FRESHWATER SYSTEMS · PLASTIC POLLUTION

Assessment and Quantification of Plastics in Lake Victoria

Abundance, composition and density of plastic macro-litter along six Kenyan shoreline beaches, and the urbanization gradient that drives it.

REFERENCE	ISSUED	REGION
C82_15(2)	June 2026	Six Lake Victoria beaches

FRESHWATER SYSTEMS

6
shoreline beaches surveyed for plastic litter

64 to 79%
of beach macro-litter is plastic

3.6
items m^{-2} peak litter density, at Dunga

2017
year Kenya banned single-use plastics

Background

Plastics are among the most widely distributed waste materials. They are composed mainly of organic polymers that do not degrade easily, and they fragment over time into micro- and nano-plastics that can be taken up by both marine and freshwater organisms through ingestion. Africa is a significant consumer of plastics, and inadequate waste-management systems struggle to match rising use. Most comprehensive litter surveys in Kenya have focused on the marine coast (Kilifi, Kwale, Malindi and Lamu), leaving the inland lakes, rivers and reservoirs poorly documented. To begin closing this gap, KMFRI surveyed plastic macro-litter at six shoreline beaches: Marenga, Usenge, Dunga, Litare, Sindo and Sori-Karungu.

Policy context: Kenya banned single-use plastic carrier bags in 2017, and the Kenya Plastic Pact, endorsed through the Ministry of Environment, aims to phase out problematic and unnecessary plastics by 2030.

Methods

Litter was collected by hand from 10 m by 10 m quadrats spaced at 20 m intervals to ensure full coverage of each beach, with teams of 8 to 14 members. Materials were segregated into categories (packaging, bags and wrappers, and consumer-product wastes such as plastics, metal, glass, electronics, fishing gear and wood), enumerated, and weighed on a balance of up to 20 kg, following marine-litter monitoring manual guidelines adapted for the lake shore.

Key Findings

Plastics dominate every beach

Total macro-litter items ranged from 1,071 at Dunga down to 414 at Litare, in the order Dunga (1,071), Sori-Karungu (681), Usenge (548), Sindo (528), Marenga (418) and Litare (414). Plastics were the dominant category at every site, from 64.4% at Sindo to 79.4% at Marenga, followed by paper and cardboard and by cloth and textiles. Total litter weight rose from 4.4 kg at Litare to 38.9 kg at Dunga. Plastic litter was significantly associated with paper and cardboard and with the 2019 sub-county population density, reflecting human settlement and demand for consumer products.

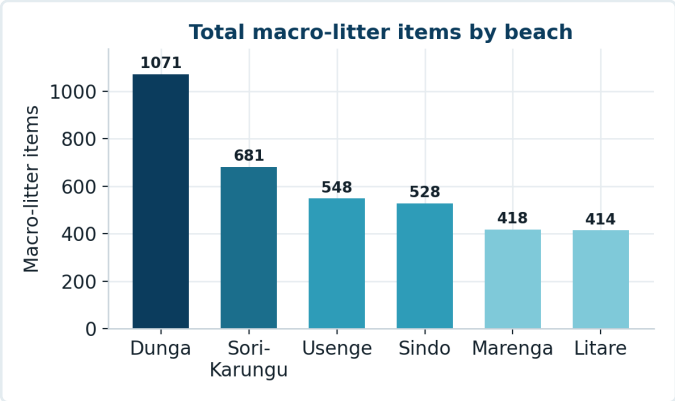


Figure 1. Total macro-litter items by beach: Dunga, the most urbanized site, carried more than twice the load of the least urbanized beaches.

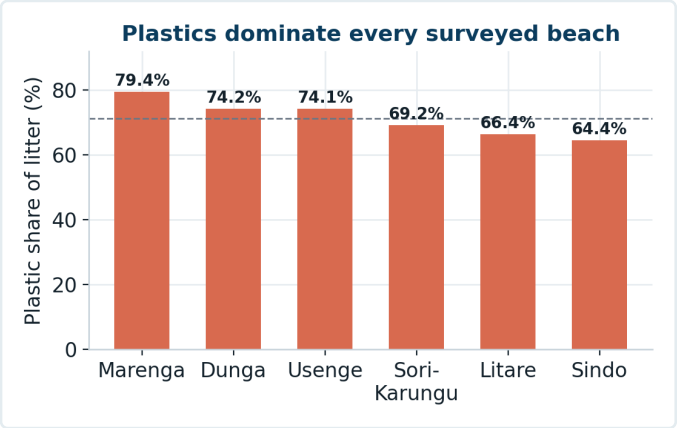


Figure 2. Plastics dominated the litter at every beach, ranging from 64% to nearly 80% of all items.

Density tracks urbanization

Mean macro-litter density increased steadily from the less-urbanized beaches (Litare 1.38, Marenga 1.39 items m^{-2}) to the more-urbanized Dunga (3.6 items m^{-2}), and plastic density followed the same gradient, from 0.92 to 2.7 items m^{-2}. Recognizable brands were mostly wrappings and packaging of locally consumed products, including milk, bread, confectionery, drinking water, soap, detergents, beverages and medicines, alongside discarded fishing ropes and nets.

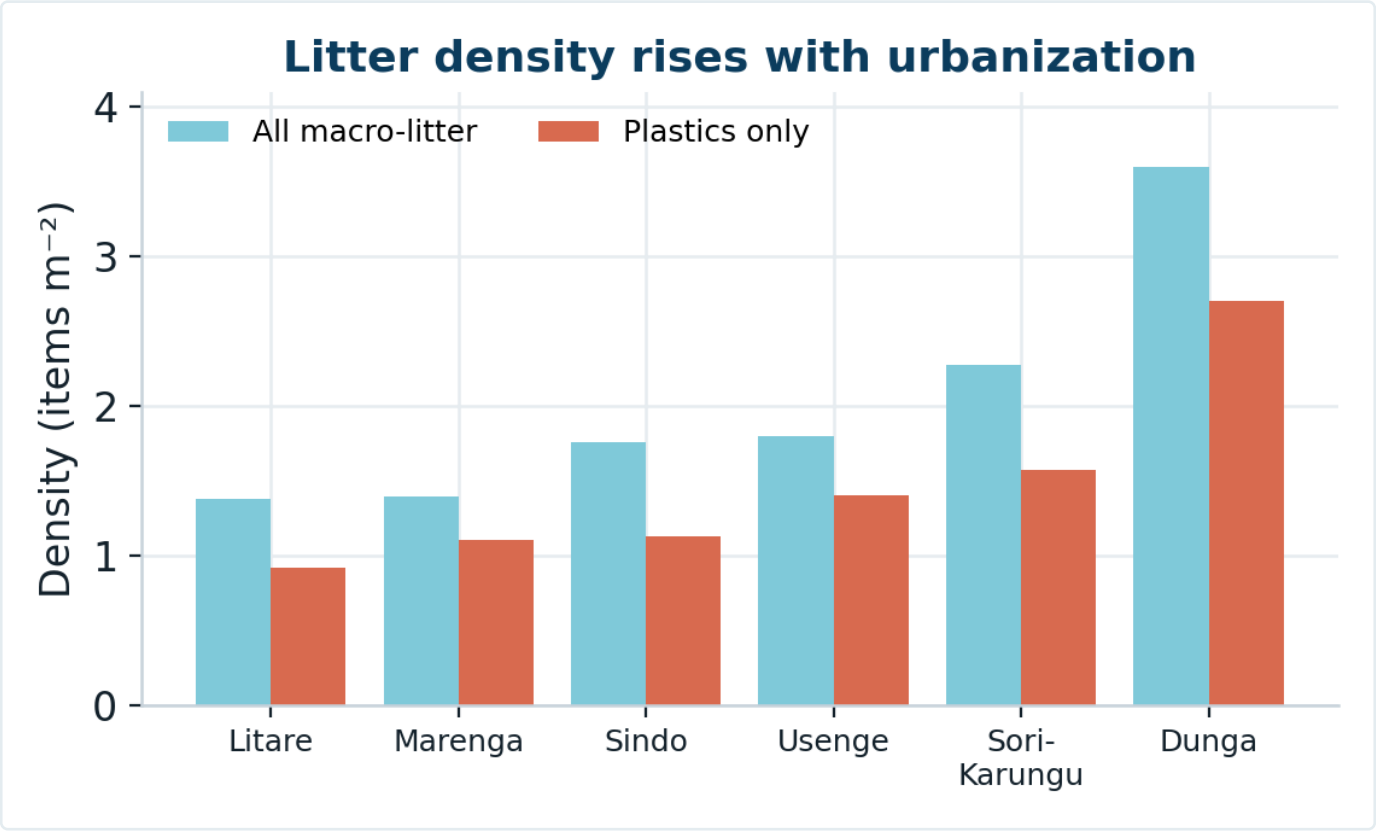


Figure 3. Mean macro-litter and plastic-only densities rise together along the urbanization gradient from Litare to Dunga.

Conclusions

- Plastics dominate the macro-litter at all six beaches, with densities and totals rising sharply with urbanization.
- Litter is closely tied to open-air markets, restaurants, residential settlements, transport, boating and commercial fishing.

- Inland-lake beaches differ from marine beaches, lacking tidal influence but bordered by settlements and markets, so they need tailored monitoring methods.
- Quantitative data on micro- and nano-plastics in inland waters remain scarce and require dedicated study.

Recommendations

1. Extend surveys to more beaches, and develop monitoring methods suited to inland-lake shorelines.
2. Support chemical analysis of plastic items to identify the polymer types in circulation.
3. Raise awareness and promote on-site recycling of plastics, glass and organic litter, alongside community-led clean-ups.
4. Provide financial support to youth and interested groups to mitigate plastic pollution through recycling.
5. Strengthen enforcement of single-use-plastic policy and the Kenya Plastic Pact phase-out targets.

Authors: Mwamburi, J., Keyombe, Last, J., Otuo, P., Aura, C.M., Onduso, G., Nyamweya, C., Mwainge, V., Ogwai, C., Guya, F., Ongore, C., Wawiye, P., Owili, M., Nyaboke, H., Gichuru, N., Nyaundi, J., Lenjo, N., Babu, J., Basweti, G., Wacira, T., Fonda, J. & Githukia, C.

KMFRI Headquarters
P.O. Box 81651-80100, Mombasa
Tel: +254 (041) 475151/4
director@kmfri.go.ke

KMFRI Kisumu Centre
P.O. Box 1881-40100, Kisumu
Tel: +254 (0)770 567 443
kisumucentre@kmfri.go.ke

Online
www.kmfri.go.ke
ISO 9001:2015 Certified
Freshwater Systems Directorate

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