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*Article*

# A Short Article on Marine Litter: From Land to Sea

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**Abstract:** Marine litter, comprising persistent and human-made solid materials discarded in marine environments, poses a severe threat to Nigeria's coastal and marine ecosystems. Despite existing international, regional, and national regulations, ineffective enforcement and compliance have led to widespread environmental degradation (UNEP, 2021). This study examines the factors contributing to the proliferation of marine litter in Nigeria, focusing on regulatory gaps, insufficient waste management infrastructure, and the lack of public awareness. The findings reveal that the marine ecosystem is deteriorating due to inadequate waste disposal practices and limited understanding of the impacts of marine litter on both the environment and human health (UNEP, 2021). The paper concludes with recommendations for improving regulatory enforcement, enhancing public education, and investing in waste management infrastructure to address the growing crisis of marine litter. Throughout this article, the limited information on the impacts of marine pollution across Africa is highlighted, emphasizing the value of these insights despite their scarcity.

**Keywords:** marine litter; plastic pollution; waste management; ocean health; environmental impacts; community cleanup; single-use plastics; ecosystem disruption; lagoon pollution; sustainable practices

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## Introduction

Marine litter is an escalating global environmental issue, defined by the United Nations Environment Programme (UNEP) as any persistent, manufactured, or processed solid material discarded, disposed of, or abandoned in marine and coastal environments (UNEP, 2021). This issue is particularly critical in developing nations such as Nigeria, where a combination of regulatory inefficiencies, inadequate waste management infrastructure, and a lack of public awareness exacerbate the problem. In Nigeria, the detrimental impact of marine litter is not only an environmental concern but also poses significant health risks to humans and marine life. This paper explores the multifaceted challenges of marine litter in Nigeria, including regulatory shortcomings, public awareness deficits, and infrastructural inadequacies, and proposes potential solutions to mitigate these issues.

## The Path of Litter from Land to Sea

Marine debris originates from various sources, including careless disposal on beaches, intentional or accidental discards from vessels and offshore platforms, and even wind-blown litter from landfills. However, a substantial portion of this pollution embarks on a journey from land, carried by rainwater through storm drains, canals, and rivers, ultimately reaching the ocean.

This debris often accumulates in ocean gyres, vast rotating currents that trap and concentrate waste, forming extensive garbage patches. These patches are not solid islands of trash, as often imagined, but rather vast expanses of microplastics, tiny fragments not always visible to the naked eye. The density of debris in these areas is alarming, with millions of plastic pieces found per square kilometer.

The full extent of marine debris remains a mystery, as a significant portion sinks to the ocean floor, hidden from view. Cleaning up this submerged pollution is a daunting challenge due to the

immense size of the oceans and the difficulty of separating debris from marine life. Consequently, prevention strategies are paramount in addressing this crisis.

Governments and international organizations have enacted regulations to curb ocean dumping, while environmental groups, such as the National Geographic Society, focus on educating the public about the detrimental impacts of marine pollution. Collaborative initiatives like the Mission Blue program aim to raise awareness and reduce marine debris, particularly plastics.

Ultimately, individual actions are crucial in combating this issue. By avoiding littering, minimizing waste generation, reusing materials, and recycling, we can collectively reduce the amount of debris entering our oceans. It is through concerted efforts at both individual and societal levels that we can safeguard our oceans and protect the delicate balance of marine ecosystems. Litter on land often makes its way to the ocean through a variety of pathways:

**Urban Runoff:** Rainwater and water from outdoor use flow over impervious surfaces like roofs, driveways, and sidewalks, collecting litter along the way. This runoff enters storm drains, which often lead directly to rivers and streams, ultimately carrying the debris to the ocean.

**Wind:** Lightweight litter, including plastic bags and packaging, can easily be carried by wind from landfills, streets, and open spaces. Even microscopic plastic particles can be transported long distances through the atmosphere, reaching remote areas and eventually settling in the ocean. (Mayes, 2018).

**Illegal Dumping:** Improper disposal of waste in unauthorized areas is a significant contributor to marine litter. When waste is dumped in areas lacking proper containment or management, it can be washed into rivers and streams during rain events, eventually finding its way to the ocean. (NOAA, 2018).

**Recreational Activities:** Beaches, parks, and other recreational areas can become sources of marine litter when visitors leave behind trash or it is blown away by the wind. Additionally, activities like boating and fishing can contribute to debris entering the water through accidental spills or discarded equipment. (Planet Wild, 2023).

## Environmental Consequences of Marine Litter

Scientific research continues to uncover alarming impacts of plastic pollution (Arabi et al., 2023). Plastic remains the predominant type of marine debris, causing widespread environmental harm globally (Kühn et al., 2015; CBD, 2016).

## Impact on Biodiversity

Marine litter affects a diverse range of species worldwide. Initially documented affecting 557 species, by 2016, this number had risen to 817 (CBD, 2016). In Africa, however, research on the effects of marine litter remains limited. The region accounts for a fraction of global studies, with only 12 impact assessments conducted (Gall & Thompson, 2015). This disparity is concerning given Africa's rich biodiversity and challenges in waste management.

A study reviewing plastic pollution across African aquatic environments from 1987 to 2020 highlighted significant research outputs primarily from North (15 studies), East (6), West (13), and South (25) Africa (Akindele & Alimba, 2021). These studies often focus on macro litter and its impacts, such as entanglement, smothering, and ingestion by marine mammals, turtles, and birds (Ryan, 2018).

## Entanglement and its Effects

Entanglement in plastic nets, ropes, and other debris poses a severe risk to marine animals globally (Kühn et al., 2015). It affects a wide array of species, including invertebrates, fish, sea turtles, seabirds, seals, and marine mammals (Kühn et al., 2015; Ryan, 2018). Plastic items, particularly ropes and nets, account for a significant portion of entanglement cases (Gall & Thompson, 2015).

Entangled animals suffer from abrasions, cuts, and wounds that can lead to infections and death. They may also experience suffocation, strangulation, and impaired mobility, hindering their ability to feed and evade predators (Gall & Thompson, 2015).



## Suffocation

Floating plastic debris can accumulate biofouling as it sinks, settling on the seafloor and smothering marine vegetation and corals (Fazey & Ryan, 2016). This accumulation interferes with gas exchange and light penetration, leading to reduced oxygen availability and anoxic conditions that impact ecosystem functioning (Napper & Thompson, 2020).

Despite the absence of specific reports on smothering impacts in Africa, concerns remain regarding the vulnerability of African coral reefs and associated ecosystems to marine debris (Naidoo et al., 2020).

## Economic and Ecological Ramifications

The consequences of marine litter extend beyond environmental harm, impacting economies reliant on marine resources, tourism, and the costs associated with cleanup efforts. Addressing these impacts requires concerted efforts in research, policy, and public awareness to mitigate the pervasive threat of marine litter globally.

Community-driven efforts play a pivotal role in mitigating marine litter. Effective initiatives include: 1. Coastal Cleanups: Organized efforts mobilize volunteers to remove debris from shorelines, raising awareness and significantly reducing litter volumes. 2. Inland Waterway Cleanups: Targeting rivers and streams prevents litter from entering oceans. Collaboration with local authorities enhances the effectiveness of these cleanups. 3. Adopt-a-Road Programs: Local organizations and businesses adopt specific road sections to manage litter, minimizing runoff into water bodies.

## Case Study: Clean Up Makoko Initiative

The "Clean Up Makoko" initiative, led by the Life In My Hands Initiative in Lagos State, Nigeria, exemplifies community engagement in marine debris reduction. Volunteers intercept litter at lagoon bodies before it reaches the ocean, contributing to substantial cleanup efforts. Recent activities removed over 200 kg of litter, accompanied by extensive public education on ocean conservation benefits. This initiative aims to foster a knowledgeable public, crucial for sustainable environmental stewardship.



Plate source: Life In My Hands Initiative

## Individual Actions to Combat Marine Litter

While community initiatives are crucial, individual actions also play a pivotal role in mitigating marine litter. Each person's behavior contributes to collective impact, and simple steps can yield significant benefits.

1. **Proper Waste Management:** Responsible waste disposal is fundamental in preventing marine litter. Always use designated bins for waste disposal, whether at home, on the streets, or at the beach.

Separate recyclables from general waste to enhance resource recovery. By ensuring proper disposal, we prevent waste from entering water bodies and eventually the ocean.

**2. Reducing Single-Use Plastics:** Single-use plastics like bags, bottles, straws, and cutlery are major contributors to marine debris. These items are often discarded after short-term use, ending up in landfills or as litter. Making conscious choices to avoid single-use plastics can substantially reduce our environmental impact. Opt for reusable alternatives such as cloth bags, stainless steel water bottles, and bamboo utensils. When single-use plastics are unavoidable, ensure they are disposed of properly in recycling bins whenever feasible.

**3. Participating in Clean-Up Efforts:** Engaging in community cleanups is an effective way to combat marine litter. These organized events, frequently held at beaches, rivers, and parks, unite people in collecting and removing debris. Volunteering your time not only directly contributes to environmental cleanup but also raises awareness about litter issues. Organizing cleanups with friends or family can have a similarly positive impact.

**4. Educating Others:** Raising awareness about the consequences of littering and the importance of proper waste management is critical. Share information with peers, family, and your community through discussions, social media, or educational activities. Encourage others to adopt responsible practices and join efforts to address marine litter. By spreading knowledge and inspiring action, you can catalyze broader change.

**5. Supporting Sustainable Businesses:** Consumers can influence businesses to adopt sustainable practices. Choose to support companies that prioritize eco-friendly packaging, minimize plastic waste, and implement effective waste management strategies. By making informed purchasing decisions, you encourage businesses to adopt practices that protect the environment.

**6. Advocating for Policy Change:** Engage with local representatives to advocate for policies that address marine litter. Support initiatives for stricter waste management regulations, increased funding for cleanup activities, and policies promoting recycling and reduced plastic use. Active participation in the political process can drive systemic changes needed to tackle the root causes of marine litter.

**7. Practicing Environmental Consciousness:** Every-day choices impact marine litter prevention. Consider the environmental footprint of your daily decisions, from product purchases to waste disposal practices. Opt for environmentally friendly alternatives whenever available and strive to minimize your ecological impact through mindful actions.

## **Zero Waste Lifestyle - A Sustainable Approach to Combat Marine Litter**

Embracing a zero-waste lifestyle presents a proactive and effective strategy to mitigate marine litter from its source. By substantially reducing our waste output, we can significantly curb the influx of debris into our oceans and water bodies. This lifestyle shift requires a conscientious effort to reassess our consumption habits and embrace sustainable alternatives. At its core, the zero-waste lifestyle revolves around the 5 R's: Refuse, Reduce, Reuse, Recycle, and Rot (Compost).

**Refuse:** The initial step involves consciously declining single-use items, excessive packaging, and products that contribute to unnecessary waste. This entails making informed choices during shopping trips, opting for unpackaged produce, and eschewing disposable items such as plastic bags, straws, and cutlery.

**Reduce:** The subsequent step is to minimize overall consumption by purchasing only what is essential and opting for durable, long-lasting goods. This principle applies across various categories, including clothing, electronics, food, and household items. Prioritizing quality over quantity helps in reducing the volume of waste generated.

**Reuse:** Reusing items is pivotal in the zero-waste lifestyle. Rather than discarding items after a single use, individuals can explore inventive ways to repurpose them. For instance, glass jars can serve as storage containers, old clothing can be repurposed into cleaning rags, and plastic containers can be reused for packing meals.

**Recycle:** Recycling plays a crucial role in waste management, but it should be considered a final option after exhausting the other R's. Ensuring that recyclable materials are properly sorted and cleaned enhances their chances of being transformed into new products.

**Rot (Compost):** Organic waste, such as food scraps and yard trimmings, can be composted instead of ending up in landfills. Composting not only reduces waste but also yields nutrient-rich soil that enriches gardens and landscapes.

Adopting a zero-waste lifestyle transcends mere waste reduction; it fosters a mindful approach to consumption and resource utilization. Through deliberate choices and the adoption of sustainable alternatives, individuals can significantly diminish their environmental footprint, conserve resources, and prevent waste from polluting marine ecosystems.

In Nigeria, where robust waste management infrastructure is often lacking, embracing a zero-waste lifestyle assumes even greater significance. By minimizing individual waste footprints, Nigerians can actively contribute to cultivating a cleaner and healthier environment for current and future generations.

## Conclusions

Marine litter presents a significant and escalating threat to global ocean health and marine ecosystems. While the visual impact of plastic debris floating in oceans is distressing, its origins often stem from land-based sources such as littering, inadequate waste management, and industrial runoff. This debris, predominantly composed of plastics, poses severe risks to marine life by entangling animals, disrupting habitats, and entering the food chain.

Addressing this multifaceted issue demands a comprehensive approach that targets both the sources and pathways of litter into the sea. Community-driven cleanup initiatives are pivotal in removing existing debris from coastal areas, improving aesthetics, safeguarding wildlife, and restoring ecological balance. In Nigeria, initiatives like beach cleanups along the Lagos coastline exemplify grassroots efforts to raise awareness and combat marine litter.

Individual actions also play a crucial role in mitigating marine litter. Simple yet impactful measures, such as responsible waste disposal, reducing single-use plastics, and active participation in community cleanups, empower individuals to contribute directly to cleaner oceans. These actions collectively reduce the volume of waste entering marine environments.

Addressing the root causes of land-based litter necessitates enhancing waste management infrastructure, particularly in developing countries like Nigeria where inadequate systems exacerbate the problem. Education and awareness campaigns are instrumental in fostering behavioral changes towards responsible waste disposal practices and promoting environmental stewardship.

Effective solutions require collaborative efforts among governments, businesses, and individuals to implement policies, support sustainable practices, and ensure effective waste management strategies. By working together, we can achieve tangible reductions in marine litter, preserve marine biodiversity, and safeguard the health of our oceans for future generations.

The battle against marine litter transcends mere cleanup; it is a critical endeavor to protect the planet's health and secure a sustainable future. Through concerted action and the adoption of sustainable practices, we can uphold clean, thriving oceans that support diverse ecosystems and benefit humanity globally.

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