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CHAPTER 17

Disregarding our future: Malaysia's waste and pollution crisis

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Abstract: Malaysia has developed rapidly since the Second World War, transforming from a primarily agrarian country that relied on primary industries, to one with thriving secondary and tertiary industries, with an overarching ambition of becoming a high income nation. As industrialisation, urbanisation, and consumerism expanded, Malaysia has overlooked the development of one important sector—waste management. The challenges posed by waste management in Malaysia are varied and complex. This paper presents a broad overview of the different categories of waste (household waste versus industrial, commercial, and institutional wastes); an examination of the legal framework and actors governing waste management in Malaysia as well as the inherent loopholes, weaknesses and challenges; and lessons learnt from selected case studies of waste mismanagement and pollution.

INTRODUCTION

"Waste" is defined by the Cambridge Dictionary (n.d.) as "*unwanted matter or material of any type, especially what is left after useful substances or parts have been removed*". All waste materials will cause some form of pollution to the soil and water bodies, and to the air if incinerated. However, "pollution" is a broader term that defines damage caused not only by wastes, but also by harmful contaminants or substances released through human activities such as manufacturing (emissions and effluents) or agriculture (fertilisers and pesticides). This chapter will focus largely on pollution caused by the problem of wastes, as industrial pollution is clearly regulated by one agency under one law.

Zero waste and circularity

In recent years, the terms "Zero Waste" (United Nations Environment Programme 2023) and "circularity" have come to dominate discussions on solutions to the problem of waste. Both terms are subject to abuse and need to be qualified. "Zero Waste" has been defined as principles and practices that promote the conservation of all resources through responsible design, production, consumption, reuse and recovery of materials without burning or discharges to land, water, or air (US EPA 2025). In Malaysia, some have dismissed the term "Zero Waste" on the basis that it is impossible not to generate any waste matter at all, while others have co-opted and misused the phrase, for example in taglines such as "zero waste to landfills", in attempts to promote waste management technologies which arguably cause other forms of pollution.

Both approaches have disregarded the other definitions of "waste"—as a noun: "*an unnecessary or wrong use of money, substances, time, energy, abilities, etc*." (the word "wastage" can also be used here), and as a verb: "*to use too much of something or use something badly when there is a limited amount of it*". A complete understanding of "Zero Waste" would focus on these latter two definitions which highlights upstream waste prevention and not just downstream waste management. Thus, it is entirely possible to adopt practices that are not wasteful, and adjust behaviours to generate significantly less waste matter. Meanwhile, "zero waste to landfill" disregards this important principle of waste reduction, merely aiming to decrease the volume of waste going to landfills, usually by presenting a miraculous way to make the waste "disappear", but not to reduce waste generation or wastefulness.

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Similarly, "circularity" or "circular economy" is often misused. The concept seeks to shift from the linear (take-make-dispose) economy towards production cycles that imitate natural cycles in nature, where nothing goes to waste. This would reduce our reliance on natural resource extraction and decrease pollution. As noted by the United Nations Environment Programme (UNEP), circularity, sustainable consumption, and responsible production are essential for the achievement of all multilateral agreements on the environment—the Sustainable Development Goals, the Paris Agreement, the Kunming-Montreal Global Biodiversity Framework, and even the global plastics treaty currently under negotiation, among others (UNEP 2021).

However, far too often, in developing economies including Malaysia, "end-of-pipe" waste management practices and technologies that negatively impact human and environmental health, such as waste incineration and unproven chemical recycling technologies, are promoted as circular solutions. In reality, they destroy materials, create hazardous waste, and do not enable a reduction in virgin material use. Conversely, Europe has recognised that waste incineration is not sustainable (Makavou 2021) nor circular (European Parliament 2020), while the UNEP Circularity Platform acknowledged that the "...recovery of energy are processes used in some countries to manage waste, but the value of the material is consumed once, and not put back into the loop. Therefore, these processes are not developed further on this platform" (UNEP, n.d.). The true definitions of "Zero Waste" and "circularity", reflecting the waste hierarchy that prioritise waste prevention at source, underlines the discussions in this chapter.

Towards a high-income, high-waste country

Malaysia has developed rapidly since the Second World War, transforming from a primarily agrarian country that relied on primary industries to one with thriving secondary and tertiary industries, with an overarching ambition of becoming a high-income country. The industrial growth and rapid urbanisation have brought prosperity, but also a surge in waste and pollution. About 75.1% of the Malaysian population lived in urban areas in the year 2020, compared to 70.9% in 2010 (Department of Statistics Malaysia 2022).

In general, the types of wastes in Malaysia are separated into "solid waste" and "hazardous (scheduled) waste", which can both be further segregated into wastes generated by households, industrial premises (including manufacturing, mining, agriculture), commercial entities, and institutions, as well as construction and public cleansing activities. In 2025, solid waste generation was about 15.38 million tonnes, or over 39,000 tonnes daily (Isamudin 2026), with per capita waste generation amounting to 1.17 kg/day. This was a steady increase from 13.88 million tonnes in 2019, to 13.91 million tonnes in 2020, to 13.95 million tonnes in 2021 (Ministry of Economy 2024). It is projected that solid waste generation will increase to 17.03 million tonnes in 2035, with daily volume continuing to rise at a rate of 1.4 to 1.7% annually (Pfordten 2025).

Figures of waste composition from a 2013 report are still being reported in the media (Pfordten 2025). According to the National Solid Waste Management Department (2013), in Peninsular Malaysia, food waste makes up 44.5% of household solid waste generated, with approximately 16,000 to 17,000 tonnes discarded daily. Plastic waste (13.2%), disposable diapers and sanitary napkins (12.1%), and waste paper (8.5%) make up the top four categories. Others include garden waste (5.8%), glass (3.3%), textiles (3.1%) and tetra pak/aseptic cartons (1.6%). The government spends up to RM2 billion for solid waste management, but only for states who have surrendered jurisdiction over waste management to the federal government (Bernama 2025). Meanwhile, the national recycling rate of about 37.9% in 2024 falls short of the 40% target under the Twelfth Malaysia Plan (Malaysian Investment Development Authority 2026). However, the reported recycling rate has been disputed by waste policy experts as being inaccurately measured and too high (Muslim 2025; Tham and Lee 2026).

Meanwhile, Malaysia's agricultural sector generates approximately 168 million tonnes of biomass annually, including palm oil waste, rice husks, coconut debris, sugar cane waste, urban waste, and forestry waste, most of which are disposed of via open burning or landfilling (Harun *et al.* 2025). Pesticides (Waras *et al*. 2024), including banned pesticides such as paraquat, and chemical fertilisers (Miwil 2025) pose a risk to the environment. The livestock, poultry, and aquaculture sectors also cause odour and environmental pollution emanating from excretion and wastewater (Bernama 2021; Basyir 2022; Shadiqe 2025).

Pollution also occurs from industrial processes as well as the workings of modern cities.[a] Industrial pollution often raises significant environmental concerns in Malaysia. The major sources of industrial pollution in Malaysia are manufacturing plants that discharge effluents, either untreated or inadequately treated waste into water bodies, and emissions released through smokestacks or flues in industrial facilities, especially by power plants. Common types of pollutants generated include heavy metals, particulate matter, volatile organic compounds, sodium dioxide, nitrogen dioxide, carbon monoxide, and chemical waste.

Another problematic type of waste created by businesses is construction waste. A survey conducted in 2012 by the Ministry of Housing and Local Government (KPKT) found that construction and demolition (C&D) waste is responsible for 41% of all solid waste in Malaysia. In a 2019 report by SWCorp, the federal statutory body tasked to implement solid waste management policies in certain states of Peninsular Malaysia and the Federal Territories, approximately 1,446 locations of illegal waste disposal had been discovered between 2014 and 2018 (Amry *et al.* 2023). In Kuala Lumpur, construction waste reportedly accounted for 94.6% of all illegal waste (Bernama 2023), with the rise of illegal dumping correlating with the increase in construction projects. Approximately 25,600 tonnes of C&D waste is produced daily (Ting *et al.* 2022). More than 50% of construction waste is wood waste, which often has been treated with chemical substances and requires special rules (SCP Malaysia 2016).

As for scheduled waste, which includes chemical waste, heavy metals, oil waste, e-waste, and medical waste, the Environmental Quality Report 2024 (Department of Environment 2025) reported the generation of 5,378,977.55 metric tonnes in 2024. Dust, slag, dross or ash formed the highest quantity of waste produced, amounting to 47.35%. A total of 1,879,787.20 metric tonnes of scheduled waste was dealt with under special management, where the waste was reused by industries as fuel or raw material, or was disposed of at sanitary landfill sites. A total of 3,978.04 metric tonnes of scheduled waste were exported.

Malaysia's soil, rivers, coastlines, and communities are increasingly burdened by mismanaged waste, waste crimes, and pollution, threatening public health, biodiversity, ecosystems, and economic resilience. The Environmental Quality Report 2024 report also noted that the air quality throughout Malaysia was only good for 35.2% of the year, while 64.1% of the year had moderate air quality, and 0.7% had unhealthy air quality. In areas close to industries, the air quality is frequently poor. Out of 672 rivers tested, 25% were slightly polluted and 4% were polluted. There is increasing concern about pollution pressures on the river from point sources such as pipelines and sewers and non-point sources such as runoff and atmospheric deposition.

This chapter presents a brief and broad overview of the different categories of wastes; examines the legal framework and actors governing waste management in Malaysia, as well as the inherent loopholes, weaknesses and challenges; and explores lessons learnt from

[a] Pollution caused by cities include heat pollution from air conditioning, air pollution from vehicle combustion, water pollution from sewage treatment systems or sullage from households, and light pollution caused by overuse of lighting at night which affects wildlife and biodiversity. Due to constraints on the word limit, this chapter will not delve deeper into these types of pollution.

selected case studies of waste mismanagement and pollution in the country. Some waste categories that are especially challenging for Malaysia include those from mining, radioactive wastes (including from rare earth processing), solid waste from unplanned urbanisation and construction, ever increasing post-consumer waste (single-use or low quality consumer goods), imported or illegally trafficked wastes (including plastic and electronic wastes), and emerging waste from energy transition to renewables (including solar panels, electric vehicles, lithium ion batteries). It is projected that by 2050, around 80 million tonnes of solar panels will reach the end of their lifespans, and Malaysia could accumulate up to 870,000 depleted EV batteries (Palansamy 2025).

LAW, POLICY, AND PRACTICE: CHALLENGES IN MANAGING WASTE AND POLLUTION

Several laws and institutions govern the management of various types of waste and pollution in Malaysia. An inexhaustive list is summarised in Table 1, covering mainly laws that apply to West Malaysia, and some for Sabah and Sarawak. Some legal gaps exist which the government is already working on, including developing laws to regulate household electrical and electronic waste, extended producer responsibility (EPR) for products that are put on the market, microplastics, and non-industrial pollution (such as pesticide run-off).

Table 1. Legislation related to waste and pollution in Malaysia.

Type of waste / Law	Definition/Explanation
"Solid waste" Solid Waste and Public Cleansing Management Act 2007 (SWCorp)	Solid waste refers to: a. Any scrap material or other unwanted surplus substance or rejected products arising from the application of any process; b. Any substance required to be disposed of as being broken, worn out, contaminated or otherwise spoiled; or c. Any other material that according to this Act or any other written law is required by the authority to be disposed of, but does not include scheduled wastes as prescribed under the Environmental Quality Act 1974, sewage as defined in the Water Services Industry Act 2006, or radioactive waste as defined in the Atomic Energy Licensing Act 1984." For states in Peninsular Malaysia that have accepted this Act, the Solid Waste and Public Cleansing Management Corporation (SWCorp) is tasked with law enforcement and policy implementation. States that have not accepted this Act regulates waste management through their Local Authorities. For Sabah, there is the Solid Waste Management and Public Cleansing Enactment 2022, implemented by local councils. For Sarawak, there is the Sustainable Resources and Wastes Management Ordinance 2025, implemented by the Sustainable Resources and Wastes Management Authority (SRWMA).
"Controlled solid waste" Solid Waste and Public Cleansing Management Act 2007 (SWCorp)	Controlled solid waste refers to "any solid waste falling within any of the following categories: commercial solid waste; construction solid waste; household solid waste; industrial solid waste; institutional solid waste; imported solid waste; public solid waste; solid waste which may be prescribed from time to time." This definition is reflected in Sabah's Solid Waste Management and Public Cleansing Enactment 2022.

Local Government Act 1976 Street, Drainage and Building Act 1974 Local authority by-laws under these Acts (Local Authorities)	These laws outline the roles of the Local Authorities in maintaining cleanliness in public spaces, streets, drainage systems, and buildings. For Sabah, the corresponding laws include: • Local Government Ordinance 1961 • Public Health Ordinance 1960 • Uniform Building By-Laws 2022 • Uniform (Anti-Litter) By-Laws 2010 • For Sarawak, the corresponding laws include: • Local Authorities Ordinance 1996 • Protection of Public Health Ordinance 1999 • Sarawak Buildings Ordinance 1994
"Pollution" and "Waste" Environmental Quality Act 1974 (EQA) (DOE)	This federal law provides broad environmental standards and pollution control across Malaysia, enforced by the Department of Environment (DOE). Pollution is defined as "any direct or indirect alteration of the physical, thermal, chemical, or biological properties of any part of the environment by discharging, emitting, or depositing environmentally hazardous substances, pollutants or wastes so as to affect any beneficial use adversely, to cause a condition which is hazardous or potentially hazardous to public health, safety, or welfare, or to animals, birds, wildlife, fish or aquatic life, or to plants or to cause a contravention of any condition, limitation or restriction to which a licence under this Act is subject". Waste "includes any matter prescribed to be scheduled waste, or any matter whether in a solid, semi-solid or liquid form, or in the form of gas or vapour which is emitted, discharged or deposited in the environment in such volume, composition or manner as to cause pollution". Regulations under this Act cover the appeal board, scheduled waste and its treatment/disposal facilities, clean air, sewage, industrial effluent, prescribed premises for crude palm oil and raw natural rubber, control of petrol and diesel content, emissions by petrol/diesel engines and motorcycles, motor vehicle noise, lead in motor gasoline, halon management, refrigerant management, and pollution from solid waste transfer stations and landfills. Any pollution caused to rivers by mining or agricultural activities also fall under this Act. Orders under this Act covers the requirements for Environmental Impact Assessments (EIA), marine pollution, open burning, and delegation of powers to various parties across several issues. For Sabah, the EQA is applied together with the Environment Protection Enactment 2002. For Sarawak, there is the Natural Resources and Environment Ordinance (Chapter 84) (1958 Edition) as well as the Environment (Reduction of Greenhouse Gases Emission) Ordinance 2023.
"Scheduled waste" Environmental Quality (Scheduled Wastes) Regulations 2005 (DOE)	These regulations outline requirements for storage, handling and disposing of hazardous or scheduled waste. Scheduled waste refers to waste falling within the categories of waste listed in the First Schedule: metal and metal-bearing wastes (batteries, e-waste); wastes containing principally inorganic constituents which may contain metals and organic materials (asbestos, gypsum); wastes containing principally organic constituents which may contain metals and inorganic materials (acids,

	oil, solvents); wastes which may contain either inorganic or organic constituents (alkalis, drugs, clinical, dioxin, leachate, ash, explosives); residues from treatment of scheduled wastes. The Environmental Quality (Amendment) Act 2026 grants Sabah and Sarawak legislative authority over the management of scheduled waste. Sabah is transitioning from the federal Electronic Scheduled Waste Information System (eSWIS) to Sabah Electronic Scheduled Waste Information System (SESWIS).
"Radioactive waste" Atomic Energy Licensing Act 1984 (AELB)	Radioactive waste refers to any waste which consists wholly or partly of: a. a substance or article which if it were not waste would be radioactive material; or b. a substance or article which has been contaminated in the course of the production, storage or use of any radioactive material, nuclear material or prescribed substance or by contact with or proximity to any other waste within the meaning of paragraph (a) of this definition. The Atomic Energy Licensing Board (AELB) enforces radioactive waste management policy through its licensing procedures.
"Sewage" and "Sewage sludge" Water Services Industry Act 2006 (National Water Services Commission, SPAN)	Sewage means "any liquid discharges containing human excreta, animal or vegetable matters in suspension or solution derived from domestic activities and being generated from household, commercial, institutional and industrial premises including liquid discharges from water closets, basins, sinks, bathrooms and other sanitary appliance but excluding rain water and prohibited effluent." Sewage sludge refers to "residual mixture of solid and liquid produced during the partial or full treatment of sewage but does not include treated sewage effluent discharged through a disposal pipe." For Sabah, the EQA regulation on sewerage is applied together with the Sewerage Services Enactment 2017. For Sarawak, there is the Sewerage Systems and Services Ordinance 2005 (Chapter 63).
Pesticide Act 1974	There are regulations to control the presence of pesticides in food, as well as to control the research, possession or use of unregistered pesticides, and unapproved use of pesticides. However, there is no comprehensive legislation to regulate the management of chemical substances in the environment.
Waste from poultry and livestock farming (DVS)	Poultry and livestock farming is regulated by states under respective enactments, with enforcement by the state Department of Veterinary Services (DVS). The Animals Act 1953 regulates the control of diseases, slaughter, and prevention of cruelty to animals for Peninsular Malaysia, and not environmental pollution.

Incomplete regulatory framework: State-federal conflicts

The following sections will discuss the challenges facing waste management and pollution control in Malaysia. Firstly, legal jurisdiction is fragmented between states and the federal government, and especially between Peninsular Malaysia and the territories of Sabah and Sarawak. Malaysia is rich in natural resources, and the responsibility for managing these resources is distributed among state authorities and across several federal ministries. High levels of coordination is required among state authorities and ministries so that the environment is protected for future generations. Problems arise when states with limited financial resources exploit their natural resources for short-term profits, e.g., by granting permits for logging, mining, or quarrying. While such activities require state approval, the pollution caused by the activities and the obligation to meet international commitments on environmental protection (forest cover, biodiversity, marine protected areas, carbon emissions, hazardous substances) often fall under the responsibility of the federal government.

Jurisdiction over solid waste management is also split between the federal government and the local government, depending on whether the state has accepted the federal solid waste law. The Solid Waste and Public Cleansing Management Act 2007 (Act 672) is only applied in six states: Johor, Melaka, Negeri Sembilan, Kedah, Perlis, and Pahang, and the Federal Territories of Kuala Lumpur and Putrajaya. In these states, SWCorp is tasked with law enforcement and policy implementation (e.g., the Community Service Order for public littering, effective 1 January 2026), while the National Solid Waste Management Department (JPSPN) develops relevant policies and strategies. Both fall under the federal Ministry of Housing and Local Government (KPKT).

Five states have yet to adopt the Act, namely Penang, Selangor, Perak, Kelantan, and Terengganu, although Penang and Selangor have indicated intention to adopt it. In these states, Local Authorities (LAs) are responsible for providing solid waste management services within local authority areas under the Local Government Act 1976. The services comprise mainly waste collection and transport to disposal sites, public cleansing, as well as the operation of some recycling centres. LAs either provide the services directly or contract them out to private sector service providers. The State Governments oversee the LA activities and play a role in the provision of land for disposal facilities. KPKT, the Ministry of Health (MOH) and the Ministry of Economy provide local authorities with technical and financial assistance to better manage their wastes. Act 672 was established to standardise solid waste management (household, commercial, construction, industry) and public cleansing across all local authorities regardless of revenue levels, but the incomplete adoption of the Act has hindered efforts to institute nationwide reforms for waste management. Sabah and Sarawak have separated waste management systems respectively, and have been granted increasing autonomy in recent years (Soo 2026).

Fragmented institutional framework and weak policy implementation and coordination

Act 672 mandates waste separation at source by law. Failure to comply can lead to a fine not exceeding RM 1,000. The government announced the implementation of waste separation at source in 2015 under this Act, but until today, there is still no enforcement of this practice, due to administrative hurdles and lack of manpower to enforce the law. In addition, other provisions on take-back systems are also under-developed.

Another challenge is the separate jurisdiction over "plastic waste" versus "hazardous waste", and "solid waste" versus "pollution control". Plastic and solid wastes fall under the jurisdiction of JPSPN and KPKT, while hazardous waste and pollution fall under the jurisdiction of the Department of Environment (DOE) and the Ministry of Natural Resources and Environmental Sustainability (NRES). This has caused confusion and inaction over waste problems. One such example is the issue of plastic waste imports and its ensuing pollution. While JPSPN was in control of permits and volumes of imported plastic waste

allowed into the country,[b] the regulation of pollution by recycling facilities or open burning of wastes fell to the DOE, while illegal dumping is under the Local Authorities or SWCorp. There is currently no legal framework in Malaysia to regulate microplastic pollution or chemicals leached from plastic waste piled in the outdoors.

Furthermore, on the issue of plastic pollution, the previous iterations of NRES, formerly known as the Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC) and then the Ministry of Environment and Water (KASA), had developed several roadmaps:

- Malaysia's Roadmap Towards Zero Single-use Plastics 2018 – 2030 (by MESTECC)
- Malaysia Plastics Sustainability Roadmap 2021 – 2030 (by KASA)
- National Marine Litter Policy and Action Plan 2021 – 2030 (by KASA)

NRES is also tasked with leading negotiations at the Intergovernmental Negotiating Committee meetings to develop an internationally legally binding instrument on plastic pollution, including in the marine environment. However, the ministry has no legal jurisdiction over plastic pollution and plastic waste, and has no legal means to implement these policies. The single-use plastics roadmap is coordinated by a Joint Ministerial Committee co-chaired by the ministers of NRES and KPKT and Joint Steering Committee co-chaired by the secretary generals of the same two ministries (Regional Knowledge Centre for Marine Plastic Debris 2026), but progress has been minimal.

Separately, KPKT has launched the "National Strategic Plan for Solid Waste Management 2005" towards Vision Malaysia 2020, the "National Solid Waste Management Policy 2016", the "National Cleanliness Policy (2020 – 2030)" in 2019, and recently the "Circular Economy Blueprint for Solid Waste 2025 – 2035". KPKT also chairs the National Circular Economy Council for Solid Waste.

Meanwhile, the Ministry of Economy (formerly the Economic Planning Unit (EPU) under the Prime Minister's Department (PMD)) spearheads the 13th Malaysia Plan 2026 – 2030 which contains "Strategy D6.3: Enhancing implementation of circular economy and improving waste management". This ministry also produced the National Sustainable Consumption and Production (SCP) Blueprint (2016 – 2030). It is extremely unfortunate, however, that the SCP Blueprint reviewed waste incineration uncritically, without the consideration of the lack of circularity and pollution caused by burning (SCP Malaysia 2016).

Finally, the Ministry of Investment, Trade and Industry (MITI) has developed the "Circular Economy Policy Framework for the Manufacturing Sector in Malaysia". All these policies and plans indicate that policymakers in Malaysia finally view waste management as a priority in the pursuit of further economic progress. Nevertheless, the efforts remain fragmented, short sighted, and lack adequate follow through. Weak data and monitoring systems for all these plans further compound the problem.

Lack of infrastructure and genuine initiatives

Improper waste separation occurs not only because of a lack of implementation and enforcement, but also due to infrastructure gaps. The lack of dedicated collection service for recyclables and compostable, composting facilities able to divert organic and food waste, and material recovery facilities able to divert recyclable waste, have inadvertently exacerbated pollution caused by waste in the country. Overflowing landfills are susceptible to pollution from microplastics and hazardous leachate and chemicals, as well as the creation of greenhouse gas emissions such as methane as organic matter decomposes underground without oxygen (Ghosh 2023).

[b] The issuance of import permits for plastic waste has been taken over by SIRIM beginning 1 July 2025.

Worsening the problem is the fact that there are 114 non-sanitary landfills throughout Malaysia, essentially open dumps in the ground, and only 22 sanitary landfills (Malaysian Investment Development Authority 2026). Meanwhile, 21 landfills managed by SWCorp are set to reach full capacity by 2041 (Pfordten 2025). However, a larger challenge looms even before waste separation, which is Malaysia's absence of waste collection services and infrastructure in rural, remote, mountainous areas or islands, leading to open dumping. In addition, too many irresponsible parties resort to illegal dumping to avoid landfill tipping fees (Lee 2025), while it has become an unhealthy practice in Malaysia for landowners to convert their lands into illegal dumpsites to earn money by charging lower tipping fees compared to official landfills.

The lack of priority given to collecting and recovering materials in domestic wastes have seen recyclables such as plastic and paper, and compostables such as food and garden wastes, continue to be released into the environment, clogging up landfills, and soon, to be burnt in incinerators. Turning to incinerators instead of focusing on improving collection and separation-at-source appears to be the "easy" and "profitable" way out of the waste crisis. But it merely transfers the pollution from land to the air, and replaces one waste stream with another.

The promotion of waste incineration as part of the circular economy is a "false solution" to the waste crisis. According to the Environmental Justice Foundation (2025), false solutions can be defined as:

> "approaches or policies that are presented as solutions to a given collective problem, but reject, avoid, devalue, delay or otherwise pose burdens to social, economic, political or infrastructural reforms that address the root cause of the problem, and may generate other problems or shift the burden to future generations, other ecological systems, or other parts of the human society, especially marginalised groups."

False solutions refer to approaches that would ultimately prove unsuccessful in solving the problem at hand, because the measures do not address the root of the problem, which is unregulated production and high consumption rates, especially for single-use plastics seen as disposable. False solutions include prioritising recycling, waste-to-energy incinerator facilities, and bio-based/biodegradable disposable plastics without first considering waste reduction measures that can change systems of design, production, consumption, and disposal. Genuine solutions that tackle the root causes of waste must include reduction-enabling upstream policies such as non-toxic reuse-and-refill systems for packaging, strict controls of chemicals, and bans of toxic and non-essential products.

From the broader perspective of sustainability, incinerators are a losing proposition and are fundamentally incompatible with a closed-loop circular economy, where materials ought to be recovered for reuse. Incinerators do not eliminate waste, but instead have a voracious appetite for waste, often locking-in Local Authorities to contracts that require them to commit to delivering a minimum amount of waste for incineration, or suffer financial penalties. They also produce large quantities of hazardous ash (amounting to as much as 30% of the total waste burned), which must then be disposed of. Incinerator ash is highly toxic and should not be used carelessly. Communities living around incinerators are also at high risks of cancers, respiratory disease, miscarriage, premature birth, and congenital abnormalities (Arnika 2024). Incinerators destroy discarded products and materials, but merely transfer the pollution to the air and concentrate toxicity in the ashes.

Conquered by industrial capitalism

Malaysia's growth model, one that places gross domestic product (GDP) expansion ahead of other wellbeing indicators, replicates that of Western industrialised capitalist economies. In this model, when the priorities of MITI and the Ministry of Economy clash with those of the Ministry of Health or NRES, the former is likely to prevail. Economic wealth measured in GDP tends to take precedence over human and environmental health. However, a key difference between Malaysia and the industrialised countries is that, even as the societies became wealthier, they have managed to offshore polluting industries as well as their toxic wastes to other countries. Malaysia is unfortunately catching up in this era of late-stage capitalism, and needs to struggle to seek solutions for domestically generated wastes while being a recipient of polluting industries and wastes from advanced economies.

Malaysia has depended heavily on natural resource extraction (including fossil fuels, minerals, and timber), urbanisation, and ever expanding industrialisation to move up the economic ladder. Approaches, policies, and legal frameworks on the environment do not reflect a public mandate to protect the rights of citizens to clean air, clean water, and a healthy, thriving environment and ecosystems. Instead, our environmental laws have been constrained to controlling specific activities, instead of taking a more integrated approach to matters concerning the environment. Provisions within the EQA, enforced by the DOE, are currently limited to pollution control or minimisation, when in fact, environmental management should also protect, preserve, and conserve the natural environment.

In addition, the DOE may issue licenses to companies, as a temporary measure, that allow them to release discharges that exceed pollution control limits. These are, in essence, permits to pollute at set levels. Some industries are given a grace period to deal with pollution problems, but these licenses end up incentivising delayed remedial actions. The standards set for pollution parameters must be high enough to ensure environmental improvement and should be appropriate to our environmental conditions. It is insufficient to only ensure that each individual facility meets the prevailing parameters for pollutants in their wastewater discharges. For example, when approving the construction of more facilities that discharge effluents into the river, the total maximum daily load of pollutants in the river must be taken into account, especially in estuaries that are vulnerable to trapping pollutants due to tidal flows that are unable to wash pollutants out to sea.

The mindset of placing wealth and convenience ahead of health is observed across all levels of society, from businesses guilty of non-compliance with environmental regulations to lower their operational costs, to criminals involved in waste trafficking and illegal dumping, to villagers who lease out their agricultural lands to be used as dumping sites for a fee, down to the individual litterbug.

CASE STUDIES: THE COST OF GROWTH

Risking our rivers: Sungai Juru and Sungai Kim Kim

The pollution of Sungai Juru affecting the community of Kampung Kuala Juru in Penang is a landmark case that catalysed the environmental movement in Malaysia in the 1970s (Sekaran 2025). The Juru River basin is a case of chronic river pollution due to industrial discharge, domestic waste, and other effluents. Major rehabilitation and restoration efforts are being undertaken to improve the river water quality until today. However, the root cause of the pollution should be addressed to ensure sustainability.

While the Sungai Juru pollution has been a long-pending crisis, the pollution of Sungai Kim Kim in Johor was a sudden disaster that occurred when toxic chemical waste was illegally dumped into the river in March 2019. A total of 5,039 students and residents

in the area were affected, with 1,228 hospitalised and 26 treated in Intensive Care Units (Chinnayah 2019), and 111 schools in Pasir Gudang were also forced to close. Despite cleanup efforts of Sungai Kim Kim, a second wave of pollution happened merely weeks after, and smaller-scale contamination incidents have been reported over the years.

Sungai Kim Kim became a national scandal, highlighting weak enforcement and lack of emergency preparedness. Together, these two cases of river pollution demonstrate the spectrum of Malaysia's pollution challenges, from chronic neglect to acute emergencies, illustrating Malaysia's continuous struggle to balance industrial growth with environmental health.

Corporate impunity: Bukit Merah radioactive waste disaster and Raub gold mine cyanide controversy

Malaysia's rapid industrial and resource extraction activities often come at the expense of community and environmental health. Two landmark cases, the Bukit Merah radioactive waste dump in Perak and the Raub gold mine cyanide controversy in Pahang, exemplify systemic weaknesses in industrial waste management, corporate impunity causing devastating harm on communities, and community resistance through grassroots activism and community lawsuits.

In 1982, Asian Rare Earth (ARE), a joint venture involving Mitsubishi Chemical from Japan, began processing rare earth in Bukit Merah. The plant generated radioactive thorium waste, which was improperly disposed of in nearby residential areas. Villagers suffered from elevated rates of leukaemia, lead poisoning, birth defects, infant deaths, and miscarriages (Consumers' Association of Penang, n.d.). For the first time in Malaysian legal history, an entire community, with the crucial support of the Consumers' Association of Penang and Sahabat Alam Malaysia, went to court over an environmental issue, to protect their health and environment from radioactive pollution. The grassroots activism and lawsuits eventually forced the plant's closure in 1994.

Decades later, a gold processing company, used cyanide leaching to extract gold in Bukit Koman, Raub. Villagers complained of skin diseases, respiratory problems, and water contamination linked to cyanide tailings. Air monitoring by the community using portable gas analysers showed hydrogen cyanide levels in the air were excessive periodically. The Ban Cyanide Action Group (BCAG) mobilised protests, including rallies with thousands of supporters, and legal challenges with the support of Sahabat Alam Malaysia. The company responded with defamation suits against activists and media outlets, winning some cases. Although the company operations eventually ceased, the case highlighted how corporations can use litigation to silence dissent rather than address environmental risks.

These two cases are powerful narratives for advocacy, reminding Malaysia that industrial growth must never come at the expense of human health and environmental safety. This is particularly necessary as Malaysia is embarking on rare earth mining and processing. By placing profits above precaution, we risk perpetuating the same mistakes that have marred our environmental history and undermined public health.

Waste colonialism: Plastic waste and electronic waste imports

In addition to Malaysia's challenges dealing with domestic wastes, the country became the top destination for plastic waste exports from industrialised countries in 2018, after China banned the import of solid waste. That year, Malaysia received more than 850,000 tonnes of plastic waste exported by countries such as the United Kingdom, the United States, Japan, Germany, France, and Spain. While a portion of these imports were recycled into plastic

pellets, a significant amount of low-quality post-consumer waste was illegally dumped and burned. Residents from Kuala Langat, Klang and Sungai Petani organised themselves into environmental associations to protest against the constant air pollution and bad odours caused by the processing and burning of plastic waste. They patrolled their neighbourhoods, gathered locations of plastic waste recycling facilities, and organised demonstrations in front of factories. From 2019 to June 2020, the DOE had officially seized and returned 225 containers of plastic waste to the countries of origin, as well as carried out 316 operations against illegal factories (Wong 2021, 2024).

Plastic waste imports decreased after 2021, due to tighter global and national regulations and strengthened enforcement, including the Plastic Waste Amendments to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, which allowed Parties to control the import of plastic wastes using the Basel Convention (Basel Convention, n.d.). Soon after that, Malaysia became a top destination for electrical and electronic equipment waste (e-waste), particularly from the United States (Basel Action Network 2025). Raids at illegal facilities in Selangor found teenagers being exploited as forced labor (Rahim 2023). Illegal dumpsites were soon covered with piles of microplastics from e-waste casings and shredded cable residues. As of May 2026, 803 containers of e-waste were reportedly retained at Port Klang (Camoens 2026), while three massive inter-agency coordinated enforcement actions were carried out to inspect or raid e-waste facilities nationwide (Ops Hazard 1.0, 2.0 and 3.0) in 2025 and 2026, involving hundreds of officers (Hisham 2026).

Waste trafficking affected Malaysia not only in terms of peoples' health and the environment, but also heightened the risks of graft and illegality, as well as placed a heavy burden on enforcement agencies. The costs of this waste colonialism, where clean air, water, land, labor, and health of recipient countries are "conquered" and "exploited" to the benefit of others, extends beyond pollution. This is an intersecting issue of governance, national security, human rights, and environmental justice, too often driven by illicit activity and businesses avoiding costs in exporting countries. In July 2025, Malaysia tightened import regulations for plastic waste, and in April 2026, Malaysia completely banned the import of e-waste.

"Homoplastikus": The unique problem of plastic waste

In 1950, the world produced 1.5 million tonnes of plastic. In 2023, the European Union (EU) shipped more than 1.3 million tonnes of plastic waste to third countries. Reasons for export included the lack of capacity, technology, or financial resources to treat the waste locally (European Parliament 2014). It is, however, difficult to imagine a developing country like Malaysia having more capacity, technology and resources than the EU. Not only does this demonstrate the developed world's longstanding inability to properly handle the incredibly high levels of plastic consumption and subsequent waste it produces, but also the scale of negative impacts this has on receiving communities, and on the planet.

In Malaysia, unregulated plastic use and excessive plastic packaging have led to villagers in rural areas with no waste management services resorting to open burning and dumping in rivers, mangrove areas, beaches and mountains, particularly in islands or in the remote frontiers of Sabah and Sarawak. Over time, this plastic waste degrades into microplastics, which subsequently enter the food chain. Malaysian scientists have found microplastics in 93.3% of 180 Indian mackerel analysed (Najihah *et al.* 2025) and in all cockles (Mohan *et al.* 2024) . The study highlighted that cockles accumulate microplastics, which could potentially result in bioaccumulation and biomagnification in humans through consumption.

The question of solving plastic pollution is being debated currently by an Intergovernmental Negotiating Committee on Plastic Pollution led by the UNEP. There must be caution and due diligence when it comes to technologies or substitutes that negatively impacts human health and the environment, yet do not address problems of overproduction, such as incineration as discussed above. Other such technologies include chemical recycling and refuse-derived-fuel. Meanwhile, upstreamplastic waste prevention and minimisation must be prioritised, and single-use plastic products should not be replaced by regrettable substitutes such as bio-based, biodegradable, and compostable plastics, which have been shown to contain toxic chemicals (Zimmerman *et al.* 2020) and heavy metals (Jang *et al.* 2022).

OPPORTUNITIES: SOLUTIONS AND INNOVATIONS

Prevention and minimisation: The waste hierarchy

Malaysia is a Party to various multilateral environmental agreements (MEA), which means the country has pledged to abide by and enforce international obligations to protect the environment, including by strengthening the domestic policy and legal framework. The MEAs related to waste and pollution and Malaysia's obligations are summarised in Table 2. Each MEA would provide technical guidance to Parties who have ratified or accepted the agreements, on how to meet their obligations on waste and pollution. The Basel Convention has also released guidelines on how to manage waste in an environmentally sound manner.

Table 2. MEAs related to waste and pollution and Malaysia's obligations.

MEAs	General Obligations
ASEAN Agreement on Transboundary Haze	To control open burning and haze
Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal	To prohibit the import of hazardous waste from OECD countries
Paris Agreement - UN Framework Convention on Climate Change (UNFCCC)	To reduce greenhouse gas emissions
Montreal Protocol on Substances that Deplete the Ozone Layer	To eliminate ozone depleting substances such as chlorofluorocarbons (CFCs), etc.
Rotterdam Convention	Prior informed consent procedure for certain hazardous chemicals and pesticides in international trade
United Nations Convention on the Law of the Sea (UNCLOS)	To control pollution from ships
Vienna Convention for the Protection of the Ozone Layer	Framework for cooperation regarding ozone layer
Minamata Convention on Mercury	To control anthropogenic releases of mercury throughout its lifecycle Malaysia signed, but has yet to ratify
Stockholm Convention on Persistent Organic Pollutants	To reduce and/or eliminate persistent organic pollutants Malaysia signed, and preparing to ratify
Intergovernmental Science-Policy Panel on Chemicals, Waste and Pollution	To bridge the gap between scientific knowledge and global policy
Global Framework on Chemicals - For a Planet Free of Harm from Chemicals and Wastes	To regulate the use of chemicals across its lifecycle, including products and waste.

All these agreements are based on the prevention principle and the precautionary principle first developed at the Rio Declaration in 1992. In addition, the waste hierarchy and the Cartagena Declaration on the Prevention, Minimization and Recovery of Hazardous Wastes and Other Wastes (2011) emphasises waste prevention over waste management. Malaysia is currently in the negotiation process towards a Global Plastic Treaty, and these prior agreed principles on environmental protection should form the foundation of the agreement.

A revolution: Community-based initiatives, Zero Waste movements

As examined in the introduction, Zero Waste is an approach to resource use that ensures efficiency, recovery, and protection of scarce natural resources. It can be both a goal and a plan of action aimed at ending waste disposal in incinerators, dumps, and landfills. Zero Waste represents a revolution in our relationship with waste, aiming to safeguard health and improve the quality of life for everyone who interacts with waste, including producers, handlers, and the broader community.

The key elements of a Zero Waste approach include: reducing consumption; reuse and refilling systems; product redesign to be non-toxic and durable; banning waste incineration; composting or bio-digestion of organic materials; comprehensive waste segregation and safe recycling; active citizens and worker participation, and; policies, regulations, incentives, and financing structures to support these systems.

Several bottom-up initiatives have created Zero Waste movements, including Zero Waste Malaysia (54,400 members), Zero Waste Sabah (18,200 members), and Zero Waste Perak (579 members). Zero Waste retail outlets have also been set up, without receiving any support from the government. By adopting a genuine Zero Waste approach, including by developing public policies that support genuine upstream community-led solutions on waste prevention, Malaysia would be able to significantly reduce its reliance on incineration, conserve natural resources, decrease landfill use, and lower carbon emissions. This transition will contribute to a more sustainable and resilient waste management system, benefiting both the environment and the community.

Responsible businesses initiatives

Converting agricultural waste into bioenergy may offer a sustainable pathway for Malaysia to achieve its renewable energy goals, mitigate greenhouse gas emissions, and support rural economic development. Key challenges exist, however, including high initial capital costs, limited technical expertise, regulatory complexities, and low public awareness, which hinder the scalability of solutions like anaerobic digestion, biomass pelletization, and biochar production. Supportive policy measures could be set out to facilitate private sector leadership, such as bioenergy-specific subsidies and carbon pricing, public-private partnerships and community engagement. Using agricultural waste could offer a way for Malaysia to align economic and environmental aims (Harun *et al.* 2025).

To enhance the governance of chemicals in Malaysia, the government should consider developing a Pollutant Release and Transfer Register (PRTR) (United Nations Institute for Training and Research, n.d.). PRTR is an open-access national database of releases and transfers of harmful (and potentially harmful) chemicals to the environment. The data can be collected from point sources of pollution, such as directly from factories as required by the EQA, as well as from diffuse sources, such as agricultural farms or transportation, which Malaysia has yet to regulate. PRTR could require reporting on releases to air, water, and land, and waste transported to treatment and disposal sites. The data will be collected through annual reporting by industrial facilities and estimation of emissions from diffuse sources to allow tracking of trends over time; the use of common identifiers for chemicals, comparison and aggregation of the data; standardisation of data

for ease of analysis, and; dissemination of the information made available to the public through a National PRTR website. Having such a transparent system would guide Malaysia towards more responsible and environmentally sound management of waste and pollution.

To address post-consumer waste, Malaysia's circular economy and Extended Producer Responsibility (EPR) laws and policies are being developed, but upstream measures such as eco-design, material substitution, and producer accountability remain under-emphasised, compared to downstream recycling efforts and waste management. Manufacturers must be made responsible for the entire lifecycle of the products that they put into the Malaysian market, including for imports. EPR must begin at the product concept stage, incorporating holistic eco-design where durability, repairability, and the use of non-toxic materials are pertinent. Strengthening upstream strategies is critical to reduce waste generation and reliance on downstream partial recycling.

CONCLUSION AND RECOMMENDATIONS

Malaysia's pollution and waste crisis disproportionately affects marginalised communities. Communities living downstream of sources of pollution, farmers whose yields have decreased due to pollution, riverine fishers, and indigenous communities reliant on rivers for sustenance, are among those who bear the heaviest burdens. Communities near waste-burning sites, illegal dumpsites, and industrial zones face higher risks of respiratory problems, including asthma, bronchitis, and lung cancer due to prolonged exposure to polluted air. Polluted rivers and groundwater not only increase the risks of water-borne diseases, but also disrupt the water supply to consumers, such as in the case of frequent unscheduled water cuts in Selangor. Toxic exposure from hazardous waste, including radioactive waste, poses severe risks. Children in particular are especially vulnerable, with toxic exposure linked to developmental delays and neurological damage.

In addition, we are experiencing the triple planetary crisis of pollution, climate change, and biodiversity loss. Malaysia is one out of only 17 megadiverse countries in the world, but extreme weather events, rising sea levels, and chemical and waste pollution (largely driven by unsustainable production and consumption) threaten not only the wellbeing of our people, but also the survival of all species of wildlife on land and in the sea.

This reality—we all contribute to waste and it affects all of our existence—demands urgent multifaceted responses at global, regional, national, and local levels, with dialogue among all stakeholders, especially those negatively impacted. To find long-term solutions to waste and pollution, there should also be more multistakeholder dialogues across topics: development (wellbeing, post-growth, post-capitalist economics), labour (health and safety), conservation, climate change, gender, indigenous peoples, and more.

The different types of wastes and pollution call for different solutions. However, the solutions lie on a spectrum in terms of effectiveness, whether they actually offer a genuine solution, or simply "kick the can down the road" and would end up causing even more problems in the future. Crucially, taglines such as "waste to wealth" are misleading and ought to be stopped. Waste management is costly, costing the Malaysian government more than RM2 billion annually. Waste is a responsibility, and if not addressed adequately, will leave repercussions for future generations.

The underlying principles have already been set out by the United Nations General Assembly, which declared that everyone on the planet has a right to a clean, healthy and sustainable environment (United Nations Environment Programme 2022). In a resolution passed in 2022, the General Assembly said that "climate change and environmental

degradation were some of the most pressing threats to humanity's future". The human right to a healthy environment highlights the urgent need for procedural rights such as public participation and access to information in decision-making, and access to remedy in the face of violations, emphasising grassroots empowerment and local action, to support substantive rights such as the rights to clean air and clean water. Policy implementation and law enforcement are crucial in protecting these rights, and there must be environmental and human rights due diligence before adopting various technologies to deal with wastes. The state has a duty to protect and promote the human right to a healthy environment, while businesses have the duty to respect those rights (United Nations Office of the High Commissioner of Human Rights 2012).

In practice, waste minimisation measures should be prioritised, including but not limited to:

- reuse and refill infrastructure that emphasises the circulation of standardised and safe reusable packaging;
- mandatory extended producer responsibility (EPR) that prioritises durable product design, waste prevention, and reverse logistics for waste collection and safe recycling, informed by comprehensive life cycle assessments to ensure verifiable environmental benefits; and
- mandatory prior informed consent and data transparency for waste imports.

Finally, there must be due diligence, and adoption of the precautionary principle and the prevention principle, when it comes to technologies or substitutes that do not holistically address the root cause of waste and pollution—overproduction—and negatively impacts human health and the environment. These technologies include chemical recycling, waste incineration, refuse-derived-fuel, and regrettable single-use plastic substitutes such as bio-based, biodegradable, and compostable plastics, which only create further problems of pollution. Malaysia has committed to meeting the Sustainable Development Goals (Department of Statistics Malaysia 2025) and has developed The National Planetary Health Action Plan (Academy of Sciences Malaysia 2025). It's time for Malaysia to view waste and pollution as a policy priority.

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