP

IN 2020, PO CONTRIBUTED 3% TO MALAYSIA'S GDP AND CURRENTLY ACCOUNTS FOR 38% OF VALUES OF MALAYSIA'S AGRICULTURAL OUTPUT [4]



## AGENCY THAT Helps to increase farmer income

Malaysian Palm Oil Board (MPOB) [2]



- Palm Oil Integration Incentive Scheme (ITE)
- Palm Oil Integration Incentive Scheme (ITA)

## HOW DOES PO INDUSTRIES CONTRIBUTE TO NO POVERTY? [3]

- Poverty eradication
- Narrowing income gap between rural and town-folk
- Established rural townships = workers can enjoy a good quality of life
- Reduce labor migration from rural to urban area

**PALM OIL = KEY NATIONAL OF ECONOMIC SOURCES [5]**

BRINGING IN FOREIGN DIRECT INVESTMENTS

LEVERAGING BOTH LOCAL AND FOREIGN LABOUR

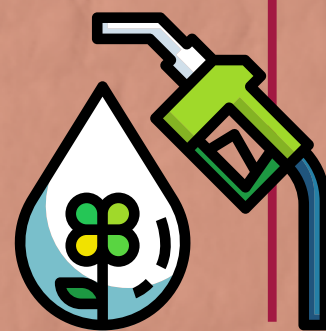
ASSISTING IN ENSURING DOMESTIC AND REGIONAL FOOD SECURITY

PROMOTING THE BIOFUEL INDUSTRY AND ALLEVIATING RURAL POVERTY

**PALM OIL IN FOOD AND NON-FOOD SECTORS HAS INCREASE MARKET IN GLOBAL OILS AND FATS ECONOMY! [6]**

Eg:

- Palm phytonutrients
- Cocoa butter substitute
- Bio-jet fuel
- Bio-polyol & Polyurethane
- Bio-lubricants
- Personal care products



## HOW POME CONTRIBUTES TO CLEAN ENERGY [8,9]

Production of crude palm oil

Generate a liquid by-product: palm-oil mill effluent (POME)

Anaerobic digestion of POME

Produce biogas = renewable energy sources

**BIOGAS**

Have better photosynthetic efficiency

Produce more oxygen into the atmosphere

Absorb more CO<sub>2</sub> from the atmosphere

**HIGHER LEAF AREA INDEX [7]**

Oil palm lives for 20 - 30 years [9]

Does not need to be replanted annually

Causes less disruption to species' habitats

Does not involve intensive and highly mechanized ploughing, planting, and harvesting.

**15**

LIFE ON LAND

SCAN ME FOR REFERENCE



Reference Lists.pdf

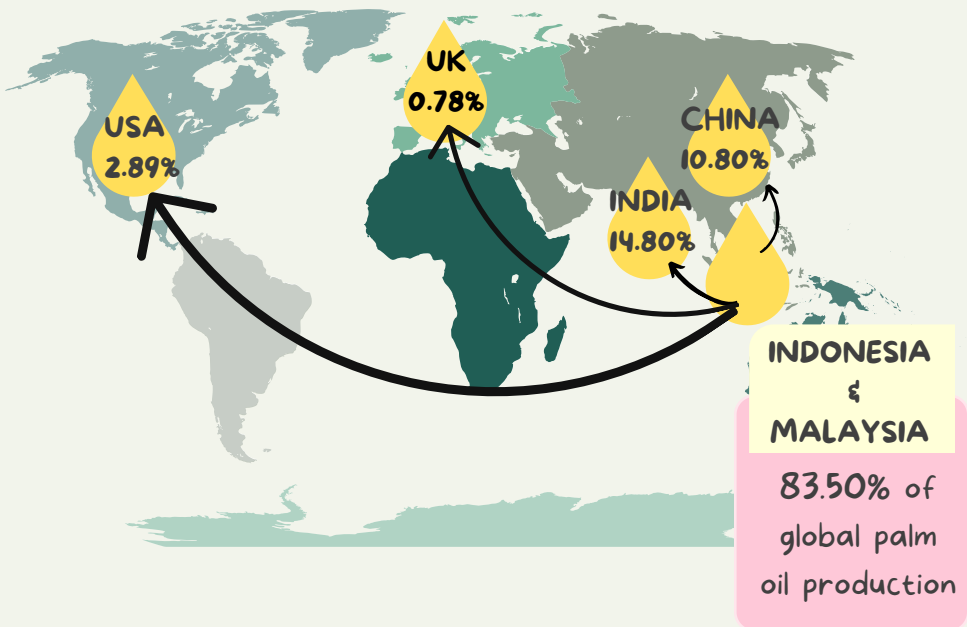


# CONTRIBUTION OF MALAYSIAN PALM OIL TO SUSTAINABLE DEVELOPMENT GOALS

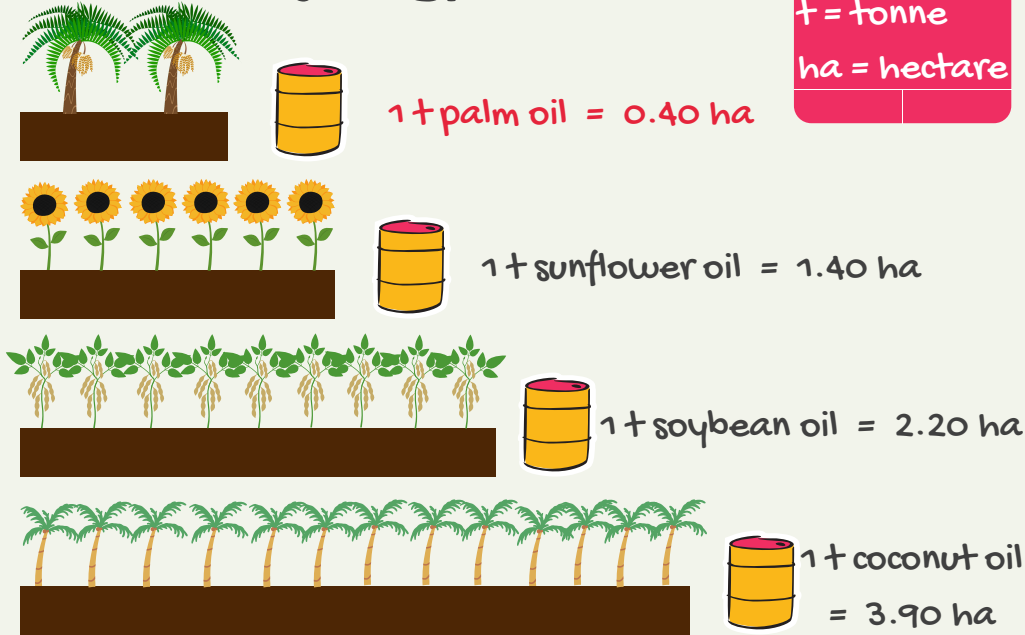
Leong Xuan Yin | Jennifer Wee Shin Ping  
Department of Biotechnology, Universiti Malaya



## Major palm oil trade flow



## Land needed to produce one tonne of the major types of oil



### NO PROVERTY



- 10% less poverty results from increasing the land area used for oil palm agriculture by 10%.
- PO(Palm Oil) industry in Malaysia contribute to the country's low unemployment rate of around 3.4%.

SDG 1

### ZERO HUNGER

- PO helps the local population's nutrition
- Applying a sustainable intercropping system will increase food security by ensuring a diverse diet and easy access to various food types.
- Lower the rate of malnutrition.



SDG 2

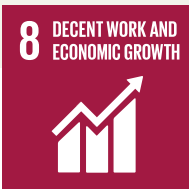
### GOOD HEALTH AND WELL-BEING



- Antioxidants (vitamin E) support healthy immunological function and cell communication.
- Vitamin A in PO is beneficial for the retinas and overall eye health.

SDG 3

### DECENT WORK AND ECONOMIC GROWTH



- Higher profitability and low labour intensity.
- Malaysia provides 44% of all PO shipped globally.

SDG 8

## PALM OIL TREE ↔ BIOTECHNOLOGY

- Genetic Mapping
- In Vitro Propagation



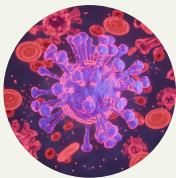
Master biotechnology knowledge



Detect positive traits related to oil palm productivity and stability



Produce palm oil tree with desired characteristics



Disease Resistant

+



High Nutrient Content

+



High Oil Content

←

## Products containing palm oil

### Foods 68%

- Cooking oils
- Margarine
- Chocolate
- Breads



- Soaps
- Detergents
- Cosmetics
- Cleaning agents

### Industrial Applications 27%

### Bioenergy 5%

- Transport
- Electricity
- Heat



## REFERENCE

- [https://www.researchgate.net/publication/360532961\\_Palm\\_oil\\_contribution\\_to\\_the\\_United\\_Nations\\_sustainable\\_development\\_goals\\_SDGs\\_outcomes\\_of\\_a\\_review\\_on\\_socio-economic\\_aspects](https://www.researchgate.net/publication/360532961_Palm_oil_contribution_to_the_United_Nations_sustainable_development_goals_SDGs_outcomes_of_a_review_on_socio-economic_aspects)
- <https://www.goldenagri.com.sg/palm-oil-sustainable-development-goal-commodity/>
- <https://iopscience.iop.org/article/10.1088/1755-1315/892/1/012068/pdf>
- <https://oec.world/en/profile/hs/palm-oil>
- <https://ourworldindata.org/palm-oil>

# A GREENER WORLD USING PALM OIL

**MALAYSIA IS THE WORLD'S**  
**2nd LARGEST PRODUCER AND EXPORTER OF PALM OIL**

**EXPORT MORE THAN**  
**34%** of total palm oil exported in the world. [2]

World's Oils And Fats  
Production [3].

**11%**

Export Trade Of  
Oils And Fats [3].

**27%**

World's Palm Oil  
Production Capacity [1].

**25%**

## PALM OIL IN DAILY LIFE



**TOOTHPASTE** keeps our teeth shiny, our gums healthy and breath fresh. Glycerine from palm oil gives a consistent texture to the toothpaste and helps it glide smoothly from the



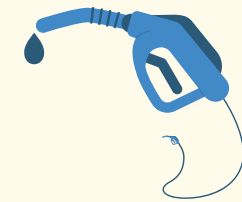
Palm oil enhance the texture of food and is cholesterol-free. It makes **ICE CREAM** smooth and creamy and give baked goods a creamy taste and texture.



Palm kernel oil derivatives are used as surfactants in **DETERGENTS, DISHWASHING LIQUID** which can break down grease and remove stain on the surfaces and fabrics.



Palm fatty acid distillate is (PFAD) is a rich source of **VITAMIN E\***. It can be further use in health care product. It is sustainable as PFAD is usually treated as waste[7].



The used palm oil can be chemically treated to create a **BIODIESEL\*** which is a more environmentally friendly alternative to existing fossil fuels[1][4].

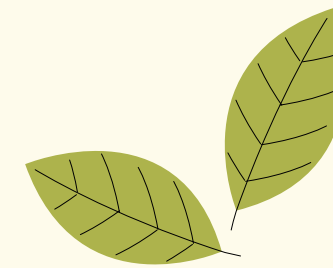
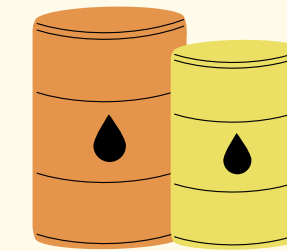
\*POTENTIAL



## SUSTAINABLE RAW MATERIAL

20 TO 30 YEARS OF ECONOMIC LIFE, AND THE FRUITS CAN BE OBTAINED IN BUNCHES AFTER 30 MONTHS OF FIELD PLANTING [1].

MULTIPLE APPLICATIONS FOR EACH TREE PART, FROM THE FRUITS TO PROCESSED PALM OIL BIOMASS IN ADDITION TO POSSESSING THE ABILITY TO PRODUCE BIOFUELS[1].

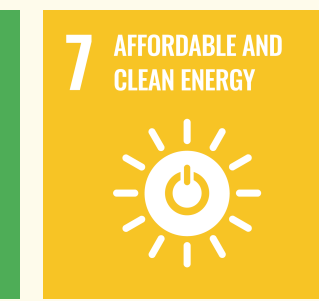


## ECO-FRIENDLY PRODUCT

USED COOKING PALM OIL CAN BE REPURPOSED TO MAKE ECO SOAP, CANDLES AND TURNS IT INTO BIODIESEL[4].



**SDG**  
Achieved



## CHEAPER VITAMIN SOURCES

A CHEAPER PRICE TO OBTAIN PHYTONUTRIENT-RICH OIL THAT ALLOWS FOR THE ALLEVIATION OF MICRONUTRIENT DEFICIENCIES[8].

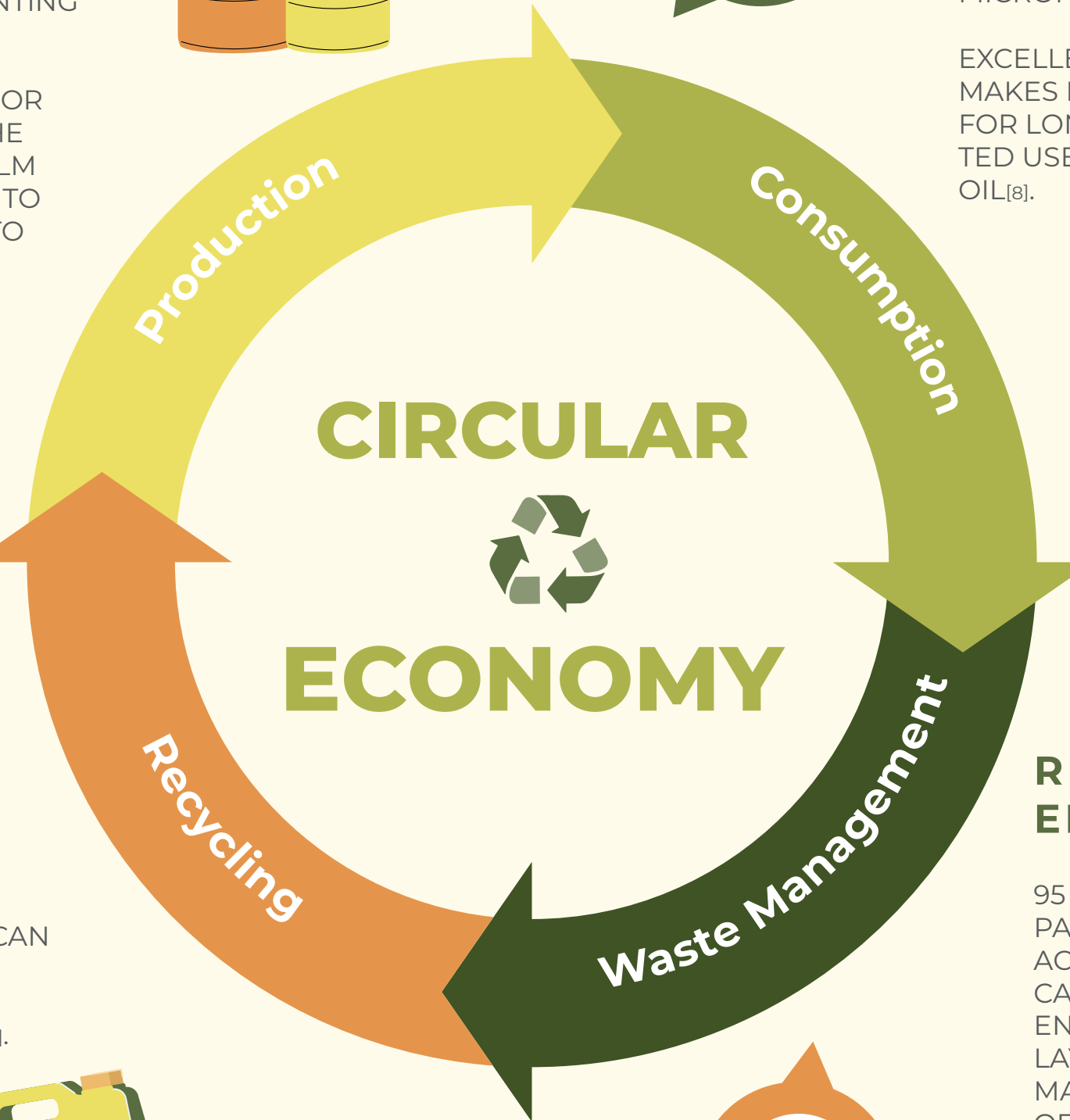
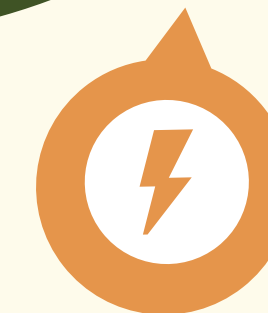
EXCELLENT OXIDATIVE STABILITY MAKES IT A SAFER ALTERNATIVE FOR LONG-TERM STORAGE, REPEATED USE, AND HIGH HEAT COOKING OIL[8].



## RENEWABLE ENERGY

95 MILLION TONNES OF OIL PALM BIOMASS GENERATED ACROSS MALAYSIA IN 2021. IT CAN BE CONVERTED TO GREEN ENERGY AND FERTILIZER. MALAYSIA COULD USE THE BIOMASS PRODUCT ABOUT 82MW OF ELECTRICITY[6].

BIOGAS GENERATED FROM ANAEROBIC DIGESTION OF POME[5] CAN BE USE AS GREEN ENERGY AND IT COULD PRODUCE ABOUT 113MW[1].



## REFERENCES

- [1] MIDA, Malaysian Investment Development Authority. (n.d.). Sustainable Development Goals: The Miracles Of Oil Palm. Retrieved August 25, 2022, from <https://www.mida.gov.my/sustainable-development-goals-the-miracles-of-oil-palm/>
- [2] MPOC, Malaysian Palm Oil Council. (n.d.). Malaysian Palm Oil Industry. Retrieved August 15, 2022, from <https://m-poc.org.my/malaysian-palm-oil-industry/>
- [3] MPOC, Malaysian Palm Oil Council. (n.d.). The Oil Palm Tree. Retrieved August 15, 2022, from <https://m-poc.org.my/the-oil-palm-tree/>
- [4] MPOC, Malaysian Palm Oil Council. (n.d.-a). How to dispose of used cooking oil: The Sustainable Way. Retrieved August 15, 2022, from <https://mpoc.org.my/how-to-dispose-of-used-cooking-oil-the-sustainable-way/>
- [5] Chin, M. J., Poh, P. E., Tey, B. T., Chan, E. S., & Chin, K. L. (2013). Biogas from palm oil mill effluent (POME): Opportunities and challenges from Malaysia's perspective. Renewable and Sustainable Energy Reviews, 26, 717-726. <https://doi.org/10.1016/j.rser.2013.06.008>

- [6] Rajani, A., Kusnadi, Santosa, A., Saepudin, A., Gobikrishnan, S., & Andriani, D. (2019). Review on biogas from palm oil mill effluent (POME): Challenges and opportunities in Indonesia. IOP Conference Series: Earth and Environmental Science. <https://doi.org/10.1088/1755-1315/293/1/012004>
- [7] Veningtia Sari, A., Harimawan, A., & Lestari, D. (2021). Purification of vitamin E from palm fatty acid distillate through neutralization, extraction, and adsorption methods. IOP Conference Series: Materials Science and Engineering, 1143(1), 012062. <https://doi.org/10.1088/1757-899X/1143/1/012062>
- [8] Mohd Hanafiah, K., Abd Mutalib, A. H., Miard, P., Goh, C. S., Mohd Sah, S. A., & Ruppert, N. (2021). Impact of Malaysian palm oil on Sustainable Development Goals: Co-benefits and trade-offs across Mitigation Strategies. Sustainability Science, 17(4), 1639-1661. <https://doi.org/10.1007/s11625-021-01052-4>

DEPARTMENT | CHEMICAL AND ENVIRONMENTAL ENGINEERING  
SCHOOL | MALAYSIA-JAPAN INTERNATIONAL INSTITUTE OF TECHNOLOGY  
DESMOND LAI YII CHIN | TAN KAI WEN

DEPARTMENT | RAZAK SCHOOL OF ENGINEERING & ADVANCED TECHNOLOGY  
SCHOOL | RAZAK FACULTY OF TECHNOLOGY AND INFORMATICS  
LOONG MING SUEN

# PHILANTHROPY OF MALAYSIAN PALM OIL

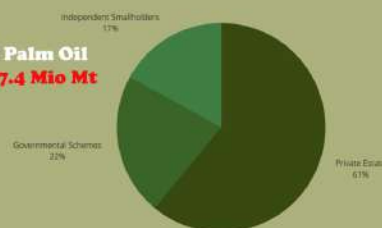


PALM OIL IS THE MOST WIDELY USED VEGETABLE OIL IN THE WORLD, ACCOUNTING FOR MORE THAN 35% OF ALL VEGETABLE OIL PRODUCTION, FOLLOWED BY SOYBEAN OIL (28%), RAPESEED OIL (12%) AND SUNFLOWER OIL (9%). (FAOSTAT, 2021)

## NATIONAL ECONOMIC GROWTH

• High demand from India and China led to rapid growth with exporting **44% Palm Oil** globally.

• Covid-19 pandemic led to decline of Palm Oil exports from **18.5 Mio Mt in 2019 to 17.4 Mio Mt in 2020.**



## POVERTY ALLEVIATION



• **FEDERAL Land Development Agency (FELDA)** led in progressive land expansion scheme.

• **FELDA** contributed to poverty alleviation among settlers with reported **average household monthly income increased from RM1338 to RM3000.**

• It has exceeded normal poverty limit **RM720 per month.**

## QUALITY EDUCATION



• Education is considered an essential factor in improving agricultural production.

• The majority of the large palm oil companies in Malaysia are engaged in the construction of schools to provide education for the kids of their employees, improving the standard of living of workers and their families as a result.

• The local community is **offered assistance by palm oil companies in order to increase children's access to education.**

NURAINA SYAFIERA/NUR SYUHADA NASUHA  
DEPARTMENT OF CHEMICAL ENGINEERING, UNIMAS.



## EMISSIONS

• **Conversion of forest into Palm Oil plantations reduced carbon stocks by over 50% and increased greenhouse gas emissions by four times.**

• **Palm Oil plantations & associated cultivation practices emit up to two times more CO<sub>2</sub> than other crops.**

• **Palm Oil plantations also absorb CO<sub>2</sub> and produces around 18t O<sub>2</sub> ha<sup>-1</sup> pa.**

• **Greenhouse gas emissions in Malaysia can be reduced by 4.1t CO<sub>2</sub>-eq ha<sup>-1</sup> pa simply by banning establishment of new Palm Oil plantations on peat soil.**

## HOW CAN MPO FURTHER CONTRIBUTE TOWARDS THE UN SDGs?

### GENDER EQUALITY

• In recent years, multi-stakeholder initiatives like RSPO have increased their efforts to protect the rights of female workers in the oil palm industry.

• Malaysia can promote cross-cutting policies to prevent gender discrimination in the palm oil industry, such as by setting up gender committees for the purpose of safeguarding female workers' rights and advancing their interests within the large companies in the sector like in Guatemala at Central America.

## SOURCES:

(1) CHIRIACÒ, M.V., BELLOTTA, M., JUSIĆ, J., & PERUGINI, L. (2022). PALM OIL'S CONTRIBUTION TO THE UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS: OUTCOMES OF A REVIEW OF SOCIO-ECONOMIC ASPECTS. ENVIRONMENTAL RESEARCH LETTERS, 12(6), 063007. [HTTPS://DOI.ORG/10.1088/1748-9326/AC6E77](https://doi.org/10.1088/1748-9326/AC6E77)

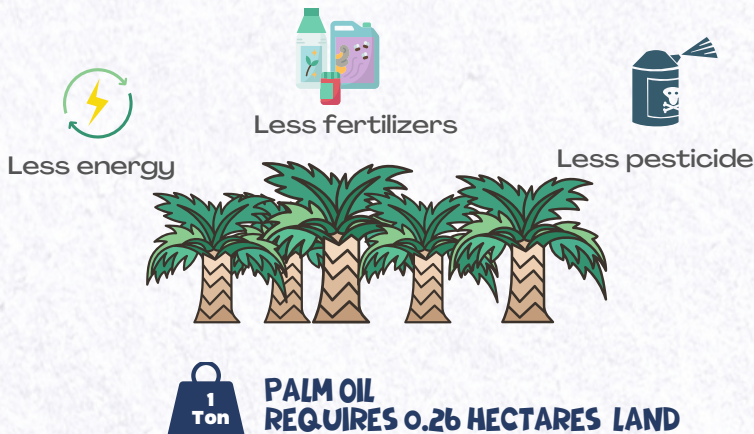
(2) HANAFIAH, M. K. (2021, OCTOBER 15). IMPACT OF MALAYSIAN PALM OIL ON SUSTAINABLE DEVELOPMENT GOALS: CO-BENEFITS AND TRADE-OFFS ACROSS MITIGATION STRATEGIES. SPRINGERLINK. [HTTPS://LINK.SPRINGER.COM/ARTICLE/10.1007/s11625-021-01052-4?error=cookies\\_not\\_supported&code=fd7e19a2-8a41-49c7-b971-8e71c37f7215](https://link.springer.com/article/10.1007/s11625-021-01052-4?error=cookies_not_supported&code=fd7e19a2-8a41-49c7-b971-8e71c37f7215)

# MALAYSIA PALM OIL

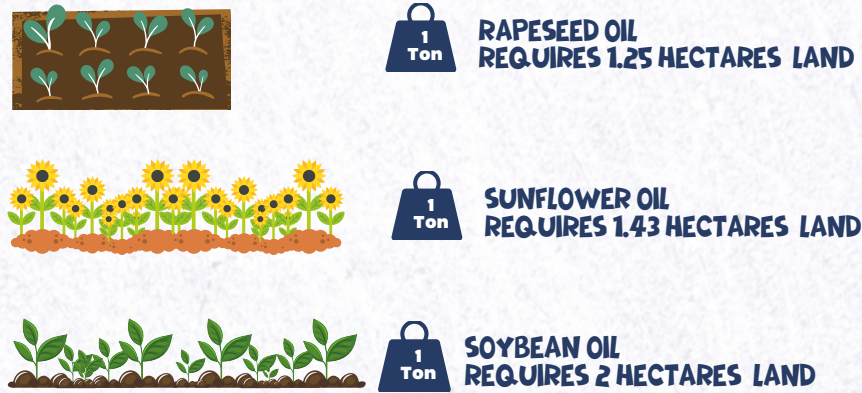
## SUSTAINABILITY AND ENVIRONMENT

### Palm Oil Plantation

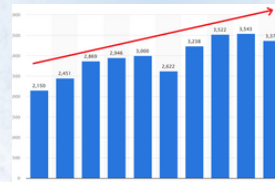
REQUIRES LESS INPUT FOR CULTIVATION AND PROCESSING OF PALM OIL



PROVIDES THE HIGHEST YIELD OF OIL COMPARED TO THE OTHER OIL-BEARING CROPS



DEMAND OF PALM OIL IN MALAYSIA INCREASE FROM 2011 TO 2021



Palm oil generates high yield of oil at a lower cost and it can be used for vegetable oil in the world. To increase the production of palm oil, opening of palm oil plantations in rural and remote areas has been carried out.



Tropical rainforest and wildlife habitat

Tropical rainforests have thick soil which is not suitable for agriculture plantations and this will lower the yield. To improve the production of yield and reuse the land, the forest needs to be cleared out.



Tropical rainforests are converted into empty land.

Burning old rainforests to get rid of unwanted plant waste can enhance nutrient availability in depleted soils. However, this will cause dramatic haze problems and increase greenhouse gas emissions which result in air pollution.



Empty land used for palm oil plantation

Conversion of rainforests into Palm Oil plantations reduced carbon stocks by over 50% and increase greenhouse gas emissions. It affects the environment although the palm oil production yield has increased.

The yield of palm oil have successfully increased by 5.06Mha. However, deforestation for new palm oil plantations between 2001 and 2017 has reached 5.98 Mha accounting for 68.2% of the total amount of deforestation in Malaysia.

### Malaysia's SDG contributed by MPO 19 February 2020 2015

Malaysian Palm Oil Green Conservation Fund (MPOGC) was incorporated to support conservation projects and solve the negative impacts



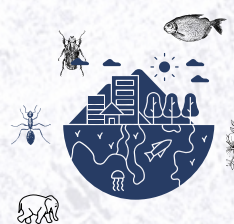
Malaysian Sustainable Palm Oil (MSPO) certification scheme was established to improve the branding of Malaysian Palm Oil.



Collaboration between the Malaysian Palm Oil Council (MPOC) and the Sabah State Government to carry out sustainable projects.

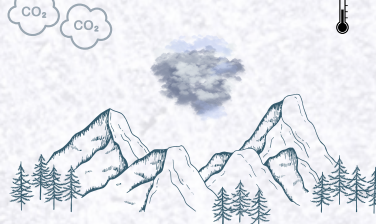
### NEGATIVE IMPACT OF OPENING LAND FOR PALM OIL PLANTATION <sup>[1]</sup>

BIODIVERSITY



Endangered and reduce the species abundance.

ENVIRONMENT



Cause air pollution and affect the health of humans.

CLIMATE



Increase in temperature and causing microclimate changes. <sup>[2]</sup>

### Ways to improve the Sustainable of Palm Oil by MPO <sup>[3]</sup>

#### Regulatory Bodies

Implement zero deforestation project with MPO

Allow and open access for the available forest and empty waste land. Prohibit open burning the forest.

#### Stakeholder Bodies

Conserve and preserve the larger ecosystem.

Optimizing the productivity of palm oil plantation and efficiency while adhering to transparency, ethical, and legal principles.

#### Governments Bodies

Practice strict guidelines for best palm oil plantation

Practice the legal enforcement that embedded in national law to improve the sustainability of palm oil production.



Plant of 1 million forest trees in Lahad Datu, Sabah



Action to combat climate change and its impact. This can help to build a greener Malaysia and reduce early global warming. Besides that, this can help to reduce greenhouse emission and regulate climate change. <sup>[2]</sup>



Conserve Orang Utan Population Census and Pygmy Elephants program



Maintain and protect the biodiversity ecosystems to provide habitat for the animals. Restore and manage the forests well to prevent land degradation and halt biodiversity loss.

#### Reference

1. Mohd Hanafiah, K., Abd Mutalib, A., Miard, P., Goh, C., Mohd Sah, S. and Ruppert, N., 2021. Impact of Malaysian palm oil on sustainable development goals: co-benefits and trade-offs across mitigation strategies. Sustainability Science, 17(4), pp.1639-1661.
2. Chiriaco, M., Bellotta, M., Jusić, J. and Perugini, L., 2022. Palm oil's contribution to the United Nations sustainable development goals: outcomes of a review of socio-economic aspects. Environmental Research Letters, 17(6), p.063007..
3. Mardiharini, M., Azahari, D., Chaidirsyah, R. and Obaideen, K., 2021. Palm oil industry towards Sustainable Development Goals (SDGs) achievements. IOP Conference Series: Earth and Environmental Science, 892(1), p.012068.

# SUSTAINABLE MALAYSIA PALM OIL



## Malaysia Palm Oil (*Elaeis Guineensis*)

Edible vegetable oil is extracted from fruits of oil palm trees. Semi-solid at room temperature and bright orange-red in color. Today, palm oil is the leading commodity in the global oils and fats market.

## BACKGROUND

1875

British introduce oil palm

1917

First plantation of oil palm in Selangor.

1960

Oil Palm become Malaysia's main commodity crop

## BENEFITS



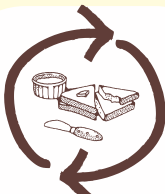
Long shelf life



Ideal ingredient for foods



Stable at high temperatures



Cost-effective replacement for animal fats



Ideal ingredient for foods

## WHAT MPO CONTRIBUTED TO MALAYSIA'S SDG <sup>[2]</sup>

SDG 1



Ensure and provide job opportunities to reduce poverty.

SDG 2



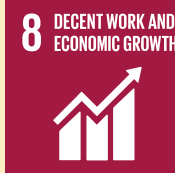
Increase agricultural productivity and achieve food security.

SDG 3



Boost the health of a country's overall population

SDG 8



Promote inclusive and sustainable economic growth for palm oil industries.

SDG 9



Develop technology, research and innovation in palm oil industries.

## ACTIONS

### MANUFACTURE PALM OIL FOOD PRODUCTS

Food products from palm kernel oil or constituent of palm oil is affordable and able to improve our body nutrition.



- Versatile and edible vegetable oil in the world.
- Processed products from utilisation of oil palm.

### DECREASE THE UNEMPLOYMENT RATE <sup>[4]</sup>

Narrowing income gap between rural area and urban workforce by providing both employment and job opportunities of palm oil industries.



- Increase the small holder income from traditional crops
- Provide job opportunities and decrease the unemployment rate (employ approximately 2.3 million people)

### ECONOMIC GROWTH AND DEVELOPEMENT <sup>[4]</sup>

Expand palm oil plantations in rural area. Empower the farmers to use technology that can improve yield and production.



- More than 20% of Peninsular Malaysia's land area is covered with oil palm plantations.
- Total area of mature palm oil plantations in Malaysia is 5.2 million hectares.

### END POVERTY

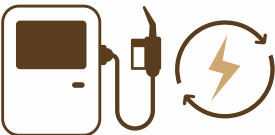
Remain the price of palm-based products at affordable range so it can be available in low-middle income families.



- Provide cheap vegetable oil-based products to increase the growth rate

### ALTERNATIVE ENERGY FOR ELECTRICITY <sup>[4]</sup>

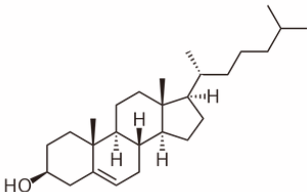
Constituent of palm oil waste can be used to produce steam and bioelectricity that can help offset the demand for electricity and diesel fuel <sup>[1]</sup>



- Palm oil biomass generates approximately 40% of electricity operation efficiency.
- Ability to replace Malaysia's yearly reliance on coal. <sup>[3]</sup>

### INCREASE THE FOOD SECURITY

Minimize the use of animal fats and monounsaturated oil such as olive oil to improve the healthy of Malaysian.



- Lower density lipoprotein cholesterol
- Protective effect on cardiovascular health
- Reduce fat oxidation

## NOWADAYS



World produced 72 million tonnes of oil palm which provided to 84% of global palm oil production.

## HOW MPO CONTRIBUTES TO MALAYSIA'S SDG

### POLICIES

- Implement policies that stimulate environmentally sustainable palm oil demand.

### INVESTMENT

- Invest in MPO renewable energy resources and develop palm oil sources.

### MANAGEMENT

- Convert unused land into Palm Oil plantation

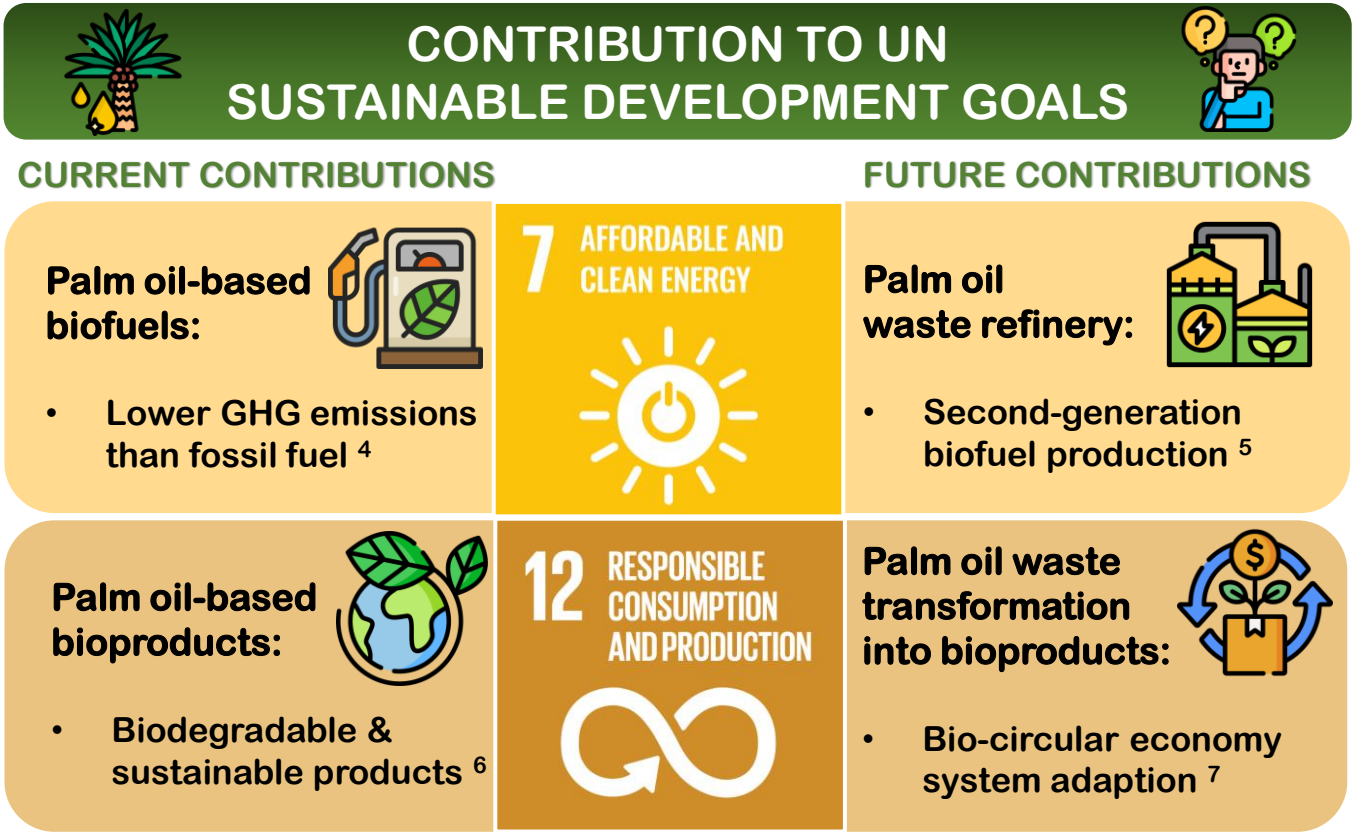
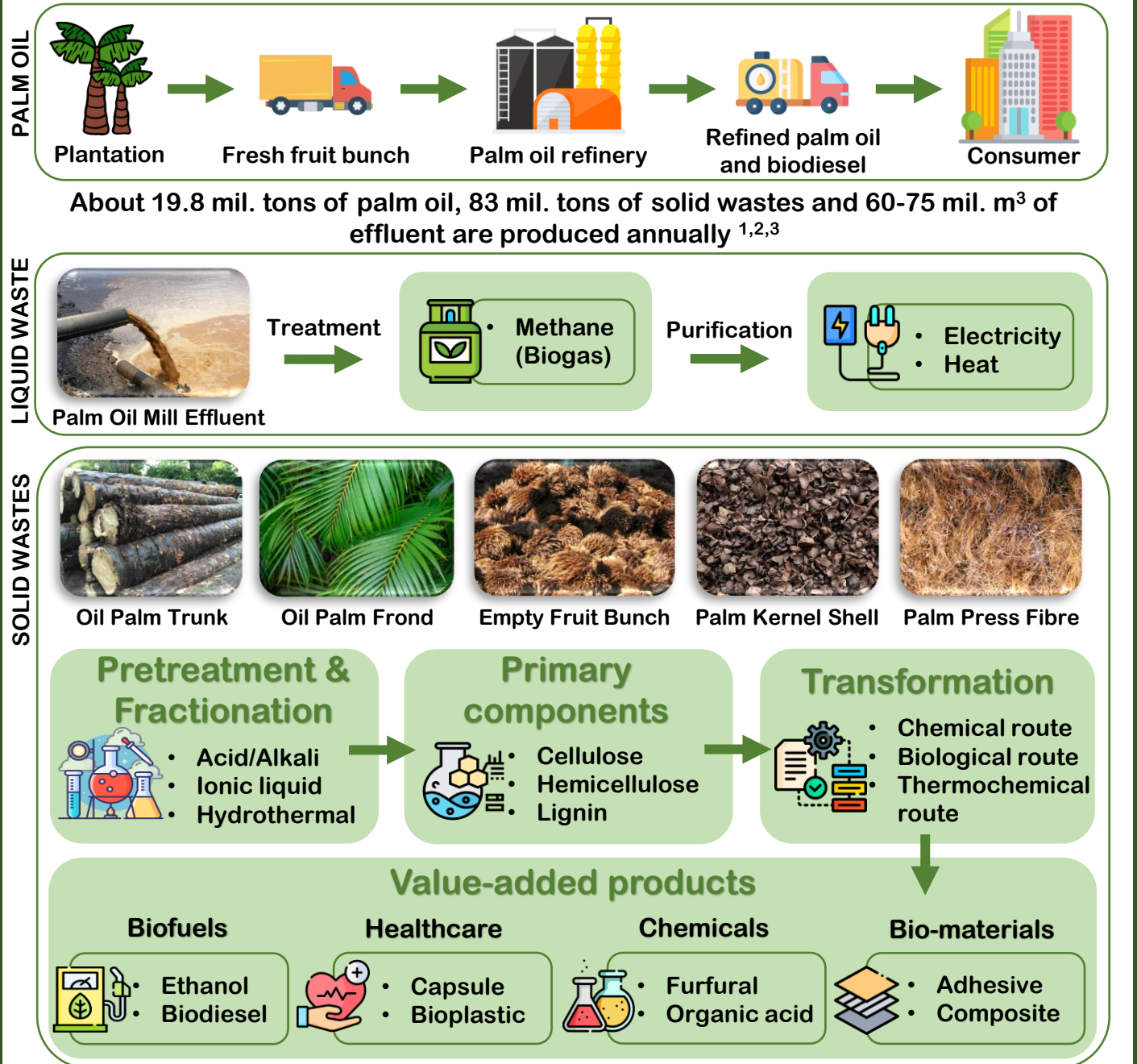
### CONSUMERS

- Promote through branding for more sustainable palm-based products.

### Reference

1. Zamri, M., Milano, J., Shamsuddin, A., Roslan, M., Salleh, S., Rahman, A., Bahru, R., Fattah, I. and Mahlia, T., 2022. An overview of palm oil biomass for power generation sector decarbonization in Malaysia: Progress, challenges, and prospects. WIREs Energy and Environment, 11(4).
2. Mardiharini, M., Azahari, D., Chaidirsyah, R. and Obaideen, K., 2021. Palm oil industry towards Sustainable Development Goals (SDGs) achievements. IOP Conference Series: Earth and Environmental Science, 892(1), p.012068.
3. Begum, S., Kumaran, P. and Jayakumar, M., 2013. Use of Oil Palm Waste as a Renewable Energy Source and Its Impact on Reduction of Air Pollution in Context of Malaysia. IOP Conference Series: Earth and Environmental Science, 16, p.012026.
4. Mohd Hanafiah, K., Abd Mutalib, A., Miard, P., Goh, C., Mohd Sah, S. and Ruppert, N., 2021. Impact of Malaysian palm oil on sustainable development goals: co-benefits and trade-offs across mitigation strategies. Sustainability Science, 17(4), pp.1639-1661.

# Present and Future Directions of Waste Management in Malaysian Palm Oil Industry



Prepared by: Diyasha Sengupta, Sia Chin Siew, Yong Khai Jie. School of Engineering, Monash University Malaysia

# HOW DOES MALAYSIAN PALM OIL SUPPORT UN SUSTAINABLE DEVELOPMENT GOALS

## WHAT is Palm Oil?

Oil palm, *Elaeis guineensis*, is by far the most important global oil crop, supplying about 40% of all traded vegetable oil. Malaysia and Indonesia are the world's largest producers of palm oil. Palm oils are key dietary components consumed daily by over three billion people, mostly in Asia, and also have a wide range of important non-food uses including in cleansing and sanitizing products. Palm oil is the major dietary oil in Malaysia that frequently used:

- As household cooking oil
- In snacks and canned food
- In instant noodles production
- In food service preparations

## The Benefits of Palm Oil

### Helps in improving vision



Palm oil may help increase the amount of vitamin A you can absorb, which is a critical vitamin for your retinas and general eye health. Vitamin A is a fat-soluble vitamin, which means that you need fat in your diet to absorb the vitamin efficiently. Adding palm oil to your diet has been shown to increase your body's ability to absorb vitamin A, and presumably other fat-soluble vitamins.

### 100% Cholesterol FREE

Originating from a plant, palm oil is cholesterol-free and it helps in reducing cholesterol as effectively as other vegetable oils such as olive, rapeseed and canola oil.

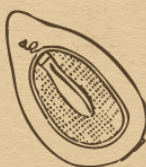
### Contains unsaturated fats



Palm oil has almost equal parts saturated and unsaturated fatty acids. Myristic acid (1%), stearic acid (5%) and palmitic acid (44%) make up the saturated fatty acid component in addition to monounsaturated oleic acid (39%), and polyunsaturated linoleic acid (11%).

### Rich in Vitamin E

Palm oil is rich in antioxidants, one of which is vitamin E. This vitamin is critical for keeping your immune system healthy and for helping your cells communicate. Studies show that getting enough vitamin E in your diet can reduce your risk of heart disease, certain forms of cancer, and age related macular degeneration.



## WHAT is UN Sustainable Development Goals?



The Sustainable Development Goals are the blueprint to achieve a better and more sustainable future for all. They address the global challenges we face, including poverty, inequality, climate change, environmental degradation, peace, and justice.

## HOW Malaysian Palm Oil Support SDG's?

### 1 NO POVERTY



### NO POVERTY

The oil palm industry in Malaysia, has been instrumental in eradicating poverty, boosting the prosperity of rural communities, and halting rural migration. The palm oil industry has contributed immensely to the nation's economic growth and in increasing rural incomes. Oil palm cultivation involves some 207,000 independent smallholders covering 807,000 hectares.

### 2 ZERO HUNGER



### ZERO HUNGER

Assessing the effects of palm oil production in relation to SDG 2 is a particularly important issue given the fact that current estimates show that almost 8.9% of the world's population (690 million people) suffer from hunger and malnutrition. Oil palm is considered a primary crop for many countries from an economic perspective, while the effects on food security can be positive. Some studies maintain that the presence of oil palm crops helps to guarantee food security and alleviate malnutrition. Moreover, palm oil contributes also to the improvement in the nutrition of local populations as a result of rising incomes, prompting increased spending on food, which has effectively also weakened the role of subsistence food production.

According to a series of studies carried out in Southeast Asia, earnings from oil palm cultivation contribute to improved food security in smallholder households by providing families with greater economic means to purchase food.

### 3 GOOD HEALTH AND WELL-BEING



### GOOD HEALTH AND WELL-BEING

Palm oil brings crucial development into rural areas. Prior to the arrival of palm oil estates, villagers may have had to travel miles to their nearest clinic. With palm oil estates, infrastructure and facilities such as clinics are set up giving local communities easier access to healthcare. Combined with higher earnings from palm oil which allows them to get better food and nutrition, they enjoy greater well-being.

### 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



### NATIONAL ECONOMIC GROWTH

Most plantations in Malaysia has the largest OP plantations, 61% of which are private estates, 22% are managed by government schemes (half of which are smallholders) and 17% are owned by independent smallholders.

More than 300,000 smallholder farmers, including farmers from indigenous tribes in East and West Malaysia, contribute to more than 180,000 tonnes of PO exports annually, although OP agriculture is usually associated with Borneo.

### 12 RESPONSIBLE CONSUMPTION AND PRODUCTION



In 2017, Peninsular Malaysia contributed a larger proportion of Malaysia's total PO product. Growing demand in China and India has spurred rapid growth in the PO industry, with Malaysia supplying 44% of global PO exports. Malaysia has further cultivated its domestic polyolefin refining business through a series of policies, and its refining capacity has exceeded the annual output of crude palm oil by 26.5 mt.

REFERENCES:

