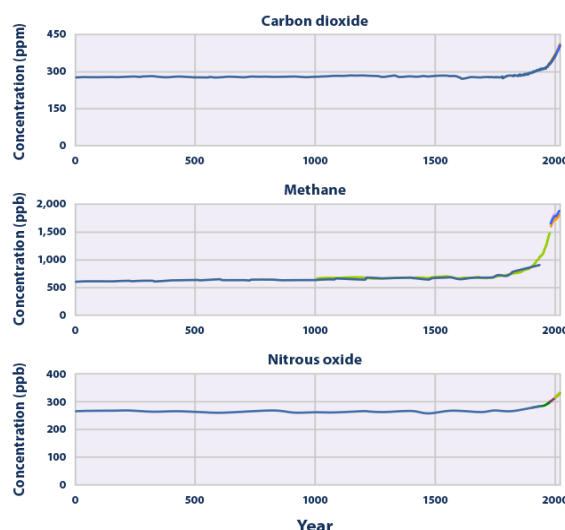


Why is Climate Change an Issue in Malaysia? What Climate Change Mitigation and Adaptation Measures Would You Suggest to the Government? Discuss.

Throughout human history, the endeavours of society have always bent to the environment around us. The climate has been, and always will be, a restriction humanity must innovate around. Take the Incas, whose unique mountainous climate led to the innovation of step-like farms (known as terrace farming) in order to cultivate a variety of crops at different altitudes to best utilise the resources at hand. Or the Egyptians, who built their homes to resist the heat of the desert and flooding of the Nile. Today still, the world's economies revolve around the climate: harvests could fail due to temperature changes and natural disasters could destroy factories and homes for example.

However, we have long since reached the point where our actions cause climate change. "Climate change" refers generally to the changes in temperature, precipitation and atmospheric conditions. The release of greenhouse gases into the atmosphere is one of the main causes. The Industrial Revolution between 1760 and 1840 can be seen as a major turning point: it saw the rise of modernised industry and mass production, and despite revolutionising our technology and economies, it marks a spike in the release of greenhouse gases by humans, as shown below.

Global Atmospheric Greenhouse Gas Concentrations Over Time

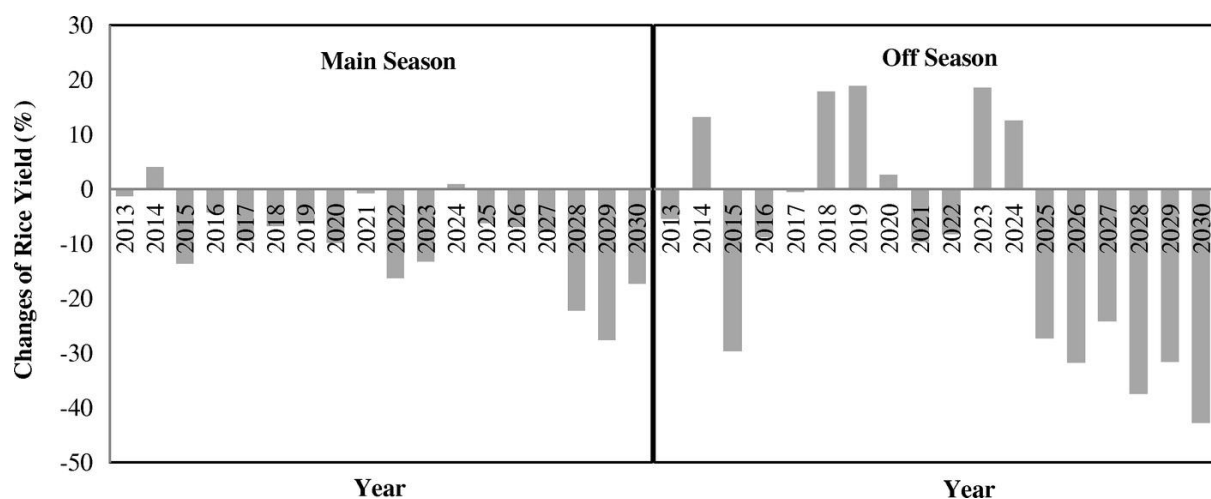


Source: U.S. EPA, [Climate Change Indicators in the United States: Atmospheric Concentrations of Greenhouse Gases](#).

The graph displays the concentrations of the 3 main greenhouse gases: the mid-1700s mark a steep increase of the gas concentrations, the same time that the Industrial Revolution kicked off. It's clear that industrial and economic progress is correlated with, if not the cause of, climate change. As a developing country, Malaysia is prone to these adverse effects of economic development- prevention and adaptation measures should be taken to avoid the ramifications of climate change and global warming.

Malaysia is a tropical country; some of the major effects of climate change include a general rise in temperature and fluctuations in precipitation. Wet seasons threaten flash floods from heavy storming, which also cause soil erosion and landslides, damaging land and property. The dry seasons are projected to be even hotter, running the risk of longer droughts. Climate change also poses a danger to the health of citizens, as the rising temperature could lead to heat strokes, affecting both indoor and outdoor workers.

This can affect several areas of Malaysia's economy. Firstly, the extremities with rainfall could lead to weaker harvests and instability in Malaysia's agricultural industry. The industry accounts for about 10% of employment and about 6% of the GDP- but more importantly, it helps provide food security. 40% of Malaysia's food is grown locally, most of which are staple necessities like rice. If climate change continues as projected, we'd be facing drastic losses with our rice harvests. The graph below displays the projected change in rice yields:



Source: *Impact of Climate Change on Food Security in Malaysia: economic and policy adjustments for rice industry.* Vaghefi.

An overall 12% decrease in the yield of rice would be a major setback to the lower income households of the country, especially when coupled with the already rising food prices. A fall in the rice harvest would drive up the price even higher (as supply fails to meet demand), creating greater disparity between the nation's wealthy and poor, as such a price increase would take up a greater portion of a poor person's income.

Another key issue with climate change is that it causes natural disasters (namely flooding in Malaysia), which damages infrastructure and real estate. This is an economical loss as it costs the government money in order to provide relief and repairs, while also afflicting businesses whose workers or offices have been caught in the damage. Last December, the government spent 1.4 billion ringgits on flood relief alone. The rising temperatures and heavier rainfalls mean there's a risk of rivers overflowing- and rising sea levels caused by melting ice caps threaten Malaysia's coastal areas. These coastal areas are some of Malaysia's most lucrative tourist destinations or key ports for trade: Penang, Langkawi and Port Klang to name a few. We are already seeing the effects of this in real time, as beaches, like Pantai Pasir Panjang are slowly being enveloped by the sea.



Source: *Malaysia at Risk of Losing Coastal Areas*, *The Star*, Loh

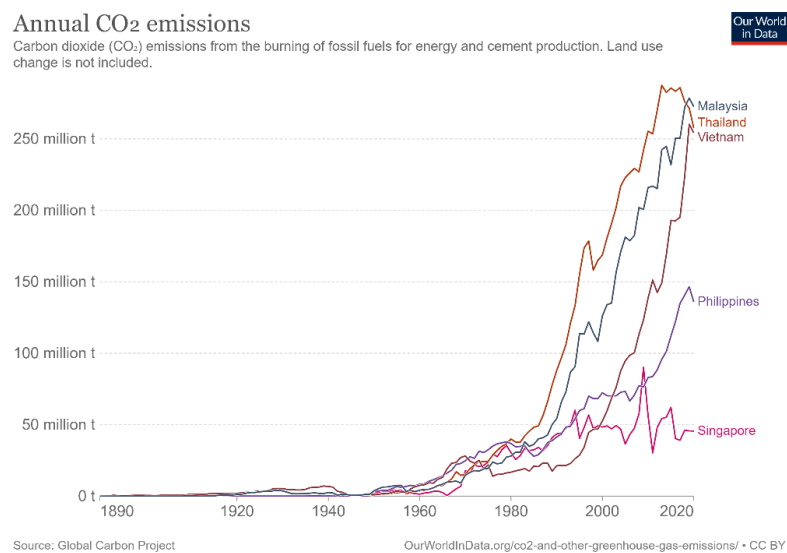
Finally, climate change also threatens many of the important job sectors in Malaysia, which can be detrimental to its economy on a large scale. Many of our industries revolve around natural resources, such as palm oil, rubber and general agriculture. Rising temperatures would make jobs in these industries more taxing to the workers and even put them at risk of heat stroke. Flash flooding and drought could also put these workers out of a job very quickly, should the plantations they work on or their homes be destroyed. Climate change also leads to job insecurity in the tourism industry, as many of Malaysia's key natural attractions are prone to being destroyed as a result of climate change: beaches, wildlife and the rainforests are all at risk.

The rising temperature also negatively impacts the productivity of those working in factory or office jobs, as a result of heat stress. Heat stress is the overall heat load on a person due to metabolic and environmental factors, and occurs when the body is no longer able to fully regulate body temperature as a result. It often occurs with jobs that involve manual labour, protective clothing, or dealing with heat, like in restaurant kitchens. Heat stress can cause ailments to workers, even to the extent of heat stroke. This would prove detrimental to their health, but also reduce their

overall productivity. Global warming takes heat stress to a national scale and as such, threatens to stall the economy.

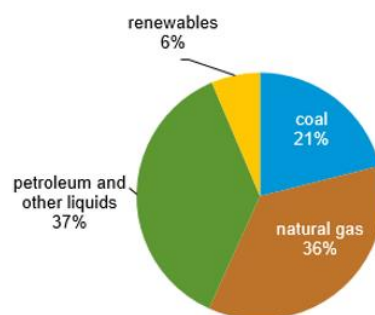
These negative effects of climate change in Malaysia most heavily affect the lower and working class: meaning that climate change directly contributes to economic inequality in the country. This is a prime example of economic market failing to manage scarce resources for the benefit of society, meaning that government intervention is necessary to protect economic equality and the safety of the Malaysian people.

In order to prevent climate change, it is important to first understand its causes- and more specifically, how Malaysia is currently contributing to climate change. Malaysia as a country produces large amounts of greenhouse gases annually, and is one of the biggest contributors to climate change in the South East Asia region.



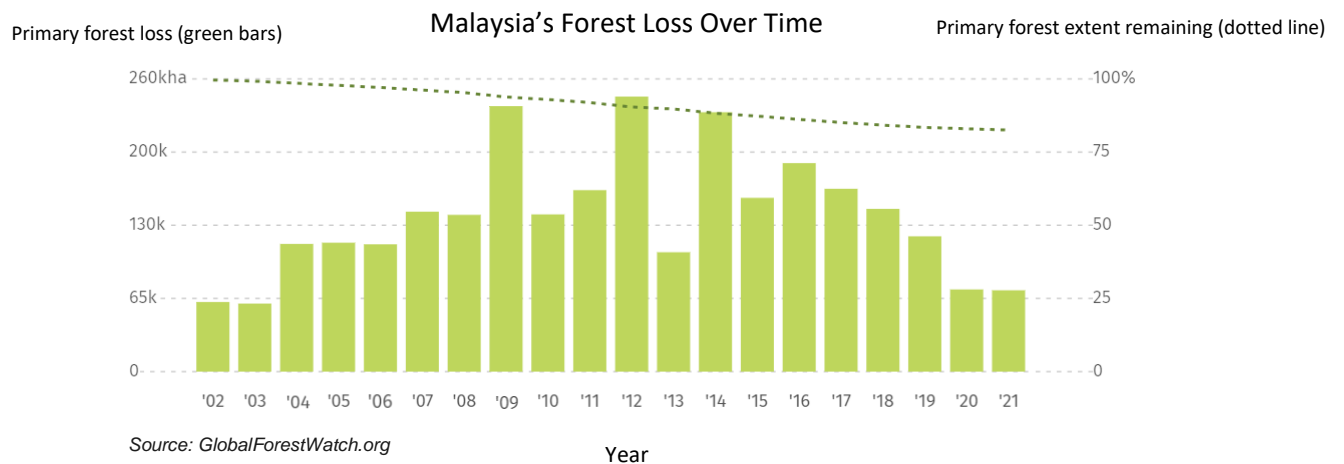
This is in part due to how Malaysia produces its energy to run the country. Malaysia relies heavily on fossil fuels for energy, and as of 2019, only 6% of the energy produced in the country is renewable.

Primary energy consumption in Malaysia, 2019



Source: BP 2020 Statistical Review of World Energy

The widespread use of fossil fuel combustion as a method of energy production is simply not sustainable in the long run, as it is one of the biggest contributors to the country's greenhouse gas emissions. In addition to this, Malaysia has always had issues with deforestation, which also contributes to global warming.



This loss of forest over time has led to a total of 5 gigatons of carbon dioxide being emitted from 2001 to 2021. From this, we can see that we have two primary issues to tackle in order to mitigate the effects of climate change.

Malaysia has already implemented some adaptation measures. These include flood prevention measures (184 flood structural measures and 70 new flood mitigation projects to be implemented); setting up the National Water Balance Management System to manage water shortages; adopting the National Agro-Food Policy to help with food shortages and employing Integrated Shoreline Management Plans to monitor coastline erosion. Mitigation efforts include policies to increase the use of biofuels and energy efficient vehicles- these have reduced emissions by 1.6 million tonnes per year. Additionally, incentives like tax exemptions are provided to companies that generate renewable energy, encouraging its use.

However, there is room for improvement with these policies. Firstly, the incentives used to promote renewable energy only apply to the companies that are actually producing said energy. There could be greater incentive provided to companies to move away from fossil fuels to cleaner energy. One such incentive could be the implementation of a cap-and-trade scheme within the country, where the government sets a cap on the total amount of emissions produced and creates tradable permits for each unit of emissions. Businesses receive these permits and can only emit as much as their permits allow- incentivising businesses to innovate their production to be more energy

efficient and utilise cleaner energy. If a business truly cannot stay below the maximum emissions set, they could purchase additional permits from a business that can. Ultimately this puts a hard limit on greenhouse gas emissions and incentivises all businesses to work towards cleaner production, mitigating future effects of climate change.

More direct measures could also be taken: subsidies could be supplied to producers of clean, renewable energy, while Pigouvian taxes are implemented on fossil fuel producers. This would make renewable energy a cheaper alternative to fossil fuels, motivating the country's producers to use renewable energy. The government could even go as far as supplying the renewable energy themselves. Malaysia has the potential for solar panels and hydroelectric dams, thanks to the country's tropical climate. This allows for the creation of solar panel fields and hydroelectric dams to be a valid form of government work project and could be seen as the crucial first step to shifting the country off its heavy dependence on fossil fuels. Government projects on such a scale would also provide jobs for those who may have been laid off as a result of the shift away from the fossil fuels.

Additionally, the current measures do not address Malaysia's deforestation issue. Increased regulation of the logging industry by the government could help with this, by implementing restrictions over how much land can be used for logging and enforcing protection over Malaysia's rainforest. Another key issue is the use of rainforest land for palm oil plantations- by incentivising producers to move towards renewable energy, the demand would also move away from palm oil, thus conserving Malaysia's rainforests. Eventually, rainforest replantation efforts could be undertaken to help mend the damage caused by palm oil plantations.

Further action could also be taken in order to mitigate coastline erosion: efforts to restore coastal habitats could prove useful. Malaysia has been losing both its mangrove forests and coral reefs- both of which can provide a natural barrier to reduce the force of waves, preventing coastal erosion and flooding. A temporary but more immediate response would be to replenish the sand lost at beaches, stalling for time for coastal restoration efforts. Similarly, the Malaysian wetlands should also be restored and conserved to help prevent river flooding. This by extension would also protect houses and infrastructure.

A response to the diminishing rice yields would be to encourage and subsidise a movement to diversify Malaysia's crops. This would shift the country's dependence away from rice, as different crops, like maize, would not be as heavily affected by changes in temperature. As such, farmers are more likely to have a high yield, reducing the worry of a food shortage. It is also possible to adopt crops that are specifically tolerant to changes in temperature and available water, making the harvest much more secure.

Finally, it would also be prudent to educate the Malaysian people and raise awareness of the threat climate change poses- surveys have shown that despite the general awareness of the effects of pollution, Malaysians have comparatively low awareness towards climate change (on a scale from 1-5):

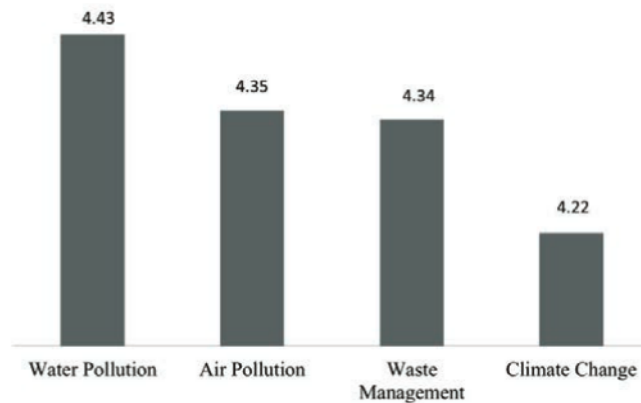


Fig.1. Environmental awareness level of Malaysians

Source: *Environmental Awareness and Behaviour Index for Malaysia*. Sau Wei, Weng Wai, Ahamad

In conclusion, climate change is a major issue in Malaysia as it threatens several sectors of the country's economy, as well as worsening the standard of living gap between the rich and poor, leading to economic inequality. The causes of climate change can be traced to the country's dependence on fossil fuels and its existing issue of deforestation. While the current adaptation and mitigation measures will help cushion the negative effects of climate change, further action is required to truly tackle the problem- this must be done by challenging these two fundamental problems head on, as well as furthering mitigation and adaptation efforts for vulnerable aspects of the country and economy.

(2000 words)

Bibliography:

- Cartwright, M. (2022, July 15). *Inca Food & Agriculture*. World History Encyclopedia. Retrieved July 19, 2022, from <https://www.worldhistory.org/article/792/inca-food--agriculture/>
- Vivian. (2022, May 27). *A guide to the roofs of Ancient Cultures & Roofing Technology - IKO*. IKO Roofing. Retrieved July 19, 2022, from <https://www.iko.com/na/blog/ancient-roofs/>
- What is the difference between global warming and climate change? What is the difference between global warming and climate change?* | U.S. Geological Survey. (n.d.). Retrieved July 19, 2022, from <https://www.usgs.gov/faqs/what-difference-between-global-warming-and-climate-change#:~:text=%E2%80%9CGlobal%20warming%E2%80%9D%20refers%20to%20the,%2C%20temperature%2C%20and%20wind%20patterns.>
- Encyclopædia Britannica, inc. (n.d.). *Industrial revolution*. Encyclopædia Britannica. Retrieved July 19, 2022, from <https://www.britannica.com/event/Industrial-Revolution>
- Environmental Protection Agency. (n.d.). EPA. Retrieved July 19, 2022, from <https://www.epa.gov/climatechange-science/causes-climate-change#:~:text=Since%20the%20Industrial%20Revolution%2C%20human,also%20affect%20the%20earth's%20climate.>
- Vaghefi, N. (n.d.). *Impact of climate change on food security in Malaysia: Economic and policy adjustments for Rice Industry*. Taylor & Francis. Retrieved July 19, 2022, from <https://www.tandfonline.com/doi/full/10.1080/1943815X.2015.1112292>
- Shahid, S., Pour, S. H., Wang, X., Shourav, S. A., Minhans, A., & Ismail, T. bin. (2017, January 9). *Impacts and adaptation to climate change in Malaysian real estate*. International Journal of Climate Change Strategies and Management. Retrieved July 19, 2022, from <https://www.emerald.com/insight/content/doi/10.1108/IJCCSM-01-2016-0001/full/html>
- Loh, A., Trisha, N., Zainal, F., Vethasalam, R., Shah, M. F., & Murali, R. (2022, April 16). *Malaysia at risk of losing coastal areas*. The Star. Retrieved July 19, 2022, from <https://www.thestar.com.my/news/nation/2022/04/16/malaysia-at-risk-of-losing-coastal-areas>
- Department of Occupational Safety and Health. Guidelines on Heat Stress Management at Workplace 2016* | Ministry of Human Resources Malaysia. (n.d.). Retrieved July 19, 2022, from <https://www.dosh.gov.my/index.php/legislation/guidelines/industrial-hygiene-1/2017-guidelines-heat-stress-management-at-workplace/file#:~:text=Findings%20from%20enforcement%20activities%20and,and%20need%20to%20be%20addressed.>
- Overview of business in Malaysia*. ASEAN UP. (2019, March 25). Retrieved July 19, 2022, from <https://aseanup.com/business-malaysia/>
- Malaysia and our food security conundrum*. BusinessToday. (2022, May 21). Retrieved July 19, 2022, from [https://www.businesstoday.com.my/2022/05/21/malaysia-and-our-food-security-conundrum/#:~:text=60%20percent%20of%20Malaysia's%20food,US%2412.67%20billion\)%20of%20foodstuffs.](https://www.businesstoday.com.my/2022/05/21/malaysia-and-our-food-security-conundrum/#:~:text=60%20percent%20of%20Malaysia's%20food,US%2412.67%20billion)%20of%20foodstuffs.)

- Employment impact of climate change adaptation.* (n.d.). Retrieved July 19, 2022, from https://www.ilo.org/wcmsp5/groups/public/---ed_emp/documents/publication/wcms_645572.pdf
- Ritchie, H., Roser, M., & Rosado, P. (2020, May 11). *Malaysia: CO2 Country Profile.* Our World in Data. Retrieved July 19, 2022, from <https://ourworldindata.org/co2/country/malaysia?country=MYS~THA~PHL~SGP~VNM>
- Hosseini, S. E., Wahid, M. A., & Aghili, N. (2013, August). *The scenario of greenhouse gases reduction in Malaysia.* ResearchGate. Retrieved July 19, 2022, from https://www.researchgate.net/publication/255722705_The_Scenario_of_Greenhouse_Gases_Reduction_in_Malaysia
- U.S. Energy Information Administration - EIA - independent statistics and analysis.* International - U.S. Energy Information Administration (EIA). (n.d.). Retrieved July 19, 2022, from <https://www.eia.gov/international/analysis/country/MYS>
- Vizzuality. (n.d.). *Malaysia deforestation rates & statistics: GFW.* Global Forest Watch. Retrieved July 19, 2022, from <https://www.globalforestwatch.org/dashboards/country/MYS/?category=forest-change>
- Latiff, R., & Pearson, J. (2021, December 29). *Malaysia to spend \$335 million for flood relief.* Reuters. Retrieved July 19, 2022, from [https://www.reuters.com/markets/commodities/malaysia-spend-335-million-flood-relief-2021-12-29/#:~:text=KUALA%20LUMPUR%2C%20Dec%2029%20\(Reuters,Sabri%20Yaakob%20said%20on%20Wednesday.](https://www.reuters.com/markets/commodities/malaysia-spend-335-million-flood-relief-2021-12-29/#:~:text=KUALA%20LUMPUR%2C%20Dec%2029%20(Reuters,Sabri%20Yaakob%20said%20on%20Wednesday.)
- SauMeia, N., WengWaia, C., & Ahamadb, R. (2016, July 5). *Environmental awareness and behaviour index for Malaysia.* Procedia - Social and Behavioral Sciences. Retrieved July 19, 2022, from <https://reader.elsevier.com/reader/sd/pii/S1877042816303019?token=3EC4B9505527C952AFD47E5E5ADD4E6A432F041D04162506E95539337295F006E295EA06A80F37247AE967B7359EE12A&originRegion=eu-west-1&originCreation=20220716062823>
- Zhee Qi, T., & Muntazar bin Ali, A. (2020, August 6). *Malaysia and the Paris Agreement: Current wants or future needs?* UMLR | University of Malaya Law Review. Retrieved July 19, 2022, from <https://www.umlawreview.com/lex-in-breve/malaysia-and-the-paris-agreement-current-wants-or-future-needs>
- Sibley, M. (2021, January 14). *How do emissions trading systems work?* Grantham Research Institute on climate change and the environment. Retrieved July 19, 2022, from <https://www.lse.ac.uk/granthaminstitute/explainers/how-do-emissions-trading-systems-work/#:~:text=Emissions%20trading%2C%20also%20known%20as,emissions%20allowed%20under%20the%20cap.>
- Welsh, T. (2022, June 3). *Crop diversification: A solution for Food Crisis, climate change.* Devex. Retrieved July 19, 2022, from <https://www.devex.com/news/crop-diversification-a-solution-for-food-crisis-climate-change-103368>

Protect your property from coastal erosion - FEMA. (2020, November). Retrieved July 19, 2022, from https://www.fema.gov/sites/default/files/2020-11/fema_protect-your-property_coastal-erosion.pdf

Eco-Business. (2013, September 4). *Malaysia's mangrove forest rapidly depleted and degraded.* Eco. Retrieved July 19, 2022, from <https://www.eco-business.com/news/malysias-mangrove-forest-rapidly-depleted-and-degraded/#:~:text=The%20status%20quo%20for%20mangrove%20in%20Malaysia&text=How%20ever%2C%20it%20is%20said%20that,Sarawak%2C%20Negeri%20Sembilan%20and%20Penang.>

Macaranga. (2022, June 1). *Now or never for Malaysian coral reefs.* Macaranga. Retrieved July 19, 2022, from <https://www.macaranga.org/now-or-never-for-malaysian-coral-reefs/#:~:text=Mass%20coral%20bleaching%20has%20happened,of%20the%20world's%20coral%20reefs.>