REPUBLIC OF KENYA
MINISTRY OF ENVIRONMENT
AND FORESTRY

nema

National Marine Litter Management Action Plan

2021 - 2030

Foreword

Kenya has complex and diverse coastal and marine ecosystems which play important ecological functions, ensure food and nutrition security, livelihood enhancement and recreation valued at over USD 4.4 billion annually. The coastal and marine ecosystems continue to face huge pressure from natural and human activities such as climate change, resource overexploitation, habitat destruction and pollution. Marine litter pollution compounds the existing pressures with adverse implications on the integrity of the coastal and marine ecosystems. This realization has ignited global, regional and national impetus to reverse the build-up of marine litter.

Kenya has committed herself to multilateral instruments such as the London Convention 1972, UNCLOS of 1989, MARPOL of 1994, Nairobi Convention of 1985 and Basel Convention 1989 which in addition to the Kenya Constitution 2010, complement to guarantee all Kenyans a clean and safe environment. As part of the global community, Kenya shares in the growing international concern of marine litter and is responsive to the calls by the UNEP-Regional Sea Program, the United Nations Environment Assembly, and regional endeavours to address this scourge.

The development of this action plan is a reflection of the Kenyan government's resolve to take a steadfast journey culminating in the realization of the Kenya Vision 2030 of becoming a middle developing country in a clean environment. Kenya has made tremendous steps that have seen a total ban on plastic carrier bags and single-use plastics in protected areas. In addition, Kenya is developing this Action Plan to lay a roadmap for addressing the marine litter problem in Kenya's marine and coastal environment. It leverages on strong institutional capacity and partnerships to build synergies for driving strategic actions on product innovation, knowledge sharing, market-based mechanisms and life cycle approaches to reverse business as usual scenarios.

Over the next 10 years (2021-2030), the action plan will further the implementation of the national strategy for the general management of solid waste. This will be achieved by preventing and reduction of litter at the source, improving litter monitoring, enhancing awareness and information sharing and continuous removal of litter from the marine environment.

This Action Plan is both a fulfilment and an enabler towards the achievement of the national strategies goals and sectorial policies targeting the environment and natural resources. It is anchored on scientific evidence, multi-stakeholder and participatory approaches as catalysts for preventing and reducing marine litter along the Kenyan coast to realize the potential of blue economy and protection of the marine environment.

DR. CHRIS K. KIPTOO
PERMANENT SECRETARY,
MINISTRY OF ENVIRONMENT AND FORESTRY

Acknowledgments

This first National Marine Litter Management Action Plan (NMLMAP) is part of an initiative conducted by NEMA to reduce marine litter pollution.

NEMA wishes to acknowledge the financial support from the government of the Republic of Kenya for the preparation of the Kenya NMLMAP. The development of this Action plan was made possible through stakeholders' consultation and participation. NEMA particularly wishes to acknowledge the contribution of stakeholders from the following institutions: Coast Development Authority (CDA), Kenya Coast Guard Service (KCGS), Kenya Fisheries Service (KeFS), Kenya Forest Service (KFS), Kenya Wildlife Service (KWS), Kenya Marine and Fisheries Research Institute (KMFRI), Kenya Maritime Authority (KMA), Kenya Ports Authority (KPA), National Environment Management Authority (NEMA), Water Resources Authority (WRA), County Government of Taita Taveta, County Government of Kilifi, County Government of Tana River, Pwani University, International Union for Conservation of Nature (IUCN), World Wide Fund for Nature (WWF), United Nations Environment Programme (UNEP), United Nations Human Settlements Programme (UN-Habitat), The University of Nairobi (UON), Technical University of Mombasa (TUM), Centre for Environmental Justice and Development (CEJAD), Coastal and Marine Resource Development (COMRED), Coastal Oceans Research and Development-Indian Ocean (CORDIO), Eco-Ethics Kenya, The Maritime Technology Cooperation Centre for Africa (MTCC Africa), Nature Kenya, Kenya Association of Manufacturers (KAM), Ocean Conservancy, Kenya Conservation of Aquatic Resources (KCAR), Kenya PET Recycling Company Limited (PETCO), Kwale Plastic Plus Collectors (KPPC), Kenya Private Sector Alliance (KEPSA), Tana Delta Environmental Conservation (TADECO), Eco World and Jil Industries.
Special thanks are extended to Mr. Steve Trott representing Eco World, Susan Scull-Carvalho representing KPPC and Mr. Dipesh Pabari representing Flipflopi expedition for allowing their initiatives to be used as case studies in this Action Plan.

NMLMAP was developed by a team of scientists from Kenya Marine and Fisheries Research Institute (KMFRI) including Dr. Okuku Eric, Mr. Kenneth Otieno, Ms. Brenda Gwada, Mr. Gilbert Owato, Ms. Maureen Kombo, Ms. Mary Chiphatsi and Ms. Purity Chepkemboi. Oversight and overall coordination of NMLMAP were provided by Mr. Stephen Katua, Mr. Dan Ashitiva, Ms Mercy Amai and the ICZM Steering Committee members.

MAMO B. MAMO
DIRECTOR GENERAL,
NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY

List of Acronyms

BMUs	Beach Management Units
CBOs	Community-Based Organizations
CDA	Coast Development Authority
CG	County Government
CoG	Council of Governors
CS	Civil Society
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Co-ordination Act
FAO	Food and Agriculture Organization
GEF	Global Environment Facility
GPA	Global Programme of Action for the Protection of the Marine Environment from Land-based Activities
ICC	International Coastal Clean-up
ICZM	Integrated Coastal Zone Management
IMO	International Maritime Organization
IOC	Intergovernmental Oceanographic Commission
KAM	Kenya Association of Manufacturers
KATO	Kenya Association of Tour Operators
KAWR	Kenya Association of Waste Recyclers
KCGS	Kenya Coast Guard Service
KEPSA	Kenya Private Sector Alliance
KeFS	Kenya Fisheries Service
KFS	Kenya Forest Service
KFS	Kenya Ferry Services
KIRDI	Kenya Industrial Research and Development Institute
KMA	Kenya Maritime Authority
KMFRI	Kenya Marine and Fisheries Research Institute
KPA	Kenya Ports Authority
KWS	Kenya Wildlife Service
MARPOL	International Convention for the Prevention of Pollution from Ships
MEAs	Multilateral Environmental Agreements
MoE&F	
MoL&PP	Ministry of Environment and Forestry Ministry of Lands and Physical Planning
MoH	Ministry of Health
MT	Metric Tonnes
NEM	North East Monsoon
NEMA	National Environmental Management Authority
NGOs	Non-government Organizations
NPS	National Police Service
NTSA	National Transport and Safety Authority
SEM	South East Monsoon
SMEs	Small and Medium Enterprises
SWM	Solid Waste Management
UN	United Nation
UNEP	United Nations Environment Programme
WIO	Western Indian Ocean
WIO- LaB	Western Indian Ocean Land Based Activities Project
WIO-RAPMaLi	Western Indian Ocean Regional Action Plan on Marine Litter
USD	United States Dollar

Executive summary

Marine ecosystems are estimated to contribute USD 2.5 trillion to the global economy. The Western Indian Ocean (WIO) region is valued at USD 333.8 billion with Kenya's share being more than USD 4.4 billion. However, marine ecosystems are globally under pressure from various triggers, amongst them, coastal pollution particularly marine litter pollution leading to losses of up to USD 940 billion from the tourism revenue and decline in fisheries. In the WIO region, UNEP-GEF WIO-LaB Project and WIO Trans-boundary Diagnostic Analysis identified marine litter among the main pollutants requiring urgent action. The United Nations General Assembly and the UNEP Regional Seas Programme have also highlighted marine litter as a priority pollution source category requiring urgent action. In 2018, the Nairobi Convention developed a regional Western Indian Ocean Regional Action Plan on Marine Litter (WIO-RAPMaLi) in response to Decision CP7/2 to implement the Global Programme of Action (GPA) which recommended several actions including the development and implementation of a model national management plan for marine litter. Following the recommendations of the Nairobi Convention and the ICZM action plan (2019-2023), NEMA has prepared the first National Marine Litter Management Action Plan (NMLMAP) for Kenya.

NMLMAP is designed as a flexible tool that guides stakeholders and provides a framework for cooperation to combat marine litter. It contains a set of actions requiring the collective involvement of various stakeholders and allows them to identify measures and actions already being implemented and consider others needed to further combat marine litter. The development of NMLMAP is guided by 8 core principles which include: precautionary principle, the polluter pays principle, integration, the prevention principle, the ecosystem approach, public participation and stakeholder involvement, sustainable consumption and production and the best available knowledge and socioeconomic effectiveness.

NMLMAP is presented in seven chapters. Chapter 1 provides the general introduction of marine litter and provides the objectives, justification of the action plan and presents the plan's conceptual framework. Chapter 2 provides a general overview of marine litter, types, categories, sources and pathways and impacts. It also highlights the status of marine litter in Kenya by presenting findings of studies for macro-litter (beach, floating and benthic), meso-litter on beaches and micro-litter in the water column, sediments and biota. Chapter 3 provides a comprehensive review of SWM in Kenya and summarizes the main challenges experienced in the management of waste from land and sea-based sources. Chapter 4 provides key findings of policy, institutional and regulatory framework reviews and their adequacy in addressing ML pollution.

Chapter 5 proposes actions that are aimed at promoting waste prevention, reduction, sustainable management and circular economy, enhanced research, awareness and data dissemination. The proposed actions are categorized into 4 thematic areas: A) prevention and reduction of litter from land-based sources, B) prevention and reduction of litter from sea-based sources, C) prevention and reduction of transboundary waste and D) activities to support the implementation of the plan. The actions are further divided into 12 strategic objectives i.e. 1) promote prevention and reduction of litter from land-based sources, 2) promote sustainable waste management from land-based sources, 3) promote effective wastewater treatment and storm water management, 4) integrate and promote circular economy in solid waste management, 5) promote prevention and reduction of litter from sea-based sources, 6) promote sustainable waste management of litter from sea-based sources, 7) promote prevention and reduction of transboundary waste, 8) support litter

removal activities, 9) promote education and awareness on marine litter management, 10) strengthen the engagement of stakeholders in marine litter management, 11) strengthen research and monitoring programmes, and 12) encourage data and information sharing. The specific actions are summarized in Chapter 6 in the implementation matrix that also provides expected outputs, key indicators, implementing institutions, timeframes and associated budget. Chapter 7 provides a summary of how NMLMAP will be implemented. It further details resource mobilization strategies, reporting, monitoring and evaluation and timelines for review.

It is expected that successful implementation of the NMLMAP will contribute to the achievement of SDG 6 (target 6.3) on reduction of pollution by reducing untreated wastewater, municipal and waste management which contain micro-plastics, SDG 12 (target 12.4) on the management of chemicals and all waste throughout their life cycle and SDG 14 (target 14.1) on reduction of marine pollution, such as plastic floating debris from land-based activities.

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CHAPTER 1: INTRODUCTION

Kenya has complex and diverse coastal and marine ecosystems consisting of coral reefs, seagrass beds and mangroves. These ecosystems play an important role in ensuring food and nutrition security, livelihood enhancement, recreation and supporting both Counties and National economies. In addition, they provide ecosystem services such as carbon sequestration, nutrient cycling, climate regulation, shoreline protection, and habitats for economically viable fauna.

The global annual value of marine ecosystems is estimated at USD 2.5 trillion, making it the world's seventh-largest economy (GEF, 2018). The Western Indian Ocean (WIO) region's annual economic value of goods and services is valued at USD 333.8 billion with Kenya's share being slightly over USD 4.4 billion (UNDP, 2018). Despite the importance of marine ecosystems, they are under immense pressure from natural and human activities such as climate change, resource overexploitation, habitat destruction and coastal pollution including marine litter pollution (Santos and Shaw, 2019). Jointly these pressures result in an annual loss of USD 350-940 billion globally stemming from loss of tourism revenue, decline in fisheries and other impacts (GEF, 2018).

Litter disposal and accumulation in the marine environment is one of the rising global threats to the health of the oceans. The UNEP-GEF WIO-LaB Project identified marine litter among the main pollution issues in the WIO region whereas the WIO Trans-boundary Diagnostic Analysis identified marine litter as a serious threat that requires an urgent remedy. Despite the global efforts to address marine litter pollution, there are indications that the problem is worsening.

1.1 Justification for the plan

Taking into account the rising global concern about marine debris, the United Nations General Assembly and the UNEP Regional Seas Programme highlighted marine litter as a priority pollution source category to be urgently addressed. They developed "Guidelines for the Development and Implementation of Regional Strategies for Addressing Marine Litter" at the second Intergovernmental Review Meeting held in Beijing, China on, 16th October 2006. The resolutions of the meeting suggested three phases to be used by each Regional Seas Conventions and action plans to incorporate the marine litter issues including assessment of the international/regional or national situation, preparation of an international, regional or national action plan and integration of the international, regional or national strategy into the programme of work.

The Nairobi Convention developed a regional Western Indian Ocean Regional Action Plan on Marine Litter (WIO-RAPMaLi) in 2018 in response to Decision CP7/2 to implement the Global Programme of Action (GPA) within the context of the Amended Nairobi Convention and the Protocol on land-based sources and activities. With the support of the UNEP, WIO-RAPMaLi proposed several actions including 'Action 2' that proposed the development and implementation of a model national management plan for marine litter. National Environment Management Authority (NEMA), recognizes that the sources of marine litter are diverse and ocean dynamics turn it into a transboundary issue requiring collective global action. In response to the recommendations of the Nairobi Convention and the ICZM action plan (2019-2023), NEMA is preparing the first National Marine Litter Management Action Plan (NMLMAP) for Kenya. The action plan will contribute to the UNEP and GPA Global Partnership on marine litter (a global framework for prevention

and management of marine debris), and the Honolulu Strategy developed at the 5th International Marine Debris Conference. It also addresses SDG goal 6 (target 6.3) on reduction of pollution by reducing untreated wastewater, municipal and waste management which contain microplastics, SDG Goal 12 (target 12.4) on the management of chemicals and all waste throughout their life cycle and SDG goal 14 (target 14.1) on reduction of marine pollution, such as plastic floating debris from land-based activities.

1.2 The objective of the plan

The overall objective of this Action Plan is to improve the status of Kenya's marine and coastal environment by addressing the marine litter problem through cooperation and partnerships. This plan will specifically:

1. Contribute to the implementation of the national strategy for the general management of solid waste.
2. Prevent and reduce marine litter pollution and its impact on the marine environment.
3. Improve monitoring and assessment of marine litter and its impacts for a science-based approach to marine litter pollution management.
4. Enhance knowledge sharing and awareness on marine litter and its impacts.
5. Contribute to the removal of litter from the marine environment where practical and feasible using environmentally sound methods.

1.3 Scope of the action plan

The action plan targets litter discharged from sea-based and land-based sources as well as litter that is already present in the marine environment and applies to territorial waters and Kenya EEZ. The action plan will be implemented for 10 years with a clear time plan attached to it.

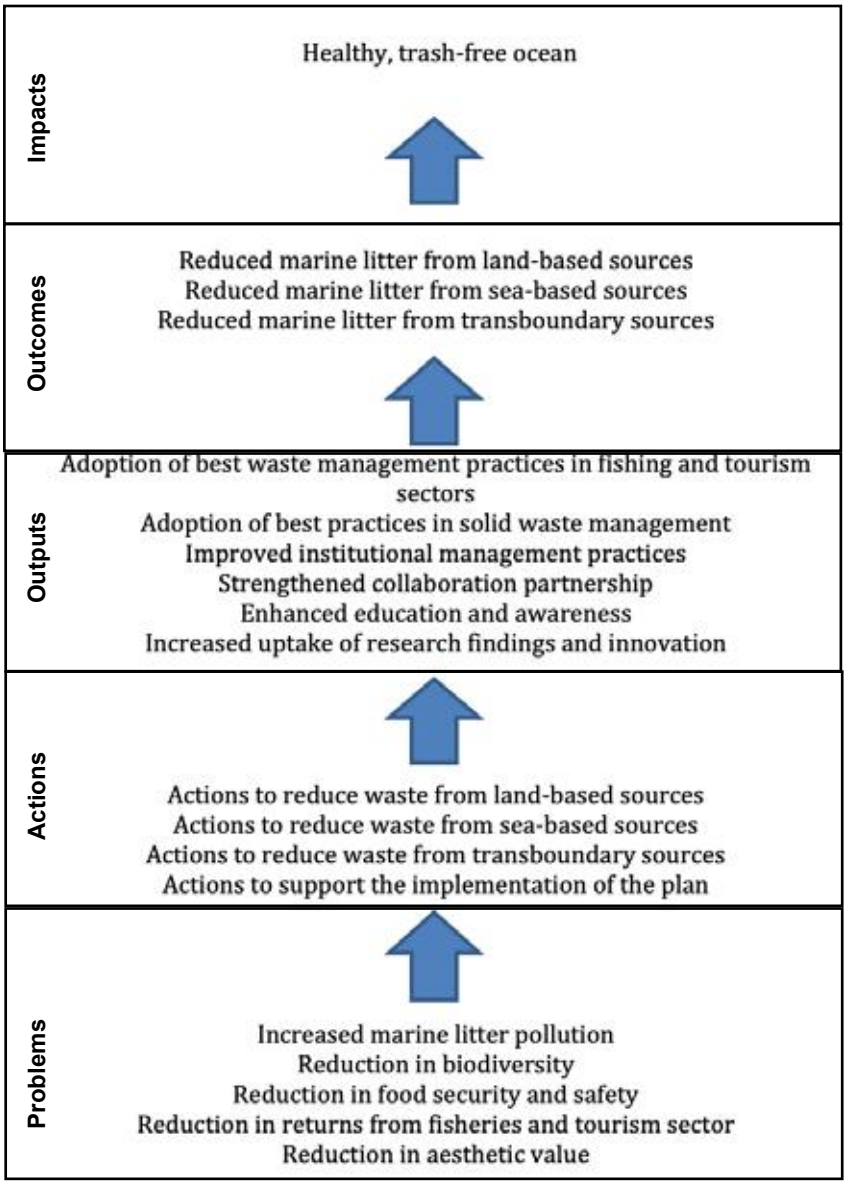
1.4 Guiding principles

1. The precautionary principle: Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation. As such, preventive measures are to be taken when there are reasonable grounds for concern that substances or energy introduced, directly or indirectly, into the marine environment may bring about hazards to human health, harm living resources and marine ecosystems, damage amenities or interfere with other legitimate uses of the sea, even when there is no conclusive evidence of a causal relationship between the inputs and the effects.
2. The polluter pays principle: Adoption of necessary and appropriate legislations and enforcement such that costs of pollution prevention, control and reduction measures are to be borne by the polluter, with due regard to the public interest.
3. Integration: Within and among member countries, where marine litter management shall be an integral part of the solid waste management and other relevant strategies to ensure environmentally sound management of human activities and rational use of resources.
4. The prevention principle: That any marine litter management measure should aim at addressing the prevention of marine litter generation at the source and input into the ocean, removal of existing litter along the beaches and improvement of solid waste management.
5. The ecosystem approach: The comprehensive integrated management of human

activities based on the best available scientific knowledge on the ecosystem and its dynamics, in order to identify and take action on influences that are critical to the health of the marine ecosystems, thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystems.

6. Public participation and stakeholder involvement: Enhancement of public participation and stakeholder involvement, by creating awareness about the problem of marine litter and ensuring a sense of public ownership in order to build support for relevant measures.
7. Sustainable consumption and production: Transforming unsustainable patterns of production and consumption to sustainable ones that decouple human development from environmental degradation, for example, the use of goods and services that respond to basic needs and bring a better quality of life, while minimizing the use of natural resources, toxic materials and emissions of waste and pollutants over the life cycle.
8. Best available knowledge and socio-economic effectiveness: Actions and operational targets should be based on available knowledge of the predominant amounts, materials, items and sources of marine litter found in the Kenyan coastline and take into account the social and economic costs of degradation compared to the cost and benefits of proposed measures.

1.5 Conceptual framework



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CHAPTER 2. BACKGROUND TO MARINE LITTER

Marine litter also known as marine debris has been defined by the United Nations Environment Programme as any persistent, manufactured or processed solid materials which is discarded, disposed of or abandoned in the marine and coastal environment. Marine litter pollution is a multifaceted complex problem with huge implications on marine and coastal ecosystems. It is present on the beaches, ocean surface, suspended in the water column, and at the bottom of the ocean. The density of marine litter varies spatially and is influenced by the characteristics of litter, point of discharge, geomorphology, hydrological and meteorological conditions.

2.1 Sizes and categories of marine litter

Marine litter can degrade and fragment through mechanical abrasion, photo and/or physical degradation into various size classes (GESAMP, 2015; Haseler et al., 2018; Tursi et al., 2018)

1) Mega-litter - large debris (>1000mm)
2) Macro litter- large items (>25mm)
3) Meso litter - Items of size range 5-25 mm
4) Micro litter - Small litter particles (<5mm)

The most encountered marine litter categories in Kenya are plastic, foam, rubber, glass, metal, clothing, paper & cardboard, processed wood, construction materials and ceramics, e-waste, hygiene and marine & fishing gear.

Category	Examples	Category	Examples
Plastic	Plastic bags, drink bottles, straws, lollipop sticks, food wrappers/drink labels, food containers, cups and plates, caps& lids, lighter, ropes, pens, pegs, toothpaste tube 	Marine and Fishing gear	Fishing hook, buoy, fishing line, fishing net, snorkeling gear, life jacket 
Rubber	Rubber boots, gloves, balloons, rubber fragments 	Hygiene	Diapers, condom, tampon, sanitary towel, syringe and needles, earbuds, toothbrush 
Glass	Glass bottle, light bulbs, glass cups, glass fragments 	E-Waste	Phone chargers, Computer/ phone parts, fridge parts, electric cables and appliances 
Cloth	Flip flops, cotton clothing, Shoes, fabric pieces 	Construction and building material	Porcelain tiles, bricks, ceramic, concrete, painted stone 
Metal	Aluminum cans, wire mesh, coins, metal cutlery, aerosol cans, nails, screws 	Foam	Styrofoam, mattress, foam food containers, foam fragments 

Fig 1. Categories of marine litter

The relative proportions of these materials vary spatially with plastic being the most abundant litter type. Plastics play an important role in modern life in the manufacturing industries due to their low densities, easy shaping, durability, low cost, mechanical resistance, resilience and affordability. These desirable attributes have resulted in a significant increase in their global production and the resultant post-consumer waste totalling to about 3.7 billion metric tonnes, a figure that is projected to double by 2025 (Plastics Europe, 2013; Galgani et al., 2019).

The same properties that make plastics useful also make the mismanaged post-consumer plastic waste a significant environmental threat (Ryan et al., 2009). Currently, over 381 million tons of plastic are estimated to be produced annually (Ritchie and Rosser, 2018) and at least 12 million tonnes of plastic end up in the oceans (IUCN, 2020).

2.2 Sources of marine litter and their pathways to the sea

Marine litter originates from sea-based, land-based and transboundary sources which are largely based on the prevailing production and consumption patterns.

Land-based activities contribute to about 80% of all marine litter in the ocean, rivers or on beaches. The major land-based sources of marine litter include wastewater treatment plants, overflow from sewers, recreational activities, illegal dumping from industrial and household waste, and poorly managed waste dumps (Jambeck et al., 2015; Okuku et al., 2020a). Other sources of marine litter include illegal dumping sites close to beaches such as the decommissioned Kibarani dumpsite and littering along streets and beaches. The release of litter from these sources into the marine environment occurs through a variety of pathways including river, storm drains, sewage or winds; deliberate beach littering and directly left ashore via shipping and fishing activities. The sea-based sources of marine litter are mainly from maritime ships, fishing vessels, leisure boats, mariculture, port/shipbuilding and repair, offshore oil and mining platforms and tourism activities waste disposal at sea. Marine litter is transboundary making it everyone's problem and responsibility. It is challenging to precisely determine trans-boundary waste sources and quantifies due to the limited scientific effort that has been put in place.

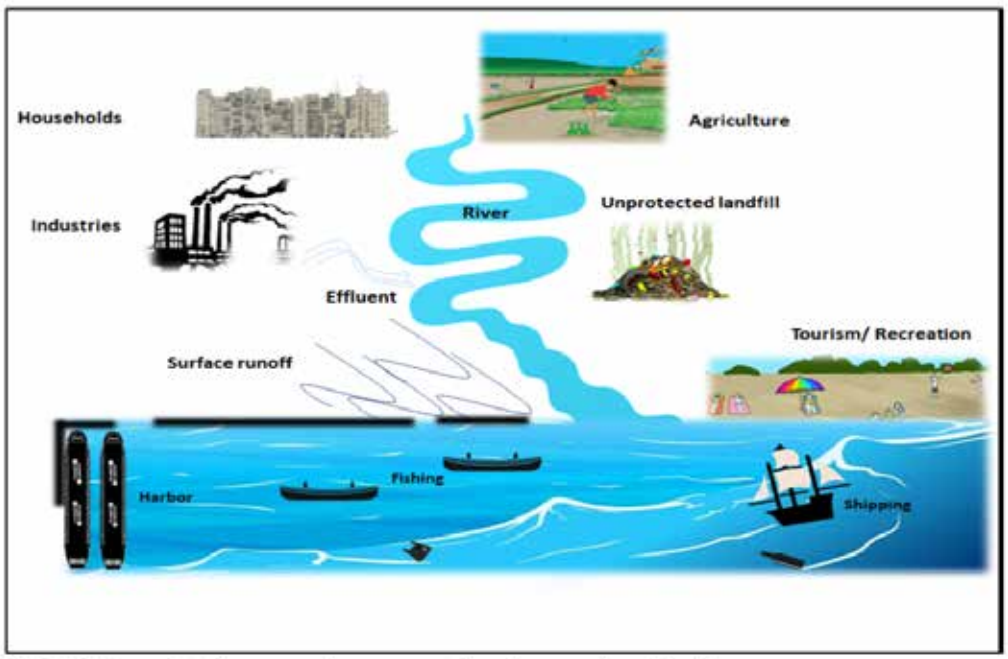
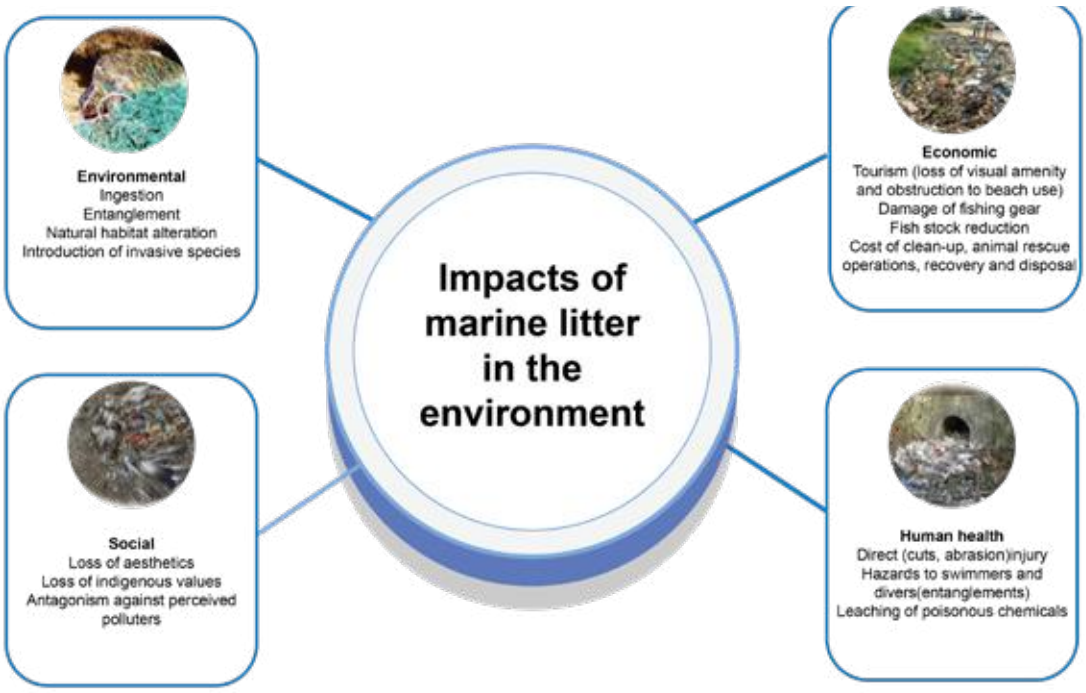


Fig 2. Schematic diagram of sources and pathways of marine litter



2.3 Impacts of marine litter

Marine litter gives rise to a wide range of negative environmental, social, economic and human health impacts. They cause direct or indirect damage to marine ecosystems hindering human activities such as fishing and aquaculture, shipping and tourism and recreational activities.

2.4 Status of marine litter pollution in Kenya

Marine litter is a ubiquitous problem in Kenyan beaches that has just recently attracted scientific attention. The existing body of information on the status of marine litter has documented occurrence on some beaches, benthic environments and those floating on the ocean surface.

2.4.1 Marine macro-litter on Kenyan beaches

It is estimated that 37000 tons of litter leak into the Kenyan marine environment annually (IUCN, 2020) and are harboured in beaches, benthic systems or freely floating on the water column. Beaches in Kenya have up to 5 macro-litter items per square meter, mostly dominated by plastic, foam and rubber at 58%, 15% and 11% respectively. The occurrence of macro-litter varies with the location of the beach and dominant activities. Urban beaches having more litter compared to remote beaches while recreational beaches accumulate up to 24 litter items per square meter of beach daily translating to 12,864,000 items/day for the entire Kenyan coast (Okuku et al., 2020a). The drier section of the beaches has reported to accumulate more litter in comparison to the wet section indicating that the litter is from beach dumping by beach goers.

308,653 litter items weighing 24,156.54 kilograms were collected in 2019 during the annual international coastal clean-up compared to 197,137 items weighing 59,846 kilograms collected in 2020 (ICC 2019, 2020). Of growing concern is the improper disposal of hygiene products such as soiled baby/adult diapers in the Kenyan beaches contributing

about 1% of the total litter collected from beach clean-ups. Miraa and muguka chewing by beach goers is contributing 20 % of food packaging products (FP).

Fig 4. Food packaging material of concern

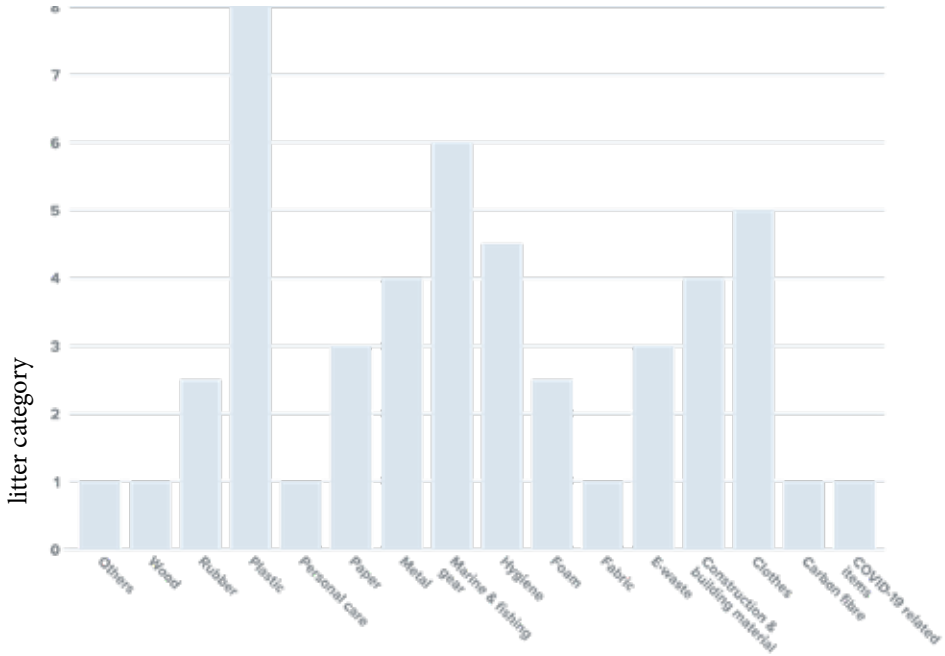


Fig 5. Components of marine litter along the Kenyan coast (Source: Okuku et al., 2021a)

Marine litter collected on the Kenya beaches were mainly of Kenyan origin constituting 88% of the total litter on beaches whereas 12% originated from foreign countries i.e., Tanzania (4.7%), India (1.8%), USA (1.0%), South Africa (0.9%), China (0.7%), Thailand (0.7%), UK (0.4%), Uganda (0.3%) and Egypt (0.2%) (Okuku et al., 2020a). These results indicate that a local Kenyan solution can reduce the amount of marine litter by around 88%. Locally manufactured (PET, HDPE, PP) bottles and other single-use containers of Kenya origin constituted 93% of the total containers and bottles in urban beaches but only contributed 30% in the remotely placed beaches (Ryan 2020). This confirms that marine litter is a cross-border issue and global efforts are required to address it.

Food packaging (FP) is the most abundant litter category with a 91.3% contribution to brandable litter. The other main contributors are Personal Care products (PC) and Household products (HP) with 6.2 and 2.0% contribution respectively. PET (clear or tinted plastic drink bottles) contributed 16% of FP while HDPE, PP, and PVC accounted for 3%, 3%, and 0.6% respectively (Okuku et al., 2020a). Recyclable litter constituted 31.9% of the total beach litter indicating that investment in recycling can reduce the litter on the beaches by 31.9%.

Seasonal changes, particularly monsoons have been identified as factors notably affecting litter composition. Foreign products contribute 35.6% of branded marine litter in Mkomani beach during South East Monsoon (SEM) whereas only 11.7% of foreign products were encountered during North-East Monsoon (NEM). PET packaging dominated during SEM (53.6%) compared to NEM (20.2%) (Okuku et al., 2021b). These findings confirm the contribution of sea-based sources and possibly indicating the contribution of transboundary litter sources to the litter stream on the Kenyan Coast. These monsoon-related results indicate the important contribution of sea-based sources of marine litter.

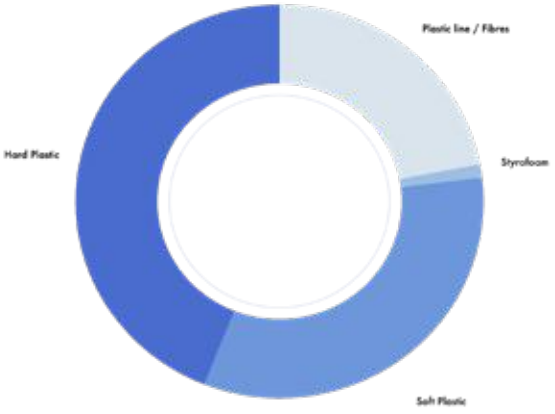


Fig 6. Floating marine litter on Kenyan waters (Source KMFRI, 2020)

2.4.2 Marine litter floating on Kenyan waters

Marine litter on the beaches can be transported to the sea by wind or waves in addition to sea-based litter coming as floating litter. Up to 347,337 litter items are floating in a square kilometer in Kenyan nearshore coastal waters. This litter consists mainly of 40% hard plastic fragments, 36% soft plastic and 24% plastic line/fibres (KMFRI, 2020).

Some of the floating litter absorb water or are fouled by organisms thus enhancing their sinking to the seafloor. A survey by KMFRI in Malindi, Mombasa, Kilifi, Diani and Wasini reported that 81% of the collected benthic litter was plastic. The specific amount and types of litter in each survey were varied depending on location. In Kilifi, the litter was dominated by 90.4% plastics, Nyali in Mombasa had plastics contributing 87.5% of the total litter collected whereas Wasini and Diani had plastic and glass dominating with 53% and 34.3% of the total litter respectively.

Fig 7. Marine litter on the sea floor

Fig 8. Beach meso litter categories

2.4.3 Beach meso litter on Kenyan beaches

Marine macro litter degrades when exposed to physical and chemical degradation to form meso litter. Most visited recreational beaches harbour higher amounts of meso-litter, reaching up to 95 items per square meter. Meso litter on the Kenyan beaches is mostly composed of plastic (55%) and metal fragments (35%) (Okuku et al., 2020b).

Most of this meso-litter resides in the upper section of the beach with vegetated beaches having higher amounts compared to those protected by

seawalls. Beach clean-up targeting meso litter should therefore be concentrated in the upper beach particularly those with vegetation.

2.4.4 Microplastic (MPs) in Kenyan waters and fauna

The concentration of microplastics in Kenyan nearshore water ranged between 110 and 255 items per cubic meter (Kosore et al., 2018). Filaments contributed 79% of surface-water microplastics with particle sizes ranging from 0.25-2.4 mm. Zooplankton mainly Chaetognatha, Copepoda, Amphipoda and fish larvae ingested 51, 36, 24 and 18 particles per individual, respectively. Ingested microplastics were dominated by filaments (97%) sizes between 0.01 and 1.6 mm. Microplastic fibres have also been encountered in crabs (0.65 MPs per gram of wet tissue) and oysters (3.36 MPs per gram of wet tissue) (Awuor et al., 2020).

Monsoons were observed to be one of the factors affecting the distribution of microplastics. The total abundance of MPs during Northeast and Southeast Monsoons ranged from 83 to 8,266 and 126-12,256 MPs m-3 respectively. The highest microplastic abundances was found in Mombasa during SEM, mainly contributed by runoff and effluents discharged to the sea during the heavy rains. Malindi also had a high abundance during SEM due to the input from River Sabaki (KMFRI 2020).

2.4.5 Marine litter in Kenyan Mangroves

Fig 9. Mangrove litter at KMC, Mombasa

Mangroves are unique intertidal habitats in terms of structural complexity which make them prime coastal habitats for trapping marine debris with their pneumatophores or prop roots. Mangroves provide ecosystem services ranging from carbon sequestration, biodiversity reservoirs, shoreline & habitat protection and important socioeconomic and cultural benefits to local communities (Luo et al., 2020). Marine litter may smother and dislodge the propagules, thereby affecting the natural regeneration of the mangrove forests. Some marine plastic litter may also contain harmful chemicals that may be released to the environment (Martin et al., 2019).

Ongoing studies being conducted in mangrove forests along the Kenyan coast by KMFRI suggest that ocean-based activities significantly affect the density of anthropogenic debris. Plastic ropes and nets commonly used by small-scale fishermen were the major litter categories found.

Additionally, litter was more abundant in dense mangrove forests and litter distribution depended on the mangrove morphology i.e., mangroves with pneumatophores retained more litter compared to mangroves with prop roots.

2.4.6 Marine litter in Sabaki Estuary

The riverine survey estimated that litter is discharge at a rate of 0.035 items m-3 s-1 translating to an estimated annual litter flux of between 6,622,560 and 614,952,000. The standing stock survey in the estuary revealed that plastics contributed 90.8% (0.046 items m-2 weighing 0.0007 grams m-2) of the total branded litter. The mean daily accumulation rate was (2.7 items m−1 day−1) in the wet zone and (4.4 items m−1 day−1) in the dry zone respectively. Food packaging material contributed 77.4% of the branded litter with 69.8% of branded marine litter being of Kenyan origin.

Fig 10. Litter collection at River Sabaki, Malindi Kenya


Source: GapKenya


Source: Mji Bora


Source: KMFRI


Source: KMFRI

CHAPTER 3: SOLID WASTE MANAGEMENT IN KENYA

More than 98% of the plastic consumed in Kenya is imported, either in the form of products or in the form of primary virgin plastic. Only 27% of the plastic waste generated in Kenya is collected: 8% collected for recycling and the remaining 19% disposed of in unsanitary landfills or dumpsites. 73% of all plastics waste is uncollected. Due to the absence of sanitary landfills and incineration facilities, there is no proper disposal of waste in Kenya. Therefore, all plastic that is not recycled is prone to leakage. In 2018, the per-capita plastic waste generation in Kenya is of 11 kg/year, which is below the global average of 29 kg/cap/year but matches the average for east-southern African countries of 12 kg/cap/year. In Kenya, 37 thousand tonnes of plastic leak into the ocean every year. This is only a small fraction of the mismanaged waste, which reaches 465 thousand tons per year.

Poor solid waste management is a challenge that is worsened by the ever-increasing population and rapid urbanization. Developing countries (with their inadequate waste management infrastructure) are undergoing rapid urbanization (estimated at 24% in 2014 by the World Bank, 2016) which provides a large consumer market for plastic goods, most of which are single-use plastics (UNEP-WCMC IU, 2018). The population of Kenya's major cities is estimated to be growing at approximately 4.2% annually (United Nations, 2019) compared to the country's inter-censual population growth rate of 2.2% (KNBS, 2019). Currently, the average per capita waste generation in the Kenyan major towns with solid waste disposal sites is roughly 0.46 kg/day (Soezer, 2016). Although this waste generation rate is generally low compared to developed countries' rate of 1.4-2.0 kg/capita/day (Khatib, 2011), Kenya still faces several challenges in waste management with the bulk of post-consumer waste ending up in illegal dumps and eventually leaking into the ocean.

Some of the challenges facing solid waste management include littering habits, lack of segregation at source, lack of or inadequate dumping sites, improper dumping practices, inadequate supporting infrastructure facilities, bad cultural attitudes and limited technical, human and financial capacities. Solid waste management in urban areas is expected to worsen in the future, with the projection that nearly half of the Kenyan population will be living in urban areas (Haregu et al., 2017). Kenya operates waste management at two levels, land and sea-based waste management.

3.1 Land-based waste management

Over 80% of marine litter originates from land as a result of unsustainable production, consumption patterns and poor post-consumer waste management. The Constitution of Kenya expressly identifies solid waste management (SWM) as a function of the County Governments. The county government issue permits to waste collectors while NEMA enforces 10 minimum points for dumpsites, licences garbage transporters, incinerators and transfer stations, designates dumpsites, conducts control and annual audits, reviews results and advises on best practice, encourages best practices in garbage management through improvement and restoration orders and shutting down of non-compliant facilities.

Land-based waste management is divided into various components including segregation, collection, transport, treatment and disposal.

3.1.1 Waste segregation

Waste generators such as households, commercial premises and market traders are required by the EMCA Waste Management Regulations of 2006 to segregate waste at the source (point of generation) as the best practice but in reality, this is only done for hazardous waste. Moreover, there are no consumer obligations and regulations to segregate waste at the source. However, very little waste segregation at the source occurs in Kenya (NEMA, 2015), even in the presence of segregation bins. This is because the willingness of consumers to segregate waste in any terms is difficult to enforce. Waste is dumped without sorting or even mixed by collectors during pick up and transportation. This renders some of the recyclable waste unsuitable for recycling.

3.1.2 Waste collection

Waste collectors are required by Waste Management Regulations of 2006 to collect waste from the designated area of operations or storage areas and deliver them to the designated storage or disposal sites. County Governments collect waste in the cities and towns centres, while private operators and CBOs collect those in residential and informal areas respectively (NEMA, 2015). This arrangement works well with the high-income and some middle-income residential areas that can afford the services, whereas low-income areas face affordability challenges leading to unregulated disposal of waste in streets. Currently, only less than 40% of waste in Kenya is collected and disposed of at designated dumpsites (Soezer, 2016). The other waste remains uncollected due to inaccessibility of waste collection services, unaffordability by low-income households, irregular collection and inadequate transportation trucks (NEMA, 2015) and may leak into the environment.

3.1.3 Waste transport

Waste may be transported to a transfer station such as skips, bunkers, and other waste containment facilities by the waste generators or hired collectors before it is eventually transported to the designated landfill or dump sites. Only NEMA-licensed transporters are allowed to ferry waste directly to the legally established dumpsites in the appropriate vehicles outlined in Waste Management Regulations of 2006 even though there are still cases of illegal operators whose waste rarely reach the legal dumpsite and may leak into the environment (NEMA, 2015). Transport is one of the main challenges in the solid waste management in Kenya due to 1) non-compartmentalization of vehicles, leading to re-mixing of already sorted waste thus hampering material recovery, reuse and recycling; 2) limited coverage of transportation network; 3) frequent breakdown of trucks; 4) unorganized and inefficient transportation in informal sectors and 5) unsupervised collection and transportation leading to illegal dumping and leakage into the environment.

3.1.4 Waste recycling

Approximately 50-80% of the general waste stream comprises recyclable materials (NEMA, 2015). Recycling companies in Kenya access this waste through market mechanisms and process it into valuable secondary materials. The Kenyan recovery and recycling rates are generally low due to low morale, low pay, lack of strict enforcement of clean initiatives required for controlling land, air and environment pollution, market challenges due to low quality of recycled material and lack of incentives making imported materials cheaper than recycled products. In 2017, of the 42,950 MT of plastic waste

forwarded to recyclers, 36,193 MT of plastic waste were recycled, 23,006 MT of these being plastic packaging materials (KAM 2019).

3.1.5 Waste treatment

The standards for the treatment of wastes are stipulated in the Waste Management Regulations of 2006. Waste can be treated through open burning, composting, incineration, anaerobic digestion, pyrolysis and gasification. Even though open burning is commonly practiced as means of waste treatment in Kenya, it is illegal and poses significant risks to human health (due to the release of noxious chemical substances such as dioxin and particulate matter) and directly contributes to climate change (IUCN, 2020).

3.1.6 Waste disposal

Waste is required to be transported to landfills for disposal in Kenya. Most of the operating landfills are open dumpsites that do not adhere to the international standards for landfills. Whereas there are no sanitary landfills in Kenya, a few legal dump sites have been designated in Mombasa (Mwakirunge dumpsite), Kwale (Kinondo dumpsite), Kilifi (Mtondia and Maji ya Chumvi dumpsites), Garissa (Garissa township) Lamu dumpsite (Dandi and Domoni dumpsite) and Taita Taveta (Chakaleri and Riata dumpsites). However, illegal dump sites such as VOK dumpsite in Mombasa, Matuga dumpsite in Kwale, Kasorina dumpsite in Kilifi, Maungu dumpsite in Taita Taveta and Hola dumpsite in Tana River, still exist. Kibarani dumpsite is an example of a decommissioned dumpsite that was situated at the shore of Makupa Creek, Mombasa. The dumpsite was previously used as an open dumpsite between 1960s and 2018 before it was transferred to Mwakirunge dumpsite. Although the dumpsite is not in use, it continues to pollute Makupa Creek through underground leachate.

Proper waste disposal is a challenge in Kenya due to inadequate public land and goodwill resulting in poor management of existing sites, lack of appropriate waste disposal infrastructure and the inadequate number of transfer stations (NEMA, 2015). This is further compounded by insufficient monitoring, lacking legal enforcement, limited data availability and lack of land zoning which has fuelled conflicts when new residential areas are developed close to illegal dumping spots.

3.2 Sea-based waste management

Kenya has identified marine-based sea waste as a source of marine litter (Okuku et al., 2021). Sea-based sources contribute to marine litter through accidental or deliberate discards. The management of sea-based sources waste include:

Table 1: Summary of wastes generation, collection and recovery status in major towns (NEMA, 2015)

Name of town	Estimated waste generated (tons/ day)	% Waste collected	% Waste recovery	Uncollected waste
Nairobi	2400	80%	45%	20%
Mombasa	2200	65%	40%	35%
Nakuru	250	45%	18%	37%
Kisumu	400	20%	Unknown	Unknown
Thika	140	60%	30%	40%
Eldoret	600	55%	15%	45%

3.2.1 Management of waste from the maritime industry

Kenya Maritime Authority (KMA) has the responsibility of domesticating maritime conventions especially from the International Maritime Organization (IMO) and the International Labour Organization (ILO) to ensure international compliance in implementing safety and security as well as marine environment protection standards. To this end, the provisions of Annex V of MARPOL convention prohibiting the disposal of waste at sea have been domesticated and anchored in Kenyan Law through The Merchant Shipping Act 2009 (Rev. 2012) and administered by Kenya Maritime Authority as established by the Kenya Maritime Authority Act (2012). They perform inspections to ensure that ships comply with the “no dumping at sea” requirement. They also ensure the availability and functionality of port reception facilities for the disposal of vessels generated wastes. KMA also monitors waste in ships through a Garbage Management Plan and Garbage Record Book that ships are expected to provide for auditing. Currently, there is no receptor facility at the port and the wastes from the ships are collected directly by contracted waste collectors by KPA. Wastes from ships are usually segregated, however, these are usually re-mixed by contractors who collect the waste from the Port facility.

3.2.2 Management of waste from ferries, tourism and fishing boats

KMA requires ferries, fishing boats and tour boats to have in place waste bins. Most fishing boats, dhows, glass boats and jahazi lack bins for waste disposal and signs that warn against littering. However, the big cruise boats and yachts have bins installed where tourists can deposit their waste. Ferries in Kenya have dustbins and litter signs that warn the public against littering. Around 14 tonnes of abandoned, lost or otherwise discarded fishing gears leak into the Kenyan marine environment annually (IUCN, 2020) with no clear framework of management.

Case studies

a) Ecoworld plastic recycling

Ecoworld Recycling operated in partnership with Watamu Marine Association (WMA) is a unique plastic recycling enterprise at the Kenyan coast in Watamu, Kilifi County. It recycles post-consumer plastic waste to reduce the impacts on the natural environment whilst supporting community livelihoods. Ecoworld has created a dynamic partnership with community groups and hotels from which they collect recyclable waste from different litter categories i.e., marine litter and fishing gears, plastics, metals, rubber and glass. Ecoworld engages community groups through a "Weigh and Pay" project, which pays waste pickers per kilogram for plastic waste collected from beaches and the local environment. The partnership with the tourism industry provides Ecoworld with free recyclable waste from hotels and sponsorship for beach cleaners and clean-up events.

From the collected plastic waste, HDPE and PET is sorted, machine shredded and sold to buyers in Mombasa, such as Weeco, a Chinese PET recycling firm and Jil Plastics. In addition to standard plastic recycling, at Ecoworld plastic bottles are used to make building blocks for wall constructions and various plastic polymers are machine moulded into value-added products such as key rings and table mats.

Fig 11. Ecoworld recycling initiatives

In 2020 Ecoworld received 47 tons of marine litter and recycled 15 tons of plastic waste. It aims to increase to more than 100 tons annually as it is currently expanding its operations to the neighbouring towns of Malindi and Kilifi, targeting a population of more than 300,000 people, thus significantly reducing the waste disposed at landfill sites and leakage into the marine environment.

The Ecoworld innovative approach has created dynamic plastic waste value chains and is helping develop the circular economy at the coast. In line with recent government and industry plans for increased PET recycling, the enterprise is now perfectly placed to expand its recycling operations and create an important source of income for unemployed coastal people working as waste pickers and recyclers.

The Ecoworld success story is also due to teamwork and a desire to partner and collaborate with government bodies and agencies, NGOs and CBOs and the plastic

manufacturing industry. This Watamu case study has demonstrated the potential for empowerment of coastal communities and SME to manage solid waste and reduce the impacts of marine litter. Ecoworld Recycling aims to replicate the project model in other coastal resort towns which will be a win-win result for communities, the environment and our ocean.

b) Flipflopi expedition

The Flipflopi expedition is a non-profit Kenyan movement for change with a mission to end single-use plastic and lead a plastic-reuse revolution through education, sailing expeditions, positive storytelling, dance, clean-ups, artwork and music and campaigns. The movement bases its activities upon a holistic approach through education and awareness as part of its positive campaign strategy to demonstrate to locals, possible solutions and innovations that are both positive and tangible in reducing marine litter.

Fig 13. KPPC waste management plan

The movement built the world's first dhow (sailing boat) made from 10 tonnes of recycled plastics and covered with 30,000 multi-coloured flip flops all collected from the Kenyan coast. The movement uses locally-focused narratives and a cultural symbol of the dhow to turn awareness into action and provide possible solutions and innovations that are positive and tangible in reducing marine litter. The movement recognises that marine litter is a transboundary problem that needs to be addressed through collaboration and has used Flipflopi expedition to bring people from different backgrounds and social statuses (from Lamu, Kenya to Zanzibar, Tanzania) for a common goal.

The expedition fundraises to support local-based community initiatives through partnerships with UNEP, UK government, Foreign, Commonwealth & Development Office (FCDO), French Development Agency (AFD) and donations from well-wishers in the private sector and crowd funding

c) Kwale Plastic Plus Collectors (KPPC)

KPPC is a good example of a Public Private Partnership in waste management. It is a social enterprise located in Ukunda, Kwale County, it collects waste to create a sustainable waste management system. KPPC partners with Kwale County Government, Diani Municipal Council, Base Titanium, Flipflopi and NEMA in waste

management. It receives sponsorships from hotels, NGOs, research institutions and travel agencies who facilitate their research, conservation education, sorting activities at the depots and Trash for Cash initiatives. The enterprise also sources for funds from local businesses and through crowd funding to substitute the donations it receives Trash for Cash initiatives has created employment for the locals..

Fig 13. KPPC waste management plan

KPPC pilots waste management initiatives (such as the use of segregated bins) to determine the efficiency and responsiveness of the local community. Currently, KPPC works on a pilot area of 300km2 where it has installed 30 bins that are segregated into plastic, paper, metal and glass. 14 bins of these were donated by hotels, 9 by Bio-Foods and 7 by the county. Waste is collected weekly from the bins and transferred to the collection points. Glasses are sorted by colour, plastics by size and types (HDPE and PET), metals by type and paper by hard (e.g., cartons) and soft (e.g., newspaper).

In support of extended producer responsibility, KPPC has introduced take-back schemes with manufacturers by collecting, aggregating and delivering consumer products packaging to their producers. Bio-Foods Kenya is one of such manufactures that are involved in take-back schemes.


THE CONSTITUTION OF KENYA
REPUBLIC OF KENYA
INTEGRATED COASTAL ZONE
ACTION PLAN FOR KENYA,
REPUBLIC OF KENYA
NATIONAL ENVIRONMENT POLICY, 2013
KAM 60
Kenya Plastic Action Plan
Accelerating a Circular Economy in Kenya
CODE OF CONDUCT FOR RESPONSIBLE FISHERIES
Information Handbook
REPUBLIC OF KENYA
KENYA GAZETTE SUPPLEMENT
RECEIVED
REPUBLIC OF KENYA
THIRD MEDIUM TERM PLAN
2018 – 2022
Transforming Lives: Advancing socio-economic development through the "Big Four"
The National Treasury and Planning
Treasury Building
Nairobi, Kenya
KENYA VISION 2030
WESTERN INDIAN
REGIONAL ACTION PLAN ON MA
(WIO-RAPMaLi)
UN environment

CHAPTER 4: POLICY, INSTITUTIONAL AND REGULATORY FRAMEWORK

Kenya has an existing legal framework to deal with general litter issues in compliance with marine litter-related international conventions and agreements such as the MARPOL Convention, the London Convention, the Basel Convention and the Global Programme of Action (GPA) for the Protection of the Marine Environment from Land-based Activities. However, the current legal frameworks are not well oriented to marine litter with un-clearly defined responsibilities between different government agencies.

4.1 International obligations

Kenya is a party to various Multilateral Environmental Agreements (MEAs) aimed at protecting and safeguarding the environment and natural resources. These MEAs are not specifically formulated to deal with marine litter but they have been broadly formulated to encompass implications to marine litter.

4.1.1 United Nation Convection on the Law of the Sea (UNCLOS 1989)

UNCLOS came into force in 1994, providing a broad legal framework for ocean-related issues, placing a general obligation on the States to protect and preserve the marine environment. It calls on States to address land-based sources of pollution as well as pollution from ships, cooperate with other states on marine issues, and work to address marine issues beyond national jurisdiction.

4.1.2 International Convention for the Prevention of Pollution from Ships (MARPOL 1994)

Kenya is a party to MARPOL developed under the auspices of the International Maritime Organization (IMO). It was adopted in 1973 and amended in 1978. The Convention addresses pollution from ships by oil; noxious liquid substances carried in bulk; harmful substances carried by sea in packaged form; sewage, garbage; and the prevention of air pollution from ships both accidental and those occurring during routine operations. Annex V of MARPOL, which came into force in 2013, addresses ocean-based litter pollution and prohibits the discharge of all waste from ships.

4.1.3 London Convention 1972 and London Protocol 1996

Kenya is a party to the Convention on the prevention of Marine Pollution by Dumping of Wastes and other matter 1972 (London Convention, 72) which aims to prevent, reduce and where practicable, eliminate pollution caused by dumping or incineration of waste at sea. The 1996 London Protocol revised the London Convention and allowed some dumping. It prohibited all dumping from ships except for materials listed on the “reverse list”. Plastics are not included in the reverse list; thus, dumping plastics is prohibited.

4.1.4 Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Western Indian Ocean

The Convention is a partnership between governments, civil society and the private sector, that offers a legal framework for the coordination of efforts of the Contracting Parties to protect the marine environment in the Western Indian Ocean Region. Parties agreed upon the Protocol for the Protection of the Marine and Coastal Environment of the Western Indian Ocean from Land-Based Sources and Activities. The Protocol facilitates individual and collective action by member states to tackle the threats to the marine and coastal environment of the Western Indian Ocean from land-based sources and

activities, including but not limited to untreated domestic waste and discharges, industrial discharges, agricultural run-off and activities causing physical alterations and destruction of habitats. Kenya's maritime and environmental laws have provisions to implement the obligations under the Convention and the Protocol.

4.1.5 Basel Convention on the Control of Transboundary Movements of hazardous wastes and their Disposal

The Basel Convention seeks to establish a regulatory system applicable when transboundary movements are permissible, minimize the amount and toxicity of hazardous wastes and ensure their environmentally sound management as close as possible to the source of generation. Kenya ratified the convention in 2000 and obliged herself to protect human health and the environment against the adverse effects of hazardous wastes including transboundary wastes that might eventually contribute to marine litter.

4.1.6 Bamako Convention

The Bamako Convention is a response to Article 11 of the Basel Convention which encourages parties to enter into bilateral, multilateral and regional agreements on Hazardous Waste to help achieve the objectives of the convention. The Convention covers not only radioactive wastes but also any waste with a listed hazardous characteristic or a listed constituent as hazardous waste. Other products also covered under the Convention as waste include those that have been severely restricted or have been subject to prohibitions. The Convention calls for the ban on the importation of hazardous and radioactive wastes as well as all forms of ocean disposal. For the Intra-African waste trade, parties must minimize the trans-boundary movement of wastes and only conduct it with the consent of the importing and transit states among other controls; they should minimize the production of hazardous wastes and cooperate to ensure that wastes are treated and disposed of in an environmentally sound manner.

4.1.7 FAO code of conduct for responsible fisheries

FAO Code of conduct for responsible fisheries calls for appropriate measures to minimize pollution, waste, discards, catch by lost or abandoned gear, catch of non-target species, and negative impacts on associated or dependent species, particularly the endangered species. The code of conduct also calls for cooperation to develop and apply technologies, materials and operational methods that minimize the loss of fishing gear and the ghost fishing effects of lost or abandoned fishing gears which form a large proportion of marine litter.

4.1.8 Honolulu strategy

The Honolulu Strategy is a framework for a comprehensive and global collaborative effort to reduce the ecological, human health, and economic impacts of marine debris worldwide. The strategy was introduced under the auspices of UNEP to be adopted and used by member countries and organizations implementing the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA). This framework includes a set of goals and strategies applicable all over the world, regardless of specific conditions or challenges. Specifically, Honolulu Strategy sets goals to reduce the amount and impact of litter and solid waste introduced into the marine environment from land-based and sea-based sources and those accumulated on shorelines, in benthic habitats and pelagic waters.

4.2 Legislative Framework

4.2.1 The Constitution of Kenya, 2010

Chapter V of the Kenyan constitution prescribes the need for conservation and protection of the environment. The constitution of Kenya entrenches the general rules and principles of international law as part of Kenyan Law and domiciles principles of international Law as a guide to environmental legislation.

The Constitution guarantees the right to a clean and healthy environment in Article 42. Article 42 further guarantees the right to have the environment protected for the benefit of present and future generations through legislative and other measures particularly those contemplated in article 69 and the right to have obligations relating to the environment fulfilled under Article 70. Article 69 imposes obligations on the State to ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits; eliminate processes and activities that are likely to endanger the environment. Further, part 2 of the second Schedule outlines the role of the counties in solid waste management entailing refuse removal, refuse dumps and solid waste disposal.

4.2.2 Environmental Management and Coordination Act (Rev Ed. 2015)

Environmental Management and Co-ordination Act provide for the management of various segments of the environment and natural resources. The framework law makes no express reference to marine plastics. The Act prescribes measures for the management of waste and control and prevention of pollution of the marine environment. EMCA makes provision for the establishment of NEMA as the principal instrument of Government for the implementation of all policies relating to the environment. To Administer the Act, NEMA has developed regulations that prescribe measures for the handling, storage, transportation, segregation and destruction of waste. These regulations have subsequently been issued by the Government and include:

4.2.2.1 Environmental Management and Coordination (Waste Management) Regulations, 2006

The Environmental Management and Coordination (Waste Management) Regulations, 2006 has provisions for the responsibility of the waste generator, cleaner production methods, segregation of waste by the generator, waste transportation license, responsibility of waste transporter, transportation of waste by licensed transporter, license for the disposal facility, waste treatment by operators of disposal sites, the requirement for environmental audit and re-use and recycling plants.

4.2.2.2 The Environmental Management and Coordination (Prevention of Pollution in Coastal Zone and Other Segments of the Environment) Regulations, 2003

These regulations were issued to ensure the prevention of marine pollution that require all ships in the territorial waters of Kenya to off-load all liquid and solid waste (including garbage, plastic waste, fishing gear waste and any other kind of waste) to the certified Port Waste Reception Facility at the Port of Mombasa. The regulations require all ships to obtain a certificate from Kenya Ports Authority in accordance with MARPOL, and prescribes inspection by NEMA appointed agents, of all ships calling in any port of Kenya for inspection for compliance

4.2.2.3 Environmental Management and Coordination (Wetlands, Riverbanks, Lakeshores, and Seashores Management) Regulations, 2009

Wetlands, Riverbanks, Lakeshores, and Seashores Management Regulations seek to provide for the conservation and sustainable use of wetlands and their resources in Kenya. The regulations also set out to prevent and control pollution in the wetlands which include shallow marine waters. The regulations implications for marine litter potentially emerge from its objective of ensuring the protection of wetlands as habitats for species of fauna and flora. The regulations also embody Environmental Impact Assessment, polluter pays principle and designation of protected wetlands as vehicles for prevention of wetland pollution

4.2.2.4 Environmental Management and Co-ordination (Impact Assessment and Audit) Regulations, 2003 (Legal Notice No. 101 of 2003)

These Regulations were established to operationalize Part IV and Part V and the Second Schedule of EMCA (1999) with regards to all policies, plans, programmes and project activities. The regulations require all sites and facilities treating, recycling or disposing of waste to obtain an operating licence from NEMA. Such facilities must undertake an Environmental Impact Assessment (EIA) and obtain an EIA licence from the Authority before their establishment. They are further required to submit annual environmental audits to NEMA during their operation. The regulations set a safeguard for the sound operation of such waste management facilities in the prescribed manner to among others prevent leakage of litter to the environment along the waste management chain to protect the environment.

4.2.2.5 Draft Plastic bag control and Management Regulations of 2018

The draft regulations set to prohibit and regulate plastic bags used for packaging, while requiring the aspiring importers, exporters and manufacturers to submit a recycling plan in their application. They also seek to promote the use of alternatives in place of plastics and limit over-packaging. Further, plastic bags sold in Kenya are prescribed to be made out of 30% recycled material and labelled as such by the manufacturers

4.2.2.6 Draft Extended Producer Responsibility Regulations. (2020)

Draft EPR regulations provide for all producers of products to join an Extended Producer Responsibility scheme and form Producer Responsibility Organizations (PROs) to assume the management responsibility of the products introduced into the market by the producers. The PROs shall collect, sort, recovery, recycle, treat and undertake end-of-life management of its members' products. It further proposes for the PROs to undertake market development for the secondary raw materials market, facilitate research and development on material recovery and incentivize waste reduction

4.2.3 Kenya Maritime Authority Act (Rev Ed. 2012)

Kenya Maritime Authority Act (Rev Ed. 2012) provides for the establishment of the Kenya Maritime Authority as a body with responsibility to monitor, regulate and coordinate activities in the maritime industry and for all other matters. Through the Act, Kenya Maritime Authority is mandated to administer and enforce Merchant Shipping Act and undertake and co-ordinate research, investigation, and surveys in the maritime field to prevent marine pollution among others. Specifically, the Act provides for regular inspection of ships and ensures the prevention of marine source pollution including sea-based sources of marine litter, protection of the marine environment and response to marine environment incidents.

4.2.4 Merchant Shipping Act 2009 (Rev Ed. 2012)

The Merchant Shipping Act consolidates the law relating to shipping and connected purposes. It makes provision for the registration and licensing of Kenyan ships, the safety of navigation, prevention of pollution, maritime security and the liability of ship-owners among others. Under the Act, the Minister for matters relating to shipping and seafarers has powers to actualize international maritime conventions and agreements by formulating regulations for the protection and preservation of the marine environment from pollution by ships. Further, the Act places an obligation on ship operators to acquire and honour the International Oil Pollution Prevention Certificate, International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk among others.

4.2.5 Kenya Coast Guard Service Act 2018 (Rev Ed. 2020)

The Act establishes the Kenya Coast Guard Service with the mandate to, among others, enforce pollution control, enforce sanitation measures, prosecute maritime offenders and protect maritime resources. Section 8 (2) invokes cooperation between the Kenya Coast Guard Service and other public authorities in emergencies within territorial waters and assists them to effectively execute their mandates. Further, the Kenya Coast Guard Service is granted powers to assist in environmental protection.

4.2.6 Fisheries Management and Development Act, 2016

The Fisheries Management and Development Act was established in part to 'protect, manage, use and develop the aquatic resources in a manner which is consistent with ecologically sustainable development.' The Act in section 5 (2n) prescribes among others minimization of abandoned gear and pollution as some of the principles guiding its implementation. The Act is explicit on marine litter but section 49(1) prescribes minimization of pollution of Kenyan fishery waters by the introduction of substances that produce harmful effects to fish or the marine environment and further provisions for safeguarding against aquaculture wastes.

4.2.7 Wildlife Conservation and Management Act, 2013.

Wildlife Conservation and Management Act was established for the protection, conservation, sustainable use and management of wildlife in Kenya and connected purposes. The Act establishes Kenya Wildlife Services as the sole custodians of protected areas including Marine Protected Areas. Section 89 of the act prohibits pollution by discharging of any hazardous substances, any pollutant detrimental to wildlife or waste into a designated wildlife area.

4.2.8 Water Act, 2016

The water Act, 2016 prohibits pollution of water course or water resources by rubbish, dirt, refuse, effluent; including sea water and transboundary waters within the territorial jurisdiction of Kenya. The act regulates exploitation discharges into water resources through licensing and invokes polluter pays principle to prosecuted pollution offenders.

4.2.9 Forest Conservation and Management Act, 2016

Forest Conservation and Management Act, 2016 was enacted in part to provide for the development and sustainable management of all forest resources for the socio-economic development of the country and connected purposes. Section 7 of the Act establishes the Kenya Forest Service and vests upon it the responsibility of conserving, protecting and managing all public forests including mangrove forests, which are critical habitats in the marine environment. The Act further provides for community participation in the

management of community forests by among others protecting and conserving the forests in a prescribed manner.

4.2.10 Kilifi County Solid Waste Management Act 2016

The coastal Kilifi County passed Solid Waste Management Bill 2016 which is now pending assent. The Bill among others, vests solid waste management responsibility on all actors; prescribe solid waste segregation into categories, including plastic wastes (Clause. 10); outlines the responsibility of the county government in the collection and disposal of solid wastes from the streets and public areas (Clauses. 16, 17). The bill tasks the county administration with the facilitation and promotion of recovery of waste materials through reduction, re-use, recycling and composting of waste by the various actors in solid waste management. The Act takes a systemic approach to waste management with potentially positive implications to marine litter, there is however a lack of redress targeting marine litter as a failsafe mechanism.

4.3 Gazette Notices

4.3.1 Gazette Notice No. 2356 of 2017

Gazette Notice No. 2356 effected the ban on manufacture, sale and use of plastic carrier bags and flat bags for domestic and commercial packaging in Kenya with effect from 27 August 2017. Pursuant to this gazette notice, all entities intending to sell or use the banned plastic bags are to do so with express authority from NEMA and following guidelines set by NEMA.

4.3.2 Gazette Notice No. 4858 of 2019

Gazette Notice No. 4858 institutes a ban on the use of single-use plastics including plastic bottles, straws and related products within protected areas including beaches. The Gazette Notice was issued by the government under the provisions of section 116, 2 (d) of the Wildlife Conservation and Management Act, 2013 with effect from June 2020.

4.4 Institutional Framework

4.4.1 Ministry of Environment and Forestry

The Ministry of Environment and Forestry is responsible for the overall formulation of all Government policies relating to the environment in Kenya, including policies for the protection and conservation of the natural environment, and for pollution prevention and control. So far, the Ministry has not formulated any policies specifically targeted to marine plastic pollution. However, there are general policy frameworks on waste management and protection of the marine environment that bear implications on plastic waste.

4.4.2 County Governments

The 47 county governments of Kenya have within their responsibilities the function of refuse removal and solid waste disposal. The county governments may formulate county policies and laws for the efficient discharge of this function. County Governments are thus key in ensuring that plastic waste and other forms of waste do not find their way into the marine environment. Pursuant to this key function, some counties, have put in place waste management laws applicable within their respective jurisdictions. The coastal counties are yet to put in place laws to address the challenge of marine litter, current efforts to enact such laws are still at the Bills drafting stage. Kilifi County has however passed the Solid Waste Management Act 2016 which is pending assent.

4.4.3 National Environment Management Authority (NEMA)

NEMA is established under the Environmental Management and Co-ordination Act No. 8 of 1999 (EMCA) as the principal instrument of Government for the implementation of all policies relating to the environment. The Authority works in collaboration with other lead agencies and County Governments in providing supervision and coordination of matters relating to the environment for effective implementation of all policies relating to the environment. These functions extend to implementation monitoring and enforcement of compliance of regulations including among others, those related to marine pollution and resources conservation, waste management.

4.4.4 Kenya Maritime Authority (KMA)

Kenya Maritime Authority is the lead agency responsible for, amongst other functions, ensuring the prevention of marine source pollution, protection of the marine environment and response to marine environment incidents. The Kenya Maritime Authority works to ensure that threats and risks from ships and offshore installation source pollution as well as pollution from land-based sources are minimized to reduce the impact on the marine environment. It is within the mandate of the Kenya Maritime Authority, working in collaboration with other relevant agencies such as the National Environment Management Authority to implement and enforce the existing regulations in order to control and prevent marine pollution from all sources including plastic waste.

4.4.5 Kenya Ports Authority (KPA)

Kenya Ports Authority is responsible for the prevention of pollution within her premises from ships in line with MARPOL convention. KPA enforces Harbour Regulations regarding garbage discharge into Harbour waters by including prescription of waste handling procedures. KPA operates a Port Waste Reception Facility at the Port of Mombasa and is mandated to issue all ships with a certificate for sound waste disposal at the port in accordance with MARPOL and as per the EMCA-Prevention of Pollution in Coastal Zone and Other Segments of the Environment Regulations of 2003.

4.4.6 The Kenya Coast Guard Service (KCGS)

Kenya Coast Guard Service brings together state actors with mandates extending to within Kenyan Territorial waters. The service is mandated to among others enforce marine pollution, sanitation measures, port and coastal security, protection of maritime resources including fisheries the service works in close cooperation with other government agencies.

4.4.7 Kenya Marine and Fisheries Research Institute (KMFRI)

KMFRI was established to conduct research on aquatic systems covering both marine and freshwater. In part, KMFRI is mandated to undertake research in among others, environmental and ecological studies, and marine research including marine pollution by marine litter to provide scientific data and information for sustainable development of the Blue Economy. KMFRI is also the government agency bearing the responsibility to monitor and report Sustainable Development Goal indicator 14.1.1 (marine litter and eutrophication). KMFRI only recently started research on marine litter in 2016 despite its long-time responsibility of monitoring pollution in the marine environment.

4.4.8 Kenya Fisheries Service (KeFS) and Kenya Wildlife Service (KWS)

Kenya's fisheries and wildlife laws also have provisions for conservation, management, development and protection of fisheries and wildlife resources within Kenya's maritime zone. The lead agencies responsible for fisheries and wildlife, namely Kenya Fisheries

Service and Kenya Wildlife Service, work in close collaboration with the agencies responsible for environmental and maritime affairs to monitor and prevent any pollution to the marine environment. This general mandate includes actions to prevent waste dumping (including plastic waste and fishing gear waste) into the marine environment. In this regard, the Kenya Fisheries Service and Kenya Wildlife Service work hand in hand with the Kenya Maritime Authority and National Environment Management Authority to monitor and enforce actions against all forms of pollution in the marine environment, including plastics pollution.

Whereas KeFS and KWS broadly enforce measures against pollution in the marine environment, Wildlife Management and Conservation Act and Fisheries Management and Conservation Act do not explicitly proscribe marine litter pollution. This scenario potentially leaves grey areas in enforcement and the lack of legal basis for standards-setting and monitoring.

4.4.9 Kenya Forest Service (KFS)

Kenya Forest Service is mandated to provide for the development and sustainable management, including conservation and rational utilization of all forest resources for the socio-economic development of the country and connected purposes. The Service functions to conserve, protect and manage all public forests including mangrove forests which exist in the marine environment and are key traps and sinks both sea-based and land-based marine litter. Similarly, community forest associations registered by KFS co-manage sections of mangrove forests within their spatial jurisdiction.

4.4.10 Water Resources Authority (WRA)

Water Resources Authority is a state corporation established under Section 11 of the Water Act, 2016. It is mandated to safeguard the right to clean water by ensuring that there is proper regulation of the management and use of water resources including seawater and transboundary waters. In part, the authority functions to formulate and enforce standards, procedures and regulations for proper management and use of water resources, including regulation of pollutant discharge into water bodies.

4.5 Global institutions

4.5.1 Intergovernmental Oceanographic Commission of the United Nations Educational Social and Cultural Organization (UNESCO-IOC)

The IOC works, together with member states, to protect the health of the ocean by coordinating programmes in areas such as ocean observations. The IOC provides a focus for all other United Nations bodies that are working to understand and improve the management of oceans, coasts and marine ecosystems. Governments of member states also get assistance from the IOC to address their individual and collective ocean and coastal problems through the sharing of knowledge, information and technology and through the coordination of national programmes. In this regard, the member states get support to build their scientific and institutional capacity in order to achieve the United Nations Sustainable Development Goal 14 which includes marine litter.

4.6 Policy Framework

4.6.1 The National Environmental Policy 2013

The National Environmental Policy 2013 aims to achieve sustainable management of terrestrial and aquatic ecosystems, including marine ecosystems and critical habitats.

The policy leverages on environmental safeguards, economic incentives, Payment for Ecosystem Services (PES) and the polluter pays principles as approaches to realizing its objective. For the coastal and wetland ecosystems, the policy commits to support research, training and management. The policy provides for fostered cleaner production, waste recovery, recycling and reuse.

4.6.2 Kenya Environmental Sanitation and Hygiene Policy (2016-2030)

Kenya Environmental Sanitation and Hygiene Policy emphasize the development of a sound solid waste management system, enforcement of legislation and regulations as key approaches to halting solid waste pollution and nuisance. The policy tasks the national and county governments, and state agencies in pollution and solid waste management, wastewater management, treatment and disposal of waste, management of industrial wastes, management of healthcare waste and management of e-waste. Further, the policy calls for the concerned state actors' action in the protection of wetlands and watercourses from solid waste pollution by identifying and targeting all environmentally sensitive areas such as wetlands and watercourses prone to impact from waste pollution.

4.6.3 Integrated Coastal Zone Management Policy

ICZM policy presents a framework to guide development planning and management, conservation of the environment and accommodate the social and economic needs of local communities. The policy pursues in part to conserve the coastal and marine resources and environment. The policy anchors empowerment of county governments to adopt innovative ways to effectively manage both municipal wastewater and solid waste to mitigate environmental pollution. Additionally, partnerships in waste management, public awareness, legislation and enforcement to control pollution and improve waste management practices that ultimately contribute to marine litter.

4.6.4 National Oceans and Fisheries Policy

The National Oceans and Fisheries Policy was formulated in recognition of the need for development and sustainable management of fisheries for the benefit of the present generation and posterity. The policy broadly identifies environmental concerns as one of the issues requiring an integrated approach in developing the welfare of fisher communities. The policy employs sustainability and environmental integrity as a guiding principle to address among others, depletion of fish stocks and loss of biodiversity and environmental degradation. The policy instrument recognizes the role of research in better understanding environmental factors as one of the strategies to achieve its objective.

4.6.5 Draft National Sustainable Waste Management Policy, 2019.

The draft policy calls for a hierarchical approach to waste management with a keen focus on reduction, reuse, recycling and composting. The policy proposes a strategic approach to waste management laying emphasis on waste prevention, education and awareness, economic instruments to promote waste prevention, formulation of enabling regulations that support and promote EPR schemes as well as strategic phase-out of single-use plastics.

4.7 Strategies

4.7.1 Vision 2030

The social pillar of Kenya's vision 2030 recognizes the need for a sustainable waste management system. Waste management and pollution control as a programme component of the Third Medium Term Plan 2018-2022 (MTP III) of the Vision 2030

trained focus on the disposal of human and industrial waste, e-waste, elimination of harmful emissions including those from factories and motor vehicles. MTP III outlines policy formulation and reform, legislation and enforcement, strengthening Environmental Governance including environmental monitoring for strengthening compliance with standards, financial incentives and establishment of at least two proper waste management systems in each county some of the means of pursuing this programs' goal.

4.7.2 Sustainable Development Goals

On October 21, 2015, the UN General Assembly adopted resolution 70/1 and endorsed the 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs). Goal 14 seeks to conserve and sustainably use the oceans, seas, and marine resources for sustainable development. Specifically, Goal 14.1 aims to prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris. Goal 14 however only sets targets for marine debris floating on the water column, no targets exist for the beach or benthic litter.

4.7.3 Shoreline management strategy

The Shoreline Management Strategy outlines a strategy for shoreline management in support of overall coastal zone planning and decision-making as envisioned in Kenya's ICZM action framework. The strategy identifies key management issues faced by the Kenyan shoreline, recommends shoreline management policies and objectives in response to these observed issues and finally outlines strategies to achieve these policies and objectives. In the strategy, the Kenyan shoreline is divided into cells and accorded cell-specific recommendations. The strategy recognizes potential and real challenges posed by solid waste pollution from ships, urban runoff, and direct littering in estuaries and the sea. The strategy further recommends strengthening of solid waste management systems and enforcement of sectorial regulations to curb solid waste leakage into the marine environment.

4.7.4 The National Solid Waste Management Strategy, 2014

The National Solid Waste Management Strategy was developed to guide sustainable solid waste management in Kenya and ensure a healthy, safe and secure environment for all. The Strategy is a deliberate and visionary commitment for the country in the management of solid waste and is premised on Zero waste as a guiding principle that encompasses harnessing waste to create wealth, employment and reduce pollution of the environment.

The strategy employs a multi-stakeholder approach to achieve a broad range of interventions encompassing legislation and policy formulation, promotion of waste segregation and public awareness, waste resource recovery and development of waste infrastructure. In the long term, the strategy aims to achieve 80% waste recovery and 20% sanitary landfilling in a sanitary landfill by 2030. The strategy committed to employing financial incentives, legislation, advocacy and institutional instruments to achieve its targets. The strategy however fails to recognize marine litter as an important pollutant in the marine environment nor its connection to land-based solid waste management

4.8 Linkages with other Action Plans

Several other action plans have been developed to support existing safeguards that respond directly or indirectly to marine litter. The action plans present opportunities to build synergies with this action plan through harmonized approaches and trained focus on identified priority areas.

4.8.1 Western Indian Ocean Regional Action Plan on Marine Litter

Nairobi Convection developed a regional Western Indian Ocean Regional Action Plan on Marine Litter (WIO-RAPMaLi) in 2018 in response to Decision CP7/2 to implement the GPA within the context of the Amended Nairobi Convention and the Protocol on Land-Based Sources and Activities, with the support of UNEP. The action plan identified 12 actions under five broad themes: Stakeholder engagement; Policy and legal frameworks; Operations for removal and reduction of marine litter; Education and outreach; and Monitoring, research and reporting.

The NMLMAP fulfils Action 2 under the Stakeholder Engagement theme calling for the development and implementation of a model national management plan for marine litter. WIO-RAPMaLi foresees the implementation of this action as a vehicle that will promote effective collaboration between Agencies and other parties, provide best practice guides for different sectors and foster integration of marine litter issues in other sectors

4.8.2 Integrated Coastal Zone Management Action Plan

Integrated Coastal Zone Management (ICZM) has been adopted in Kenya as a resource management and development tool for Kenya's coastal zone resources. The ICZM action is developed to enhance coordination and integration across the relevant sectors in the management of these resources and ameliorate existing duplications, overlaps and inconsistencies. Indeed, the ICZM brings on board most of the stakeholders with direct and indirect mandates on marine litter. The current ICZM action plan (2019-2023) recognizes land-based sources and activities associated with solid wastes and effluents from municipal wastes and plastics which constitute marine litter. The action plan calls for strengthening enforcement of relevant regulatory frameworks to address pollution of coastal zones and the development and implementation of strategies and plans to address pollution in the coastal zone including marine litter. This NMLMAP is thus the fulfilment of the recommendation of the ICZM Action Plan (2019-2023).

4.8.3 Kenya Plastic Action Plan

The Kenya Plastic Action Plan was developed by the Kenya Association of Manufacturers (KAM) in recognition of the rise of the negative impacts caused by increased leakages of plastic waste into the environment. KAM as the umbrella organization of the manufacturing sector articulates their unified position to inform the preparation of a suitable and sustainable policy framework on plastics in Kenya. The Action Plan incorporates policy suggestions and sustainable funding mechanisms to enable circular economy concepts for the environmentally sustainable use and recycling of plastics in Kenya. Some of the proposed strategies for reduction of challenges associated with plastic include the establishment of financial and organizational bases such as tax incentives, Extended Producer Responsibility (EPR) schemes; development of a systematic recycling structure, adoption of waste segregation and collection best practices among others.


WHAT WE DO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CHAPTER 5: THE ACTION PLAN

5.1 Strategic objectives and actions

This chapter identifies a number of actions in conformity with the objectives and principles of the action plan and is well informed by the findings on main items, materials, amounts and sources of marine litter. It is divided into four themes: 1) Prevention and reduction of litter from land-based sources, 2) Prevention and reduction of litter from sea-based sources, 3) Preventing and reducing transboundary waste and 4) Activities to support the implementation of the plan

5.1.1 Thematic area 1. Prevention and reduction of litter from land-based sources

The amount of marine litter reaching the marine and coastal environment can be reduced significantly by preventing waste generation and reducing solid waste leakage into the environment at the point of generation.

5.1.1.1 Strategic Objective 1. Promote prevention and reduction of litter from land-based sources

The ideal waste management practice is to prevent waste from being generated. Even though preventive and reduction measures are recommended as the first step to solid waste management, few of these practices have been adopted due to the challenges faced during implementation. Preventive measures require the synergy of production technologies and product designs, sustainable waste management and sound policies and regulations. Despite the ban on plastic carrier bags and the ban on single-use plastics in protected areas that were introduced to prevent plastic pollution, lack of awareness on the impacts of marine litter and use of eco-friendly alternatives has hampered the attainment of plastics-free oceans in Kenya. Challenges in marine litter prevention and reduction include; inadequate capacity to enforce the existing laws and bans, expensive plastic alternatives and lack of appropriate financing mechanisms (e.g., incentives) to promote the use of eco-friendly alternatives.

5.1.1.2 Strategic Objective 2. Promote sustainable waste management from land-based sources

Sustainable waste management from land-based sources is essential in preventing and reducing litter from land-based sources. Waste management in Kenya is facing several challenges including inadequate resources allocated to the counties to deal with the massive waste generated, use of open dumpsites, piling of waste by informal waste collectors along the streets and beaches or dumping in illegal dumpsites which leaks into the environment and lack of specific activities relating to marine litter management in the existing solid waste management strategies. Initiatives which promote recycling such as waste segregation throughout the waste value chain are key in reducing the amount of waste in the environment.

5.1.1.3 Strategic Objective 3. Promote effective waste water treatment and storm water management

A sound investment in waste water treatment and storm water management is important to reduce unnecessary leakage of waste into the environment. Sewage and storm water has been reported as one of the main contributors of microplastic pollution into the aquatic environment. Currently, there are inadequate sewage treatment plants in the coastal counties, with Mombasa County having only one operational sewage treatment plant whereas some counties such as Lamu, Tana River, Kwale and Kilifi have no sewage

treatment infrastructure. There are no known storm water treatment facilities developed to treat storm water before discharging to receiving water. There is a need to adopt new and improve on the existing wastewater treatment technologies in each county to retain microplastics. Storm water infrastructure also needs to be constructed to reduce waste leakage into the waterways.

5.1.1.4 Strategic Objective 4. Integrate and promote circular economy in solid waste management

The circular economy is defined as an economic model in which resources are used more efficiently through the three guiding principles of reducing, reusing and recycling. In the circular economy, waste is re-introduced at the processing stage as a resource thus closing the loop. The application of the circular economy concept offers solutions for the management of solid waste by avoiding the associated negative externalities thus protecting the environment. In Kenya, the circular economy is at the infancy stage. There have been discussions on its implementation and the recommendations on the way forward suggested as contained in "The Kenya Plastic Action Plan'' developed by the Kenya Association of Manufacturers. However, no law or guidelines currently exist on the implementation or enforcement of the circular economy. Nevertheless, there is government and private sectors' commitment to managing plastic waste. The government has provided tax incentives to investors in plastic recycling (15% Corporate Tax for investors operating a plastic recycling plant for the first 5 years and VAT Exemption on services offered to plastic recycling plants and supply of machinery and equipment used in the construction of the plants.

The main challenges in implementing the circular economy include the many inter-county levies imposed on transporting collected waste for recycling, lack of a dedicated framework at national and county levels to guide efforts to promote a circular economy; overlapping, duplicated and contradicting legislation under different sectorial mandates that complicate compliance and enforcement requirements which obscure circular economy opportunities; inadequate or lack of awareness on the circular economy concept, their applications and benefits in the country; inadequate capacity to implement circular economy measures; lack of appropriate financing mechanisms, some products contain an unfavourable mixture of material which lowers the recycling value; the lengthy process of obtaining licenses that are required for moving waste and stiff competition of recycled material and virgin material in terms of price, quality and availability. To achieve a sustainable circular economy, there is a need to provide incentives to all relevant stakeholders to encourage them in the recycling industry.

5.1.2 Thematic area 2. Preventing and reducing litter from sea-based sources

The sea-based sources of marine litter are mainly ship, fishing vessels, leisure boats and offshore platforms. Better management of waste delivered ashore and waste management on board is important to reduce and prevent sea-based marine litter. Measures to reduce and prevent marine litter from sea-based sources should therefore begin with the provision or improvement of reception facilities for all types of ship-generated waste and cargo residues, in particular solid waste and garbage, at ports, fishing harbours, marinas and beach resorts. Kenya Ports Authority and County Government must receive the waste that is generated from the normal operation of the ships and boats. The County Government must accept the responsibility for further management and treatment of garbage.

5.1.2.1 Strategic Objective 5. Promote prevention and reduction of litter from sea-based sources

Waste prevention and reduction at sea are important in reducing sea-based waste that leaks into the ocean. To achieve this, the development, implementation and enforcement of relevant regulations as well as the adoption of best practices for sea-based waste are key. Existing new technologies should also be adopted to be able to trace sea-based marine litter polluters for appropriate actions.

5.1.2.2 Strategic Objective 6. Promote sustainable waste management of litter from sea-based sources

Sea-based sources of waste include waste maritime industry, ferries, tourism boats, offshore platforms and fishing boats. Enforcement of relevant legal frameworks that prevent disposal of wastes at sea will greatly reduce litter leaking into the ocean. The development and upscaling of waste facilities onshore and provision of waste bins in ships and vessels are also vital in managing wastes from sea-based sources. In addition, there is a need to develop and disseminate the best waste management practices. Development of programmes such as fishing gear return schemes will be very key in addressing litter originating from the fisheries sector.

5.1.3 Thematic area 3. Preventing and reducing transboundary waste

Transboundary sources of sea-based marine litter present unique challenges in marine litter management. The complexities including transportation by oceanic current, transport litter beyond the production jurisdiction thus making litter a global problem that requires global solutions.

5.1.3.1 Strategic Objective 7. Promote prevention and reduction of transboundary waste

Approaches tailored to augment existing multilateral instruments can be pursued including harmonized regional reporting in furtherance to the MARPOL convention, broader collaboration and coordinated effort by neighbouring states pursuant to the spirit of the Regional Seas approach, as well all greater regional implementation of IMO regulations

5.1.4 Thematic area 4. Activities to support the implementation of the action plan

Implementation of this Action Plan requires an enabling environment for success. These include adequate public participation, cross-sector, county, national and international partnerships and cooperation, targeted research to generate required scientific knowledge, effective involvement of stakeholders in implementation, adequate education and training, information sharing and public awareness.

5.1.4.1 Strategic Objective 8. Support litter removal activities

Two approaches for dealing with the marine litter problem are to prevent and reduce marine litter input to the marine and coastal environment and to remove accumulated litter that is already discarded, disposed of and abandoned in the environment. Measures for removing existing marine litter include beach and sea bottom clean-up operations. A variety of beach clean-up activities are being undertaken by national agencies, County Governments, volunteers, NGOs and local communities. There is a further need to properly clean all decommissioned dumpsites close to marine environments to reduce long-term impacts through seepage of leachate. Seabed clean-up activities that are not currently being practiced in Kenya but could be promoted by the application of modern technologies and through experienced scuba divers. The introduction of economic instruments/ incentives to encourage fishermen to deliver marine litter caught during

fishing operations to reception facilities in ports and beaches instead of throwing it overboard back into the sea is a promising option. All the recovered litter should be treated in an environmentally friendly manner after collection.

5.1.4.2 Strategic Objective 9. Promote education and awareness on marine litter management

Education and outreach activities are key in any efforts to prevent and reduce the amount of marine litter. The implementation of better waste management strategies and practices will reduce the generation of marine litter at the source but may not resolve the marine litter problem as a whole. There is a need to bring about a change in attitudes and behaviours of target groups as well as the general public on how to handle the waste. To raise the awareness of everyone's responsibility to prevent marine litter pollution, a variety of education and training programmes on the sources and effects of marine litter, and ways to resolve the problem, for different target groups is needed. Clean-up campaigns are one of the ways to raise public awareness. Increased public awareness in the whole society often pushes political decision-making for better control and management of marine litter. Public awareness campaigns should be targeted at beach areas, public boating and marinas, and public parks where the impacts of littering could be demonstrated on the impacts of marine litter on wildlife and habitat areas. Community-based education programmes are necessary to fully engage the public in protecting their environment and existence. Specialized educational programmes for subsistence and commercial fishing are needed to help address derelict fishing gear and equipment issues related to wildlife entanglements and habitat damage. Introducing litter management in the education curriculum is also key in inculcating responsible culture in our future generation.

5.1.4.3 Strategic Objective 10. Strengthen the engagement of stakeholders in marine litter management

Reduction of plastic litter input into the marine environment requires promotion and support of changes in plastic production and consumption as well as waste management. Forging partnerships with the private sector, NGOs and the scientific community is important for effective addressing of marine litter problems. Current approaches to marine litter pollution are frequently directed to specific parts of a source-to-sea system and/or a single sector, making them ill-suited to address all sources of marine plastic pollution. This is further compounded by factors such as weak collaboration between collectors, transporters and government institutions, lack of voluntary agreement to promote waste management, inadequate involvement of the private sector in financing waste management and general lack of coordination of stakeholders in the waste management sector. There is therefore a need for a full understanding of the relevant stakeholders at the different levels and mechanisms for engagement designed and implemented. These stakeholders need to collaborate and take coordinated actions to prevent marine plastic pollution at its source. Full engagement of the private sector in marine litter issues is necessary to identify economically viable strategies for preventing marine plastic pollution

5.1.4.4 Strategic Objective 11. Strengthen research and monitoring programmes

Data generated through assessments and monitoring programs are necessary to inform measures, set priorities, and eventually evaluate the effectiveness of measures undertaken. Whereas assessments of the distribution of litter have been carried out along the Kenya coast, limited information is available on sources, sinks, and economic costs related to the impacts of marine plastic pollution. There are no long-term monitoring and assessment programmes that are ongoing. Most marine litter studies are descriptive and not based on clear, measurable targets and indicators. Financial support and capacity

building are required to develop and maintain the necessary assessment and monitoring programmes and to manage the growing data requirements for global commitments. Furthermore, there are diverse monitoring procedures for marine litter being used in Kenya thus making spatial or temporal comparisons difficult if not impossible. There is a need to develop or improve technologies for wastewater management and monitoring waste at the sea. Targeted research on the identification of sensitive and hotspots areas is also urgently required.

5.1.4.5 Strategic Objective 12. Encourage data and information sharing

Sharing Best Management Practices success stories and other activities that have worked in one locality might provide some guidance for use in other localities. However, in Kenya, there is a weak working relationship between key stakeholders and inadequately financing of meetings and conferences where issues can be presented and discussed thus contributing to low knowledge sharing. There is a need for coordinated collation of data and centralized processing and archiving in an online database that can be accessed by all stakeholders. Key to this process is the development and sharing of common data and information templates and the submission of relevant metadata.

CHAPTER 6: IMPLEMENTATION OF THE PLAN

The implementation of the plan will be coordinated by NEMA under the guidance of ICZM Steering Committee. The implementation plan is presented in the implementation matrix. It describes actions, outputs and their performance indicators, leads and support agencies to spearhead implementation, timeframe and budget required for implementation in each thematic area.

The lead implementing agencies are required to domesticate this plan into their agency national plans and provide targets, means of verification for monitoring of progress towards implementation

Thematic Area	Strategic objective	Action	Outputs	Key Performance Indicators	Potential partners	Timeframe (Year)	Budget (Million)
1. Prevention and reduction of litter from land-based sources	1. Promote prevention and reduction of litter	Identify and promote source reduction measures through product innovation and product design	**OP 1.** Upgraded source reduction measures Adoption of minimalist approach in manufacturing	Types of product designs embraced by manufacturers Number of operational innovative product materials introduced in the market Products with long durability for reuse, recycling and materials reduction in weight and toxicity.	**KIRDI** KAM, Manufacturers and recyclers	2-10	50
		Promote the use of eco-friendly alternatives to plastics	**OP 2.** Reduced use of plastics	Number of eco-friendly consumer products	**CS** CBOs, BMUs, KATO, KWS, Govt Agencies	2-10	15
		Identify and promote the use of biodegradable products through the provision of short-term subsidies to local businesses to support the transition	**OP 3**. Increased provision of environmentally friendly products	No. of recyclable and biodegradable options made available	**MoE&F** CG	10	10
		Promote reduction, phasing out and replacement of micro-beads and single-use plastic	**OP 4.** Reduced use of micro-beads and single-use plastic products (SUPs)	Number of cosmetic products introduced to the market without microbeads % reduction in the quantity of single-use plastics produced % reduction in the number of cosmetic products with microbeads	**MoE&F** KAM, Civil Society (CS), NEMA	3-10	10
		Encourage establishment and use of water refill stations	**OP 5.** Reduced use of SUPs	% reduction in the number of single-use plastics produced	**MoE&F** KAM, Civil Society (CS), NEMA	3-10	10
		Develop and implement best practices to reduce the loss of plastic pellets during production and transport	**OP 6.** Reduced loss of plastic pellets	Quantity of plastic pellets in the environment Best practices in place being used	**NEMA** KAM, Manufacturers and recyclers	1	20

		Encourage establishment and use of water refill stations	**OP 5.** Reduced use of SUPs	% reduction in the number of single-use plastics produced	**MoE&F** KAM, Civil Society (CS), NEMA	3-10	10
		Develop and implement best practices to reduce the loss of plastic pellets during production and transport	**OP 6.** Reduced loss of plastic pellets	Quantity of plastic pellets in the environment Best practices in place being used	**NEMA** KAM, Manufacturers and recyclers	1	20
		Mobilize resources to improve the capacity for integrated waste management practices.	**OP 7.** Improved waste management capacity	Number of waste bins installed Number of solid waste transportation vehicles	**NEMA** CG, NGOs, MoE&F	1-10	100
		Introduce mandatory provision of ashtrays on beaches	**OP 8.** Ashtrays introduced on beaches	Number of cigarette ashtrays installed in public areas, outside restaurants and bars Reduced number of cigarette butts on the beach	**NEMA** Hoteliers, BMUs, KWS	1-2	10
		Ensure all national and local waste prevention and management plans make reference to marine litter, its impacts and removal measures	**OP 9**. Increased recognition of marine litter as a problem both locally and nationally	Number of revised or newly developed national and local waste prevention and management plans with particular focus on marine litter	**NEMA** CG	1-5	30
		Integrate marine litter into the national legislation on solid waste management	**OP 10**. Increased recognition of marine litter as a national problem	Number of new or revised legislation dealing with marine litter	**MoE&F** NEMA, State Agencies, CG	1-4	20
		Strengthen the infrastructure for compliance with existing waste management legislation	**OP 11.** Adequate waste management infrastructure in place	No. of transfer stations in place No. of segregation waste bins in place No. of waste collection vehicles No. of designated disposal sites	**CG** CBOs, CDA, NGOs, BMUs,	1-10	9000
		Enforce the ban on SUPs and carrier bags in Protected Areas	**OP 12.** Reduced litter in Protected Areas	Number of offenders prosecuted	**NEMA** KCGS, KWS, BMUs,	1-10	20
		Enforce smoking in designated public areas, outside restaurants and bars	**OP 13** Reduced litter leakage into the marine environment	Reduced number of cigarette butts in the beach	**NEMA** CG	1-10	20

		Enforce no-littering policy in national parks and protected areas	**OP 14.** Reduced amount of litter in parks and protected areas	% reduction of the quantity of litter in national parks and protected areas The number of prosecutions.	**KWS** NEMA, BMUs, KCGS, KFS	1-10	30
		Promote and pilot existing regional and international eco-certification such as Blue Flag and Green Globe Certification programmes	**OP 15.** Waste minimization programmes in place	No. of certified organizations and institutions No. of national strategies incorporating eco-certification programmes	**NEMA** CS, NGOs, association of hoteliers, marinas, KATO, KEPSA	1,4,7,10	8
	2. Promote sustainable solid waste management and resource efficiency	Establish a national working group on marine litter assessment and management	**OP 16.** Enhanced national coordination of marine litter assessment, monitoring and management	Operational working group	**NEMA**	1-10	30
		Improve access and provision of infrastructure for collection and treatment to informal areas	**OP 17.** Increased collection of waste from informal areas	Number of additional small scale waste collectors licensed Number of households with access to regular waste collection services	**CG** CDA, waste collectors and transporters, CBOs, NGOs	1-10	900
		Strengthen and implement waste audit during collection, transportation and disposal	**OP 18.** Increased assurance of waste delivery to designated dumpsites Improved tracking and disposal of waste	Increased % of collected waste reaching designated dumpsites	**NEMA** CG	1-10	450
		Develop and publicize the list of waste collectors and transporters and their area of operation	**OP 19.** Increased waste collection and transportation to dumpsites	One operational online database in each coastal county % increase in waste collected and transported	**NEMA** CG	1-10	90
		Develop code of conduct for responsible waste collection and transportation and recycling	**OP 20.** Responsible waste collection, transportation and recycling code of conduct	Progress of adoption of code of conduct	**NEMA** CG	1	2
		Ensure timely collection and transportation of waste to avoid leakages	**OP 21.** Reduced leakage of litter to the environment	% adherence to transport schedules	**CG** NEMA	1-10	10

		Develop a mechanism for licensing transportation of separate waste categories	**OP 22.** Improved waste segregation practice along the entire value chain	Number of re-issued waste specific transportation licenses	**NEMA** CG, CBOs, waste transporters	1-2	5
		Set up adequate and appropriately labelled waste segregation bins in streets, residential areas, recreational beaches and protected areas	**OP 23.** Enhanced waste segregation	Number of waste bins installed in strategic places	**CG** KWS, BMUs, CBOs, NEMA	1,3,5,7,9	45
		Link and audit informal waste collectors, transporters, recyclers	**OP 24.** Increased waste collection and transportation to dumpsites	Number of informal collectors, transporters, recyclers	**CG** NEMA	1-10	90
			OP 25. Reduced leakage of litter into the environment				
			OP 26 Increased coverage of waste				
		Ensure all disposal sites close to waterways are identified, mapped and decommissioned and any proposed ones informed by sound science	**OP 27.** Reduced marine litter pollution from the dumpsite	Number of disposal sites identified and mapped Number of dumpsites close to waterways decommissioned manufacturers, brand owners and first importers	**NEMA** CG, KMFRI, Universities, NGOs	2-3	9
		Ensure all dumpsites and landfills are well protected with low permeability linings	**OP 28.** Reduced marine litter pollution from landfills and dumpsites imperviously lined	Number of dumpsites and landfills meeting NEMA guidelines	**CG** NEMA	1-10	900
		Enforce provisions of waste management regulations with regards to waste transportation	**OP 29.** Reduction of fly-away litter from trucks	Number of offenders prosecuted and licenses withdrawn % of trucks adhering to the truck-covering requirement	**NEMA** NTSA, CG, NPS	1-10	180
		Ensure strict enforcement of waste management in the transport industry (public transport) and provide clear guidelines on disposal of collected waste	**OP 30.** Reduced litter leakage into the environment	Amount of litter on highways Number of compliant vehicles	**NTSA** CG, NPS	1-10	1200

		Promote Extended Producer Responsibility strategies requiring producers, manufacturers, brand owners and first importers to be responsible for the entire life-cycle of the product	**OP 31.** Increased responsibility of producers, manufacturers, brand owners and first importers	Number of Extended Producer Responsibility schemes adopted	**NEMA** KAM	1-10	100
			OP 32. Increased enforcement of Polluter Pays Principle	Number of policy instruments-pollution tax			
		Expand existing beach patrols in MPAs to other major recreational beaches	**OP 33.** Enhanced enforcement of no littering on the beaches	Number of beach patrols carried out	**CG** BMUs, KCGS	1-10	400
		Enforce provisions of waste management regulations on waste minimization and segregation throughout the waste value chain	**OP 34**. Reduced leakage of waste into the environment	% reduction in the amount of waste in the environment Number of successful waste segregation initiatives in the waste value chain	**NEMA** CG, KWS	1-10	90
		Develop and enforce specialized marine litter waste management strategies for public events	**OP 35.** Reduced amount of marine litter generated from public events	Number of operational waste management strategies put in place	**NEMA** CS, BMUs, CG	2-10	80
		Revise the existing sectoral legislation, waste management regulations and strategies to encompass marine litter and accommodate wastes from the recycling industry.	**OP 36.** Increased anchorage of marine litter in law	Number of revised sectoral legislation, waste management regulations and strategies	**MoE&F** CG, KWS, NEMA, KeFS, KCGS, KFS	1-4	20
			OP 37. Reduced litter from the recycling industry				
		Secure co-financing for waste management operational activities through economic incentives, fees, charges, deposit funds or taxes)	**OP 38.** Increased resources to finance waste management	Number of successful economic incentives introduced and adopted Number of stakeholders co-financing waste management	**MoE&F** CG, KWS, Hoteliers,	2-10	8
		Enforce the guideline for COVID-19	**OP 39.** Reduced COVID-19 related litter into the environment	Number of COVID-19 masks littered Number of cases prosecuted	**NEMA**	1-10	100

	3. Promote effective wastewater treatment and storm water management	Promote and facilitate the expansion of wastewater infrastructure (i.e., to cover the informal sector)	**OP 40.** Increased treatment of wastewater to retain microplastic from entering waterways	% increase in the number of wastewater treatment infrastructure coverage in informal areas	**CG**	2-4	1000
			OP 41. Expanded wastewater treatment infrastructure to informal areas				
			OP 42. Reduced waste leakage into the ocean				
		Promote and facilitate expansion of storm water treatment infrastructure (i.e., to cover informal sector)	**OP 43.** Increased treatment of storm water to retain microplastic from entering waterways	% increase in the number of storm water treatment infrastructure coverage in informal areas	**CG**	2-4	1000
			OP 44. Expanded storm water treatment infrastructure to informal areas				
			OP 45. Reduced waste leakage into the ocean				
		Adoption of new technologies in WWTPs and storm water treatment	**OP 46.** Reduced amount of solid waste and microplastic entering waterways	Number of functional wastewater and storm water treatment technologies adopted At least 2 WWT adopted per county	**CG** NEMA	2-4	2000
			OP 47. Improved technology for WWTs and storm water treatment				
		Enforce provisions of waste management regulations on waste treatment and disposal	**OP 48.** Improved solid waste management	Number of licenses withdrawn Reports of waste management violations Number of cases prosecuted	**NEMA** CG, MoH, KWS, KCGS, KFS	1-10	30
	4. Promote circular economy	Integrate circular economy concept into waste management regulation and strategies	**OP 49.** Adoption of circular economy concept in solid waste management	Number of policy instruments and strategies incorporating the circular economy concept	**MoE&F** CG, NEMA	1-4	20
		Encourage organizations and individuals to vigorously recycle and reuse plastic.	**OP 50.** Reduced amounts of waste leaking into the environment	Increase in recycling and reuse rates Number of newly licensed	**NGOs**	1-10	100

			OP 51. Adoption of circular economy concept by stakeholders	recyclers Number of organizations practicing circular economy and green growth	CBOs, KAM, manufacturers and recyclers		
		Provide incentives to promote the recycling industry	**OP 52.** Increased recycling initiatives **OP 53.** Reduced amount of waste discharged into the environment	Number of levies and taxes waived by county and national government Number of reward schemes introduced and implemented	**MoE&F** CG, CoG	2-10	16
		Strengthen return for payment schemes	**OP 54.** Increased reuse of bottles, containers and cans **OP 55.** Reduced amount of waste discharged into the environment	Number of return for payment schemes introduced and implemented	**MoE&F** CG, CoG	1-10	100
		Undertake zoning to encourage industrial symbiosis (i.e., waste from one industry to be used as raw material in another industry)	**OP. 56** Reduced amount of waste discharged into the environment	Number of zones created % reduction in the amount of waste released into the environment	**MoL&PP** NEMA		
2. **Prevention and reduction of litter from sea-based sources**	5. Promote prevention and reduction of litter	Introduce and enforce the use of marked fishing gear to identify its owner or user	**OP 57.** Increased responsibility in fishing gear management **OP 58.** Reduced fisheries-related marine litter	Number of marked fishing gears The number of freshly issued licenses requiring compliance with marked gear requirements.	**KeFS** KCGS, BMUs	1-10	1000
		Encourage the establishment of fuel refill stations	**OP 59.** Reduced use of disposable containers	% reduction in the number of disposable containers produced	**KMA** EPRA, KCGS	3-10	10
		Identify and promote source reduction measures through product innovation and design	**OP 60.** Upgraded source reduction measures Adoption of minimalist approach in manufacturing	Types of product designs embraced by manufacturers Number of operational innovative product materials introduced in the market Products with long durability for reuse, recycling and materials reduction in weight and toxicity.	**KIRDI** KAM, Manufacturers and recyclers	2-10	50

		Adopt and implement fishing methods that minimize the loss of fishing gears	**OP 61.** Reduced losses of fishing gears	Number of newly adopted fishing methods	**KeFS** NGOs, CBOs	1-10	90
			OP 62. Increased compliance to FAO code of conduct for responsible fisheries	Number of fishermen complying with FAO code of conduct for responsible fisheries	**KeFS** NGOs, CBOs	1-10	9
	6. Promote sustainable waste management	Establish and ensure proper operations of solid waste management facilities on beaches	**OP 63.** Increased amount of sea-based waste collected and properly disposed	Number of waste receptor facilities installed along the Kenyan shoreline	**CG** KPA, KFS, KeFS, KCGS, NEMA, KMA, BMUs	1-2	100
		Introduce and implement initiatives that promote take back schemes s for sea-based litter	**OP 64.** Improved waste management	Extended Producer Responsibility strategies developed and adopted Number of deposit-refund systems introduced and adopted Number of return and restoration schemes for derelict fishing gears established and operational in each county	**MoE&F** KAM, NEMA, KPA, KMA, KFS	2-10	60
		Enforce the existing national legislative instruments with a bearing on marine litter	**OP 65.** Increased compliance to marine litter related legislative instruments	Number of offenders prosecuted Reduced cases of non-compliance	**NEMA** KCGS, KMA, KWS, KeFS, Kenya Ferry	1-10	50
		Promote EPR strategies requiring producers, brand owners and first importers to be responsible for the entire product life-cycle	**OP 66.** Increased responsibility of producers, manufacturers, brand owners and first importers	Number of Extended Producer Responsibility schemes adopted	**NEMA** KAM	2-4	30
		and marinas	**OP 70.** Increased compliance to the requirements of Annex V of the MARPOL Convention		KPA, KFS, KeFS, KCGS, NEMA		
		Enforce the requirement to retain vessel-based waste on board until its discharge in the authorized waste receptor facility	**OP 71.** Increased amount of sea-based waste collected and properly disposed	% increase in the number of vessels implementing waste audit onboard Number of violators prosecuted	**KMA** KCGS, KWS, KeFS,	1-10	10

3. Promote prevention and reduction of transboundary waste	7. Promote prevention and reduction of transboundary waste	Develop harmonized methodologies and promote regional reporting in relation to MARPOL Convention.	**OP 72**. Improved data collection on waste from sea-based sources	Increased number of operational regional waste databases	**KMA** KPA, NEMA, KCGS	1-3	30
		Support regional implementation of IMO regulations	**OP 73.** Increased domestication of IMO regulations	Number of IMO regulations adopted and in operation	**KMA** KPA, NEMA, CGS	1-10	10
		Collaborate with neighbouring states in waste management	**OP 74**. Improved collaboration in waste reduction and management	Number of active collaborations in enforcement, provision of port waste reception facilities and waste audit	**KMA**	1-10	50
4. Activities to support the implementation of the plan	**8** Support marine litter removal activities	Identify disused dump sites and clean up the waste which poses a risk to the marine environment	**OP 75**. Reduced litter pollution risk to the marine environment	Number of cleaned dumping sites	**CG** CBOs, NGOs,	1-2	200
		Identify and promote market-based economic	**OP 76**. Reduced amount of marine litter in the ocean	Number of operational economic incentive programs	**CG**	1-10	100
		instruments for the removal of marine litter	**OP 77.** Increased amount of litter recovered from the environment	dealing with marine litter removal and remediation Quantity of litter retrieved from the marine environment	NEMA, NGOs, CBOs, BMUs		
		Facilitate and support public participation, in regular clean-ups	**OP 78**. Reduced amount of marine litter in the ocean	Number of clean-up activities conducted Number of school children, youth and other stakeholders involved in clean-up activities	**NEMA** State agencies, CBOs, NGOs	1-10	500

		Engage fishermen to collect litter caught in fishing nets during normal fishing	**OP 79**. Increased retrieval of marine litter from the sea	Quantity of waste collected from the sea and properly disposed of by fishermen in landing sites waste receptor facilities Number of fishermen actively participating in the programme	**KeFS** BMUs, KCGS, KMFRI	1-10	10
		Encourage stakeholders to organise and participate in clean-ups	**OP 80**. Increased public participation in reducing litter in the marine environment	Number of beaches, floating and benthic clean-ups activities conducted Number of people involved in clean-up activities	**NEMA** BMUs, CBOs, CG, KMFRI	1-10	10
	9 Improve education and awareness on marine litter	Provide training to staff from national/ county governments, port authorities and other stakeholders on the	**OP 81.** Enhanced awareness on marine litter, their sources, impacts and mitigation measures of marine litter pollution	Number of trained communities, ship crews, fishermen and port users The number of staff from national/ county governments, port authorities trained	**KMA** NEMA, KPA, KMFRI, KWS, KCGS, KeFS	1-10	50
		prevention and control of marine litter	**OP 82.** Increased knowledge on prevention and control of marine litter				
		Conduct training on litigation, enforcement, compliance, monitoring and prosecution of illegal discharges from land-based sources and vessels.	**OP 83.** Enhanced capacity on waste discharge from land-based sources	Number of trained officers	**KMA** KCGS, CG, KWS, KeFS, KFS, WRA, NEMA	1-10	50
		Develop curricula for marine-related education for professional seafarers and the recreational sector (diving school and Bandari college)	**OP 84.** Enhanced knowledge on marine litter and its impacts among seafarers and the recreational sector	Revised curriculum that integrates marine litter management	**KMA** KPA, NGOs, CBOs, NEMA, KMFRI	1-3	10
		Integrate issues of marine litter into formal education curricula	**OP 85.** Increased awareness on marine litter and its impacts among school pupils and students	Revised curriculum that integrates marine litter management	**KICD** NEMA, KMA, KMFRI	1-3	10

		Collate and communicate best management practices, case studies and lessons learnt on marine litter management at the community and national levels to stakeholders	**OP 86.** Increased awareness on best waste management practices at community and national levels	Number of best management practices, case studies and lessons learnt on marine litter management developed and disseminated	**NEMA** CG, state agencies	1-10	10
		Support community-based public education and awareness campaigns for marine litter prevention	**OP 87.** Increased awareness on marine litter and its impacts	Number of community-based public education and awareness campaigns conducted	**NEMA** NGOs, CBO,	1-10	50
		Incorporate marine litter issues into national and county calendars and environmental events	**OP 88.** Increased awareness on marine litter and its impacts	Number of marine litter related events	**NEMA** CG, BMUs, CBOs, NGOs	1	1
		Promote the "Adopt a beach" program	**OP 89.** Increased responsibility in marine environment management	Number of beaches adopted and effectively managed	**NEMA** Hoteliers, NGOs, CBOs, state agencies	2-3	10
		Build capacity of Beach Management Units (BMUs) to receive, segregate and temporary store waste generated from artisanal fishing and recreational activities	**OP 90.** Improved capacity of BMUs in waste management	Number of BMUs trained on waste management	**CG** KPA, KFS, KeFS, NEMA, CBOs, NGOs	1-2	30
		Build capacity, educate and formalize unlicensed waste collectors	**OP 91.** Enhanced capacity of waste collectors and transporters	Number of waste collectors trained and capacity built Number of new licenses issued	**CG** NGOs, CBOs	1-10	50
	10 Strengthen the engagement of stakeholders collaboration and coordination	Promote collaboration between waste collectors, transporters, recyclers, and institutions (Government, NGOs)	**OP 92.** Enhanced collaboration along the waste value chain	Number of waste collectors, transporters, recyclers, and institutions collaborating Number of joint activities implemented	**NEMA** CG, KAM, Manufacturers and recyclers	1-10	10
		Promote the involvement of producers, importers and retailers in waste reduction	**OP 93.** Increased collaboration in the management of waste	Number of resource-efficient product value chains established Number of producers,	**NEMA** KAM, KIRDI, KAWR	1-10	10

				importers and retailers financing waste collection and treatments Number of deposit-refund systems for bottles, containers and cans introduced.			
		Promote collaboration and cooperation between impacting and impacted counties on solid waste management	**OP 94.** Enhanced collaboration on waste management	Number of counties actively involved in the reduction and addressing marine litter issues	**CoG** CG	1-10	10
		Involve relevant stakeholders in the policy-making process and the policy implementation	**OP 95.** Increased ownership of policies	Number of policies development through enhance public participation Number of stakeholders involved in policy development process	**MoE&F** All relevant state and non-state actors	1-10	10
		Strengthening umbrella associations dealing with waste collection, transportation and recycling	**OP 96.** Increased collection, transportation and recycling of waste	Number of umbrella associations with enhanced capacity	**NEMA** CG, KAM, KAWL	1-10	20
		Strengthen institutional arrangements with clearly defined responsibilities	**OP 97.** Enhanced coordination of solid waste management	Number of stakeholders involved in SWM with clearly defined roles from waste generation to disposal	**NEMA** All relevant state and non-state actors	1	1
		Support international cooperation in capacity building and infrastructure development	**OP 98.** Increased international cooperation and collaboration in improving waste management in coastal, urban and rural areas	Number of developed and improved waste infrastructure Number of international cooperation in waste management	**MoE&F**	1-10	10
		Enhance cooperation and coordination with global marine initiatives	**OP 99.** Enhanced international corporations in matters of marine litters	Number of active collaborations with UNEP GPA, regional seas, The Global Partnership on Waste Management and Honolulu Strategy on marine debris.	**MoE&F** NEMA	1-10	10

		Encourage civil society to develop partnerships and voluntary agreements to reduce the generation of marine litter	**OP 100.** Increased partnership in reducing marine litter	Number of operational voluntary agreements addressing marine litter issues	**NEMA** CBOs, BMUs, NGOs	1-10	10
		Stimulate and promote Public Private Partnership (PPP) in developing integrated solid waste management and waste water treatment solutions	**OP 101.** Increased investment in solid and wastewater management solutions **OP 102.** Reduced marine litter leakage into the environment	Number of PPP investments in solid and wastewater management Number of solid waste management and waste water treatment solutions developed	**MoE&F** State agencies, CBOs, BMUs, NGOs	1-10	100
	11. Strengthen research and monitoring programmes	Support and promote research on environmentally sound technologies and production methods	**OP 103.** Increased waste reduction technologies and production methods **OP 104.** Reduced input of marine litter from land-based sources	Number of technologies and production methods developed and adopted % reduction of marine litter from land-based sources	**KIRDI** NEMA, KAM	1-10	1000
		Support and conduct research on the source, trends and impacts of marine litter	**OP 105.** Mobilized resources to support research	Number of resources mobilized to support research	**NEMA** KPA, KWS, KMA	1-10	1000
			OP 106. Enhanced knowledge on the contribution of litter sources, trends and impacts on the marine environment	% contribution of upstream litter sources to marine litter quantities Data on marine litter trends beach, floating and benthic litter Data on impacts of marine litter to organisms, ecosystem, human health and the economy	**KMFRI** Universities, NGOs, KWS, NEMA, KeFS	1-10	10
		Facilitate the development of new technologies and/or adoption of available technologies in WWTPs	**OP 107**. Increased technologies in WWTPs	Number of new technologies adopted and operational	**CG**	1-10	900
		Facilitate research on the effectiveness of market-based instruments related to marine litter.	**OP 108**. Enhanced market-based instruments aimed at marine litter reduction	Number of effective market-based instruments related to marine litter.	**NEMA** KMFRI, Universities	1,6,10	15
		Conduct research on areas with overlap between high-	**OP 109.** Enhanced knowledge on litter pollution	Number of litter sensitive areas identified and recommended for	**KMFRI**	1-10	100

		density marine litter areas and areas of high sensitivity (endangered species, key habitats, etc.)	sensitive areas	clean up	Universities, NGOs, KWS, NEMA, KeFS		
		Engage all stakeholders at community (local), national and regional levels through citizen science in monitoring and research efforts	**OP 110.** Enhanced partnership for scientific data collection	Number of stakeholders engaged through citizen science Number of citizen science surveys conducted	**KMFRI** Universities, NGOs, KWS, NEMA, KeFS	1-10	100
		Research best waste management practices in hotels, restaurants, marine transport and tourism industries	**OP 111.** Identified and improved best waste management practices (WMP)	Number of best waste management practices identified, improved and shared with stakeholders Number of WMP loopholes in SWM identified and addressed to minimize waste leakage into the marine environment	**KMFRI** Universities, NGOs, KWS, NEMA, KeFS	3	10
		Identify and map hotspot areas where marine litter accumulates and develop environmentally sound methods for removal and disposal of marine litter and remediation of affected areas	**OP 112.** Mobilized resources to support research	Number of resources mobilized to support research	**NEMA** KPA, KMA, KWS	1-10	100
			OP 113. Enhanced research to identify hot spot areas and develop environmentally sound methods for removal and disposal of marine litter	Number of litter hotspots areas identified and recommended for clean up Number of environmentally sound methods for removal and marine litter developed	**KMFRI** Universities	1-10	100
		Collate data and information from all relevant stakeholders	**OP 114.** Improved information dissemination	Operational database to support the development and maintenance of web-based database as a clearinghouse for marine litter information	**KMFRI** Universities, NGOs, KWS, NEMA, KeFS	1-10	30

	12. Encourage data and information sharing	Establish or strengthen an exchange platform for disseminating experiences on good practices and lessons learnt	**OP 115.** Increased information sharing among stakeholders **OP 116.** Enhanced sharing of best waste management practices and lessons learnt among stakeholders	Functional information sharing platforms on effective waste management strategies and practice Number of stakeholders in Marine Litter Information Sharing Platform (MLISP) develop	**NEMA** KMFRI, all relevant state agencies, NGOs, CBOs, Universities	1-10	50
		Disseminate information on the marine litter issue at key environmental meetings and conferences nationally and regionally	**OP 117.** Enhanced dissemination of research findings	Number of meetings and conferences where marine litter issues are presented and discussed Number of research findings published and disseminated	**NEMA** KMFRI, NGOs, all relevant state agencies, CBOs, Universities,	1-10	100
		Promote the exchange of information on waste management technologies	**OP 118.** Enhanced information sharing on technologies for improved waste management	Number of functional technologies that prevent marine litter input into oceans shared among stakeholders	**NEMA** KMFRI, NGOs, all relevant state agencies	1-10	50

CHAPTER 7: RESOURCES AND PROGRESS TRACKING

7.1 Funding the implementation of the action plan

The total budget required for implementing this action plan is 23.779 billion Kenya Shillings. The funds will be sourced by the Ministry of Environment and Forestry and the Ministry of Transport. Additional funds will be sourced by government agencies and authorities, NGOs, CBOs and the private sector implementing the action plan and through Private Public Partnership and external partners (UNEP, World Bank)

7.2 Progress reporting, monitoring and evaluation

The task lead institution is required to coordinate reporting of progress towards implementation of specific actions. The task lead institutions shall submit annual progress reports to the national task force on their implementation progress. The task force shall consolidate the reports and submit them to ICZM Steering Committee. For NEMA to effectively monitor progress, each task lead shall submit a domesticated implementation and monitoring &evaluation plan for actions set out in this Action Plan. Annual reporting against targets and assessment of the effectiveness of the Action Plan shall be undertaken as part of the monitoring process by the ICZM Steering Committee.

7.3 Review of the plan

Action Plan shall be implemented during the period 2021-2030, after which it shall be reviewed and updated.

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Designed by Anthony Diang'a / WWF-Kenya

National Marine Litter Management Action Plan

2021 - 2030

REPUBLIC OF KENYA
MINISTRY OF ENVIRONMENT
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