KMFRI
Kenya Marine and Fisheries Research Institute

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By: Faith Mboka *Edits: Jane Kiguta* Photos: John Father Small Layout: Faith Mboka

KMFRI leads national World Fisheries Day 2025 celebrations, showcasing research, innovation, and community empowerment

The Kenya Marine and Fisheries Research Institute (KMFRI) hosted the national World Fisheries Day celebrations on 21st November 2025 at its Mombasa headquarters. The event brought together researchers, community groups, fishers, government agencies, and partners working in Kenya's blue economy. It was organized in collaboration with the State Department for Blue Economy and Fisheries (SDBE&F) and its agencies - Kenya Fisheries Service, Kenya Fishing Industries Corporation (KFIC), and the Kenya Marine Fisheries Socio-Economic Development Project (KEMFSED). Held under the theme ***"Catalysing Sustainable Fisheries and Responsible Aquaculture Action for People, Ocean and Climate,"*** the celebration provided a space for sharing ideas, showcasing innovations, and highlighting the progress being made in strengthening sustainable fisheries

Fisheries and Blue Economy Director Dr. Davies Makilla, who represented the Principal Secretary, Madam Betsy Njagi, delivered the PS's message. In the speech read by Dr Makilla, Madam Betsy reaffirmed the government's commitment to continued investment in the fisheries sector so that communities can benefit more from the country's aquatic resources. She noted ongoing improvements in the coastal region, including the modernization of fish landing sites and the upgrading of fish markets.

Fisheries and Blue Economy Director Dr. Davies Makilla delivering PS's remarks.

Madam Betsy also shared that Kenya's fisheries sector recorded positive growth, with a 4.4 per cent increase in fish production in 2024, up from 168,424 metric tonnes the previous year, an achievement she attributed to strong collaboration among government institutions, researchers, and local communities.

In his remarks, KMFRI Director socioeconomics, Dr. Jacob Ochiewo, delivered the keynote address on behalf of the Director General Dr. Paul S. Orina. He described the commemoration as an important milestone in the development of the fisheries sector, both locally and globally, and emphasized the need for

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value addition, innovation, and responsible exploitation of marine resources to boost livelihoods and enhance national food security.

KMFRI Director for Socioeconomics, Dr. Jacob Ochiewo delivering remarks on behalf of KMFRI Director General Dr. Paul S. Orina.

KMFRI used the event to demonstrate how research is being applied on the ground to support sustainable development in the blue economy. For years, the institute has been working closely with coastal communities involved in seaweed farming, coral reef restoration, mangrove rehabilitation, mariculture, and fish value addition.

During the celebrations, community groups showcased a variety of products ranging from dried seaweed, seaweed products, fish feeds and value-added fish products to simple mariculture tools clearly illustrating how KMFRI's training, scientific guidance, and technical support are helping improve livelihoods, restore marine habitats, and strengthen local enterprises.

Community exhibitors showcasing seaweed products.

From the middle: KMFRI Director of Socioeconomics, Dr. Jacob Ochiewo; right: Fisheries and Blue Economy Director, Dr. Davies Makilla, engaging with exhibitors at the Kenya Fisheries Service booth.

The event also featured exhibitions from various institutions and development partners, highlighting innovations in aquaculture, post-harvest handling, fisheries management, and marine conservation. These displays allowed participants to learn from each other, exchange experiences, and explore new opportunities for collaboration.

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By hosting this year's celebration, KMFRI reaffirmed its key role in generating scientific knowledge, supporting communities, and promoting sustainable practices that safeguard Kenya's fisheries for future generations. The day ended with a shared commitment to continue working together to build a stronger, more resilient, and more sustainable fisheries sector.

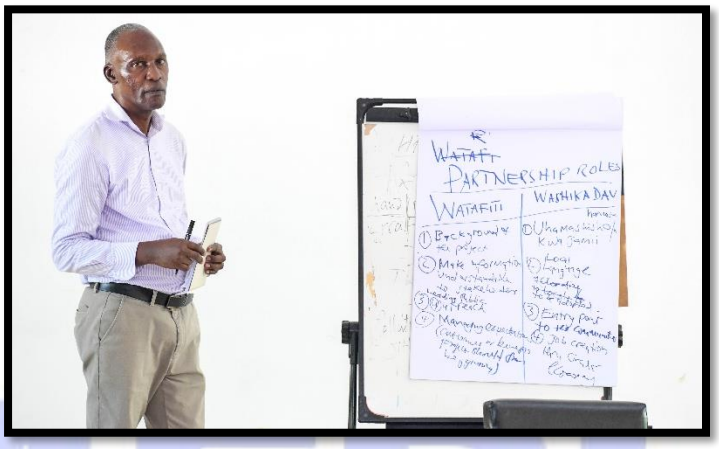
By: John Father Small *Edits: Jane Kiguta* Layout: Faith Mboka

Research in action: Tracing micro plastics along the Malindi Coastline

When dawn breaks over the Malindi shoreline, the ocean looks calm and familiar - but beneath the rising tide lies a story scientists are racing to understand. Kenya Marine and Fisheries Research Institute (KMFRI) brought that story to life through a hands-on field research mission designed to uncover how micro plastics move, settle, and impact coastal ecosystems.

The initiative, held at the Kenya Wildlife Service (KWS) Malindi Marine Park, brought together community groups, county officers, and early-career researchers for a week of intensive learning. Led by KMFRI scientist Dr. Charles Mitto, the team set out across beaches in Ngomeni, Kichwa Cha Kati, and Gongoni, transforming simple stretches of sand into living research laboratories.

What began with a briefing under a quiet coastal morning quickly shifted into action: participants marking transects, measuring tide lines, and collecting litter layer by layer. In the background, waves crashed steadily as bags filled with sorted plastic fragments and tangled fishing lines; the non-biodegradable fishing gears for analysis.



KMFRI Senior Research scientist, Dr. Charles Mitto, giving a presentation on partnership roles.

But the work was more than picking debris. Every step required discipline; calibrating tools, labelling jars, verifying GPS points, recording environmental conditions, and double-checking measurements. KMFRI scientists were on hand throughout, guiding participants on how to handle samples that may later reveal the presence of invisible micro plastics.

Just as important was the human dimension. Fisherfolk and residents more so the BMU shared observations on where waste tends to accumulate, how tides shift debris, and how plastic affects their daily lives. This knowledge helped researchers map pollution hotspots with better accuracy, proving that science becomes stronger when communities are part of it.

As some teams focused on micro plastics, another KMFRI group, led by Dr. Joseph Kamau, continued work on the Tana River sediment dynamics study, tracking how sediments travel and shape coastal

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habitats. Together, the two efforts painted a broader picture of how rivers, currents, and human activity interact along Kenya's coastline.

KMFRI staff during community engagement in Malindi.

The fieldwork had done more than collect data - it had revealed the pulse of research in motion. Participants left with new skills, deeper curiosity, and a clearer understanding of the hidden challenges facing our oceans.

For KMFRI, this was "research in action": science unfolding directly on the coastline, powered by teamwork, precision, and a shared commitment to protecting Kenya's marine environment.

By: Waiyaki E., Kimanga F., Ngoa H., Karani N., Mitto C., Labatt C., Esther F., Athman S., Atuga G., Amisi G. & John Father Small *Edits: Jane Kiguta* Layout: Faith Mboka

Weathering the plastic storm: Climate change and pollution on our shores

A multidisciplinary team from the Kenya Marine and Fisheries Research Institute (KMFRI), comprising marine pollution experts, socio-economists, and a cultural anthropologist, completed a field survey across three locations in Malindi-Magarini, Kilifi County: Kichwa cha Kati, Ngomeni, and Gongoni.

The mission aimed to understand how marine plastic pollution is shaping both the coastal environment and the livelihoods of artisanal fishing communities that depend on the marine environment for their daily survival. What the team observed reveals a growing environmental and socio-economic challenge that is increasingly redefining life along Kenya's coastline.

Over the years, plastic waste has become one of the most persistent threats to the country's marine ecosystems. What once appeared as occasional litter has now turned into a steady influx of discarded bottles, packaging materials, fishing nets, plastic bags, and fragments of household plastics washing up on beaches entangling themselves within mangroves, and drifting across nearshore fishing grounds.

For coastal communities whose livelihoods are deeply tied to the ocean, this pollution is no longer merely an aesthetic eyesore, it is today an increasingly problematic socio-economic burden. During the expedition, the KMFRI team carefully documented the

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types and quantities of plastic waste found at each site, traced the possible sources and pathways through which plastics enter the marine environment, and engaged with fishers, fish processors and traders, to better understand how this pollution impacts their daily lives.

MPP multidisciplinary team

Preliminary findings

Our preliminary findings at three sites did not paint a rosy picture. At Kichwa cha Kati, a relatively small and often overlooked site, the team encountered scattered accumulations of bottles, packaging waste, broken plastics, and nylon fishing lines. Although the build-up here was lighter compared to other sites, fishers reported that drifting plastics frequently get caught in their nets, slowing down fishing activities and increasing the cost and time involved in repairing damaged gear. Much of the waste originates upstream from nearby settlements and offshore activities, gradually depositing on their coastline.

Ngomeni accounted for the highest concentration of plastic waste in terms of weight. Local residents recounted how previously, plastic waste would be buried in landfills, but this method is no longer effective due to the rising population and entrenched use of plastics in everyday life. Today, most waste is either burned, albeit in (shallow) pits, releasing toxic fumes and creating serious health concerns, or collected by individuals who sell recyclable items to informal recycling buyers. While these small-scale recycling efforts offer an emerging income stream, they remain informal, inconsistent, and in need of more structured support.

In Gongoni, the research team observed notable community-led efforts to clean and maintain the shoreline, reflecting a strong willingness to address the issue. However, the continuous inflow of new waste still overwhelms these efforts. Fishers reported that the presence of plastic along the beaches discourages buyers and visitors, while debris in nearshore areas often entangles fishing nets or forces them to fish further offshore, adding to their operational costs. Youth and women groups have begun collecting recyclable plastics, but challenges such as unreliable markets and inadequate equipment hinder the growth of this activity.

Charting the Way Forward

Across all three locations, the socio-economic impacts of marine plastic pollution were clear. Many fishers reported reduced catches due to plastics driving fish away from traditional fishing grounds or creating underwater obstacles to fish breeding, nursery and feeding grounds that ultimately affect fish availability. Repairing or replacing gear damaged by plastic debris adds to the financial strain, while travelling further in search of cleaner fishing grounds increases fuel consumption and time spent at sea.

Onshore, community members highlighted health concerns linked to burning plastics, which release hazardous fumes. They feared that children playing along the polluted beaches risked getting cuts and infections following contact with contaminated waste. Environmental effects are equally significant; plastics clog mangroves, smother seagrass beds, and

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contribute to occasional incidences of marine animals getting entangled with nets, or with finding plastics in their stomachs.

Despite the seriousness of these challenges, the team observed promising signs of growing awareness. Beach clean-ups, community recycling initiatives, and school-based awareness activities are slowly taking root and changing attitudes. However, awareness remains far from adequate. Many residents still need training on proper waste-handling practices, information to understand the emerging dangers of burning plastics, and innovations that curb the transport of plastics from households and waterways into the ocean, and sponsorships for local recycling initiatives.

There is a clear need to strengthen public education and establish more sustainable, community-led waste management systems. KMFRI will now synthesize the data collected through plastic waste rapid surveys, in situ measurements, interviews, and observations to develop a comprehensive report with actionable recommendations. These will focus on improving local waste management systems, supporting recycling-based livelihood opportunities, enhancing fisherfolk awareness, and reducing the movement of plastics from land into the ocean. Successful long-term solutions will require close collaboration between researchers, community groups, county authorities, and private recycling actors.

While further analysis of the research findings continues, this expedition underscores a critical reality: marine plastic pollution is not only an environmental concern but also a human one - affecting incomes, health, heritage, and the future of coastal ecosystems. The findings from Kichwa cha Kati, Ngomeni, and Gongoni remind us that plastic waste does not simply disappear, and addressing this challenge requires collective responsibility and sustained action. By working together, we can protect our coastlines, strengthen our fisheries, and ensure that Kenya's marine environment remains healthy and productive for future generations.

The case studies of Kichwa cha Kati, Ngomeni, and Gongoni reveal the complex and multifaceted nature of plastic waste accumulation along the Kenyan coast. While each site faces unique challenges, common themes emerge, including the need for improved waste management infrastructure, increased community awareness, and stronger support for recycling initiatives. A holistic approach that addresses both land-based and marine sources of plastic pollution is essential to protect the coastal environment and ensure the sustainable livelihoods of coastal communities.

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By: Charles Magori, Athman Salim, Damaris Mutia & John Father Small *Edits: Jane Kiguta* Layout: Faith Mboka

KMFRI enhances Kenya's Tsunami preparedness efforts

As the world marked World Tsunami Awareness Day (WTAD) on 5th November 2025, the Kenya Marine and Fisheries Research Institute (KMFRI) reaffirmed its commitment to strengthening Kenya's capacity in tsunami preparedness and early warning systems.

KMFRI is among the key state agencies working with the Kenya Meteorological Department (KMD), Kenya Red Cross, National Disaster Operation Centre (NDOC), Beach Management Units (BMUs), and coastal county governments to develop Standard Operating Procedures (SOPs) for tsunami warning and mitigation. These collaborative efforts in warning and mitigation of tsunami effects, aim to ensure the timely dissemination of information, coordination of evacuation processes, and effective response mechanisms in the event of a tsunami threat.

The 2025 WTAD theme, "Be Tsunami Ready: Invest in Tsunami Preparedness," highlights the importance of building resilience and reducing disaster risks through proactive planning and coordinated response.

Scientific Research and Capacity Building

KMFRI scientists continue to contribute to global understanding of tsunamis and coastal protection. Research led by Dr. Charles Magori, in collaboration with Dr. Jared Bosire of the United Nations and international partners, has produced publications confirming the role of tide gauges in detecting tsunami events and the value of mangroves in reducing wave impact and coastal damage.

Tsunami wave: Small boat anchor in Malindi bay in the aftermath of death and destruction on the East African coast caused by tsunami waves triggered by the Sumatra undersea earthquake

Coastal erosion due to mangrove clearing

Kenya's experience during the 2004 Indian Ocean Tsunami, though less severe than that of countries closer to the epicenter, underscored the need for continuous investment in monitoring and preparedness. Malindi Bay was among the most

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affected areas, with significant losses in the fishing sector due to destroyed boats and gear.

Regional and International Cooperation

Kenya is an active member of the Indian Ocean Tsunami Warning and Mitigation System (IOTWMS), coordinated by the Intergovernmental Oceanographic Commission (IOC) of UNESCO. Through this framework, Kenya has participated in regional tsunami simulation exercises such as IOWave18 held in Likoni, aimed at testing national response procedures and strengthening coordination among emergency agencies. Although the planned IOWave20 exercise in Ukunda was postponed due to the COVID-19 pandemic, the country remains committed to enhancing readiness within a multi-hazard management approach.

Role of Coastal Ecosystems

KMFRI emphasizes the protection and restoration of mangroves and coral reefs, which act as natural barriers against storm surges and tidal waves. Mangroves serve as “shock absorbers,” while coral reefs act as “wave breakers,” minimizing the impact of strong waves on coastal communities. However, overexploitation and land conversion along Kenya’s coastline have degraded these vital ecosystems, necessitating reforestation and conservation efforts to restore their protective functions.

Sea-Level Monitoring and Early Warning

KMFRI operates tide gauge stations in Mombasa and Lamu, which form part of the Global Sea Level Observing System (GLOSS) under UNESCO-IOC. These stations, equipped with real-time satellite data transmission systems, provide essential data for sea-level monitoring and tsunami detection. According to the Intergovernmental Panel on Climate Change (IPCC, 2024), global sea levels are rising at approximately 3mm per year, with projections of up to 1 meter by 2100, increasing the urgency for continuous monitoring and preparedness.

Mombasa sea level monitoring station

Commitment to a Safer Coastline

While tsunamis cannot be predicted, their impacts can be minimized through preparedness, community awareness, and coordinated response. KMFRI remains dedicated to working with national and international partners to safeguard Kenya’s coastal communities and marine ecosystems through science-driven solutions and proactive disaster risk reduction initiatives.

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Mtafiti Pictorials

KMFRI Assistant Director, Fisheries, Dr. Gladys Okemwa giving her remarks during the World Fisheries Day 2025.

KMFRI Mombasa Centre Director, Dr. Erick Okuku during World Fisheries Day 2025.

Kenya Fishing Industries Corporation CEO, Dr. Mikah O. Nyaberi, giving his remarks during the World Fisheries Day 2025.

Participants join cultural performers in a dance to celebrate World Fisheries Day 2025.

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Participants of the world Fisheries Day 2025 celebrations.

Community members showcasing fish feed products during the World Fisheries Day 2025.

KMFRI Senior Research Scientist, Dr. Esther Fondo, delivering her presentation on micro-plastic pollution during Malindi - micro plastic pollution community engagement forum.

KMFRI exhibitors showcasing IEC materials during the World Fisheries Day 2025.