KEMENTERIAN
ALAM SEKITAR DAN AIR
Ministry of Environment and Water

National Marine Litter Policy and Action Plan
2021 - 2030

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For further information, please contact:

Ministry of Environment and Water, Malaysia
Blok F11, Kompleks F
Lebuh Perdana Timur, Presint 1
Pusat Pentadbiran Kerajaan Persekutuan
62000 Putrajaya, Malaysia
+03 8091 7000

www.kasa.gov.my

Foreword by The Minister

Marine plastic pollution is widespread and it is a global crisis. Aside from poor aesthetics, marine plastic pollution and microplastics can cause serious threats to the ecosystem, human health, as well as the economy and affect our overall quality of life. It is transboundary in nature and all countries must take measures to tackle the problem.

The future outlook is also bleak, whereby the ocean is projected to have more plastic than fish by 2050. Population growth and demands for goods and products, which will likely include some forms of plastic elements and packaging, will contribute to an increase in waste generation. According to the International Union for Conservation of Nature (IUCN), in 2018, around 8 million tonnes of plastic end up in the ocean every year globally. Marine plastic pollution is caused mainly by leakages and activities from land-based sources including due to gaps in solid waste management, surface water runoffs and illegal dumping, among others. Sea-based source such as abandoned, lost or otherwise discarded fishing gear also contributes to marine litter pollution. Malaysia is not spared from experiencing these problems, and it is evident that marine plastic pollution is omnipresent and must be urgently addressed.

In this regard, the Ministry of Environment and Water, with the technical support from the Maritime Institute of Malaysia (MIMA), has developed the National Marine Litter Policy and Action Plan 2021-2030 to guide nationwide actions to address marine litter pollution. This Policy mirrors the spirit of existing international and regional frameworks on marine litter but is tailored to the Malaysian context. The Ministry of Environment and Water wishes to thank the United Nations Environment Programme (UNEP) and Coordinating Body on the Seas of East Asia (COBSEA) for the technical assistance rendered as well as the Swedish Government for providing financial support that has enabled us to come up with this Policy through the project titled "Reducing Marine Litter by Addressing the Management of the Plastic Value Chain in Southeast Asia" (SEA circular).

The Policy aims to reduce marine plastic pollution in Malaysia through strategic actions along the value chain of plastic life cycle. It outlines five pillars: Policy Adoption and Implementation; Deployment of Technologies, Innovation and Capacity Building; Improve Monitoring and Data Collection on Marine Litter; Communication, Education & Public Awareness (CEPA) and Outreach; and Whole-Of-Nation and Multi-Stakeholders Approach. The Policy is substantiated with 17 action plans and 103 activities to be implemented in tandem with the Plastic Sustainability Roadmap 2021-2030 and the Roadmap Towards Zero Single-Use Plastic 2018-2030, in line with Strategy A2, Chapter 8 of the 12th Malaysia Plan, which focuses on the implementation of circular economy as a catalyst for resource sustainability.

I call upon all stakeholders, particularly the industries, waste management and recycling sectors, and all segments of society, to join hands to support the Ministry in implementing this Policy for the benefit of the current and future generations.

Thank you.

DATO' SRI TUAN IBRAHIM BIN TUAN MAN
Minister of Environment and Water

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LIST OF ABBREVIATIONS

ALDFG	Abandoned, lost or otherwise discarded fishing gear
ASEAN	Association of Southeast Asian Nations
CEPA	Communication, Education and Public Awareness
COBSEA	Coordinating Body on the Seas of East Asia
CSR	Corporate Social Responsibility
DOE	Department of Environment
DOF	Department of Fisheries
EPR	Extended Producer Responsibility
EPU	Economic Planning Unit
GPA	Global Programme of Action for the Protection of the Marine Environment from Land-based Activities
GPML	Global Partnership on Marine Litter
IMO	International Maritime Organisation
IOC	Intergovernmental Oceanographic Commission of UNESCO
JPSPN	National Solid Waste Management Department
KASA	Ministry of Environment and Water
KKMM	Ministry of Communications and Multimedia
KPDNHEP	Ministry of Domestic Trade and Consumer Affairs
KPKT	Ministry of Housing and Local Government
KPWKM	Ministry of Women, Family and Community Development
MAFI	Ministry of Agriculture and Food Industries
MARDEP	Marine Department
MAREA	Malaysian Recycling Alliance
MaSPA	Malaysia Sustainable Plastic Alliance
MIMA	Maritime Institute of Malaysia
MOOC	Massive Open Online Courses
MOHE	Ministry of Higher Education
MOSTI	Ministry of Science, Technology and Inn
MOT	Ministry of Transport
MOTAC	Ministry of Tourism, Arts and Culture
NGO	Non-Governmental Organisation
NMLPAP	National Marine Litter Policy and Action Plan
PPP	Public Private Partnerships
RAP MALI	COBSEA Regional Action Plan on Marine Litter
SDG	Sustainable Development Goal
SIRIM	Standard and Industrial Research Institute of Malaysia
STANDARDS MALAYSIA	Department of Standards Malaysia
UNEA	United Nations Environment Assembly
UNEP	United Nations Environment Programme

DEFINITIONS

Action Plan	A comprehensive framework and set of actions to help support implementation.
Bioaccumulation	The gradual increase and accumulation of substances in an organism.
Land-based sources (of pollution)	Pollution resulting from the discharge of materials or substances from the terrestrial environment to the marine environment.
Marine litter	Any persistent solid material, manufactured or processed, that is disposed of directly or indirectly into the marine environment. Marine debris, marine litter are often used interchangeably.
Marine environment	Environment in the aquatic area where marine litter is found to occur, including along the shoreline, sea surface or water column, and seafloor.
Marine plastics	Term commonly used to designate plastic fragments or pieces found in the marine environment. They are used interchangeably with marine plastic debris, marine plastic litter or marine plastic particles and include macro- and micro-plastic debris.
Microplastics	Small plastic particles which can be formed from the degradation of larger pieces. Their size definition falls within < 5 mm or < 1 mm (i.e., < 1,000 µm).
Nanoplastics	Plastic particles that result from the degradation of larger plastic particles and are of the sub-micrometre scale.
Plastic waste	Plastic that is deemed to be at the end of its life cycle, unable to be recycled or repurposed.
Policy	Statement of intent, accompanied by actions that have been agreed to officially by the stakeholders for implementation.
Sea-based sources (of pollution)	Pollution that results from the direct release (accidently or purposely) of substances or materials into the marine environment by maritime activities e.g,. shipping, fishing, offshore installations, or dumping of refuse at sea.

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EXECUTIVE SUMMARY

The United Nations Environment Programme (UNEP) describes marine litter as 'any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment'. Marine litter of which largely consists of plastic materials poses environmental, economic, health, aesthetic and cultural threats, including degradation of marine and coastal habitats and ecosystems that incur socioeconomic losses in marine-based sectors. Marine litter, especially plastic, contains a range of toxic chemicals with potential harmful impacts. Studies have shown numerous impacts on the marine life as well, including the entanglement of birds, fish, and migratory species such as turtles and marine mammals, as well as ingestion of plastic and microplastics mistaken as food, which eventually ends up in the food chain.

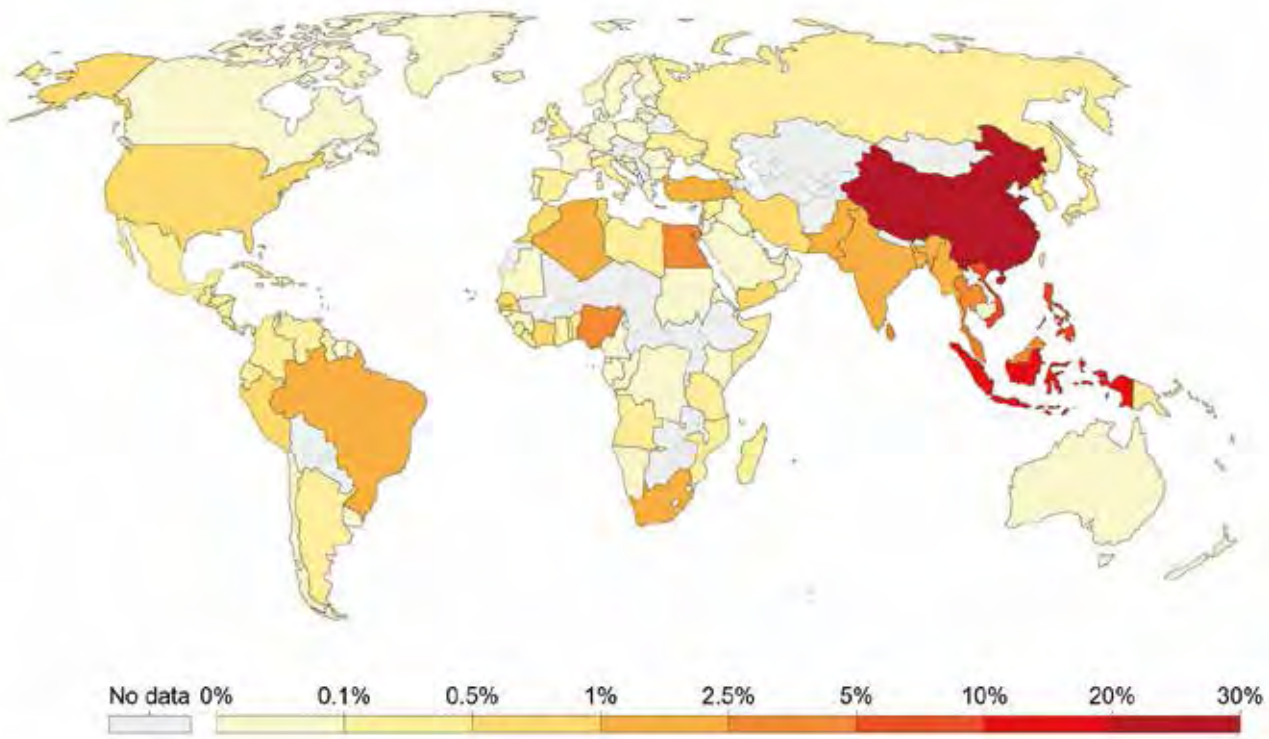
Marine litter arises from various economic sectors and activities, either directly or indirectly, from land-based and sea-based sources. These include aquaculture and fisheries (accidental loss, intentional abandonment and discarding of fishing gear), shipping (ship-generated waste, plastic blasting in shipyards, and others), cosmetics and personal care products (use of microbeads), textiles and clothing (including synthetic fibres released during washing), retail and tourism (including plastic bags, bottles, packaging materials, disposable tableware and cutlery). The problem is aggravated by inadequate infrastructure and practices in waste management.

The cost of inaction is unacceptably high and increasing, with adverse impacts on the environment, ecosystem functions and services, as well as on communities, and economic activities at large. They cause widespread physical harm and mortality to marine life, including direct economic losses to related coastal and marine industries including revenue loses in the fisheries and aquaculture, tourism and shipping sectors. Current solutions range from upstream prevention of marine litter pollution to downstream clean-up activities. Numerous global, regional and national activities are hence driven towards tackling marine litter pollution.

The Southeast Asian region is recognised as a global hotspot for marine litter pollution *(Figure 1)*. Recent studies, including World Bank's assessment, have shown that around 243 million tonnes of waste, including an estimated 31.7 million tonnes of plastic waste is generated in majority of the ASEAN member states. Reducing and minimising regional marine litter from both land-based and sea-based sources require successful addressing of waste leakage and disposal into rivers, along coastlines, and into the ocean. This hence demands for multi-stakeholder engagement across all economic sectors and groups of society to overcome linear systems of production, consumption and disposal, and to tackle marine litter at the source and at sea.

SHARE OF GLOBAL MISMANAGED WASTE, 2010

Global share of mismanaged plastic waste derived from a given country. Mismanaged waste is the sum of littered or inadequately disposed waste. Inadequately disposed waste is not formally managed and includes disposal in dumps or open, uncontrolled landfills, where it is not fully contained. Mismanaged waste could eventually enter the ocean via inland waterways, wastewater outflows and transport by wind or tides.



Source: Jambeck et al. (2015)

Figure 1. Published information on global mismanaged waste, 2010.

Recognising this concern, in 2019 the ASEAN Member States came together to prepare the Bangkok Declaration on combating marine debris. Further, building on the Declaration, the ASEAN region adopted the Regional Action Plan for Combating Marine Debris in the ASEAN Member States (2021-2025), as a vital document to guide the region and to create wave of change in the battle with marine litter pollution. Consequently, to address these regional and global threats and guide action in line with the Sustainable Development Goals (SDGs), COBSEA participating countries adopted the Strategic Directions 2018-2022 and a revised Regional Action Plan on Marine Litter (RAP MALI) in 2019 to address marine pollution, including with a focus on marine litter and microplastics. The COBSEA RAP MALI consolidates, coordinates, and facilitates cooperation, and guides implementation of necessary environmental policies, strategies and measures for sustainable, integrated management of marine litter in the region. The Regional Action Plan on Marine Litter will directly support COBSEA participating countries to deliver Target 14.1 of Sustainable Development Goal 14, to prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, including marine litter, and also contribute to the achievement of other SDGs and associated targets.

Furthermore, the International Maritime Organisation (IMO) in 2018 adopted the IMO Action Plan to address marine plastic litter from ships with actions to be completed by 2025, including for fishing vessels. This focuses on enhancing existing regulations and introducing new supporting measures to reduce marine litter from ships. Other Regional Seas Programmes, including the Global Partnership on Marine Litter (GPML), and the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) also support effective action in the region to address marine litter pollution prevention and reduction.

The 2030 Agenda for Sustainable Development calls for action to 'Conserve and sustainably use the oceans, seas and marine resources' (Goal 14) and 'By 2025, prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, including marine debris and nutrient pollution' (Target 14.1). The United Nations Environment Assembly (UNEA) resolutions on Marine Litter and Microplastics recognise the importance of a regional approach to addressing marine litter as a transboundary problem, of multi-stakeholder engagement, coordination and cooperation, and stress the need to strengthen the science-policy interface, harmonise monitoring and methodologies, and prioritise a whole lifecycle approach.

There is a need for increasing coherence, coordination and synergies between existing mechanisms and to enhance cooperation and governance to better address marine litter pollution challenges at local, national, regional and global levels. The National Marine Litter Policy and Action Plan (NMLPAP) 2021-2030 will coordinate actions to address marine litter pollution at the national, state and local levels in accordance with international standards and approaches and, as appropriate, in harmony with programmes and measures applied in the region.

The NMLPAP 2021-2030 highlights priority areas and actions to address marine litter pollution in Malaysia. It will be implemented alongside the National Roadmap Towards Zero Single-Use Plastics 2018-2030 and Plastic Sustainability Roadmap 2021-2030. The NMLPAP 2021-2030 will be coordinated and implemented by KASA in cooperation with key stakeholders, target groups and responsible agencies. It contains six desired national outcomes, to be implemented through 17 identified actions and 103 key activities, under five priority pillars as follows:

Pillar 1	Policy Adoption and Implementation
Pillar 2	Deployment of Technologies, Innovation and Capacity Building
Pillar 3	Improve Monitoring and Data Collection on Marine Litter
Pillar 4	CEPA (Communication, Education & Public Awareness) and Outreach
Pillar 5	Adopt Whole-Of-Nation and Multi-Stakeholders Approach in Harmonising Cross-Cutting Objectives

This document will be treated as a living document where adjustment and alignment of actions will be made in accordance with the latest national priorities in line with international and regional development on addressing marine litter pollution.

INTRODUCTION

SOURCE-TO-SEA FRAMEWORK FOR MARINE LITTER PREVENTION AND MITIGATION

The United Nations Environment Programme (UNEP) defines marine litter as 'any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment'. It is estimated that 80 percent of marine litter comes from land-based sources with the majority coming from a relatively small number of coastal and riverine urban areas where rapid growth and economic development is outpacing waste management systems.

Malaysia recognises marine litter as a global transboundary issue with multidisciplinary challenges, which requires both integrated national and regional cooperation.

Study by the Ocean Conservancy and the Trash Free Seas Alliance *(Figure 2)* identified the need to improve waste collection and management systems. There is also a pressing need for a collective and coordinated vision and long-term actions for the country to ensure that robust national actions are taken vis-à-vis rapid global research and innovation to address current and emerging marine litter challenges. Without immediate actions, marine litter pollution could aggravate the negative impacts on biodiversity, environment, health, society and the economy.

Existing measures to deal with marine litter pollution are fragmented and insufficient in order to successfully address the issue. This requires considering the involvement of the different sectors and stakeholders at the national level to address cross-cutting issues to deal with the issue at large.

Meanwhile, scientific breakthroughs and new technologies are being developed to create products including those that made of plastic or have plastic make up that limit environmental footprints. These developments give us a cause for optimism.

The National Marine Litter Policy and Action Plan (NMLPAP) 2021-2030 therefore focuses on two core themes:

- Strengthen the evidence base for informed decision making to address marine litter by building national capacities to monitor plastic value chain and assessing waste leakage hotspots in line with global best practices.

- Deploy practical actions in phases to tackle sources of marine litter pollution in Malaysia in-line with the latest global innovations, further developed over time through enhanced evidence-based strategies.

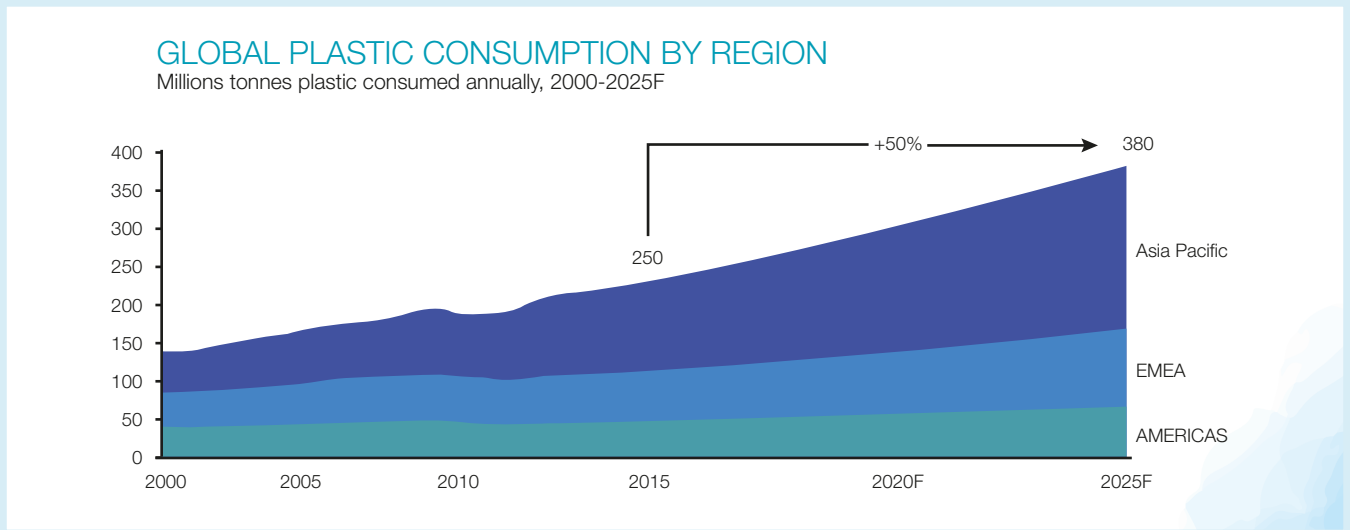


Figure 2. The Next Wave: Investment Strategies for Plastic Free Seas. Trash Free Seas Alliance and Ocean Conservancy, 2017.

The NMLPAP 2021-2030 serves as a broad-based implementation plan to address marine litter pollution (including plastic pollution) guided by a multi-stakeholder approach. It is developed in alignment with other global and regional frameworks and action plans such as the Group of 20 (G20) Action Plan on Marine Litter adopted at the G20 Hamburg Summit in 2017, and the subsequent G20 Implementation Framework for Actions on Marine Plastic Litter adopted at G20 Summit in 2019, the APEC Roadmap on Marine Debris, COBSEA Regional Action Plan on Marine Litter (RAP MALI) 2019, ASEAN Framework of Action on Marine Litter and Bangkok Declaration on Combatting Marine Debris, adopted at ASEAN Summit in June 2019.

There is a need for coherence, coordination and synergies between existing mechanisms to better address marine litter pollution challenges at the different levels. The NMLPAP 2021-2030 will be implemented alongside the National Roadmap Towards Zero Single-Use Plastics 2018-2030 and the Plastic Sustainability Roadmap 2021-2030.

THE GLOBAL 2030 AGENDA

The United Nations adopted the 2030 Agenda for Sustainable Development in September 2015. At the global level, the 2030 Agenda for Sustainable Development calls for action to 'Conserve and sustainably use the oceans, seas and marine resources' (Goal 14) and 'By 2025, prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, including marine litter and nutrient pollution' (Target 14.1).

The United Nations Environment Assembly (UNEA) resolutions on Marine Litter and Microplastics (such as UNEP/EA.4/6) recognise the importance of a regional approach to addressing marine litter as a transboundary problem, of multi-stakeholder engagement, coordination and cooperation, and stress the need to strengthen the science-policy interface, harmonise monitoring methodologies and prioritise a whole life cycle approach.

Sources and pathways of marine litter are diverse and exact quantities and routes are not fully known. Addressing the issue would hence require collective and coordinated efforts and actions amongst a large diversity of stakeholders across sectors and scales including land-based sources, as well as shipping, fishing, aquaculture, tourism and recreation which can affect or be directly affected by marine litter pollution, in dealing with divergent perspectives and interests. Furthermore, Regional Seas Conventions and programmes are prompted to increase their action and coordinate efforts. From 2021-2030, efforts would be driven towards prioritising and meeting SDG 14 (Life Below Water), and subsequent cross-cutting endeavours and related SDGs *(Figures 3 & 4)*.

For instance, the following SDGs have targets relevant to marine plastic pollution i.e., SDGs 4, 5, 6, 8, 10, 11, and 12 in addition to SDG 14. These targets deal life cycle — with focus on prevention, waste management in sustainable cities, management of waste throughout their reduction, recycling and reuse — and sustainable management of the ocean.

SDG Indicators

14.1
Knowledge and solutions to reduce marine pollution on land and at sea

14.5
Knowledge and solutions for area-based management tools

14.7
Knowledge and solutions for a sustainable ocean economy

SDG Targets

14.A
Increased scientific knowledge, research capacity and transfer of marine technology

14.C
Contribute to application of UNCLOS for conservation and sustainable use of the ocean

SUSTAINABLE DEVELOPMENT GOALS

2030 AGENDA

14 LIFE BELOW WATER

Figure 3. Sustainable Development Goal 14 (Life Below Water): Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Source: UN Department of Economics and Social Affairs (DESA), https://sdgs.un.org/goals/goal14

1 NO POVERTY	4 QUALITY EDUCATION	5 GENDER EQUALITY	8 DECENT WORK AND ECONOMIC GROWTH	10 REDUCED INEQUALITIES
Knowledge and solutions for a sustainable blue economy	Formal and informal education on the importance of the seas for sustainable development	Increased gender equity along the plastic value chain	Engagement with key stakeholders in particular small and remote islands	Increased access to data, information, capacities and technologies

Figure 4. Some of the other Sustainable Development Goals (SDGs) on cross-cutting issues

Source: UN Department of Economics and Social Affairs (DESA), https://sdgs.un.org/goals

THE POLICY FRAMEWORK

PURPOSE AND OBJECTIVES

The purpose and objective of the National Marine Litter Policy and Action Plan (NMLPAP) 2021-2030 is to guide national actions on addressing marine litter as follows:

(i) To address marine litter pollution through robust policy development.

(ii) To document concrete steps ahead on tackling marine litter pollution based on scientific evidence and lessons learned from international, regional and local efforts.

iii) To coordinate efforts at every level of the Federal Government, State Government, local government, as well as public, private and social sectors.

iv) To foster further research and innovation to prevent, monitor and tackle marine litter pollution.

v) To deploy and implement cutting-edge technologies and innovation backed with strong national standards and guidelines, as well as strengthened institutional and legal framework to ensure Malaysia is at the forefront of global efforts in tackling marine plastic pollution.

vi) To promote the sharing of best practices and lessons learned, while enhancing regional and international cooperation, and creating awareness and instigating behavioural change.

vii) To increase access to finance and facilitating private sector engagement to promote investment, trade and market creation, and market-based incentives in industries and activities that enable marine litter management and prevention.

PILLARS OF THE NATIONAL MARINE LITTER ACTION PLAN 2021-2030

Towards achieving the above objectives, the National Marine Litter Action Plan (NMLPAP) 2021-2030 will be implemented based on the following five national priority Pillars. Each Pillar consists of national actions and activities in line with regional priority areas in combating marine litter pollution.

(i) Policy Adoption and Implementation

Advance and improve engagement on addressing marine litter pollution from land- and sea-based sources through mainstreamed policy measures and priorities, sharing of information and knowledge, and enhancing coordination with stakeholders and policymakers to reduce and mitigate marine litter pollution.

(ii) Deployment of Technologies, Innovation and Capacity Building

Drive innovative technology deployment, backed up by robust standards to ensure evidence-based outcomes. Meanwhile, work towards building local capacity for advanced testing of new solutions between public-private-academic partnerships.

(iii) Improve Monitoring and Data Collection on Marine Litter

Establish a national marine litter monitoring programme, hotspots evaluation and publish assessments on marine litter. The Clean Coast Index (CCI) is an initial national marine litter monitoring framework that has been established for cleanliness assessment in the coastal areas.

(iv) CEPA (Communication, Education and Public Awareness), Outreach and Engagement

Raise awareness at all levels of society in addressing marine plastic pollution through behavioural change, new practices, advocating product/ packaging labelling towards zero single-use plastic and extended producer responsibility (EPR) schemes, among others. These efforts are to be complemented by activities and/or pledges including #cleanseasmalaysia to raise awareness and increase visibility on the urgency of marine plastic pollution and encourage behavioural change.

(v) Adopting whole-of-nation and multi-stakeholders approach in harmonising cross-cutting objectives

Improve engagement and cooperation through multi-stakeholders and whole-of-nation approach including with the informal sectors, and establishing Public-Private Partnerships (PPP) by implementing pilot projects (island and inland) as well as through potential avenues including access to research, data and information and funding opportunities to tackle marine litter problems collectively, and through better understanding the source-to-sea interactions. Aspects towards advancing the Inclusiveness, Human-Rights and gender equality are also to be assured, as well as rights of indigenous people and disadvantaged groups.

PRINCIPLES

The following principles will be used to guide implementation of the NMLPAP 2021-2030:

ENHANCE
implementation of relevant international and regional conventions/ agreements related to addressing marine debris pollution, where Malaysia is a party to.

REDUCE
marine plastic pollution loadings from land as well as sea-based sources to address adverse impact on the marine environment.

DEMONSTRATE
good practices and experiences in integrated river basin and estuaries, as well as coastal area management for improved source to sea governance, management and investments.

BEHAVIOURAL CHANGE
through transformation and modification of lifestyle into sustainable living and environmentally friendly approaches.

ROBUST SOLUTIONS
that are environmentally sound and socially just used to increase effectiveness in reducing marine plastic pollution through INNOVATIVE approaches and practices using advances in technology, techniques, processes and systems along the whole plastic value chain *(Figure 5)*.

IMPACTS ASSESSMENT
review specific guidelines and best practices documents to strengthen the identified pillars and goals on national marine litter actions.

Figure 5. Illustration of the Source-to-Sea Framework for Marine Litter Prevention and Mitigation.

ADDRESSING THE CHALLENGES

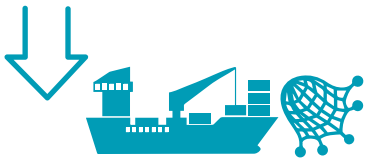
FACTORS CONTRIBUTING TO MARINE LITTER POLLUTION

Marine litter pollution largely results from human behaviour, either accidental or intentional. The major contribution comes from land-based activities, the littering of beaches, tourism and recreational use of the coasts, fishing industry activities and ship-breaking yards. Storm-related events, like floods, flush the resulting waste out to sea where it sinks to the bottom or is carried on coastal eddies and ocean currents. The major sea-based sources include abandoned, lost or otherwise discarded fishing gear, shipping activities, and legal and illegal dumping.

TARGETED AREAS FOR MARINE LITTER ACTIONS AT THE NATIONAL LEVEL

A vast number of initiatives exist at the international and regional levels, aiming at actions for reducing and preventing marine litter and mitigating its impacts. Most of the framework plans and strategies in place focus on the need to reduce the ecological, human health and economic impacts of marine litter. Broadly, these should include the following practical areas applicable to the national priority scenario setting:

Reduced amount and impact of solid waste and other land-based litter introduced into the coastal and marine environment.



Reduced amount and impact of sea-based sources of marine litter including solid waste, lost cargo, as well as abandoned, lost or discarded fishing gear (ALDFG) into the sea.

Reduced amount and impact of accumulated marine litter on shorelines, in benthic habitats and environments, as well as in the water column.

A robust monitoring and reporting framework will feed information into a structured process of regular reviews to underpin adaptive management and to provide stakeholders with information on the benefits generated to inspire actions and engagements.

This Action Plan outlines six expected outcomes, through 17 identified actions, and 103 key activities under five priority pillars to be implemented in a phased approach from 2021-2030.

EXPECTED OUTCOMES

The expected outcomes from the implementation of this action plan include the following:

(i) Strengthened national planning and enhanced regional coherence in national marine litter plan, as a key building block in further policy reforms.

(ii) Deployment of solutions including latest technology and standards to tackle marine plastic pollution, through a phased-approach.

(iii) Identify national indicators that illustrates the increased access to information in support of decision-making relevant to marine litter monitoring data and reporting which shows effectiveness of technical facilitation, advice and capacity building efforts.

(iv) Demonstrate effectiveness of the national action plan in applying a people centric approach in delivering information to end users and implementation of actions.

(v) Year-on-year increase in local marine litter knowledge hub online content.

(vi) Broadened engagement in addressing marine litter across all relevant stakeholder groups.

PRIORITY PILLARS AND ACTIONS, 2021-2030

Each Pillar consists of actions and suggested activities to combat marine litter pollution. The five Pillars are supported with 17 National Action Plan to be operationalised with 103 identified activities *(Tables 1 and 2)*.

Table 1. Actions identified under the five pillars.

Pillar I: Policy Adoption and Implementation
A. Promote national policy dialogues on prevention and reduction of marine litter from land and sea-based activities by highlighting the issue, sharing information and knowledge, and strengthening national and regional coordination.
B. Mainstream multi-sectoral policy measures to address marine litter in national development agenda and priorities.
C. Malaysia in close cooperation with ASEAN Member States to implement relevant international laws and agreements related to waste management, including MARPOL, Basel Convention, and United Nations Environment Assembly resolutions related to Marine Litter and Microplastics.
D. Implement and conduct a periodic review of the National Action Plan, through integrated source-to-sea policy interventions that are harmonised also with ASEAN and other regional and global Framework (e.g., GPML, RAPMALI).
Pillar II: Deployment of Technologies, Innovation and Capacity Building
A. Identify and deploy appropriate technologies and standards to tackle sources of marine litter pollution.
B. Encourage private sector contribution to combating marine litter pollution.
C. Access to funding and incentives.
D. Enhance scientific knowledge, transfer of technology and promote innovative solutions to combat marine litter.
E. Promote integration and application of scientific knowledge to enhance science-based decisions and policies on marine litter prevention and management.
Pillar III: Improve Monitoring and Data Collection on Marine Litter
A. Compile a national baseline on status and impacts of marine litter.
B. Strengthen national and local capacities to harmonise monitoring and assessment tools for marine litter data including national action plans/initiatives implementation.
C. Promote platforms for knowledge sharing, innovative solutions and best practices to combat marine litter.
Pillar IV: CEPA (Communication, Education & Public Awareness) and Outreach
A. Promote collaborative actions with private sector and industry associations to implement measures to address marine litter issues.
B. Accelerate citizen advocacy strategy/ programme to combat marine litter through behavioural insights approach.
C. Promote public awareness on status and impacts of marine litter and microplastics.
Pillar V: Adopting whole-of-nation and multi-stakeholders approach in harmonising cross-cutting objectives
A. Addressing human-rights issues in informal sectors through the establishment of Public-Private Partnerships.
B. Considering women's role in advocating more sustainable consumer behaviour.

LINKING MARINE LITTER POLLUTION WITH UNIVERSAL VALUES FOR SUSTAINABLE DEVELOPMENT

INTEGRATION OF HUMAN ENVIRONMENTAL RIGHTS-BASED APPROACH AND GENDER EQUALITY IN ADDRESSING MARINE LITTER POLLUTION, UNDERLINED UNDER PILLAR V

A Addressing human rights issues in informal sectors through the establishment of Public-Private Partnerships.

The United Nations Environment Programme (UNEP) refers to human environmental rights as the substantive rights to live in a healthy environment, which entails access to unspoiled natural resources; procedural rights which allows for access to environmental information and public participation in decision-making as well as ecological rights which entail rights for the environmental notions of nature's intrinsic value.

A human rights-based approach recognises and addresses the underlying causes or impacts of pollution and environmental degradation on vulnerable groups, and aims to empower and engage these groups in participatory processes and helps to build the capacity of governments, plastic producers and industries, and other duty-bearers to act and protect human environmental rights and the environment.

Understanding of the social and economic impacts of marine pollution to identify vulnerable groups facing limited access to ecosystem services, or threats to their health or livelihoods, are therefore important.

Considering the rights and interests of all stakeholders, especially the informal sectors, their participation in decision making around marine litter issues must be taken into account. This includes identifying and institutionalising appropriate consultation mechanisms from focus group discussions at coastal community level to multi-stakeholder dialogues between informal worker cooperatives and municipal government.

Applying a rights-based approach in policies, regulations and budgets, will help make processes in Malaysia more transparent, targeted and appropriate, and hold local governments and producers accountable.

B Considering women's role in advocating more sustainable consumer behaviour

Gender equality is critical to achieving human rights and sustainable development reducing poverty and environmental degradation, to improving health and food security. Understanding and addressing any inequality in policies and programmes in Malaysia are not only an essential element of a human-rights based approach, it also leads to more targeted, equitable and effective long-term results.

Gender roles and responsibilities, varied economic conditions and access to resources, cultural expectations and differences in knowledge and awareness levels influence how women and men use, dispose, and recycle different plastic products and to what extent they are exposed to health hazards and environmental threats.

Firstly, women and men are consumers of plastic products by virtue of gendered consumption patterns. Any analysis of plastic value chains and plastic leakage into the ocean will need to consider these patterns, as institutional policies may seek to reform them. For example, social gender roles in societies across South-East Asia may assign household management duties largely to women, making them a key target group for market-driven solutions to reduce food packaging waste and a potential champion for awareness raising within families and their social networks. Similarly, studies suggest that women are the biggest consumers of cosmetics and personal care products that often include microplastics and microbeads. Gender-specific roles and attitudes may also shape waste management practices of women and men in households and public spaces. Recognising and addressing gender patterns along the plastic value chain can lead to more targeted, effective and appropriate interventions.

Secondly, these patterns influence the exposure of women and men to marine litter and pollution and their ability to respond to environmental risks. In coastal communities, for instance, the gendered division of on or offshore fishing activities means that women and men face different types of marine pollution and habitat destruction with negative impacts on income opportunities and health.

Women are therefore a distinct target group for initiatives that aim to change behavioural patterns of consumption and waste management and need to be actively engaged and empowered to contribute to solutions for plastic management.

ASPIRATIONS FOR RESEARCH AND TECHNOLOGICAL DEVELOPMENT TO ADDRESS MARINE LITTER POLLUTION

Technologies and information required to address marine pollution are growing. Research and innovation in this aspect means the knowledge base and technological applications to tackle the problem are improving as well. There are hence five major areas that have been identified, as elaborated below, where further research will help to enhance the knowledge and solutions available to reduce marine litter pollution.

1. Information and Analytical Capacity

Focus to be geared towards improving monitoring methodologies and technologies, data and indicators to assess the impacts of marine litter including on the following areas, namely:

- working towards an integrated and harmonised assessment on the origins, pathways, abundance and effects of marine litter. Marine litter and waste indicators are often expressed in different units (number of items/area or/volume vs mass/year or /capita) which hinders comparison and integration;
- monitoring of litter in freshwater environments, rivers and lakes and the underpinning methods and technologies. Rivers and estuarine environments are crucial for understanding the relationship between sources and the sink of marine litter;
- improving laboratory and field assays of microplastics, tying-in to international work to better understand the impact of microplastics to human and the environment;
- building specific applications of observation technologies and remote sensing (satellites, drones, automated measurements at sea) to provide continuous monitoring of plastic litter on beaches and in surface waters over a broad spatial scale and a temporal scales, including for data coverage on point and diffuse sources of plastic waste; and
- setting indicators on socio-economic impacts of marine litter, especially human and wildlife exposures and health, and to ensure comparability across different domains.

2. Materials Science for alternatives to plastic

There is a need to foster collaboration between government, industry and the scientific community to develop new materials and new material solutions with characteristics that limit harm to the environment, as well as the possibility for utilising lifecycle analysis of possible developments of different plastic pollution solutions, including bio-based plastic produced from a variety of materials (e.g., bacteria-based plastic, soy-based plastic, cellulose based plastic, lignin-based plastic and natural fibre reinforced plastic) and advanced innovative additive-based biodegradable technology for plastic from conventional feedstock e.g., polyolefins. Future pathway could include development of new or improved materials that provide characteristics such as flexibility, biodegradability and recyclability with low potential post-consumer hazards.

3. Toxicology and Health

Develop a source-to-sea framework for determination of what good status/healthy means for freshwater and marine environments in relation to plastic litter and microplastics; with further research on the following:

- Health (human and environmental) exposure and impacts of microplastics from mismanaged waste, especially on beaches, coastal areas, lakes and rivers, including critical thresholds and most critical exposure pathways;
- Chemical toxicity of plastic and microplastics during manufacture, which could be released to the environment. Research has identified that many of these chemicals can have toxicological effects on fish, mammals and molluscs, hence a risk could exist if plastic fragments containing these chemicals are ingested by marine organisms;
- Effects of microplastics ingested by marine organisms;

- Persistent organic pollutants and the extent to which plastic litter absorbs persistent organic pollutants (POPs) in the oceans;

- Microplastics and the potential toxicity of different types and sizes of nanoplastics (particles smaller than 100 nm) to marine organisms and consumers. The available data show that nanoplastics may affect negatively organisms from different phyla with reported effects ranging from alterations in reproduction to mortality; and

- Data show a high potential for bioaccumulation/ biomagnification along marine food chains. The lack of standardised methodology for microplastics detection and the poor legal framework makes microplastics a critical environmental challenge.

4. Socio-economics

Explore market-based mechanisms and economic instruments to stimulate reduction in litter released into the marine environment. These to include the following:

- Implementation of the (EPR) Extended Producer Responsibility scheme in Malaysia;

- Enablers to raise recycling rates - Deposit-refund programmes, reverse vending machine, digitising recycling through mobile phones, identification of recycling facilities;

- Implement taxes - plastic with certain percentage and above of virgin material – both to manufacturer and consumer;

- Review rules and regulations at federal and state level to identify gaps and cross sectoral jurisdiction in mitigating marine litter at source including to further look into the management of the waste. Heavy fines for littering and illegal disposal of waste items with proper implementation; and

- Award-based incentives for the coastal communities.

5. Technologies

Work with private and academic sectors to develop technologies to address the release of marine litter into the ocean, including micro- and nanoplastics.

- Invest in research for improved recycling technologies, including full assessment of potential for mechanical recycling of consumer and industrial plastic. This includes undertaking practical trials of recyclability of different plastic materials in practice, in-depth study on possible role of chemical recycling to improve recycling rates for plastic in Malaysia, and explore applicability of advanced technologies for improved sorting and collection of waste, including AI, robotics, and advanced sensors and digital watermarks;

- Invest in development of technologies to detect, measure, and remove substances of concern from plastic. Ecotoxicity tests set out in BSI PAS 9017 standard, together with clear pass/fail criteria included in the standard, can be used as benchmark to measure ecotoxicity;

- In-depth study of bio-based plastic applications to ensure actual end-of-life conditions (i.e., composting) are accounted for when assessing their contribution to reducing plastic waste in the environment;

- Utilise latest developments in Carbonyl Index and molecular weight testing to specify improved tests for microplastics coming from plastic materials;

- Research projects to better identify and define microplastics and nanoplastics for baseline information, tying closely into global research based on established criteria to set up assessment, monitoring and reporting standards. Using data to define clear health and toxicological acceptability criteria with regards to plastic particles for human and ecosystem health; and

- Technologies for recycling of complex plastic waste, e.g., chemical recycling.

FROM SHORT AND MEDIUM-TO-LONG TERM ACTIONS

With reference to the above section, in the short-term (2021-2023), it will be important to undertake research and development to:

- establish the informatics such as marine litter hotspots, and monitoring frameworks for marine litter, including standard methodologies for sampling, laboratory testing and data collection to establish the fluxes and flows of plastic into the marine environment and toxicology of microplastics and additives in the environment emanating from plastic waste;
- define the core set of indicators, from source to sea, across the drivers, pressures, state, impact and response model of intervention (DPSIR) framework to monitor progress on the reduction of marine litter and plastics;
- establish alternative materials, based on a full life-cycle approach, for the most prevalent single use plastic items;
- develop open access certification and traceability schemes for all plastic and clear labelling schemes that are linked to them for consumer use;
- raise awareness of the issue of marine plastic pollution and promote behavioural change towards those that reduce mismanagement of plastic waste; and
- utilise latest global standards to ensure robustness of any approaches taken.

In the medium-to-longer term (2024-2030) it will be crucial to undertake research and development on:

- building a global mass balance model and life cycle analysis of the use of plastic across all major sectors, establish the impacts on resource use, and the potential for moving towards reduced plastic waste;
- the health and toxicological criteria and testing needed to establish exposure of humans and marine organisms to microplastics;
- research solutions for technologies to avoid or reduce microplastics in nature across the life-cycle of plastic; and
- eco-design principles with major sectors, with a particular focus on the maritime industries i.e., fisheries, aquaculture, offshore operations, shipping and tourism.

Given the scale and urgency of the marine litter pollution problem, some of the actions will require development, and in-depth consultation before implementation. Others could potentially be introduced straight away, such as new international standards to provide verification and assurance on plastic waste reduction. These could include consideration of the following areas:

- Introduction of the new BSI PAS 9017 standard for the biodegradation of plastic (polyolefins) in the open environment;
- Deployment of biotransformation technology for biodegradation of plastic packaging before it enters the marine environment;
- Rollout of recycling purification technology to maximise recycling yields;
- Update 'ecolabel' system with most recent technologies and standards;
- Ensure strict enforcement on ban of imported plastic waste;
- Bring forward ban of oxo-degradable/oxo-biodegradable technology; and
- Scientific solutions and innovations can be utilised to add value to plastic waste. By deploying these scientific solutions for better waste disposal, there will be a measurable impact on waste flows from source to sea, leading to reduced plastic leakage into the environment.

The Government will work with related stakeholders on the implementation of the national Action Plan *(Table 2)*.

The focus is directed towards the need to improve resource efficiency, promote a comprehensive life-cycle approach to effectively prevent and reduce plastic litter discharge into the ocean. These approaches will focus on land-based sources in particular, and pursue action including environmentally sound waste management, clean-up of marine debris including plastic litter, prevention and reduction of plastic waste generation and littering. The Action Plan promotes deployment of innovative solutions, in cooperation with existing international/regional initiatives and fora as well as cooperation to enhance national capacities.

Further, the monitoring and evaluation framework will define the methodologies to measure progress based on suitable indicators, as well as a further description of responsibilities and required resources towards realising this action plan.

Table 2. The National Marine Litter Action Plan 2021-2030

Pillar I: Policy Adoption and Implementation			
Lead & Supporting Agencies/ Stakeholders	**Lead Agency:** KASA **Key Partners:** KPKT, MAFI, MOT, MOTAC, EPU, MARDEP, DOF, DOE, JPSPN MIMA, State Governments, Local authorities		
National Actions	**National Actions**		
	Short-Term (2021 – 2023)	**Medium-Term (2024 – 2027)**	**Long-Term (2028-2030)**
A Promote national policy dialogues on prevention and reduction of marine litter from land and sea-based activities by highlighting the issue, sharing information and knowledge, and strengthening national and regional coordination.	**By 2021:** Acquire, understand, and adopt regional/ global policy perspectives on addressing marine litter pollution e.g., RAPMALI, GPML, Bangkok Declaration, ASEAN Regional Action Plan for Combatting Marine Debris. **By 2021:** Establish a National Marine Litter Monitoring Expert Group to streamline and socialise regional/ global findings with national stakeholders and actions. **By 2022:** Establish a dedicated inter-agency working group to streamline implementation of national actions on addressing marine litter, including key activities from biennial workplan from RAP-MALI and translating it on the ground nationally for stakeholders to roll out implementation of key activities to action the source-to-sea framework as a mean to: (a) enhance implementation of reducing marine litter. (b) exchange information on existing national policy instruments to combat marine litter pollution. (c) share the progress updates with COBSEA regional partners. (d) review and analyse best practices of Regional Seas Programmes to combat marine litter. (e) design a national marine litter monitoring programme. (f) improve innovation and processes design. **By 2022:** Review and strengthen the Government Green Procurement Policy to enforce hotels/resorts other related service providers to obtain MyHijau Mark/other green standards. **2021-2023:** Organise webinars, workshops, seminars, forums and other suitable form of discussion mediums to address related issues and challenges.	**By 2024:** Conduct assessment on domestic plastic waste utilisation in the local recycling industry, in both formal and informal sectors. The optimisation of domestically-generated plastic waste utilisation will minimise the need for plastic waste importation. **2024-2025:** Adopt strong monitoring, reporting and enforcement mechanisms to address implementation and compliance issues to address marine litter pollution.	

Pillar I: Policy Adoption and Implementation			
Lead & Supporting Agencies/ Stakeholders	**Lead Agency:** KASA **Key Partners:** KPKT, MAFI, MOT, MOTAC, EPU, MARDEP, DOF, DOE, JPSPN MIMA, State Governments, Local authorities		
National Actions	**National Actions**		
	Short-Term (2021 – 2023)	**Medium-Term (2024 – 2027)**	**Long-Term (2028-2030)**
B Mainstream multi-sectoral policy measures to address marine litter in national and regional development agenda and priorities.	**By 2023:** Enhance actions on: (a) Malaysia's Plastic Sustainability Roadmap 2021-2030, voluntary EPR, buyback programme, deposit refund scheme to be implemented across the board. (b) Initiate the collaboration between MASPA and MAREA to develop and promote product sustainability and circularity criteria to stimulate the market for sustainable products and secondary raw materials while concurrently, addressing the unsustainable use and disposal of single-use plastic products and in ensuring no microplastics or harmful substances are left behind. (c) Ensure full implementation of amendment of Annex II on Basel Convention which lists two categories of wastes requiring special consideration, namely wastes collected from households and residues arising from incineration of household wastes. (d) Further strengthen SIRIM ECO 001 (2018) eco-labelling criteria on biodegradable and compostable plastic and bioplastic, and/or explore moving towards phasing out other biodegradable polymers that produce microplastics. **By 2022:** Encourage national and local governments to incorporate marine litter issues in their priorities. **By 2022:** Establish a permanent reporting platform/ agenda at the national level to address marine litter pollution. **By 2023:** Phase out bioplastics as they are still deemed as single-use products and are limited in options for composting. The reduction of unnecessary single-use products in packaging and transitioning into a reuse and circular economy is targeted.	**By 2024:** Explore the formation of dedicated working group on new plastics economy and EPR, including for conducting gap analysis to identify best practice, available plastic waste recycling technologies and their requirements on the quality of the plastic waste feedstock. **By 2025:** Promote inter-sectoral initiatives and collaboration to effectively address marine litter through various relevant ASEAN/ regional- led mechanisms. **By 2025:** Develop and implement a robust and progressive strategy to combat marine litter, including establishing comprehensive integrated waste management systems to prevent plastic pollution through circular economy approaches for optimising the utilisation of domestically generated plastic waste in order to prevent water bodies pollution and minimising the importation of plastic waste. **By 2026:** Develop/strengthen upstream and downstream guidelines for mismanaged plastic leakages such as single-use plastic, ALDFG, including other sectors which cut across manufacturing, wholesale and retail, tourism as well as shipping and logistics.	**By 2028:** Ban most common or damaging types of plastic marine litter for example microbeads, fish-egg-sized nurdles.

Pillar I: Policy Adoption and Implementation			
Lead & Supporting Agencies/ Stakeholders	**Lead Agency:** KASA **Key Partners:** KPKT, MAFI, MOT, MOTAC, EPU, MARDEP, DOF, DOE, JPSPN MIMA, State Governments, Local authorities		
National Actions	**National Actions**		
	Short-Term (2021 – 2023)	**Medium-Term (2024 – 2027)**	**Long-Term (2028-2030)**
C Malaysia in close cooperation with ASEAN Member States to implement relevant international laws and agreements related to waste management, including MARPOL, Basel Convention, and UN Environment Assembly resolutions related to Marine Litter and Microplastics.	**By 2023:** Adopt, where possible, international laws and agreements related to waste management into national platforms with guidelines to facilitate successful implementation on the ground. **2021-2023:** Conduct regular dialogues through webinar; and/or through Basel Convention Regional Centre for South-East Asia.	**By 2024:** Improve effectiveness of port reception facilities and treatment in reducing plastic litter. **By 2025:** Review and formulate national legal framework on addressing marine litter pollution. Existing rules and regulations at federal and state level should be further studied to identify gaps and cross sectoral jurisdiction in mitigating marine litter at source including to further assess solid waste management.	
D Implement and conduct a periodic review of the national Action Plan, through integrated source-to-sea policy interventions that are harmonised with ASEAN and other regional and global Framework (GPML, RAPMALI).	**By 2023:** Explore the establishment of a Joint Intergovernmental Agreement on Marine Litter Solution. To avoid complication in implementing the policy and action plan, a joint tri-partite intergovernmental agreement between the Federal government (KASA/ KPKT), State governments and the local governments to be formalised. Considering not all states implement the Solid Waste and Public Cleansing Management Act 2007 (Act 672), the agreement will serve as legal document to ensure active participation and enforcement on the part of local governments, including funding for proper solid waste with a focus on marine litter issues.	**By 2025:** Conduct mid-term review of the National Action Plan 2021-2030 to assess effectiveness, and incorporate emerging developments and measures.	**By 2030:** Review of the National Action Plan 2021-2030 to assess effectiveness, and incorporate emerging developments and measures.

Pillar II: Deployment of Technologies, Innovation and Capacity Building			
Lead & Supporting Agencies/ Stakeholders	**Lead Agency:** KASA **Key Partners:** MOSTI, KPKT, DOF, DOE, JPSPN, Nuklear Malaysia, SIRIM, Standards Malaysia		
National Actions	**National Actions**		
	Short-Term (2021 – 2023)	**Medium-Term (2024 – 2027)**	**Long-Term (2028-2030)**
A Identify and deploy latest technologies and standards to tackle sources of marine pollution.	**By 2023:** Develop specific national standards as a benchmark for: (a) Private sector innovation with clear pass-fail standards criteria to ensure desired outcomes. (b) Land-based biodegradation of plastic to tackle majority of source of marine plastic litter. **By 2024:** Develop dedicated testing for marine-based biodegradation of plastic substitutes. **By 2023:** Explore possibility for Malaysia to adopt suitable international standards for biodegradation of polyolefins in the open environment, which include marine environment.	**By 2024:** Develop criteria for product and material substitutes that incorporate and emphasise potential marine impacts e.g., design products to be benign by design for the ocean. **By 2025:** Develop alternative polymers and advance materials as a potential solution to marine litter pollution, and support the development and transition to safe and sustainable product substitutes. **By 2026:** Explore and adopt latest tracking technologies for sources, pathways (source and non-source points) and impact for evidence-based actions. **By 2026:** Explore safety mandatory standards for controlling adverse impacts of microplastics on the marine ecosystem and human health concerns.	
B Encourage private sector contribution to combating marine litter.	**By 2022:** Engage private sector in capacity building and campaigns where programmes on circular economy, product life-cycle management, sustainable consumption and production and "3R" approaches are being taught and demonstrated in terms of application. **By 2023:** Mainstream private sector support to develop research and innovation such as through project funding, and prioritise EPR and CSR activities on combating marine litter.	**By 2024:** Develop open access traceability schemes for packaging and other forms of solid waste. **By 2026:** Promote private sector investment and innovation to redesign products/ packaging, using credible solutions backed up by international standards, enabling materials to return to nature if they enter the environment.	

Pillar II: Deployment of Technologies, Innovation and Capacity Building			
Lead & Supporting Agencies/ Stakeholders	**Lead Agency:** KASA **Key Partners:** MOSTI, KPKT, DOF, DOE, JPSPN, Nuklear Malaysia, SIRIM, Standards Malaysia		
National Actions	**National Actions**		
	Short-Term (2021 – 2023)	**Medium-Term (2024 – 2027)**	**Long-Term (2028-2030)**
B Encourage private sector contribution to combating marine litter.	**By 2023:** Engage value chain stakeholders to establish enabling mechanisms/ infrastructure to increase waste recovery (e.g., deposit refund scheme, kerb-side collection, reverse vending machine, etc), and increase recycling rates.	**By 2027:** Create an online business network for Malaysian private sector players to access cutting-edge technologies within the region and participate in pilot projects.	
C Access to funding and incentives.	**By 2023:** Explore existing funding mechanism to support research on marine litter priority areas, including from MOSTI besides creating funding mechanisms targeted at commercialisation and industry development either in the form of grants or loans with low interest rates.	**By 2025:** Explore opportunities for e.g., (a) Green Investment Tax Incentives (GITA / GITE). (b) Green Technology Financing Scheme (GTFS). (c) Other related funding.	
D Enhance scientific knowledge, transfer marine technology and promote innovative solutions to combat marine litter.	**By 2022:** Promote cooperation and partnership across research institutions to collect and exchange data and information and develop collaboration on combating marine litter including through national and international events/meetings, exchange visits. **By 2023:** Support research and sharing of scientific knowledge, technology and innovation development, including by engaging research institutions, public and private sectors, international partners, and other relevant stakeholders. **By 2023:** Enhance research/study on marine litter, including plastic and microplastics.	**By 2024:** Provide support for research on non-combustion treatment/ destruction of contaminated/ unrecyclable plastics. **By 2024:** Explore the possible development of a network for sharing marine litter data and information via a National Inventory for Marine Litter Monitoring Efforts and Data Collection Hub. **By 2026:** Promote efforts to identify and replicate innovative solutions implemented by cities for combating marine litter.	

Pillar II: Deployment of Technologies, Innovation and Capacity Building			
Lead & Supporting Agencies/ Stakeholders	**Lead Agency:** KASA **Key Partners:** MOSTI, KPKT, DOF, DOE, JPSPN, Nuklear Malaysia, SIRIM, Standards Malaysia		
National Actions	**National Actions**		
	Short-Term (2021 – 2023)	**Medium-Term (2024 – 2027)**	**Long-Term (2028-2030)**
E Promote integration and application of scientific knowledge to enhance science-based decisions and policies on marine litter prevention and management.	**By 2022:** Promote science-policy interface in order to enhance interaction between scientist and policy-makers, and accessibility to scientific information. **By 2022:** Appraise the effectiveness of national recycling programme, as well as industrial and solid waste management. **By 2023:** Disseminate scientific knowledge through various communication channels such as peer-review publication, conferences/ meetings and mass media. **By 2023:** Leverage on existing platform such as the Intergovernmental Oceanographic Commission of UNESCO (IOC).	**2024-2027:** Encourage participation of Malaysian scientists in policy making process, when appropriate, in order to provide evidence-based inputs to the policy. **By 2025:** Encourage scientists to incorporate multiple points of view, especially from policymakers, into study design, delivery and communication. **By 2025:** Cooperate with other countries to develop technology and innovation to tackle source-to-sea plastic pollution focusing on remote-islands requirement.	

Pillar III: Improve Monitoring and Data Collection on Marine Litter			
Lead & Supporting Agencies/ Stakeholders	**Lead Agency:** KASA **Key Partners:** KPKT, DOF, DOE, JPSPN, MIMA, Department of Chemistry, Statistics Department Local Municipalities, Academia, NGOs		
National Actions	**National Actions**		
	Short-Term (2021 – 2023)	**Medium-Term (2024 – 2027)**	**Long-Term (2028-2030)**
A Compile a national baseline on status and impacts of marine litter in Malaysia.	**By 2022:** Review and analyse material flow data and impacts of marine litter in Malaysia to develop a national baseline report. **By 2022:** Assess information and data gaps, and identify possible interventions to bridge the gaps. **2021-2023:** Benchmark with regional and international experts as well as keep abreast with developments on the above identified areas. **By 2022:** Establish a national marine litter inventory and national plastic recycling rate. **By 2022:** Assess national marine litter hotspots.	**By 2024:** Update digital and hardcopy data entry reporting for: (a) voluntary national actions addressing land-based sources of marine litter. (b) voluntary national actions addressing sea-based sources of marine litter. (c) voluntary national actions addressing education and outreach on marine litter. **By 2024:** Conduct inventory of plastic waste generation, export and import, as well as related issues. **By 2025:** Establish a centralised integrated national database to monitor marine litter pollution. **By 2023 onwards:** Display information on publicly accessible platform and update regularly to provide public with latest information on scale of marine plastic pollution.	

Pillar III: Improve Monitoring and Data Collection on Marine Litter			
Lead & Supporting Agencies/ Stakeholders	**Lead Agency:** KASA **Key Partners:** KPKT, DOF, DOE, JPSPN, MIMA, Department of Chemistry, Statistics Department Local Municipalities, Academia, NGOs		
National Actions	**National Actions**		
	Short-Term (2021 – 2023)	**Medium-Term (2024 – 2027)**	**Long-Term (2028-2030)**
B Strengthen national and local capacities to harmonise monitoring and assessment tools for marine litter data including national action plans/initiatives implementation.	**2021-2023:** Provide capacity building through trainings on the tools for Malaysian key stakeholders with support from national, regional and international experts. **2021-2022:** Conduct Training of Trainers (ToT) programme on COBSEA's Regional Guidance on Harmonised Monitoring and hotspot assessments in collaboration with international experts in line with GESAMP.	**By 2024:** Explore standardisation of methods for the measurement and monitoring of marine litter, based on existing/established protocols with regional and international monitoring framework.	**By 2028:** Move towards digitalisation of marine litter monitoring data through crowdsourcing.
C Promote platforms for knowledge sharing, innovative solutions and best practices to combat marine litter.	**2022-2023:** Organise expert exchange platforms and/or study-trip programmes at schools and tertiary institutions. **By 2023:** Establish an information platform for youths to exchange information and share innovative solution and best practices. **2021-2023:** Work with international donors e.g., MOOC on Marine Litter on offering free courses yearly on nature-based solutions, closing the loop, EPR toolbox, circular economy and the 2030 agenda etc. Efforts could be focused on translating them into other languages to reach the masses.	**By 2025:** Explore delivering virtual reality and AI interactive modules for teachers and students.	

Pillar IV: CEPA (Communication, Education & Public Awareness) and Outreach			
Lead & Supporting Agencies/ Stakeholders	**Lead Agency:** KASA **Key Partners:** MOHE, KKMM, DOF, DOE, KPDNHEP, State Government, Local Municipalities, Academia, Associations, Fishing Industry, NGOs		
National Actions	**National Actions**		
	Short-Term (2021 – 2023)	**Medium-Term (2024 – 2027)**	**Long-Term (2028-2030)**
A Promote collaborative actions with private sector and industry associations to implement measures to address marine litter issues.	**By 2023:** Strengthen support from the private sector to implement measures and mainstreaming efforts in addressing marine litter issues nationwide via parallel efforts of Corporate Social Responsibility (CSR); Environmental, Social and Governance (ESG); with Extended Producer Responsibility (EPR); and implementation of the Polluters-Pay-Principle (PPP) especially focusing on the islands and marine areas. **By 2022:** Encourage private sector actors to share best practices in addressing marine litter. **By 2023:** Introduce clear labelling systems for material recyclability and biodegradability to ensure consistent consumer understanding. **By 2023:** MAREA and MaSPA to coordinate effective CEPA. **By 2023:** Collection Points / Drop off Centers / Buy back scheme / Reverse Vending must be multiplied to the convenient stores in Malaysia and this need to be communicated widely.	**By 2025:** Develop one-stop marine litter action online platform. e.g., UK's SME Climate Hub: https://smeclimatehub.org/ **2024-2026:** Collaborate with mass media (national and private) and engage media agencies to create engaging content on marine litter issues for the public. **By 2025:** Explore/Encourage mandatory segregation at source in workplaces (offices and factories) with voluntary reporting guidelines in collaboration with relevant Ministries.	

Pillar IV: CEPA (Communication, Education & Public Awareness) and Outreach			
Lead & Supporting Agencies/ Stakeholders	**Lead Agency:** KASA **Key Partners:** MOHE, KKMM, DOF, DOE, KPDNHEP, State Government, Local Municipalities, Academia, Associations, Fishing Industry, NGOs		
National Actions	**National Actions**		
	Short-Term (2021 – 2023)	**Medium-Term (2024 – 2027)**	**Long-Term (2028-2030)**
B Accelerate citizen advocacy strategy/ programme to combat marine litter through behavioural insights approach.	**By 2022:** Develop communication plan to promote public awareness and behaviour change. **By 2023:** Adapt and apply best practices and campaigns (e.g., Friends of Environment under the DOE) towards successful behavioural change. **By 2023:** Incorporate marine litter education and activities in schools. **By 2023:** Engage colleges and universities to formalise marine litter awareness co-curricular programmes.	**By 2024:** Explore/ Encourage mandatory segregation at source in schools, colleges, universities, boarding schools, university dorms, etc. with voluntary reporting guidelines. **By 2025:** Share alternative solutions and practices to prevent and reduce land- and sea-based litter. **By 2025:** Integrate scientific finding on status and impacts of marine litter in advocacy strategy/ programme. **By 2025:** Engage multi-stakeholders including youth, environmentalists, celebrities, influencers as well as public and private sectors, and government agencies in advocacy programmes and outreach activities on combating marine litter. **By 2026:** Adapt and apply experiential and action learning. For instance, school teachers can be engaged for a TOTs (train-our trainers) as they could play a role in marine litter education at schools/ incorporation into the school curriculum.	

Pillar IV: CEPA (Communication, Education & Public Awareness) and Outreach			
Lead & Supporting Agencies/ Stakeholders	**Lead Agency:** KASA **Key Partners:** MOHE, KKMM, DOF, DOE, KPDNHEP, State Government, Local Municipalities, Academia, Associations, Fishing Industry, NGOs		
National Actions	**National Actions**		
	Short-Term (2021 – 2023)	**Medium-Term (2024 – 2027)**	**Long-Term (2028-2030)**
C Promote public awareness on status and impacts of marine litter and microplastics.	**By 2023:** Develop communication materials on status and impacts of marine litter by incorporating science-based information. **By 2023:** Disseminate the information/ materials to general public via advance communication platforms, mass media and public events. **By 2023:** Create citizen science programmes for youths and fisher communities to provide them a learning platform to work with scientists.	**By 2025:** Create incentive and reward programmes with businesses such as retailers and F&Bs in Malaysia to encourage the public to take part in combatting marine pollution in exchange for attractive returns at their business premises. **By 2024:** Scale and sustain current social media channels like #cleanseasmalaysia and other related platforms. **2024-2027:** Incorporate marine litter education and activities in schools, including related elements (i.e., impacts of mismanagement of waste that is causing marine litter, impact of marine litter and microplastics, beach cleaning activity, littering, recycling, circular economy) into the text books/ co-curricular activities.	

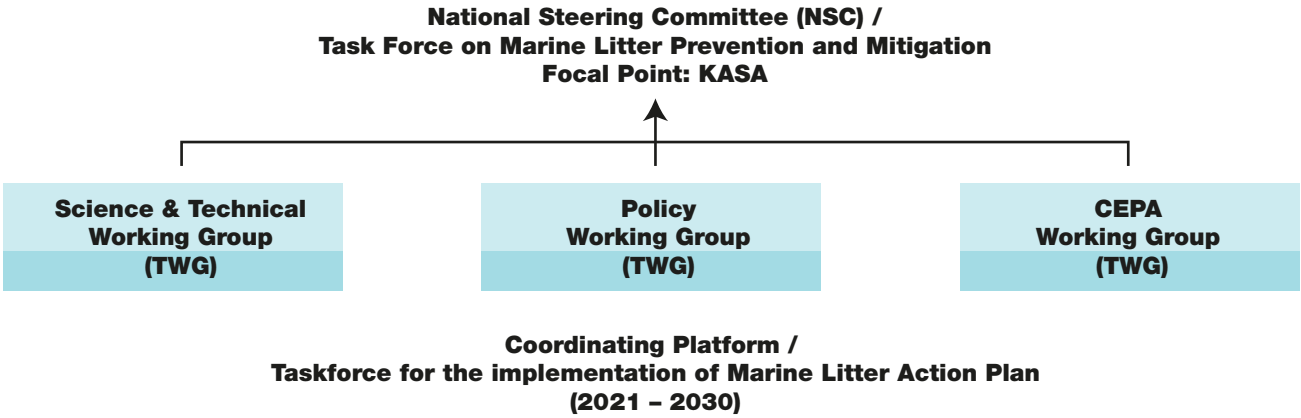
Pillar V: Adopting whole-of-nation and multi-stakeholders approach in harmonising cross-cutting objectives			
Lead & Supporting Agencies/ Stakeholders	**Lead Agency:** KASA **Key Partners:** KPKT, KPWKM, DOF, DOE, JPSPN, State Governments, Local Councils		
National Actions	**National Actions**		
	Short-Term (2021 – 2023)	**Medium-Term (2024 – 2027)**	**Long-Term (2028-2030)**
A Strengthening cooperation with the informal sector and establishing Public-Private Partnerships.	**By 2023:** Implement pilot projects (island and inland) to tackle marine litter problems collectively, and through better understanding of the source-to-sea interactions. **2022-2023:** Stimulate knowledge, leadership and skills to deal with the problem at all levels to raise global awareness and increase action and interaction between all stakeholders, including the coastal communities and sea gypsies (in the case of Sabah, Malaysia). **By 2023:** Establish dedicated recycling facility that will process and recycle plastic resins. These facilities must be enabled to buy this material with help from EPR monies. **By 2023:** Encourage involvement of the women entrepreneurs and SMEs in supporting the usage of green packaging/ recyclable products or practicing green business by providing non-financial incentives and recognitions. **By 2023:** Empower the vulnerable groups (indigenous, OKU, elderly) to combat marine litter by providing them basic infrastructures and training to manage waste sustainably.	**By 2024:** Create a task force that works with city councils, local authorities, and recyclers to explore different ways in integrating, organising, and training informal workers to increase social acceptance of their role in the waste management system. **By 2024:** Create Plastic-Free Islands, targeting the marine parks and other tourist-islands in Malaysia e.g., IUCN Plastic Waste Free Islands (PWFI). Limiting plastic use on these islands can be carried out through the following: (a) Prevention of single-use plastics (SUPs) to be brought onto the islands. (b) Prevention of use of microbeads-based products on the island (in shower gels and face scrubs). (c) Allow only reusable water bottles at hotels. (d) Recycling of fishing nets. (e) Promotion of reusable fish packaging. (f) Promotion of Reusable food containers. (g) Use of non-food dispensing system for hotels. (h) Turning waste to products.	

Pillar V: Adopting whole-of-nation and multi-stakeholders approach in harmonising cross-cutting objectives			
Lead & Supporting Agencies/ Stakeholders	**Lead Agency:** KASA **Key Partners:** KPKT, KPWKM, DOF, DOE, JPSPN, State Governments, Local Councils		
National Actions	**National Actions**		
	Short-Term (2021 – 2023)	**Medium-Term (2024 – 2027)**	**Long-Term (2028-2030)**
A Strengthening cooperation with the informal sector and establishing Public-Private Partnerships.		**By 2025:** Federal and local government to establish informal sector networks where they become regular partners of municipalities, city councils and private enterprises' pilot projects through streamlined registration processes.	
B Inclusiveness, human-rights and gender equality are to be assured in advancing the rights for indigenous people and disadvantaged groups.	**By 2023:** Collect gender-disaggregated data to identify women/men role, needs and challenges faced along the plastic value chain, including the policy environment and implications for the protection of their rights, including assessing culturally appropriate modalities to engage men and women.	**By 2024:** Integrate gender indicators and targets into projects and monitoring and evaluation plans; design and promote policies, action plans and interventions that invest in solutions for women and girls to create a level playing field, e.g., access to finance and technology. **2024-2025:** Build women's capacity to participate equitably and meaningfully in decision-making, interventions, consultations and awareness raising campaigns as agents of change; institutionalise multi-stakeholder cross-ministerial dialogues involving women's organisations. **By 2025:** Create visibility for women's needs, interests and contributions, raise awareness of gender importance, build capacities to strengthen accountability mechanisms.	

FRAMEWORK FOR THE IMPLEMENTATION OF NATIONAL ACTIONS ON MARINE LITTER PREVENTION AND MITIGATION

The NMLPAP 2021-2030 is a call for all stakeholders to work together towards addressing marine litter issue in Malaysia. There is a need to engage the various levels of key players and stakeholders in their respective roles and functions to participate in the implementation and monitoring of the Action Plan.

While the government is in the leading role in delivering the Action Plan, it would only be effective and achievable in presence of a wider partnership established amongst the civil society, private sector and local communities, academia as well as the society at large.



Specific components within ensuring the successful implementation of the Action Plan include:

- Rapid response group to rollout best practice immediately as new technology and techniques are developed.
- Communicating function to ensure public messages are properly distilled.
- Progress monitoring and reviewing efficacy of actions.
- Maintaining oversight of roles and responsibilities of key stakeholders.

ROADMAP

2021-2023 SHORT TERM	2024-2027 MEDIUM TERM	2028-2030 LONG TERM
Establish National Marine Litter Monitoring Expert Group.	Establish National legal framework on addressing marine litter.	Move towards digitalisation of marine litter monitoring data through crowdsourcing.
Establish dedicated inter-agencies working group to streamline implementation of national actions.	Explore and adopt latest tracking technologies for sources, pathways, and impact for evidence-based actions.	Review the National Marine Litter Action Plan 2021-2030 to assess effectiveness, and incorporate emerging developments and measures.
Mainstream multi-sectoral policy measures.	Adopt comprehensive integrated waste management systems to prevent plastic pollution through circular economy approaches.	
Develop national standards for private sector innovation, and explore suitable international standards for biodegradation of polyolefins in the open environment.	Develop/strengthen upstream and downstream policies for mismanaged plastic leakages such as single-use plastic, ghost nets and abandoned fishing gears, including other sectors which cut across manufacturing, wholesale and retail, tourism, shipping and logistics.	
Promote research and sharing of scientific knowledge, technology and innovation.	Standardisation of methods for measurement and monitoring of marine litter, in comparison to existing/established protocols in line with regional and international monitoring framework.	
Promote science-policy interface in order to enhance interaction between scientists and policy-makers, and accessibility to scientific information.	Mainstream private sector support to develop research and innovation to tackle the issue.	
Establish national marine litter inventory and national plastic recycling rate.	Mid-term review of the National Marine Litter Action Plan 2021-2030 to track implementation and progress.	
Identify national marine litter hotspots.		
Implement pilot projects (island and inland) to tackle marine litter, through better understanding of the source-to-sea interactions.		

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