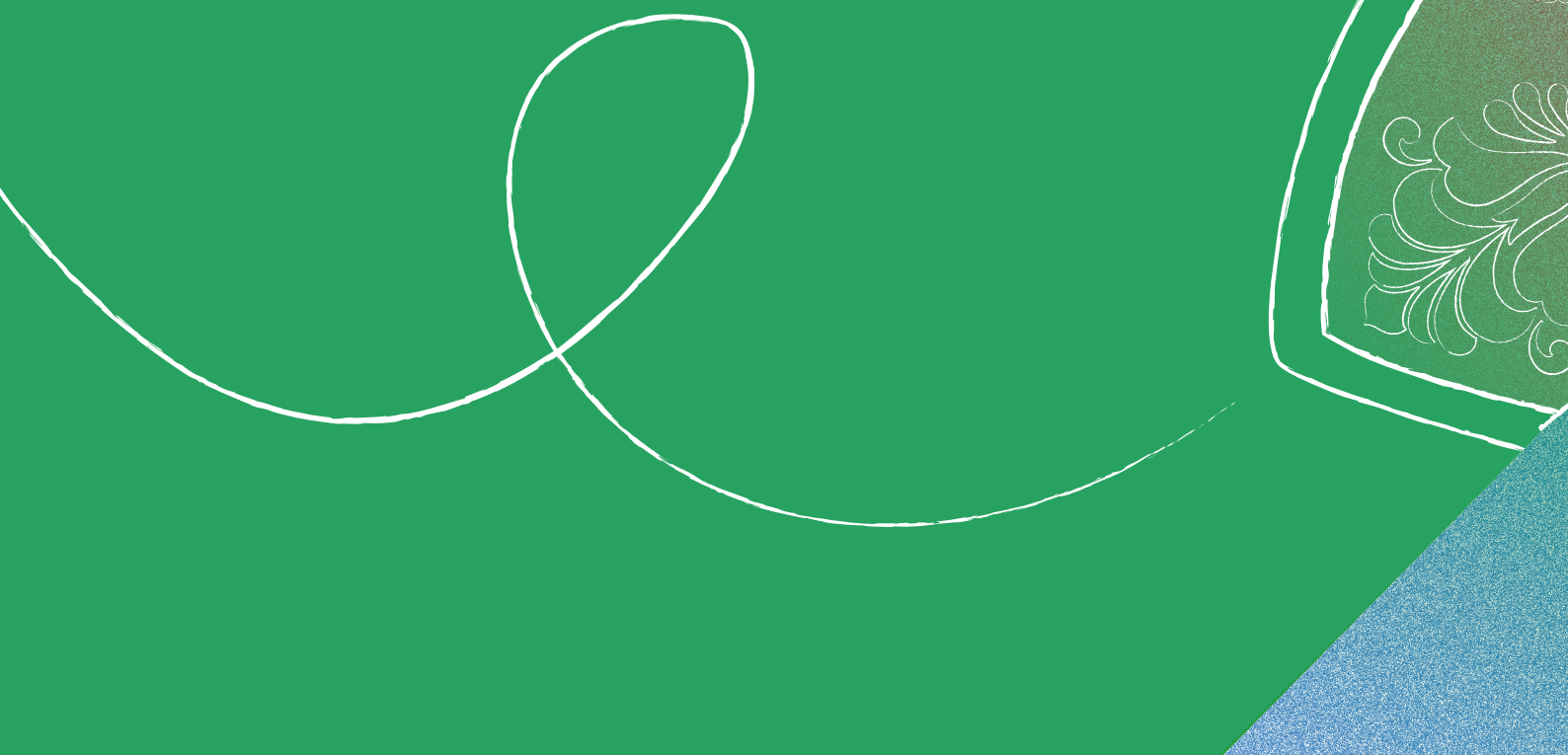
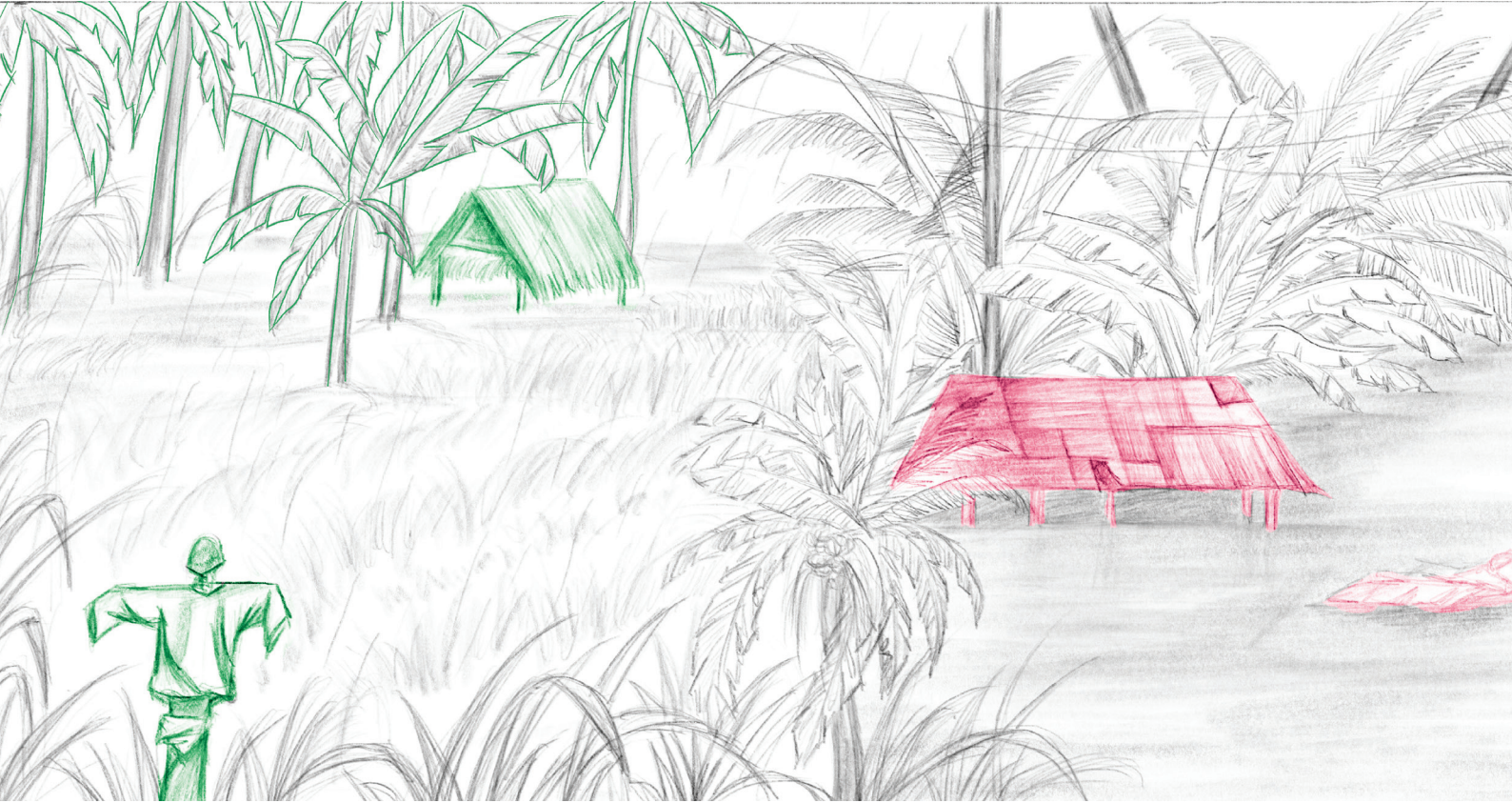


Chapter Four: Actions Towards Decarbonization





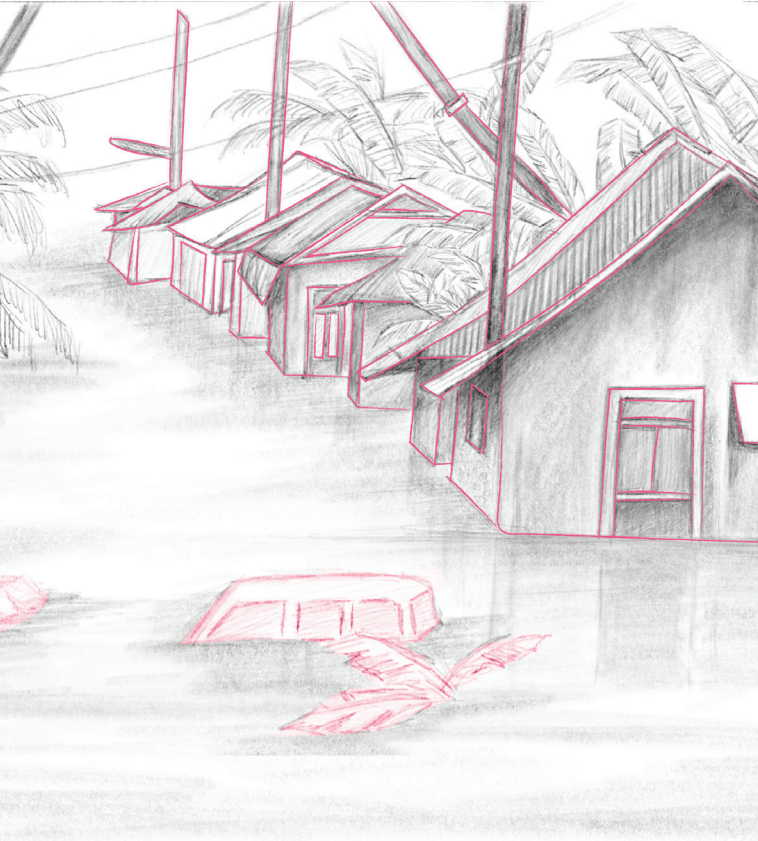
Chapter Four: Actions Towards Decarbonization



What does a change in temperature of 1-2 °C mean? In Malaysia, the difference between the daily high and low temperatures is around 7-8 °C. For those of us in air-conditioned homes or offices, changing the temperature by 1 °C requires just the tap of a button on a remote control. When cooking or baking, 1-2 °C is just a rounding error. However, when it comes to climate change, a 1-2 °C shift is massive.

Climate change is a long-term shift in temperatures and weather patterns. An increase in the average global temperature of 1-2 °C means larger changes in local maximum temperatures and greater frequency and intensity of heat waves. It means more energy in the atmosphere, changing rainfall patterns and creating more





violent storms. It means melting of glaciers and polar ice, raising sea levels all around the world. Because we have built agricultural systems based on historical weather, designed water catchment and drainage systems around historical rainfall patterns, and chosen locations for towns and cities based on historical sea levels, changes to the climate will bring massive disruption to our societies and our way of life.

While the global climate undergoes natural variations, human activity has caused it to change at an unprecedented rate. We burn fossil fuels for energy, clear land for development, and dig landfills for trash. These activities release carbon dioxide, methane, and other greenhouse gases (GHGs) into the atmosphere, making it more effective at

trapping heat from the sun. The average global temperature has already increased by over 1 °C since 1900, with most of the warming taking place since 1975. Even if we stopped all GHG emissions today, temperatures would continue to rise by more than 0.5 °C as the climate catches up with the GHG already in the atmosphere.

How can we accelerate climate actions to ensure a just, fair and acceptable transition?

We start by looking at the state of GHG emissions in Malaysia—how we are contributing to climate change and how climate change will affect us—and examine how we can reduce the carbon intensity of our cities, such as integrating alternate modes of transport with infrastructure and safety planning. We examine another environmental crisis, ozone layer depletion—that the global community has successfully come together to address—to see that it is possible to make real changes to the way we operate our industries to protect our planet.

In addition to mitigating climate change, we also need to prepare for its effects. For example, flooding events—a regular and repeating disaster risk in Malaysia—will become more frequent and intense with climate change, and we need to invest in adaptation. Finally, linking why and how we are affected by climate change is essential to building support for mitigation and adaptation. We need to invest in climate education and bring climate narratives closer to home and to create grassroots demand for action today.

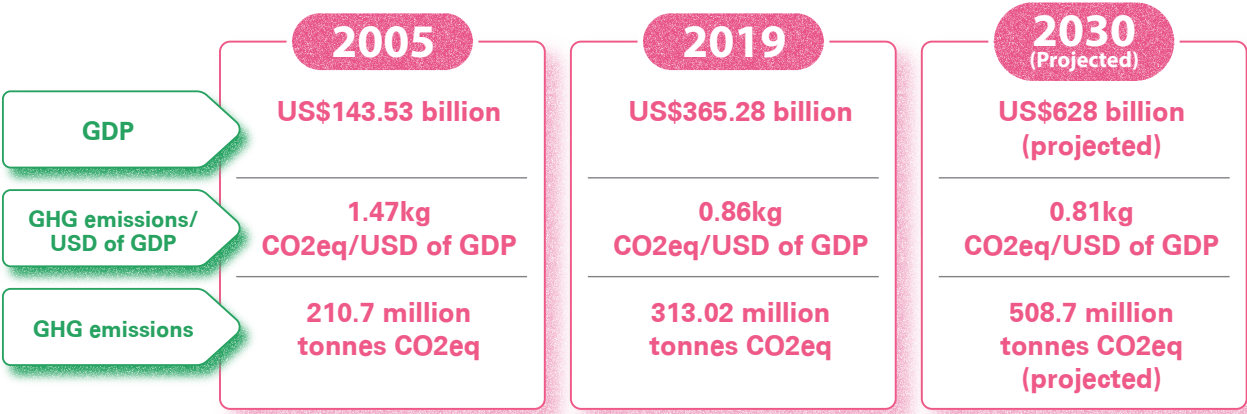
4.1

State of GHG Emissions in Malaysia

At the 26th Conference of the Parties (COP 26), Malaysia made an unconditional pledge to reduce carbon intensity, which is the amount of carbon emissions released per ringgit of economic activity generated, by 45% in 2030 compared to 2005 levels. Malaysia also aims to achieve net-zero GHG emissions by 2050. Measures to achieve this ambitious target include implementation of a carbon pricing policy and achieving 31% renewable energy

capacity for electricity generation by 2025 (compared with 23% as of 2020).¹

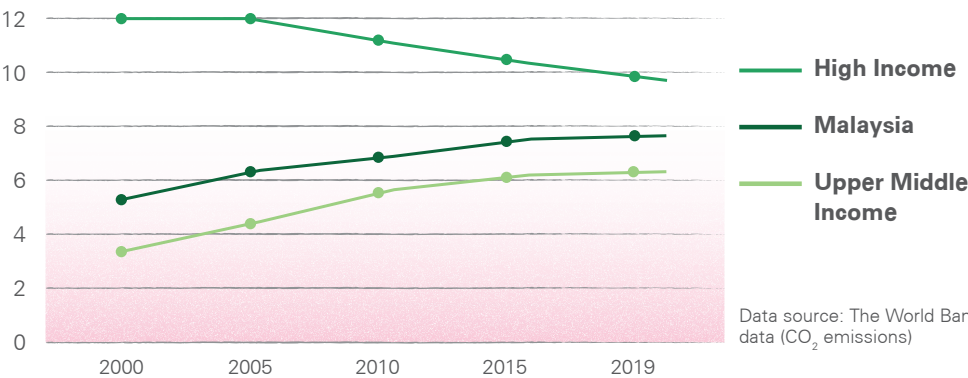
Nonetheless, Malaysia’s total GHG emissions are rising. Total GHG emissions reached 313.02 million tonnes CO₂eq in 2019 compared with 210.7 million tonnes CO₂eq in 2005.² Even with the country’s pledge to reduce carbon intensity, rising GDP means that our GHG emissions in 2030 will still double compared with 2005.³



Malaysia’s GHG target of reducing CO₂ intensity by 45% compared with 2005 baseline will still double absolute GHG emissions by 2030.

Data source: The World Bank data (GDP and GHG emissions)

CO₂ Emissions (metric tons per capita)



Data source: The World Bank data (CO₂ emissions)

¹ Sustainable Energy Development Authority Malaysia. 2020. “2020 Annual Report”. SEDA, www.seda.gov.my/wp-content/uploads/2022/01/SEDA-KWSM-Annual-Report-2020_2.pdf. Accessed 28 September 2022.

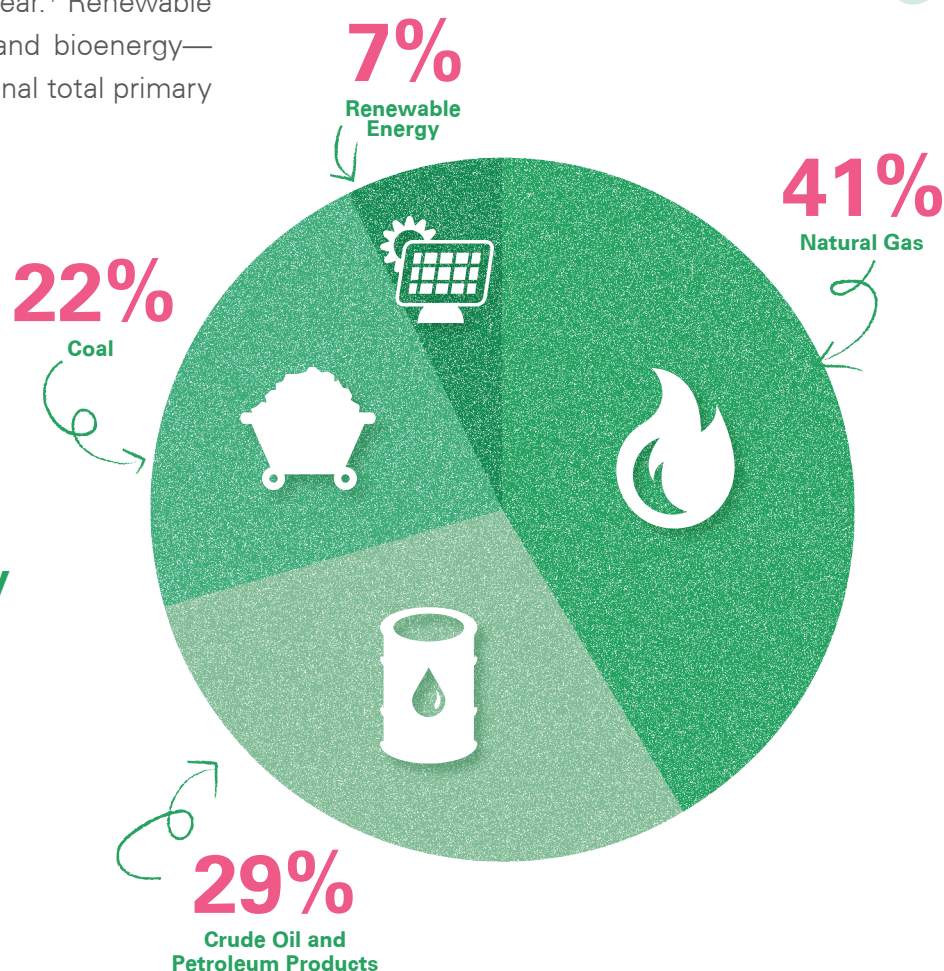
² Climate Watch. 2020. “Total Greenhouse Gas Emissions (Kt of CO₂ Equivalent) - Malaysia | Data”. The World Bank, data.worldbank.org/indicator/EN.ATM.GHGT.KT.CE?locations=MY. Accessed 7 October 2022.

³ CEO Action Network, and Climate Governance Malaysia. 2021. “Towards a Low Carbon Emissions Pathway”. CAN, CGM, www.bnm.gov.my/documents/20124/3770663/jc3_can_cgm_report_2022.pdf. Accessed 7 October 2022.

Where do Malaysia's carbon emissions come from, and do our forests absorb it?

Well, in Malaysia, the energy sector contributes 28% of GDP and accounts for 25% of the total workforce.⁴ However, energy also contributes to approximately 80% of Malaysia's GHG emissions.⁴ Energy demand grew 6% annually on average between 2010 and 2018, with the transport, power and industry sectors representing the largest components of energy demand. This was supplied by natural gas (41%), followed by crude oil and petroleum products (29%), and coal (22%), which is the fastest-growing energy source in Malaysia, with a growth rate of 11% per year.⁴ Renewable energy—hydroelectric, solar, and bioenergy—constitute just 7% of the national total primary energy supply.⁴

Malaysia's energy supply



⁴ Economic Planning Unit. 2022. "National Energy Policy 2022 - 2040". EPU, www.epu.gov.my/sites/default/files/2022-09/National_Energy_Policy_2022-2040.pdf. Accessed 4 October. 2022.

Malaysia's carbon emissions from energy use, together with emissions from waste, agriculture and land use change are outpacing our tropical forest's ability to sequester carbon.

Malaysian forests have the potential to sequester 260 million tonnes CO₂eq.⁵ However, deforestation impacts this. A 2022 study by Forest Research Institute Malaysia (FRIM), the Forestry Department of Peninsular Malaysia (FDPM), Sabah Forestry Department (SFD) and Forest Department of Sarawak (FDS) showed a 5.6% loss of forest cover between 2005 and 2020, contributing 689.26 million Mg CO₂ in that time period.⁶ Nonetheless, Malaysia's deforestation rates have slowed due to mitigation strategies by the government, which has promised to end deforestation by 2030.⁶

How will greenhouse gasses and climate change impact Malaysia?

Malaysia faces rising temperatures of 1-1.5 °C above baseline in 2041–2050. While this temperature change may seem small, especially for those of us reading this in air-conditioned environments, it will have substantial impacts on a broad range of weather patterns. Rainfall is projected to increase substantially, both in the Peninsular but even more so in East Malaysia.⁷

The changing weather patterns will affect planting seasons and productivity, with consequences for food prices and food security,⁸ and floods and droughts could potentially reduce rice yields in Malaysia by up to 60%.⁹ Climate change will also affect food production around the globe, affecting food markets in Malaysia. Today, we are already experiencing rising food prices due to a combination of the conflict in Ukraine and heatwaves and droughts that have badly affected crop production in India and China.^{10,11} Such shocks to the global food market will become more frequent and intense due to climate change.

Climate change also creates direct threats to life and health.

Unprecedented rainfall will also cause more frequent and intense floods. By 2030, up to 85,800 people may be at risk.¹² Apart from death from drowning, there are additional health impacts from infectious diseases, disruption of clean water supply, and post-traumatic stress. Floods do not only cause socio-economic disruption, population displacement, and disruption of business ecosystems, as shown below:

- The 2014 floods in Kelantan affected the hospitals there and stopped 80% of services in Hospital Raja Perempuan Zainab

⁵ Ministry of Environment and Water. 2020. **"Malaysia's Third Biennial Update Report (BUR3) to the United Nations Framework Convention on Climate Change (UNFCCC)." Ministry of Environment and Water, https://unfccc.int/sites/default/files/resource/MALAYSIA_BUR3-UNFCCC_Submission.pdf. Accessed 5 October 2022.**

⁶ Omar, H. **"Free-Access Satellite Data for Land Use Change and Forest Sector in Malaysia"**. *Journal of Advanced Geospatial Science & Technology*, vol. 2, no. 2, Aug. 2022, pp. 56-71, <https://jagst.utm.my/index.php/jagst/article/view/47>. Accessed 4 October 2022.

⁷ Rahman, Haliza Abdul. **"Climate Change Scenarios In Malaysia: Engaging The Public."** *International Journal of Malay-Nusantara Studies*, vol. 1, no. 2, 2018, pp. 55–77, journal.unhas.ac.id/index.php/IJoM-NS/article/view/5518. Accessed 13 September 2022.

⁸ Food and Agriculture Organization of the United Nations. 2015. **"Climate Change and Food Security: Risks and Responses."** FAO, www.fao.org/3/i5188e/i5188E.pdf. Accessed 28 September 2022.

⁹ Asian Development Bank & World Bank. **"Climate Risk Country Profile - Malaysia."** ReliefWeb, 2021. <https://reliefweb.int/report/malaysia/climate-risk-country-profile-malaysia>. Accessed 13 September 2022.

¹⁰ Low Minmin. 2022. **"The Soil Is as Hard as Rock : Farmers Reel from China Heatwave as Food Inflation Looms."** CNA, www.channelnewsasia.com/asia/china-heatwave-agriculture-food-inflation-chongqing-2915371. Accessed 28 September 2022.

¹¹ Hannah Ellis-Petersen. **"India's Wheat Farmers Count Cost of 40C Heat That Evokes 'Deserts of Rajasthan'."** *The Guardian*, 21 May 2022, www.theguardian.com/world/2022/may/21/india-wheat-farmers-40c-heat-food-security. Accessed 7 October 2022.

¹² World Health Organization. 2015. **"Climate and Health Country Profile: Malaysia."** WHO, www.who.int/publications/i/item/health-and-climate-change-country-profile-2015-malaysia. Accessed 7 October 2022.

II (HPRZ II). It also caused major losses and disruptions in chronic disease care among flood victims.¹³

- The November 2020 monsoon floods in the East Coast of Peninsular and East Malaysia during the COVID-19 pandemic was a challenge for implementing disease control and prevention standard operating procedures (SOPs). It led to COVID-19 clusters (Taman Bahagia cluster in Pahang and Jalan Niaga cluster in Johor).¹⁴
- In December 2021, the METMalaysia issued an unexpected red alert in the Klang Valley. The lack of familiarity and unpreparedness not only resulted in deaths, displacement and financial loss, but also post-traumatic stress.¹⁵

Virulent infections are also sensitive to climate change. Hospitalization rates in Malaysia have indeed increased in relation to higher rainfall and temperatures.¹⁶ Dengue cases are predicted to increase by 46.87% with a 1°C increase in temperature.¹⁶ Zoonotic malaria infections (caused by animal-to-human transmission) have increased from 376 cases in 2008 to 3,575 cases in 2021 because of aggressive land clearing.¹⁷

In light of these consequences, it is critical to reduce GHG emissions and prepare for climate change impacts. The Paris Agreement, the 2015 international treaty on climate change, states “All Parties should strive to formulate

and communicate long-term low greenhouse gas emission development strategies...taking into account their common but differentiated responsibilities and respective capabilities, in the light of different national circumstances.” What are Malaysia’s circumstances, capabilities and responsibilities?

Combating climate change will require the combined effort of all nations. While the developed countries of the Global North are responsible for 79% of cumulative carbon emissions, the large population and often rapid development in the Global South means that it contributes around 63% of annual GHG emissions and must be part of any climate change solution.¹⁸ Zooming in on Malaysia, the nation is a growing contributor to GHG emissions today, more than double the world average in per-capita GHG emissions, and even well above other UMICs.¹⁹ Malaysia stands on the cusp of becoming a high-income country and must find pathways to generating wealth in a sustainable manner.

Malaysia’s aim of achieving net-zero carbon emissions by 2050 acknowledges this responsibility and requires rethinking development investments. This requires shifting both cultural norms and market systems surrounding production and consumption—more is not necessarily better. Part of this shift requires an economy that is not dependent on ‘free’ carbon emissions.

¹³ Yusoff, N A, et al. 2017, “**The Impact of Floods in Hospital and Mitigation Measures: A Literature Review.**” IOP Conference Series: Materials Science and Engineering, iopscience.iop.org/article/10.1088/1757-899X/271/1/012026/meta#references. Accessed 8 April. 2022.

¹⁴ Ng, Yuki Julius, et al. 2021. “**Floods amidst COVID-19 in Malaysia: Implications on the Pandemic Responses.**” Disaster Medicine and Public Health Preparedness, europepmc.org/article/pmc/pmc8861544. Accessed 12 July 2022.

¹⁵ Rahman, Serina. 2022 “**Malaysia’s Floods of December 2021: Can Future Disasters Be Avoided?**” ISEAS – Yusof Ishak Institute, https://www.iseas.edu.sg/wp-content/uploads/2022/03/ISEAS_Perspective_2022_26.pdf. Accessed 13 October 2022.

¹⁶ Yip, Stan, et al. “**Spatio-Temporal Detection for Dengue Outbreaks in the Central Region of Malaysia Using Climatic Drivers at Mesoscale and Synoptic Scale.**” Climate Risk Management, vol. 36, 2022, p. 100429, <https://doi.org/10.1016/j.crm.2022.100429>. Accessed 28 September 2022.

¹⁷ BERNAMA. “**Increase in Zoonotic Malaria Infections a New Threat in Malaysia – Khairy.**” The Malaysian Reserve, 26 April 2022, [themalayianreserve.com/2022/04/26/increase-in-zoonotic-malaria-infections-a-new-threat-in-malaysia-khairy/](https://www.themalayianreserve.com/2022/04/26/increase-in-zoonotic-malaria-infections-a-new-threat-in-malaysia-khairy/). Accessed 29 September 2022.

¹⁸ Fuhr, Harald. “**The Rise of the Global South and the Rise in Carbon Emissions.**” Third World Quarterly, vol. 42, no. 11, 16 Sept. 2021, pp. 1–23, www.tandfonline.com/doi/full/10.1080/01436597.2021.1954901, 10.1080/01436597.2021.1954901. Accessed 10 October. 2022.

¹⁹ Climate Watch. 2020. “**CO2 Emissions (Metric Tons per Capita) - Malaysia, World, East Asia & Pacific, Upper Middle Income, Middle Income, High Income, Low Income, Lower Middle Income | Data.**” The World Bank, data.worldbank.org/indicator/EN.ATM.CO2E.PC?locations=MY:1W-Z4-XT-XP-XD-XM-XN. Accessed 10 October. 2022.

Malaysia launched the Bursa Carbon Exchange (BCX), a voluntary carbon market, in December 2022 as a step in this direction.²⁰ We must recognize, however, that shifting the economy away from dependence on intensive carbon emissions will be disruptive and even painful.

How can we ensure this transition is fair, just and acceptable?

Elsewhere, improperly designed carbon tax policies have created mistrust among citizens.²¹ That is why taking a just approach, combining GHG reduction with socio-economic transformation, is necessary so that costs and benefits are equitably distributed—that is to say, a Green New Deal.

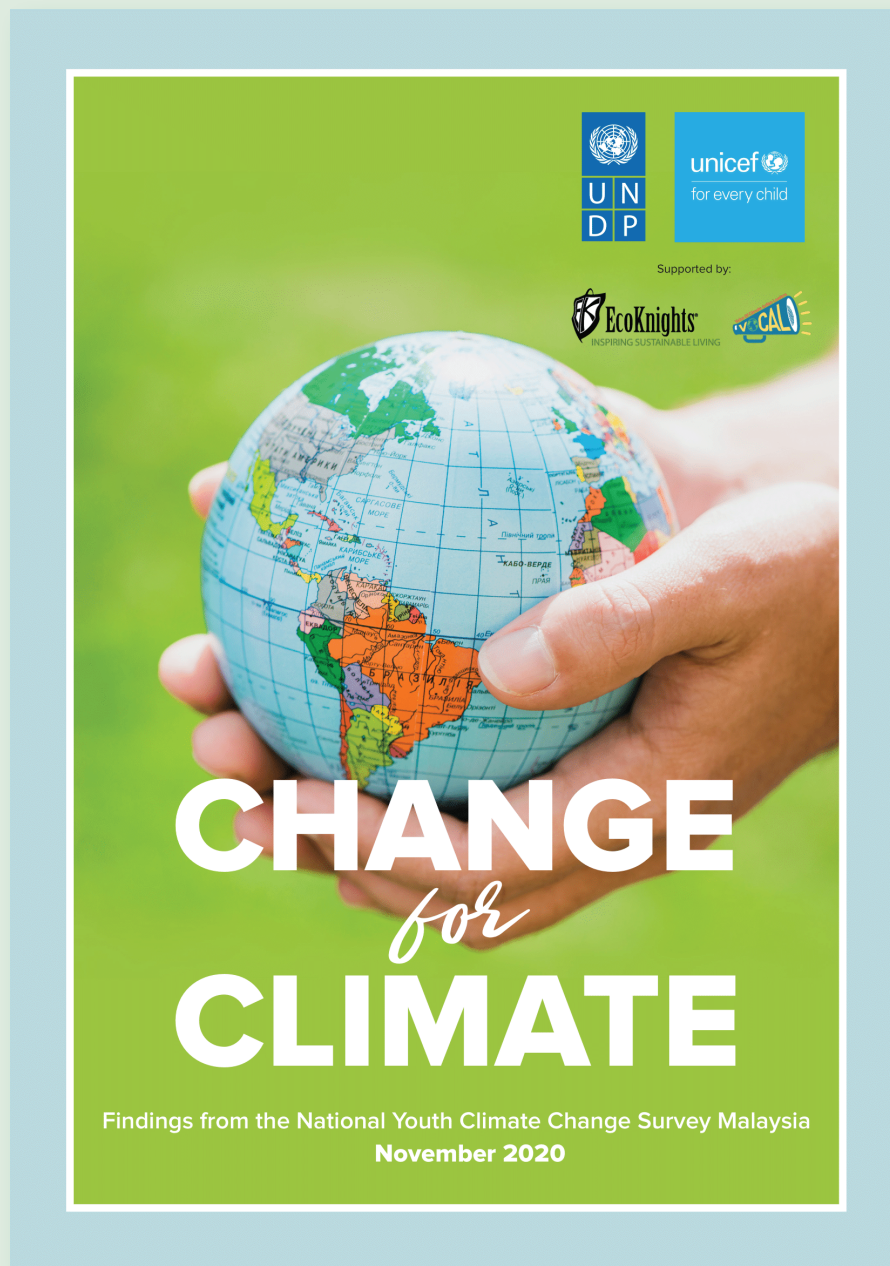
A Green New Deal is a voluntary agreement between the government, business sector and the public, that prioritizes human development goals like poverty alleviation and economic equality in preventing a climate catastrophe. Combating climate change is not just a technical problem of calculating, pricing and allocating carbon emissions. It is also a public conversation about how we are going to pay for these changes, who benefits from carbon taxes and investments in green technology, and what the outcomes will be for all citizens—in livelihoods, health, education and more.²² How we answer these questions will determine how successful we will be in combating climate change—and how equitably we share the gains from economic development.



²⁰ Bursa Malaysia. N.d. **"Voluntary Carbon Market Exchange."** <https://www.bursamalaysia.com/trade/market/voluntary-carbon-market-exchange/overview>. Accessed 25 February 2023.

²¹ World Inequality Database. 2022. **"World Inequality Report 2022: Global Carbon Inequality."** World Inequality Database, wir2022.wid.world/chapter-6/. Accessed 7 October. 2022.

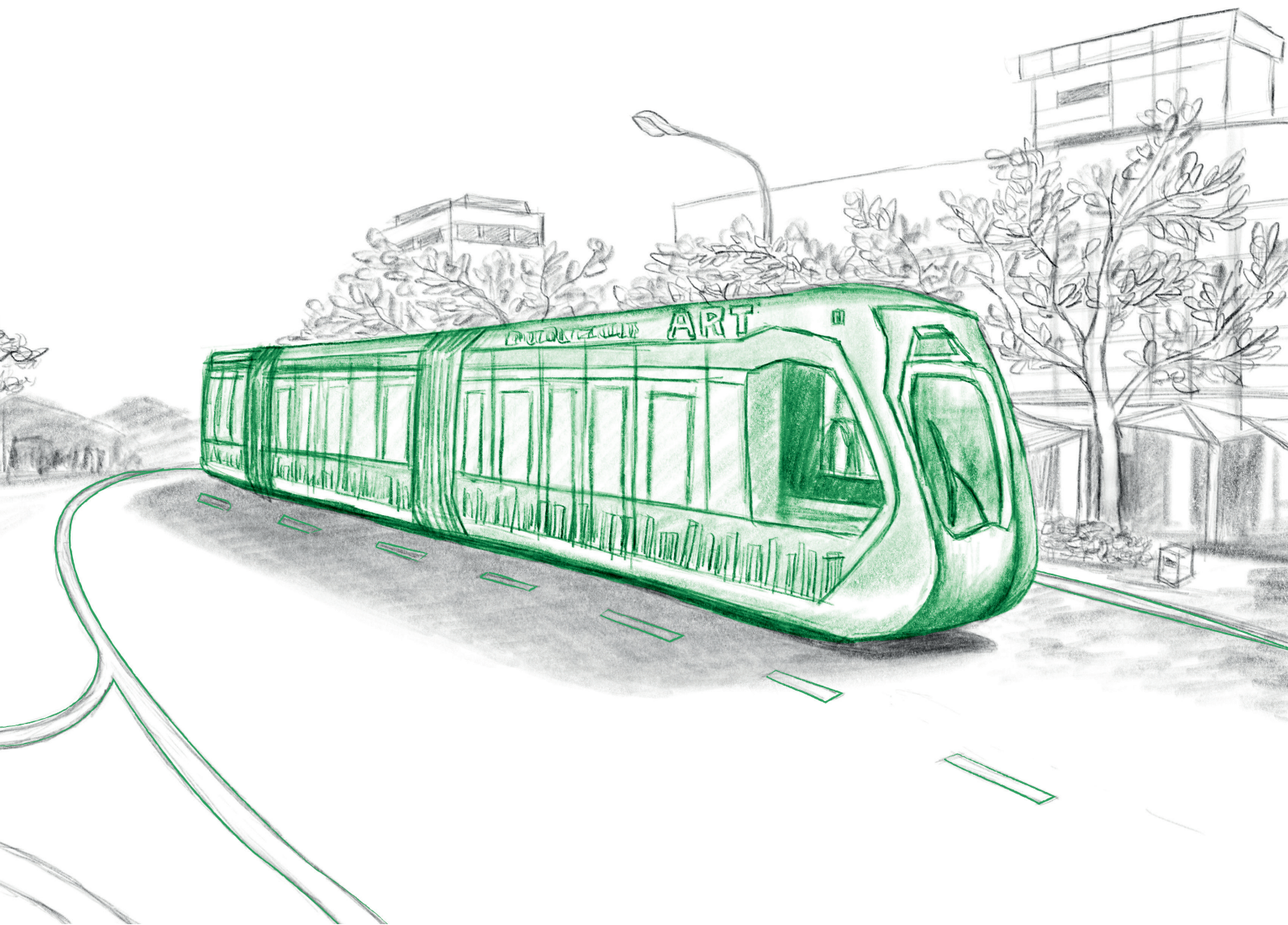
²² United Nations Conference on Trade and Development. 2019. **"UN Calls for Bold Action to Finance a Global Green New Deal and Meet the SDGs."** UNCTAD, unctad.org/press-material/un-calls-bold-action-finance-global-green-new-deal-and-meet-sdgs. Accessed 13 October. 2022.



UNDP and UNICEF conducted the **National Youth Climate Change Survey Malaysia**. Scan the QR code to find out what youth in Malaysia think about climate change.

4.2

Iskandar Malaysia Bus Rapid Transit (IMBRT)



Subject: [Invitation] IMBRT Workshop Series - Tebrau Corridor

bcc: citycouncilarchitect@irda.com.my

Dear esteemed colleague,

Green Technology Application for the Development of Low Carbon Cities (GTALCC), as part of an International Peer Review, would like to invite you to participate in a workshop to assess pedestrian improvements to Iskandar Malaysia Bus Rapid Transit (IMBRT) corridors and stations on Thursday, 28 November 2019.

This will be a series of workshops to improve pedestrian and bicycle networks in Johor Bahru as part of the Iskandar Malaysia BRT. To be upgraded from Silver++ to Gold Standard, significant pedestrian facility improvements must be made.

Attached to this email are the workshop details, agenda and location maps.

Your expertise is highly valued, and we look forward to gathering your insight. Please confirm your attendance by replying to this email by 12 November 2019. A follow-up confirmation email will then be sent to you.

Thank you.

Consultant, GTALCC

Our objectives today are two-fold – first, to conduct an in-depth discussion on the pedestrian needs along the Tebrau corridor and second, to develop a strategy for improvements.

Facilitator

By itself, the IMBRT is an excellent project that increases connectivity within Iskandar Malaysia, and it has been rated Silver++, a little bit shy of Gold – because of the first- and last-mile issue. I know, it's an issue we face again and again with public transport here in Malaysia, but I hope with your expertise, we can make some solid recommendations.

I have markers and a board for you to use. Let me just write our agenda at the top here and I'll let you take it away.

Glossary

bcc — blind carbon copy

BRT — Bus Rapid Transit

cc — carbon copy

GTALCC — Green Technology Application for the Development of Low Carbon Cities

IMBRT — Iskandar Malaysia Bus Rapid Transit

JB — Johor Bahru

Jl. — abbreviation for 'Jalan' translating to road or street

NMT — Non-motorized transport



BRT Pedestrian Improvement Workshop

focus group discussion



City Council Architect

It does sound mundane, but the success of the IMBRT system will be determined by how easily passengers can reach the stations.

Urban Planner

You're right. The system is fantastic but what is the point if you can't reach the station, or get to where you want to go from the station? Sunny weather is common throughout the year. Without weather protection to provide shade to pedestrians, it is unlikely that people will choose public transport over cars and motorcycles.

Technical Expert

There are some places in Johor Bahru with covered walkways, but they are implemented on an ad hoc basis, most notably the impressive walkway connecting JB Sentral to Princess Cove, but then again, they do not extend to the surrounding areas.

Similarly, there are some areas with pedestrian facilities that are quite good in Johor Bahru, including in the Chinatown area. You may have noticed stretches of vibrant shaded shophouse architecture, but these tend to be sporadic and disconnected from each other and from the transit network.

Urban Planner

Fair, but I must point out how dangerous an affair it is now to walk. Crossing the road is often difficult or impossible without large detours. Where pedestrian bridges are provided, they are generally of a poor design, with steep stairs. Also, I think from a walkability standpoint, pedestrian crossings are much preferred to pedestrian bridges as even well-designed bridges can add a lot of distance to a journey on foot.

The other thing is that many intersections either disregard the needs of pedestrians in the signal controls or fail to provide any consideration at all for crossing pedestrians. Where walkways are present, they are often heavily damaged, too narrow for two people to pass, or obstructed.

Facilitator

Alright, I have taken quite a number of notes on the strengths that we can leverage and the problems that we need to solve. Where should we go from here?

City Council Architect

Let's start with Tebrau, a potentially walkable and attractive cluster. The Pelangi mall, Holiday Plaza mall and Taman Sentosa mall area are all within 500m of the proposed inner Tebrau IMBRT stations, along with many shophouses and other areas of potential interest. Yet these areas are quite poorly connected for pedestrians.

Technical Expert

Studying the Tebrau area, this is what I see: high-quality connections to major demand points along and adjacent to the IMBRT corridors and stations will determine user demand. If access improvements are not carried out, then even though the corridor passes high demand locations, people will tend to avoid using the system.

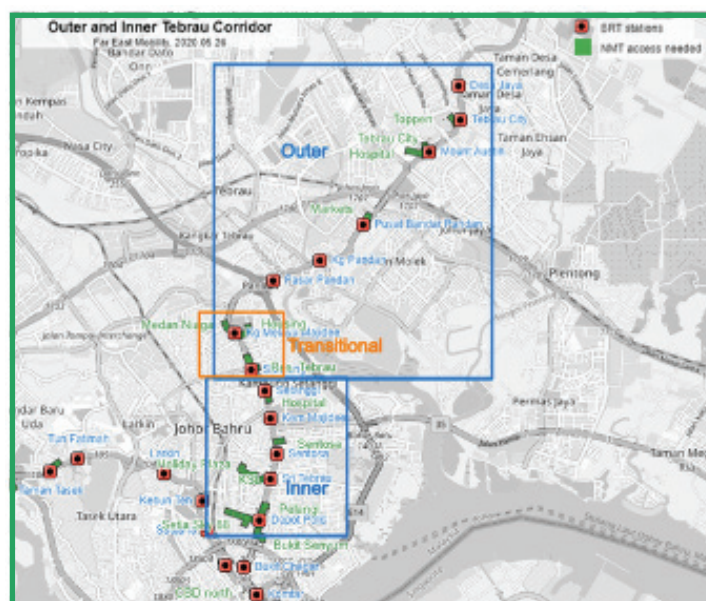
Therefore, improvements should be made along the BRT corridors, like so, accessing the corridors, like over here, and accessing bus stops outside the BRT corridor, around this area. Let me just draw it on the map with a marker.



Along the BRT corridors, I think pedestrian facility improvements should be made as part of the BRT design itself.

City Council Architect

You are quite right. Since we are workshoping Tebrau, may I draw your attention to the map of the Tebrau corridor.



The outer part, here, is a highway with free-flowing traffic including heavy truck traffic. Buildings are typically set back a long way from the road and there is nothing appealing in this corridor for pedestrians – not surprising, really, practically non-existent.

Not that I think we should do away with pedestrian improvements in the outer part, but the inner part should be our focus.

I say that because the inner part over here, is completely different – regular traffic lights, buildings built up to the edge of the public right-of-way, and shopfronts facing the road – very nice shophouses, especially the arcade style shopfronts.

It creates a highly attractive urban boulevard in stark contrast to the outer part of Jl. Tebrau. Despite that, these pictures, courtesy of colleagues at the local council, provide examples of where walkways along the inner corridor are missing.



Urban Planner

So, this would include...let me list them out on the board.

BRT Pedestrian Improvement Workshop focus group discussion

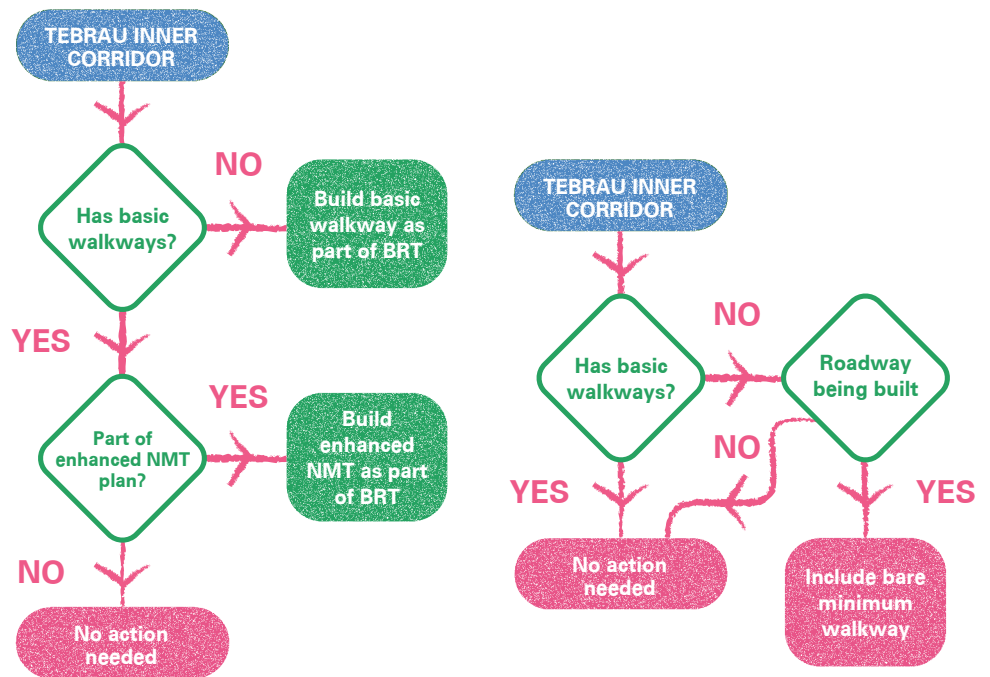
- pedestrian access to IMBRT stations
- pedestrian crossings at intersections
- provision of weather protection for pedestrians
- unobstructed walkways, including walkway reconstruction where needed
- landscaping elements such as pavings, seating, signage, lighting, greenery, plazas, public art, etc.

Right?

City Council Architect

I think we can come up with a simple flowchart for the inner corridor. Does it have basic walkways? No? Then build basic walkways as part of BRT. If yes, is it part of the enhanced NMT plan? If so – then build enhanced NMT, otherwise no action would be needed.

Alternatively, does it have basic walkways? Yes – great. No – then are roadways being built? If yes, then include the bare minimum walkway, otherwise no further action is needed.



I think this works, no?



Subject: Solid work!

To: director@irda.com.my

Dear Sir,

We just completed the last of the series of workshops last week. I'll be coming up with the report soon.

While the report will feature the issues identified and recommendations, I'd say among the recommendations on the greenways (which also serve as reminders in any green transport development) is that while they can be implemented in sections and could have excellent potential in Iskandar Malaysia, much additional planning is needed before the greenway can reach an implementation stage.

I would keep these in mind:

- Focusing on quality and not quantity. It is much easier to build 50km of greenways in a relatively remote and low-traffic location than to build 5km of greenways which connect to a dense population area and cross multiple busy intersections.
- Aiming to support regular commuting, not just recreational trips. The best greenway networks serve a dual function of supporting non-recreational as well as recreational trips.

We will discuss this more once the report is completed.

Consultant, GTALCC



The **Green Technology Application for the Development of Low Carbon Cities (GTALCC)** was a 5-year strategic project from 2017 to 2022 by UNDP and the government of Malaysia, funded by the Global Environment Fund (GEF), with Sustainable Energy Development Authority Malaysia (SEDA Malaysia) as lead consultant. The aim of this project was to facilitate the implementation of low carbon initiatives in at least five Malaysian cities and showcase a clear and integrated approach to low carbon development, by means of addressing barriers and challenges to low carbon urban development. Among the participating cities, was Iskandar Malaysia. Through the GTALCC project, an International Peer Review of IMBRT was carried out, scoring it according to the BRT Standard. The review also provided recommendations on pedestrian and bicycle (or non-motorized transport) improvements.





Scan the QR code to discover **Our Secret Weapon** in the fight against climate change and how Malaysian cities take an integrated approach to low carbon development.

Take Care Earth



Scan the QR code for **lessons on climate change** from the COVID-19 crisis.



4.3

Building Energy Efficiency

Globally, buildings account for approximately 32 percent of energy use and almost 30 percent of total greenhouse gases (GHG) emissions. Retrofitting existing buildings to be energy efficient (EE) can reduce heating and cooling energy requirements by 50-90 percent whereas new EE buildings can come close to using zero energy for heating and cooling.¹ As energy demand continues to rise, EE buildings play a critical role in reducing electricity demand and dependency on coal and fossil fuel plants.

What exactly makes a building energy efficient?

Compared to conventional buildings, EE or green buildings are designed using materials that minimize heat gain and use systems and appliances that operate on less energy. EE building design also considers environmental factors such as solar radiation, building radiation, wind direction and spatial environment to reduce the need for cooling, heating and lighting, limiting energy consumption.

Heating and Cooling Factors in Energy Efficient Building design

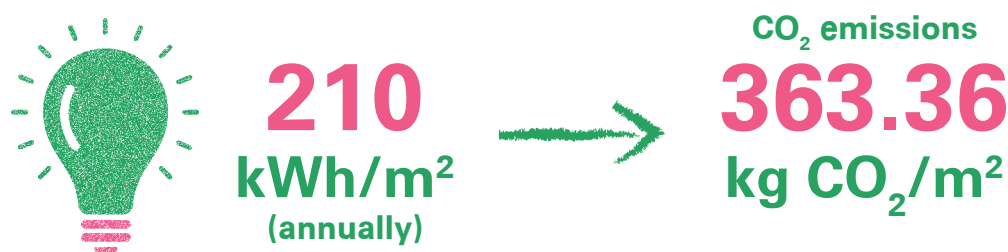


¹ Global Environment Facility. (n.d.) "Energy Efficiency." <https://www.thegef.org/topics/energy-efficiency>. Accessed 6 January 2023.

Industrial and commercial buildings in Malaysia use a lot of energy for cooling. For example, office buildings in Malaysia have an average building energy intensity (BEI), that is energy use of 210 kWh/m² annually,² releasing up to 363.36 kg CO₂/m².³ The Energy Commission's Diamond Building in Putrajaya is a green building model that achieved remarkable

savings in terms of energy and carbon emissions. Annually, the Diamond Building has BEI of 65kWh/m² (without photovoltaics) and 56kWh/m² per year (with photovoltaics), reduces carbon dioxide emissions by 1,400 tonnes and saves RM 1 million in operating costs from energy efficiency and solar power generation.⁴

Average building energy intensity (BEI) for offices in Malaysia



Benefits of EE adoption in residential built design

Traditional houses have long embraced the concept of energy efficiency in design and construction. For example, old Malay houses were built with the understanding of how our warm and humid climate works—a high roof with plenty of windows and openings optimizes natural ventilation and lighting, while locally sourced materials like Chengal wood help to regulate the temperature inside the house.

An example of a modern design is the platinum-rated S11 house in Petaling Jaya, used as the first pilot project to test the Green Building Index (GBI). Ar. Dr Tan Loke Mun—the architect and homeowner—sourced waste stones from other construction projects, and discarded polystyrene and recycled Chengal wood from old *kampung* houses, which he collected over the years. To keep the house naturally cool, the sliding doors on the first level were placed facing the North and South ends of the house (according to the prevalent wind direction in that location) to allow controlled cross-ventilation and evaporative cooling effect from small ponds. Rainwater harvesting tanks and photovoltaic solar panels were installed. The S11 house is a case study that demonstrates how using recycled materials brings down the cost, reduces material wastage and carbon emitted from the construction value chain, and how sustainable designs help reduce energy consumption.

² Energy Commission. (n.d.) "The Energy Commission Diamond Building." [https://www.st.gov.my/en/details/aboutus/9#:~:text=The%20building%20energy%20index%20\(BEI,is%20210kWh%2Fm2%20per%20year](https://www.st.gov.my/en/details/aboutus/9#:~:text=The%20building%20energy%20index%20(BEI,is%20210kWh%2Fm2%20per%20year). Accessed 10 January 2023.

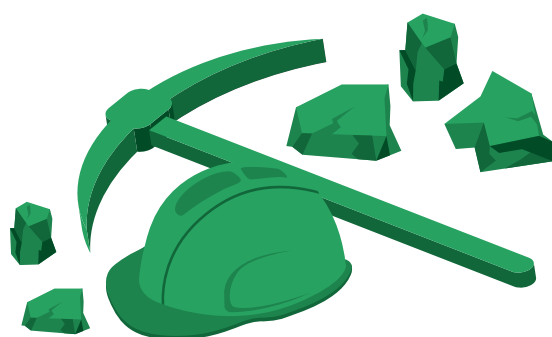
³ Klufallah, Mustafa & others. "Assessment of Carbon Emission Reduction in Buildings Projects in Malaysia – A Comparative Analysis." E3S Web of Conferences, Volume 3, 2014, <https://doi.org/10.1051/e3sconf/20140301016>. Accessed 10 January 2023.

⁴ Koay, Allan. "Diamond Building: A Shining Example of Energy Efficiency." The Star, 5 July 2011. <https://www.thestar.com.my/lifestyle/features/2011/07/05/diamond-building-a-shining-example-of-energy-efficiency>. Accessed 20 January 2023.

The building sector is a strategic area of focus for GHG emissions as new buildings have long-term impacts on energy use and construction in Malaysia is expected to grow by 6.2 percent annually between 2023 and 2026.⁵ In addition to direct emissions from construction activities, the construction sector is also responsible for 271,948 tons of construction and demolition waste,⁶ and the rate of construction waste

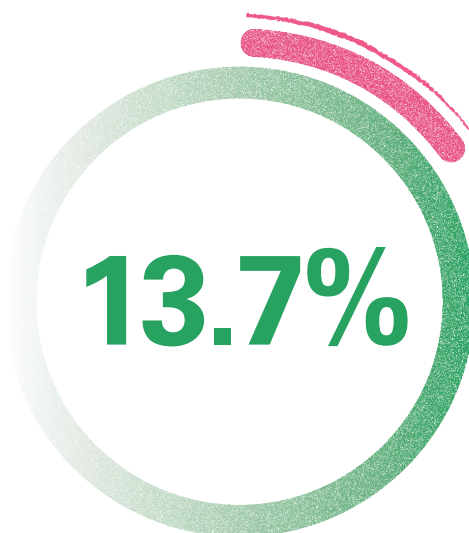
recycling is relatively low (13.7 percent). Sustainable building approaches like using green materials and industrialized building system (IBS) technology can not only reduce waste generation by 40 percent, but also shorten the construction period, while cutting costs from building materials and manpower by 14 percent compared with conventional practices.⁷

Total construction and demolition waste in Peninsular Malaysia (2018):



271,948
tons

Construction and demolition recycling rate



⁵ Global Data. November 2022. **"Malaysia Construction Market Size, Trends and Forecasts by Sector – Commercial, Industrial, Infrastructure, Energy and Utilities, Institutional and Residential Market Analysis, 2022-2026."** Global Data. https://www.dosm.gov.my/v1/uploads/files/5_Gallery/2_Media/4_Stats@media/1_General%20News/2022/04.%20APRIL/5%20April%20-%20Media%208%20-%20one%20news%20page.pdf. Accessed 10 January 2023.

⁶ Anuar Bashah, Khairul Nizam. 2021. **"Sustainable Construction Waste Management: Uplifting The Malaysian Construction Industry."** Construction Industry Development Board. <https://greenre.org/assetuploads/files/GRE%20EP%204-CIDB.pdf>. Accessed 18 January 2023.

⁷ Ministry of Environment and Water. 2020. **"Malaysia Third Biennial Update to UNFCCC."** Ministry of Environment and Water. https://unfccc.int/sites/default/files/resource/MALAYSIA_BUR3-UNFCCC_Submission.pdf. Accessed 18 January 2023.

The Malaysian government has introduced various initiatives to improve the uptake of green buildings. Among these are the Green Building Index and the Building Energy Index labelling for commercial and government buildings, the Energy Performance Contracting Fund to reduce barriers in financial institutions to fund Energy Services Companies (ESCOs) implementing energy-efficient projects in the building sector and the Energy Management Information system to consolidate scattered databases on EE initiatives. Certified green building owners are also eligible for tax exemptions under Investment Tax Allowances to purchase green technology assets for energy efficiency projects. From 2016 to 2020, a total of 28 government premises were retrofitted, including 18 hospitals, contributing to 31.5 million kilowatts hours (kWh) of electricity savings, equivalent to RM12.4 million in utility costs and 24 kilo tonnes of carbon dioxide (ktCO₂eq).⁸ A total of 108 industrial and 109 commercial buildings were also audited and retrofitted, contributing to 545 million kWh of electricity savings, equivalent to RM215 million in utility costs and 318 ktCO₂eq.⁹

Moving forward, Malaysia needs a robust regulatory framework to serve as the legal basis for planning and administering building energy efficiency programmes. The absence of a strong regulatory framework is a major obstacle to EE building adoption due to inadequate enforcement of building EE policies and non-mandatory compliance to building EE requirements stipulated in the Uniform Building By-Laws. With the tabling of the Energy Efficiency Conservation Act (EECA) in 2019 that is soon to be gazetted by the parliament, decarbonization of the building sector will be more coordinated and regulated through enhanced cooperation and compliance from cross-sectoral ministries and industries. Additionally, monitoring of the building sector's emissions, energy management systems, and of current and future construction should be sustained. Rigorous data tracking helps in assessing the impacts of EE buildings in reducing energy and GHG emissions. Finally, previous incentives like ESCOs and EPC should be intensified as they have been shown to significantly increase the share of green building adoption and energy-efficiency practices.

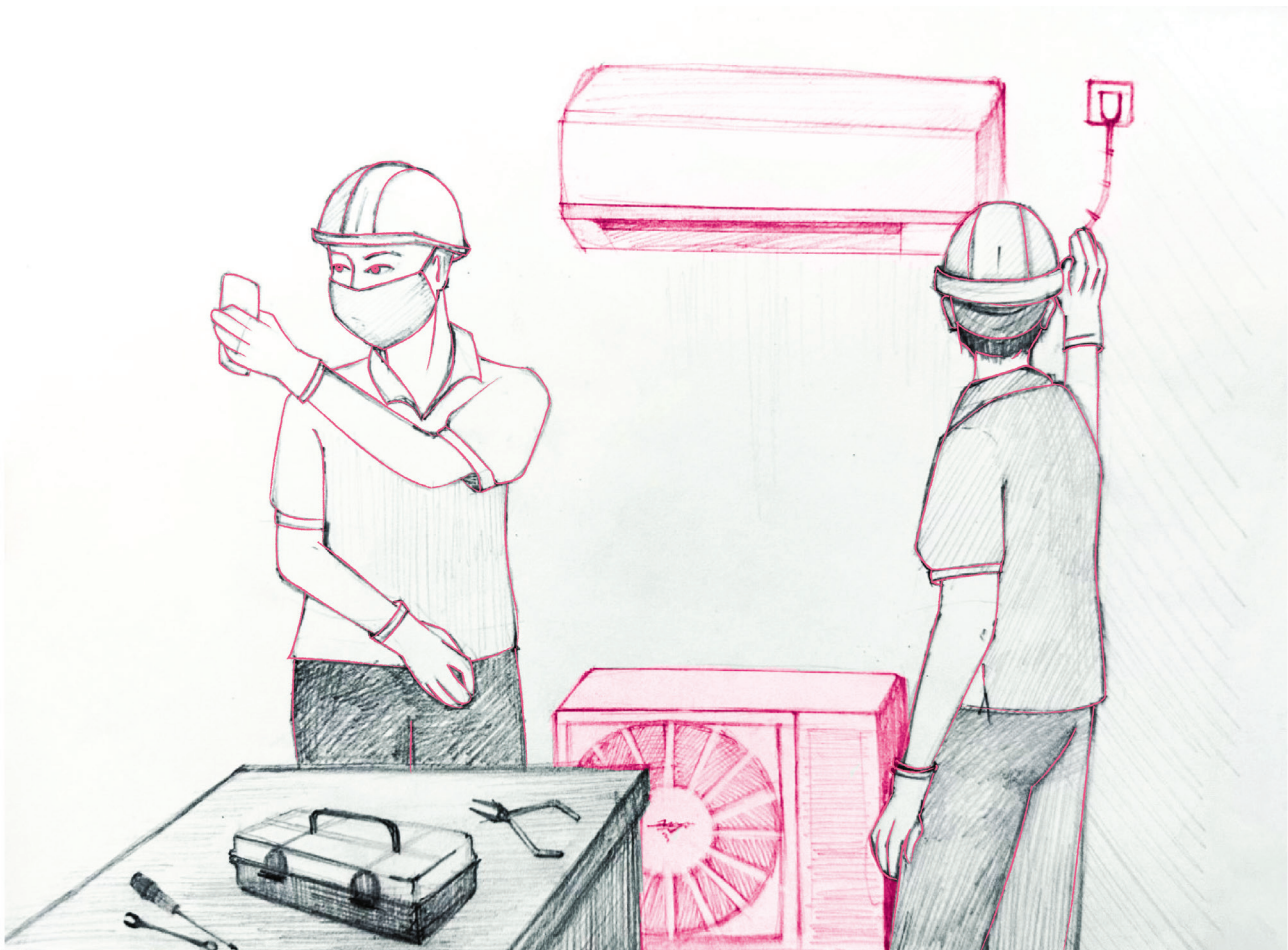


4.4

Interview with Mr. David Lim for HCFC Phase-Out Management Plan

The ozone layer lies in an upper layer of the atmosphere, absorbing harmful ultraviolet radiation (UV) from the sun. Refrigerants used in fridges, freezers and air-conditioning—along with other chemicals used in various industries—can deplete the ozone layer, exposing us to UV radiation. In 1987, nations around the world signed the Montreal Protocol, agreeing to phase out numerous ozone-depleting substances. The Montreal Protocol has gone through nine revisions since and is one of the most successful international agreements.

Almost all the ozone-depleting substances in the Montreal Protocol have been eliminated, with hydrochlorofluorocarbons (HCFCs) as one of the final substances to be phased out. Mr. David Lim Siow Wei is the Chief Executive Officer of Cooltech Solutions Group, a group of companies that specializes in refrigerant and air-conditioning services, the consultant for HCFC Phase-Out Management Plan (HPMP) stage I (2012-2016) and stage II (2017-2022) and a UN expert for ozone layer protection.



Could you tell us about the RAC industry in Malaysia and how it affects our daily lives?

Refrigeration and air conditioning (RAC) is a major industry in Malaysia. We have many international manufacturers here who produce split units (a common type of cooling system) for local use and for export. The RAC industry is an essential industry because it enables other industries to operate. Beyond cooling our homes and offices, the split units are used in the food and beverage industry to keep food fresh. In the last two years, this industry has also been critical for the refrigeration of COVID-19 vaccines. Therefore, the RAC industry is imperative for human life.

What are HCFCs and why did the RAC industry use them?

RACs require a refrigerant to move heat from the areas we want to cool (e.g., fridges, homes) to an external environment. Previously, more than 80% of split unit refrigerant systems used HCFC as the main refrigerant. HCFC was a replacement for CFC, which Malaysia phased out in 2010 because CFCs were highly damaging to the ozone layer. However, HCFCs are not a permanent solution and Malaysia has committed to replacing HCFCs with even better alternatives by 2030.

How does the HCFC phase-out management plan affect RAC businesses and what did HPMP do to help the RAC industry navigate this transition?

Alternative refrigerants to HCFCs are more expensive. They are also mildly flammable, unlike HCFC, which means manufacturers need to develop safety devices to ensure their machines and systems are safe enough to be used. This includes building and purchasing new equipment for production lines.

The phase-out programme for the RAC sector focuses on capacity-building for manufacturers, technicians and customs officers on good practices, proper handling of the refrigerant systems and alternative refrigerants. Because the alternative refrigerants are flammable, safety is an important part of the training programmes. The training programmes also help repairing and servicing businesses to reduce costs through good handling practices and management of refrigerant systems like proper recovery of refrigerant and reusing the same refrigerant after recycling.

We also do Master Training programmes twice to thrice a year for lecturers from Air-Cond Training Centres (ATC) nationwide and vocational institutes called Certification for Service Technician Programme (CSTP). Under this system, the lecturers must attend trainings and pass required tests to be a certified Master Trainer before they can train technicians. HPMP also provides new equipment for training centres.

The end-date for phasing out HCFCs is 2030. What has the Malaysian RAC industry accomplished and what still needs to be done?

New split unit systems sold in the market no longer use the HCFC system. That is a big achievement because our RAC industry is using safer refrigerant alternatives that are less harmful to the environment.

Under HPMP, to ensure HCFC phase-out, only trained and certified technicians can perform repair and servicing works for RAC units. In addition, this rule needs to be supplemented with some form of enforcement by DoE and awareness campaigns for the Malaysian public. It is quite difficult to verify whether each technician is certified because most repair

and servicing companies are small companies that sometimes do not even have offices. That is why public awareness is important. Currently, the programme only focuses on raising awareness for manufacturers and technicians, but not the public. If the public

knows that HCFC is a serious environmental threat and the country is conducting this phase-out programme, then they can play their part in protecting our ozone layer by being an environmentally conscious consumer.



keeping us cool



Scan the QR code to find out how Malaysia is **phasing out ozone depleting substances**.



4.5

Climate Change Mitigation: Flooding

Flooding is a natural phenomenon. During periods of heavy rain, rivers can overflow their 'normal' bounds and submerge the surrounding land. We call these areas 'floodplains'. Flooding becomes a disaster when it interrupts and destroys human activity, sweeping away property and infrastructure, and even claiming lives.

For a long time, we have built villages, towns and cities in floodplains. To protect ourselves from flooding, our houses are built on high ground or stilts, we widened and deepened rivers to channel water away, and built infrastructure like the Stormwater Management and Road Tunnel (SMART) to contain floodwaters. Sometimes, these measures are insufficient because rainfall is far heavier than usual. The 2021-2022 seasonal floods were caused by rainfall so heavy that it occurs on average once every

100 years. At other times, we contribute to the flooding problem. Described at the time as the 'worst' floods to have hit Kelantan in history, the 2014-2015 seasonal floods cost RM1 billion in damages, left at least 200,000 displaced and 21 dead.^{1,2} In addition to the heavy rainfall, extensive deforestation in Pahang and Kelantan, rampant rubbish pollution in rivers, and lack of investment in flood defences also contributed to the heavy floods.^{2,3} In urban settings, flash floods occur because large built-up areas prevent the landscape from absorbing water. Densely built environments such as the Klang Valley increase surface runoff. This combined with poor drainage systems—due to low capacity and/or are partially blocked by waste and debris—increase the risk of flash floods, such as the March 2022 flash flood in Kuala Lumpur.⁴

Notable floods in Malaysia 2014 – 2022



Data source: FloodList

¹ IFRC. 2015. "DREF Final Report."

² Davies, R. 2015. "Malaysia floods – Kelantan flooding recorded worst as costs rise to RMI billion." <https://floodlist.com/asia/malaysia-floods-kelantan-worst-recorded-costs>. Accessed 24 February 2023.

³ Rahman, S. 2019. "Commentary: Kelantan's epic struggles with great, yellow floods each monsoon." Channel News Asia, 13 December 2019. <https://www.channelnewsasia.com/commentary/malaysia-flood-kelantan-terengganu-develop-poor-land-forest-mine-844331>. Accessed 24 February 2023.

⁴ Bahaudin, N.H. 2022. "Tuan Ibrahim: Extraordinary rainfall cause flash flood in KL." New Straits Times, 7 March 2022. <https://www.nst.com.my/news/nation/2022/03/777793/tuan-ibrahim-extraordinary-rainfall-caused-flash-floods-kl>. Accessed 24 February 2023.

As human-driven climate change makes rainfall more intense and frequent, the risk of flooding increases in frequency and severity. Climate projections show that Malaysia is likely to experience increased annual rainfall in more intense rainfall events. In future flood scenarios, the extent of flooding will increase, with some regions likely to experience a near two-fold expansion of flooding zones.⁵ How, then, should we prepare for this?

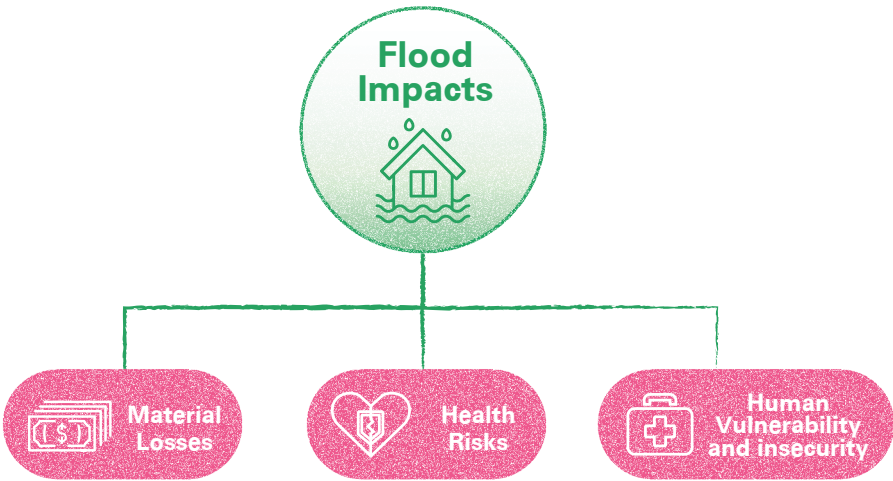
Lessons from the Past

Past flood events have highlighted specific gaps that need to be addressed to improve disaster management mechanisms. The 2014 and 2021 flood crises demonstrated certain operational inadequacies in disaster response. In the former, some evacuation centres were inundated, while in the latter, the disaster management system was overwhelmed.⁶ The National Disaster Management Agency (NADMA) is working with a range of stakeholders to learn from these experiences and improve information management and coordination of aid in future flooding.⁷

It is critical for crisis management actors to coordinate flood disaster response with other actors as floods are not localized calamities but have large spill-over effects. For example, the heavy rainfall in the 2021 floods also caused landslides. Similarly, floodwaters are health hazards polluted by contaminants that can pollute clean water sources and become breeding pools for water-borne diseases.

Flood impacts are not limited to material losses and health risks. Human vulnerability and insecurity multiply in times of crises. The socio-economic insecurities of flood victims are often larger and persist longer than what monetary aid and other forms of relief can address, and the psychological impacts are almost always unaccounted for, increasing the risk of social problems in affected communities.⁸ Meanwhile, habitat destruction and loss of other living creatures are not typically assessed.

To meet the wide range of crisis impacts, disaster management systems, while mainly top-down, should also emphasize strengthening capacity, knowledge and



⁵ Ministry of Energy, Science, Technology, Environment and Climate Change. "Malaysia Third National Communication and Second Biennial Update Report to the UNFCCC." Malaysia, 2018.

⁶ Azlee, A. 2015. "Worst floods in Kelantan, confirms NSC." Malay Mail, 5 January 2015. <https://www.malaymail.com/news/malaysia/2015/01/05/worst-floods-in-kelantan-confirms-nscc/813959>. Accessed 24 February 2023.

⁷ M. Mageswari. "Ensuring Malaysia's Disaster Preparedness." The Star, 3 April 2022. <https://www.thestar.com.my/news/nation/2022/04/03/ensuring-malysias-disaster-preparedness>. Accessed on 11 October 2022.

⁸ Yusmah, M.Y.S., Bracken, L.J., Sahdan, Z., Norhaslina, H., Melasutra, M.D., Ghaffarianhoseini, A., Sumiliana, S., & Farisha, A.S.S. 2020. "Understanding urban flood vulnerability and resilience: a case study of Kuantan, Pahang, Malaysia." Natural Hazards 101: 551–571.

awareness of communities and other affected stakeholders, recognizing that disaster risk reduction and management is a shared responsibility at all levels.⁹ Steps should also be taken to strengthen organizational resilience to minimise disruptions post-disaster,⁹ and to locate rehabilitation and recovery capacity at the community level.¹⁰

Considerations for the Future

Considering the increasing risk of water-related disasters, disaster management alone is a necessary but insufficient approach. Risk reduction and management strategies require proactive planning oriented towards reducing the potential impacts of disasters.

Risk reduction strategies should be integrated in development planning, particularly in urban areas where the impacts of floods are more severe in terms of economic and social losses. The resilience of existing and future infrastructure needs to be strengthened via the periodic reviews of guidelines and standards, including flood risks and through the application of more technically advanced design and methodologies.¹¹ Future development projects need to consider the inclusion and preservation of natural flood basins and water catchment areas. These projects should also incorporate risk assessment supported by collection of disaster data and

climate change projections. Investment in data digitalization can help collate the data necessary for planning. Initiatives on this front include the DX4Resilience project which offers digitalization and integration of disaster data using cloud-based technologies, and targets digital solutions for disaster risk reduction and management.¹²

Across all levels and sectors, human activities that exacerbate flood risks such as waste dumping, mass forest clearing and unsustainable growth of industries with heavy greenhouse gas (GHG) emissions ought to be limited and phased out. Particularly, practices that disregard environmental degradation and uncontrolled GHG emissions need to be assessed. As a major contributing factor to climate change, GHG emissions are associated with melting polar ice and glaciers, rising global temperatures and sea levels—all of which directly and indirectly lead to flooding in coastal plains and more interior lands.

Water-related disaster risks are part of the sustainable development challenges in Malaysia, and these risks are being aggravated by climate change. Upfront investment—in both climate change reduction and mitigation—will yield manyfold returns in lives and livelihoods. We must make adequate investments now, so that we are not caught unprepared when these crises arrive.

Disaster
preparedness and
management



The organization, planning and application of measures preparing for, responding to and recovering from disasters.

Risk
Reduction



Planning and design that reduces the likelihood and severity of disasters.

⁹ UNDRR. 2020. *"Disaster Risk Reduction in Malaysia: Status Report 2020."*

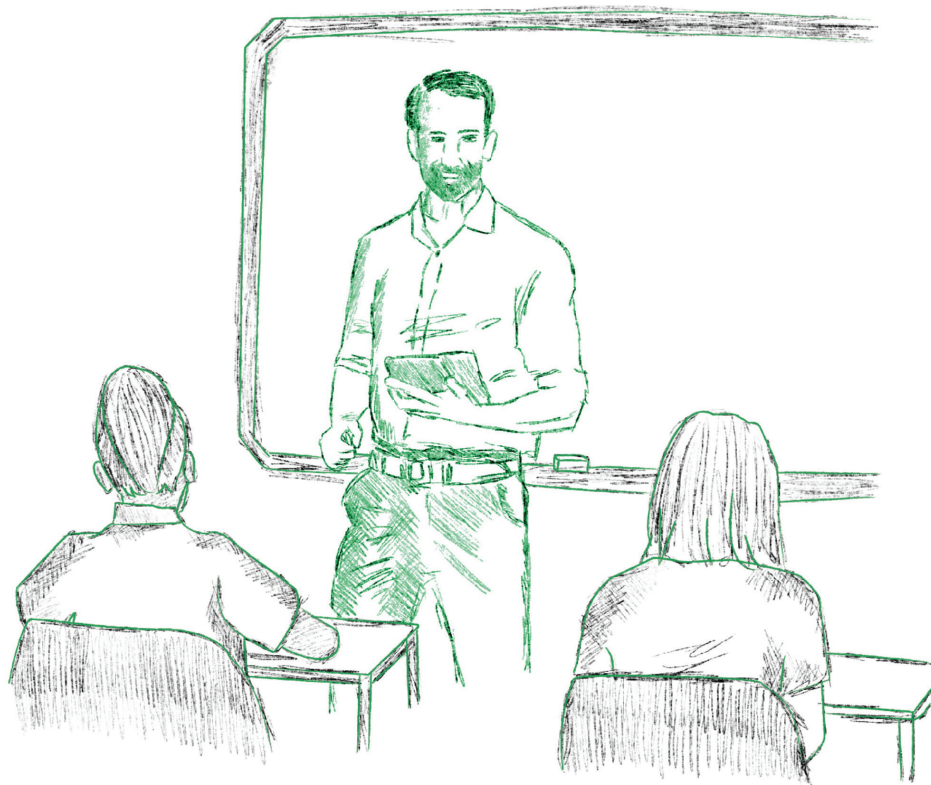
¹⁰ IFRC. 2015. *"DREF Final Report."*

¹¹ Ministry of Energy, Science, Technology, Environment and Climate Change. 2018. *"Malaysia Third National Communication and Second Biennial Update Report to the UNFCCC."*

¹² UNDP. 2022. *"DX4Resilience."* <https://www.undp.org/asia-pacific/dx4resilience>. Accessed 24 February 2023.

4.6

Youth Environmental Living Lab

**Mr. Arivukumaran:**

Does anyone have any questions about your homework? [no show of hands]

I know I've only assigned you an essay of 250 words, but I think discussing how young people can care about the environment is a good topic, which is something you should all think about.

Look around us, there have been so many new buildings over the last twenty years. It is important for the economy but has also caused much environmental damage! You know, landslides were not so frequent here when you were born. I honestly feel like we are losing our balance with nature, and that makes me sad.

Has anyone heard about the climate protest among school students globally a few years

ago? Young students from all over the world, even 12-year-old primary vernacular school students like you, participated. That means you too can have your voices heard.

See, it is our duty to care for the environment. You are aware that in our culture, we are supposed to nurture and live in harmony with nature. We have been taught to be sensitive to all living things, including the trees and plants, the air, bodies of water, nature and life at large—we call her 'Mother Earth'—we should be treating the environment with honour, dignity and respect.

What does this mean to you? Does anyone want to share some stories with the class now?

[Three students raise their hands, and Mr. Arivukumaran responds to them in turn]

Kaveeshaswary:

Sir, *Appa* and *Patti* used to tell me their stories.

Patti was born in Chetty Village, and she had a cow! She named the cow *Kamatchi*. She loved *Kamatchi* so much, which was both wealth and like family. They celebrated *Kamatchi* every year during *Mattu Pongal* for a bountiful harvest, adorning her with garlands.

Have you seen a cow up close, sir? They are very gentle and loving.

Appa tells me about the river he used to go and swim in, not that he was very good at swimming, but he loved the water, and used coconuts to help him float. Some years ago, his car crashed into the river, but because he was so used to the river, he managed to get out of the car and cry for help. The river, he says, is his close friend.

It's so inspiring that *Appa* and *Patti* co-existed with nature and had such a special relationship. I want that too for myself.

Thamarey:

Sir, my *Ammama* too loved the environment. She used to plant fruit trees and she took such good care of them. The soil to her was a source of nourishment.

I remember waking up in such beautiful weather – heavily clothed green trees, the smell of fresh dew and chatty birds chirping away from beautifully hanging nests. It's nice to see new leaves and new life around.

Now it makes me sad to see trees being cut down. No wonder it is so hot these days, and rains buckets – because we ravage trees from their roots. If my *Ammama* was still alive, she would have said, "*Aiyoo! Where have all the trees gone?*"

Sharveena:

Sir, at the back of my house, there are monkeys. They are always hanging around, but really, it is like they suffer in silence. It is getting hotter for us, but they are losing their homes and source of food!

Sometimes, we feed them bananas we get from the market, it is the least we can do. We know it is unhealthy for the monkeys to eat processed food like bread or biscuits.

You are right sir, we call her Mother Earth, but we are not treating her with honour, dignity and respect. We expect her to selflessly give and we keep taking. The once 'common' wildlife is already in danger of extinction. We think we're superior to others, but it is greed, sir.

My *Ammachi* says "**perasai unnai allituvidum**".

We cannot live without our Mother, but she can live without us. It should humble us.

Glossary

Appa: father

Patti/Ammama/Ammachi: grandmother

Mattu Pongal: a celebration of cattle during the Pongal festival for their significance in crops and harvest

Perasai unnai allituvidum: Greed will destroy you

Mr. Arivukumaran:

My heart is full listening to your stories – they live on generation after generation. While it is true that we see destruction around us, it should not stop us from doing our part and caring for the environment. Even you can do your part.

Do you want to submit your stories to YELL's #BumiBelia competition? YELL stands for Youth Environment Living Labs, and they help youths like you find their voice in environmental action.

Just because we're a small Tamil school doesn't mean our voices don't matter. We still do our best to enrich our local environment. Small efforts get magnified in effect.

You don't need advanced degrees or wait to be represented at a high level. You also don't need to wait for instructions on how to care for the environment. You need shared values, and you have shown me through your stories. Represent yourselves, and maybe that will inspire others.

Remember, **sutru suzhal meethu naam akkarai kolvathu namakkaga mattum alla, varungkala sanggathikkagavum than** – taking care of the nature is not only for us, but for the future generation as well.

I hope all of you have been inspired by the stories shared by your classmates. I will be expecting everyone to hand in your essays on Monday.

* Stories by the students were adapted from featured submissions of the #BumiBelia Stories Competition.

Youth Environment Living Labs (YELL) is a joint programme of UNDP and UNICEF in Malaysia, supported by Amanah Lestari Alam (ALAM). YELL localizes the climate narrative and strengthens the ecosystem of youth environmental leaders through capacity building for localized action and evidence-based advocacy. They help youth find their voices and participate in environmental action, facilitating, building bridges, and holding space for creativity and innovation.

**Glossary**

Sutru suzhal meethu naam akkarai kolvathu namakkaga mattum alla, varungkala sanggathikkagavum than: taking care of nature is not only for us, but for the future generation as well.

Why don't you **YELL** with us?



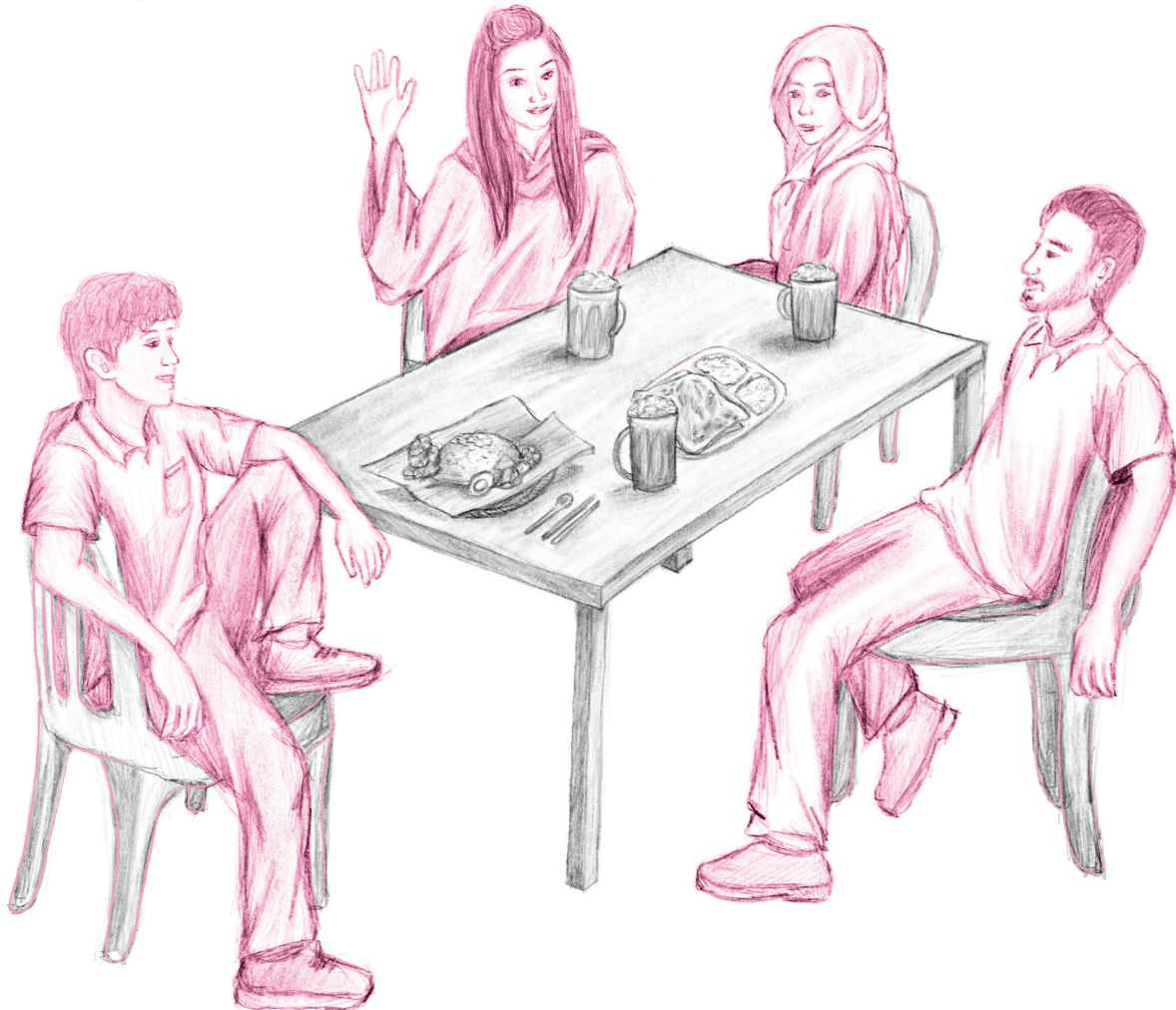
YELL (Youth Environmental Living Labs) is a partnership with young people and organizations for climate and the environment, supported by **UNDP Malaysia, Singapore & Brunei Darrussalam and UNICEF Malaysia**

Scan QR code to discover how youth can participate in an initiative for environmental action.



4.7

Why We Need Local Narratives of Climate Change



Despite our communities having experienced the adverse consequences of climate change in the last two decades, most Malaysians have not made the connection to greenhouse gas emissions, rising temperatures and melting ice caps.¹ Climate change remains a distant problem to most—a problem that someone somewhere should do something about.¹ To shift public opinion and behaviour here in Malaysia, we need local stories that people can readily recognize and relate to, as well as draw urgency and inspiration from. Without

this, grassroots demand for climate change mitigation and adaptation remains stagnant as communities remain beset by indifference that moves us, not just cognitively but viscerally. It is time for us to understand what climate change means to and demands of us. How might we present the climate change problem through the experiences of communities here in Malaysia?

Fisherfolk along the coast are coming home empty-handed as rising water temperatures

¹ Yaacob, Mashitoh & others. *“Exploring Community Perceptions of Climate Change Issues in Peninsular Malaysia.”* Sustainability 14(13), 25 June 2022, https://www.researchgate.net/publication/361573879_Exploring_Community_Perceptions_of_Climate_Change_Issues_in_Peninsular_Malaysia. Accessed 16 November 2022.

threaten fish and crab populations.² Rice paddy farmers are suffering major hits to crop yields due to extreme draught conditions and rising sea levels.³ The persistent 'haze season' continues to pose risks to public health and productivity as vulnerable urban dwellers are forced indoors.⁴ Flash flood victims across urban and rural areas are losing their homes, leading to climbing rates of internal displacement.⁵ Yet, when asked about climate change, we still think of polar bears on melting glaciers and dusty cracked lands in the desert; as opposed to the heat waves, torrential rainfall and flash floods that have plagued our communities.

Those in the Global South are not well represented in our current stories on climate change because the authors have predominately come from the Global North, thus lacking a connection to our lived experiences. We need local narratives, shared throughout our societies, to guide our understanding of and response to climate change. Such shared stories are a necessary ingredient for creating a response that all segments of society see as fair and necessary.

How then, do we build effective narratives that empower the public to drive meaningful change? First, we need to tap into our communities' behaviours and beliefs to harness personal resonance towards climate change. Individuals' behaviours and beliefs are more likely to change when complex issues are presented in ways that reflect their personal

experiences. For example, our narratives should highlight how the erratic occurrence of flash floods impacts low-income earners' access to health services or supply of necessities—and how climate change makes such events more frequent and intense.

Second, we need to move away from technical jargon and abstract ideas in climate change messaging. In addition to misinterpretation, unnecessarily complex language reinforces apathy by placing the issue solely in the domain of experts. To ensure recall across a wider audience, climate change messaging should also be rooted in interactive, visual engagement. One such example is the Urban Biodiversity Challenge, a citizen science programme that engages urban dwellers in photographing and mapping plant and animal life in their cities. By making participation accessible, connecting learning to the participants' daily surroundings and creating a sense of excitement, such activities deepen participants' understanding of community norms, values and attitudes towards urban biodiversity.⁶

Finally, we need a collection of stories that, together, connect different social identities. We live in an increasingly polarized world demarcated by the echo chambers of our own realities. Moreover, we have very real differences in our understanding of what a good and just society, economy and government look like, shaped in part by our very different experiences of life. There are different levels

² Daniele, Ushari. **"Malaysia's artisanal fishermen suffer net losses as climate change hits livelihoods."** South China Morning Post, 20 August 2022, https://www.scmp.com/week-asia/health-environment/article/3189483/malaysias-artisanal-fishermen-suffer-net-losses?module=perpetual_scroll_0&pgtype=article&campaign=3189483. Accessed 24 November 2022.

³ The Sun Daily. **"Change in weather pattern inflicting losses on farmers."** The Sun Daily, 4 October 2021, <https://www.thesundaily.my/local/change-in-weather-pattern-inflicting-losses-on-farmers-DB8425467>. Accessed 24 November 2022.

⁴ Loh, Jason & Malik, Anis Salwana Abdul. **"Solving transboundary haze."** The Sun Daily, 18 September 2022, <https://www.thesundaily.my/home/solving-transboundary-haze-NH9823168>. Accessed 24 November 2022.

⁵ Agence France-Presse. **"Malaysia's worst flooding in years leaves 30,000 people displaced."** The Guardian, 12 December 2021, <https://www.theguardian.com/world/2021/dec/19/malaysias-worst-flooding-in-years-leaves-30000-people-displaced>. Accessed 24 November 2022.

⁶ Ong, Benjamin & Teoh, Jia Chern. **"Don't deny the Dodo: Exploring urban biodiversity as a nature-based solution for ecosystem restoration."** The United Nations Development Programme, 28 April 2021. <https://www.undp.org/malaysia/blog/dont-deny-dodo-exploring-urban-biodiversity-nature-based-solution-ecosystem-restoration>. Accessed 24 November 2022.

of vulnerability to and responsibility for climate change, but it is a threat on a scale that will leave no one untouched. As we build our collection of local narratives on climate change, it is critical that all segments of society see their values, views and selves represented—in the impacts of climate change, the response needed to avert and mitigate these impacts and the shared future we hope to achieve. Even as we address the skewed weight of stories of climate change between the Global North and the Global South, we must be careful to unite rather than divide here at home.

As we forge ahead in rallying for action on climate change, we should commit to delivering local narratives in the stories that we tell. We need to ensure local ownership over the stories we tell on climate change, rather than just accepting the stories of others. Perhaps, when we see ourselves clinging on for life and to our livelihood in floods, we will resonate with the polar bears clinging on to the melting ice up north and recognize that we are all in the same boat together.



Locating climate change narratives in the Malaysian context

Scan QR code to read the full article that reflects on **localizing climate narratives among youth**, exploring future climate scenarios, and recommending youth agency to create urgency.

