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By: Brian Isoe *Layout: Faith Mboka Photos: Brian Isoe*

Coastal communities set to reap big as Blue Economy CS, KMFRI unveil Shimoni marine hatchery

Mining, Blue Economy and Maritime Affairs Cabinet Secretary H.E. Ali Hassan Joho, Kwale Governor H.E Fatuma Achani, & Fisheries PS Madam Betsy Njagi cut the ribbon.

Residents from the coastal region of Kenya are set to benefit greatly from high-quality seeds as KMFRI launches a marine hatchery to boost aquaculture practices through the constant supply of seeds to farmers in the region. This comes after the completion of a 50-million state-of-the-art hatchery in Shimoni, Kwale County, that was officially launched on 23rd July by H.E. Ali Hassan Joho, the cabinet secretary for mining, blue economy, and maritime affairs alongside the principal secretary of the State Department for Blue Economy and fisheries and the Ag Director General KMFRI Dr. James Mwaluma.

Access to quality broodstock and different species for rearing has been a challenge in the country for quite some time. This has resulted in fish farmers focusing on only a few species, making their business unprofitable. Consequently, many fish farmers rely on wild seeds to supplement their stocks, which often involves a time-consuming process. The effort to source seeds frequently proves futile, as farmers return home empty-handed after spending hours searching for wild seeds, thereby limiting the productivity of aquatic foods.

Speaking at the launch ceremony, H.E. Ali Hassan Joho mentioned that this project will not only boost fish production in the country but also play a key role in driving the meaningful development of local communities by improving their livelihoods and the blue economy overall.

“This state-of-the-art hatchery is a game-changer as it is set to bridge the fish seed gap, boost Mariculture, and uplift the livelihoods of communities along the coastal region by providing high-quality fish seed to local farmers”.

The hatchery will play a key role in contributing to Kenya's Blue Economy initiative, which aligns with Sustainable Development Goal (SDG) number two, which focuses on promoting zero hunger and achieving food security. This is a major boost for the Mariculture industry and coastal communities, with this initiative expected to reduce poverty and enhance livelihoods.

KMFRI aims to increase fisheries production by tapping into shellfish species, including prawns,

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lobsters, and mud crabs. Other fish being targeted include sea cucumber and finfish species such as milkfish and rabbitfish, which the communities have been lacking.

The Director General, during his remarks, noted that the hatchery can produce up to two million fingerlings each year, highlighting that two communities have already benefited from the program. “We have already distributed prawn fingerlings to two communities in Kwale and Kilifi counties, with plans to expand this innovation to serve the entire coast region in the pipeline.”

CS Joho, KMFRI Ag DG Dr. James Mwaluma watch as Shimoni Centre Director Dr Elisha Mrabu feeds prawns.

With the launch of this hatchery, KMFRI strategically positions itself as a centre of excellence in innovative research geared towards the development of the blue economy. This ultra-modern hatchery will produce high-quality broodstock with desirable traits including: fast growth rate of fingerlings, disease resistance, and adaptability to diverse environments once they are released to the farmers for farming in their respective ponds and tanks.

Fish farmers now look at the positive side of rearing healthier offspring with lower mortality rates and increased yields in aquaculture practice. This will progressively increase their profit by big margins compared to the traditional modes that were practised initially.

We are now looking at a situation where we have lower disease risks, boosted production efficiency, guarantee a consistent supply of quality seed, and a great run in the development of the blue economy's long-term, sustainable growth, “added Dr. Mwaluma.

The construction of this hatchery is also attributed to increased consumption of seafood, which has essential nutrients that are vital for human health, including Omega-3 Fatty Acids, rich protein value, in vitamins A and B with less saturated fats, hence the paradigm shift by many to consume more aquatic foods.

Unveiling the plaque

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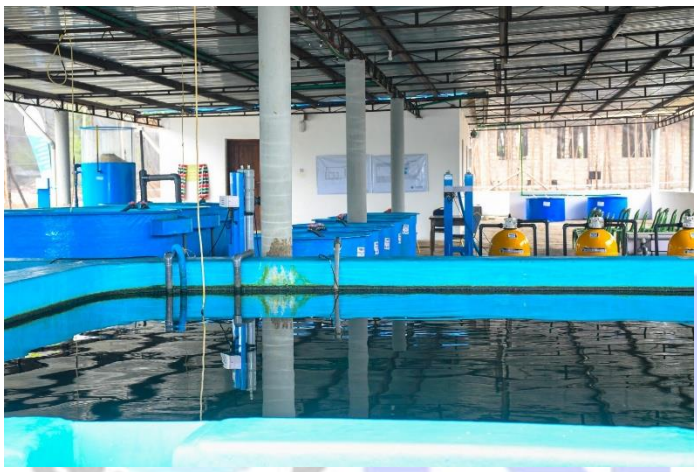
Kwale Governor, Fatuma Achani praised the project as a timely and beneficial investment in the county, terming it as a game changer opening up opportunities to the young generation through employment. She encouraged collaboration as pathway to achieving success noting that without team work from various actors in the aquaculture value chain, government and donors, the realization of this dream was far-fetched.



The newly launched hatchery at Shimoni Centre

With the now operational hatchery, KMFRI cements its role in advancing aquaculture and boosting community livelihoods through the implementation of sustainable programs that will play a key role in the harnessing and development of our marine resources sustainably.

By: John Father Small & Dr Judith Okello ***Edits: Jane Kiguta Layout: Faith Mboka Photos: John Father***

Mangroves matter: KMFRI joins national leaders in championing coastal conservation

Mida Creek, Kilifi County – July 26, 2025

Community members and KFS team pose for a photo at Mida creek.

Kenya marked the International Day for the Conservation of the Mangrove Ecosystem at Mida Creek in Kilifi County, bringing together national and county leadership, community groups, researchers, and conservation stakeholders under the theme “Protecting Wetlands for Our Future.” The high-level event was led by Cabinet Secretary for

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Environment, Climate Change and Forestry, Dr. Deborah M. Barasa, and Principal Secretary for Forestry, Mr. Gitonga Mugambi.

"Mangroves are not just ecological assets; they are economic enablers and part of our national heritage,"

Dr. Barasa praised the resilience and effort of coastal communities in mangrove restoration, noting that mangroves store up to four times more carbon than upland forests and play a critical role in Kenya's climate change mitigation strategy. "Mangrove supports biodiversity, strengthens coastal resilience, and anchors livelihoods in fisheries, ecotourism, and nature-based enterprises such as seaweed and shellfish farming," Dr. Deborah Baraza.

She urged for stronger coordination among institutions, including Kenya Forestry Service (KFS), county governments, Beach Management Units (BMUs), Community Forest Associations (CFAs), and private actors, and directed that all mangrove initiatives be aligned to the National Mangrove Ecosystem Management Plan (2017–2027).

Policy Milestone: Four National Documents Launched to Guide Mangrove Future

This year's celebration also marked a major policy milestone in Kenya's mangrove conservation journey, with the launch and dissemination of four national-level technical and policy documents expected to guide mangrove management for years to come namely: National Mangrove Ecosystem Restoration Guidelines – which provides a comprehensive framework for implementing best practices in mangrove restoration at both community and institutional levels.

Another critical document unveiled was the Mangrove Tree Nursery Manual – a practical manual to support restoration practitioners and nursery managers in producing high-quality seedlings with strong survival rates.

The CS further launched Mangrove Harvest Management Plan for Lamu County (2025–2035), a document that provides sustainable harvesting guidelines to maintain ecological balance and long-term resource availability across Lamu's mangrove zones.

CS Environment and Forestry Dr. Deborah Barasa with other government official unveil the mangrove plans documents.

The CS also unveiled the Mangrove Forest Management Technical Order No. 1 of 2025 - Kenya's first national technical order on mangrove ecosystems, offering a standardized framework for restoration, sustainable use, and protection.

These documents cement Kenya's position as a leader in integrating science, policy, and practice in coastal ecosystem management.

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KMFRI Shines in Mangrove Science & Community Engagement

Environment and Forestry CS Dr. Deborah visits KMFRI exhibition booth.

KMFRI played a prominent role in the event by showcasing its scientific innovations in blue carbon, mangrove ecology, nursery systems, and community-led conservation. Through its coastal research stations and collaborative projects, KMFRI continues to generate knowledge that informs policy, supports sustainable livelihoods, and enhances ecosystem resilience.

During the exhibition, KMFRI scientists demonstrated how mangroves serve as fish breeding grounds, coastal buffers, and economic anchors for local communities, contributing to Kenya's Blue Economy vision.

"We must move from isolated efforts to coordinated, multi-sectoral action. Mangroves are not just trees by the shore, they are life systems that connect economy, culture, and climate resilience." Dr. Deborah Barasa.

By: Dr. Judith Okello, Levis Sirikwa, Mercy Kemboi, John Father Small, *Brian Isoe* *Edits: Jane Kiguta* *Layout: Faith Mboka* *Photos: John Father*

KMFRI's critical role in conservation stands out as Kenya marks Mangroves Day

As Kenya marked the International Day for the Conservation of the Mangrove Ecosystem on 26th July 2025, the spotlight turned once again to the critical role of mangroves in supporting coastal livelihoods, biodiversity, and climate resilience. This year's national commemoration took place in Mida Creek, Kilifi County.

With increasing pressure on mangrove forests from unsustainable exploitation and climate change, Kenya Marine and Fisheries Research Institute (KMFRI) continues to lead efforts in promoting ecologically sound restoration approaches. Research by our scientists reveals that many current mangrove interventions nationwide focus heavily on mass planting, which, although well-intentioned, often lacks an ecological foundation.

From rehabilitation to true restoration

KMFRI's continued research and advocacy emphasize that genuine mangrove restoration must go beyond mass planting campaigns and focus also on the growth and survival of these forests. While large-scale planting may appear impactful, such efforts often overlook ecological principles and fail to address root causes such as altered hydrology, overharvesting, or coastal development pressures.

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Young mangrove seedlings nurtured in a nursery ready for replanting.

Community-based ecological mangrove restoration CBEMR: a science-based, community-led model

KMFRI is at the forefront of promoting Community-Based Ecological Mangrove Restoration (CBEMR), an approach grounded in biophysical assessment, community participation, and restoration of natural processes.

Unlike conventional methods, CBEMR views planting as a last resort. It emphasizes recovery by restoring tidal flows, sediment balance, and protection from disturbances. In areas such as Gazi Bay and Lamu, this approach has resulted in the spontaneous regeneration of native mangrove species.

KMFRI's role in national strategy

KMFRI has played a key role in shaping national policy through contributions to the National Mangrove Ecosystem Management Plan (2017–2027). The Institute's data indicate that Kenya continues to lose approximately 0.7% of mangrove cover annually, threatening essential ecosystem services such as carbon sequestration, fishery productivity, and coastal protection.

KMFRI urges all stakeholders to rethink restoration success metrics, emphasizing ecosystem health and resilience over planting targets.

A call for action

This year's International Mangrove Day is not just a celebration; it's a call to action. KMFRI encourages government agencies, NGOs, community groups, and development partners to shift focus from symbolic planting to restoring ecological integrity**,** enabling mangroves to thrive and continue providing essential services, such as coastal protection, fish breeding grounds, carbon storage, and livelihoods enhancement.

How Mangroves Day started

The significance of 26 July is rooted in the memory of Greenpeace activist Hayhow Daniel Nanoto, who died of a heart attack in 1998 during a protest aimed at re-establishing the mangrove wetlands in Muisne, Ecuador. His dedication to mangrove protection inspired what later evolved into the International Mangrove Day, first adopted by UNESCO in 2015 and commemorated globally since 2016.

"Restoration goes beyond planting; it must begin with understanding conditions and addressing degradation. Short-term fixes are not enough; we need long-term ecological solutions." Dr. Judith Okello

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By: John Father Small *Layout: Faith Mboka Photos: Brian Isoe*

National mangrove committee at the heart of dialogue: KMFRI leads the way toward resilient mangrove future

Ahead of the International Day for the Conservation of the Mangrove Ecosystem, stakeholders from across the country gathered at Mnarani Beach Club on 25th July, 2025, for a robust National Mangrove Stakeholders Dialogue**.** The forum brought together scientists, community organizations, government representatives, and conservationists to reflect on the journey and future of mangrove sustainability in Kenya.

At the centre of these discussions stood KMFRI**,** firmly anchored by one of its own—Dr. Judith Okello**,** Principal Research Scientist and Chair of the National Mangrove Management Committee (NMMC)**.**

A journey of growth: from policy to practice

In her opening remarks, Dr. Okello painted a vivid picture of the NMMC's transformation—likening it to a *"jumpy baby boy growing and glowing"* with accomplishments. Since the launch of the National Mangrove Ecosystem Management Plan (2017–2027), the committee has made substantial strides in aligning policy with science and practice.

The highlight of the day was the launch of a taskforce report prepared by the NMMC, which was officially handed over to stakeholders. The report outlines restoration best practices and offers guidance to both national and county-level actors working to safeguard mangrove ecosystems.

KMFRI's Principal Research Scientist and NMMC Chair Dr. Judy Okello presenting at the mangrove dialogue.

"This report is a resource that empowers stakeholders to act—not just in policy rooms, but in real landscapes, with real communities," Dr. Okello emphasized.

She also called on local communities to develop localized Mangrove Restoration Plans, ensuring grassroots ownership and sustainability of conservation efforts.

KMFRI champions restoration, science, and community

Representing KMFRI's Acting Director General, Chief Research Scientist Dr. James Kairo delivered a powerful message on the centrality of mangroves to ocean health and national resilience.

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"Mangroves are the hope for our oceans. Their restoration is not optional—it is essential," said Dr. Kairo.

He retraced Kenya's mangrove journey, highlighting key moments:

- **1990s**: Early community-led restoration awareness
- **2013**: Launch of *Mikoko Pamoja*—the pioneering blue carbon community project
- **2017**: Proposal and formation of the National Mangrove Committee
- **2019**: Introduction of *Vanga Blue Forest* initiative
- **2023**: Development of *Lamu Blue Carbon Assets*

KMFRI's Chief Research Scientist Dr. James Kairo giving his remarks at the Mangrove Dialogue.

Dr. Kairo also applauded the dialogue's organizers, noting that the forum provides an important space for aligning nature-based solutions with Agenda 2030. He emphasized the role of education and sensitization in scaling conservation outcomes, calling on all sectors to work together to "secure the future of mangroves."

Science meets community: dialogue highlights

The day featured expert presentations and panel discussions from KMFRI senior researchers and mangrove ecology experts namely Dr. Amina Juma and Dr. Victor Mwakha, who delivered insightful presentations on ecological value of mangroves. Other topics focused on carbon credits and nature-based solutions, as well as policy and financing for mangrove management.

The plenary session closed the day with a powerful call to action.

How do we sustain the mangrove ecosystem while improving local community livelihoods?

A resilient future rooted in collaboration

KMFRI's central role in both science and leadership was applauded throughout the forum. The dialogue served not only as a platform for reflection but as a springboard for deeper partnerships, policy innovation, and ground-level action. As Kenya looks to the future, the message from Mnarani was clear:

Restore the roots. Secure the future. For people, for nature, and for the next generation.

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By: Jane Kiguta

KMFRI Sagana hosts delegation from Australia and Papua New Guinea to explore aquaculture partnerships

The Kenya Marine and Fisheries Research Institute (KMFRI) Aquaculture Director Dr. Jonathan Munguti and Sagana Research Centre Director Dr. Domitila Kyule in July this year, welcomed a high-level delegation from Australia and Papua New Guinea to explore collaborative opportunities in sustainable aquaculture development.

The visiting delegation included: Prof. Jesmond Sammut, Deputy Dean (External Engagement), University of New South Wales (UNSW), Australia, Mr. Jacob Wani, Aquaculture Executive Manager, Papua New Guinea, Mr. Joshua Noiney, Senior Freshwater Aquaculture Officer, Papua New Guinea's National Fisheries Authority and Ms. Chenxiang Zhang, PhD Scholar, UNSW.

The team held discussions with Dr. Menaga Meenakshisundaram and her team from the International Centre of Insect Physiology and Ecology (ICIPE), as well as researchers from KMFRI, focusing on forging partnerships that advance sustainable aquaculture practices.

Key areas of proposed collaboration included, farmer exchange programs to promote cross-regional learning and sharing of best practices, student exchange initiatives aimed at enhancing academic cooperation and capacity building and joint research projects targeting common challenges in aquaculture and fisheries management. Another area of proposed collaboration was stakeholder training and workshops to build technical capacity within the aquaculture sector.

The collaboration aims to strengthen food and nutritional security, boost livelihoods, and promote sustainable use of aquatic resources in Kenya, Australia, and Papua New Guinea.

*KMFRI team and delegates from Australia and Papua New Guinea pose for a photo.*The KMFRI delegation accompanied the guests on an insightful tour of the facility. The visit

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included an

KMFRI Aquaculture Head Dr Jonathan Munguti and Sagana Centre Director Dr Domitila Kyule lead the delegation on a guided tour

overview of KMFRI's aquaculture research innovations, hatchery systems, and outreach programs supporting local fish farmers. This visit marked a significant step toward building strong international partnerships focused on shared goals in research, training, and sustainable development of freshwater aquaculture.

This landmark visit underscores the power of international collaboration in achieving shared goals, enhancing food security, supporting livelihoods, and ensuring the sustainable use of aquatic resources across Kenya, Australia, and Papua New Guinea. A step forward in co-creating resilient aquaculture systems that can withstand global challenges while empowering communities.

By: Faith Mboka ***Edits: Jane Kiguta***

KMFRI joins global experts at World Aquaculture Safari 2025 in Uganda

Uganda's capital, Kampala, recently played host to the World Aquaculture Safari 2025, a major international aquaculture conference that brought together scientists, industry players, government officials, and students from across the globe. Held from June 24 to 27, the event attracted more than 1,800 delegates from 79 countries, making it one of the most successful aquaculture gatherings in Africa to date.

The Kenya Marine and Fisheries Research Institute was represented by Dr. Victoria Tarus, Deputy Director Technical Capacity and Ms. Morine Mukami Ngarari, a Fisheries Research Scientist. Both contributed meaningfully to discussions around innovation, research, and youth involvement in aquaculture.

Dr. Tarus took part in a student panel session, where she joined a team of professionals from different countries to engage with university students. The session served as a platform for sharing experiences and building motivation among young people interested in aquaculture and the blue economy.

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Ms. Ngarari presented a technical paper during the

*KMFRI Deputy Director Technical Capacity, Dr. Victoria Tarus with other participants pose for a group photo during **WAS 2025**.*

Global Artemia Summit, a high-level side event supported by the World Bank and hosted by FUTUREFISH. Her presentation, titled ***"Artemia Aquaculture in Africa: Opportunities and Constraints in Kenya,"*** explored Kenya's journey in Artemia farming, the challenges of relying on imports, and the country's potential to become a major Artemia producer in East Africa.

KMFRI's presence at the World Aquaculture Safari 2025 underscored the Institute's commitment to advancing science, policy, and youth engagement in aquaculture. Through both research and leadership, KMFRI continues to play a vital role in supporting sustainable livelihoods and marine resource development in Kenya and beyond.

*KMFRI mariculture Research Scientist, Ms. Morine Mukami Ngarari giving her presentation at **WAS 2025**.*

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By: Dr Melchizeddeck Osore

New edition of Kenya Aquatica Journal showcasing pioneering freshwater research

The Kenya Marine and Fisheries Research Institute is pleased to announce the release of the latest edition of the *Kenya Aquatica* Journal, Volume 10, Issue 1, which highlights groundbreaking research on Kenya's freshwater ecosystems.

This edition has been produced through the collaborative support of KMFRI and the **WIOMSA**-Western Indian Ocean Marine Science Association under the Marine and Coastal Science for Management (**MASMA**) programme.

The issue presents a diverse array of scientific studies addressing ecological, socio-economic, and environmental challenges, offering valuable insights into sustainable management practices for Kenya's aquatic resources.

Antimicrobial Resistance & Fish Health: A study on disease surveillance in fish from lacustrine cage farms sheds light on antimicrobial resistance and emphasizes the need for responsible antibiotic use to ensure aquatic animal health and food safety.

Key Highlights from the Edition include

- **Pesticide Pollution:** Research on the impact of organochlorine pesticides in lake ecosystems advocates the use of **Rhagovelia spp.** as bioindicators for monitoring pesticide effects across aquatic food webs.

Fisheries Management in Lake Baringo: An assessment of catch and effort composition underscores the need for regulatory enforcement and stakeholder capacity building to prevent overfishing.

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Fish Kills in Lake Victoria: This study attributes wild fish kills to eutrophication and pollution, recommending integrated watershed management as a solution to safeguard fisheries and local livelihoods.

Conservation of Lake Elementaita: A multidisciplinary study combining water quality assessments, fisheries research, and community surveys calls for sustainable agriculture and conservation strategies in this key flamingo sanctuary.

Fisheries Co-management: Findings from Lake Baringo emphasize the critical role of community involvement in achieving ecosystem management success, despite enforcement challenges.

Socio-Economic Dynamics of Lake Victoria: A proposal for a citizen science-based regulatory framework aims to improve long-term sustainability of Lake Victoria's resources.

Plastic Pollution in Lake Turkana: Research recommends public awareness, improved waste management, and stricter enforcement of environmental regulations to combat plastic pollution.

Antimicrobial Resistance & Biodiversity: A review explores Kenya's aquatic biodiversity for potential novel antimicrobial agents, highlighting the country's underutilized genetic resources.

Genetic Diversity of Freshwater Fish: This study identifies gaps in genetic data and calls for expanded research to inform fish conservation and management strategies.

Fish Market Infrastructure in Lake Naivasha: An evaluation of fishery dynamics recommends investment in infrastructure such as fish markets and hatcheries to support the local fishery sector.

This edition of *Kenya Aquatica* underscores KMFRI's commitment to advancing scientific knowledge and promoting sustainable management of Kenya's freshwater ecosystems. The publication reflects the Institute's role in supporting the national and regional Blue Economy agenda through evidence-based research and policy recommendations.

The **Chief Editor, who is also Principal Research Scientist at KMFRI Dr. Melchzedeck Osore and the Editorial Board** of *Kenya Aquatica* extend their heartfelt appreciation to **KMFRI** and **WIOMSA** for their support in the preparation, compilation, and production of this important edition.

Read more
https://www.kmfri.go.ke/index.php/component/spagebuilder/page/181

About Kenya Aquatica

Kenya Aquatica is the official scientific journal of the **Kenya Marine and Fisheries Research Institute (KMFRI)**. It provides a platform for KMFRI researchers and collaborators to disseminate findings from studies conducted in Kenya's aquatic environments. The journal supports KMFRI's mandate to conduct research in marine and freshwater fisheries, aquaculture, ecological and environmental studies, and oceanography, contributing vital scientific data for the sustainable development of the Blue Economy.

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By: David Mwoma, Brian Isoe, Faith Mboka
Edits: Phionalorna Nzikwa Photos: PR team

Marine spotlight: KMFRI marks World Seaweed Day 2025 in Mkunguni, Kwale County

Harvested seaweed displayed at exhibition booth during the World Seaweed Day in Kwale County.

On June 5, 2025, the vibrant coastal village of Mkunguni in Msambweni Sub-county, Kwale County, buzzed with energy, pride, and purpose as it hosted World Seaweed Day. The event, led by the Kenya Marine and Fisheries Research Institute (KMFRI) through its Mariculture Department, celebrated seaweed's transformative potential in addressing climate change, boosting marine ecosystems, and enhancing food security while fostering economic empowerment.

KMFRI team showcases seaweed value added products at the commemoration event.

Seaweeds resemble plants; they are algae and do not have roots, stems, or leaves like land plants. Instead, they grow by adhering to rocks or other surfaces in the ocean and immediately absorbing sunlight and nutrients through their surface.

They thrive without freshwater or chemicals, absorb carbon dioxide, and support marine biodiversity by providing habitats for aquatic life. In Kenya, species like *Kappaphycus* and *Eucheuma* are cultivated for food, animal feed, fertilizers, cosmetics, and pharmaceuticals.

Seaweed Day is a vital occasion that shines a spotlight on the incredible role seaweed plays in maintaining the delicate balance of our marine ecosystems. This remarkable plant not only generates oxygen but also provides essential food and shelter for a diverse array of marine life. This year's celebration was brought to life with a captivating exhibition organized by the

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KMFRI team showcasing an impressive variety of value-added seaweed products that are making an impact on local communities. Visitors experienced technical demonstrations and engaging policy discussions, all focused on this versatile resource.

Shampoo and soap made from processed seaweed.

Members of the Kibuyuni community took center stage, proudly presenting their innovative seaweed-based creations, including shampoo, soap, delicious cakes, chapatis, and biscuits. These products beautifully highlight the economic potential and versatility of seaweed, offering a glimpse into a sustainable future.

Additionally, innovators shared cutting-edge techniques that not only enhance profitability but also minimize environmental impact, truly showcasing the promise that seaweed holds for our communities and the planet.

KMFRI has been fronting seaweed farming as an alternative farming idea that is a game changer in harnessing the blue economy. For many decades, the coastal communities have depended on the ocean for fishing activities, forgetting the immense potential that seaweed products can offer when fully scaled-up farming is commercialized.

A Unified Vision for Seaweed's Potential

The event attracted key stakeholders, including Kwale County Governor H.E. Fatuma Achani, representatives from the State Department for Blue Economy and Fisheries, Kenya Fisheries Service, The Nature Conservancy, KEMFSED, COMRED, Reefolution, GIZ, and Plan International Kenya. Their shared message was clear - seaweed farming is more than an ocean-based activity; it's a gateway to opportunity.

Asst. Director Mariculture Dr. Anthony Nzioka elaborates on KMFRI's mandate at the event.

KMFRI Assistant Director of Mariculture Dr. Antony Nzioka, speaking at the event, called on the government and partners to push for the recognition of

this product as a cash crop, noting that the potential of this commodity hasn't been fully tapped.

Governor Achani later handed over six boats to the community to support seaweed farmers, easing transport challenges and enabling access to deeper farming zones, further strengthening coastal livelihoods.

Mtengo Omar Makame, chair of Kwale's Beach Management Units (BMUs), noted that 23 BMUs are actively protecting marine ecosystems while promoting seaweed farming. "Seaweed has become a lifeline, reducing poverty and empowering women and youth who once depended on others for financial stability," he said.

Empowering Communities, Restoring Ecosystems

Seaweed farming is reshaping Kenya's coast by creating jobs, fostering gender equity, and building climate resilience. As a sustainable solution to food insecurity and marine degradation, it offers diverse income streams through products ranging from food to cosmetics. Recognized as a cornerstone of Kenya's blue economy, seaweed farming diversifies livelihoods and strengthens vulnerable communities.

However, challenges persist. Inadequate infrastructure, volatile markets, and the legal classification of seaweed as a fish under Kenyan marine law limit its growth as a recognized cash crop. Addressing these barriers is critical to unlocking seaweed's full potential.

A Vision for the Future

As climate change intensifies and fish stocks decline, Kenya's seaweed farmers offer a powerful solution: harnessing the ocean to empower communities, promote gender equity, and restore the planet. The World Seaweed Day celebration was not just an event, it was a bold step toward a sustainable blue economy, with seaweed leading the way.

By: Brian Isoe, Dr. David Mirera, Eng. Josyline Kendi, Mondesto Isaac ***Edits: Jane Kiguta Photos: Brian Isoe***

Five villages drawn from Lamu County and Lower Tana Delta benefit from the restorative mud crab aquaculture training program

Mud crab farming along the coast has undergone tremendous changes since the first cage was fabricated to house wild crabs for fattening before being sold to clients. With aquaculture/Mariculture gaining momentum along the coastal region, there is a need for farmers to explore all available alternatives that have prospects in alleviating poverty in the region.

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Scylla serrata, another name for mud crabs, are huge, edible crabs that are found along the coastal mangroves, estuaries, and mudflats, which are the habitats where mud crabs burrow into the mud for protection. The crabs hunt aggressively and consume mollusks, smaller crabs, and other aquatic life. In some places, the crabs are farmed and frequently taken for commercial use to generate income.

Dr. Mirera demonstrates how to handle and tie a Mud crab.

They are prized as seafood delicacies and are well-known for their tender, sweet and white meat that is most preferred due to the different lifestyle diseases that prevent people from taking red meat. They are frequently prepared in several ways, such as boiling, steaming, or grilling, resulting in a soft texture.

Farming of these crabs has, over the years, witnessed various advancements in the models of fabricated cages that house these crabs. Researchers have invented different models since the first cages were produced in earlier 2000 at Dabaso Conservation Group currently dubbed the Crab Shack at Malindi, Kilifi County.

Complete fabricated mud crab cages awaiting deployment to house crabs for fattening.

Recently, Dr. Mirera, a principal research scientist at Kenya Marine and Fisheries Research Institute (KMFRI) and champion of mud crab aquaculture in East Africa, endeavored to fabricate and train five villages from Kiunga, Amu, Mtangawanda, Mokowe, and Tana the necessary skills to fabricate more cages for their communities under the guidance of trainees who were being trained (ToTs, - Training of Trainers) to construct these cages.

The skills training was aimed at providing technical support towards adopting mud crab restorative aquaculture for livelihood diversification within communities adjacent to mangrove forests in the Lamu-Tana seascape.

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The training has benefited communities in various ways, including site selection for cages, the biology of mud crabs to guide farmers on how to handle cultured crabs, and the fabrication and construction of the Mud Crab Innovative Plastic Cage (IPC).

Seven days were set aside for the training that involved two days of class work and five days of practical/hands-on. The two days were an eye-opener for the TOTs, who were introduced to the mud crab farming history, progress made over the years, and what the future holds for this practice. They were also taken through the biology of mud crabs, feeding programs, and monitoring.

Training sessions incorporated Indigenous Traditional Knowledge (ITK), with the community members given time to share experience and expertise in the capture of mud crabs. It was evident that indigenous knowledge cannot be wished away at all; it is the backbone that has set the stage for where we stand at this point, and so all information and knowledge are key in ensuring the success of our endeavours.

After class training, farmers proceeded to the respective villages to fabricate innovative cages with a capacity of holding 240 crabs at a go under the guidance of technical teams from Dabaso Conservation Group (N. Ngao and D. Misinga), KMFRI (Eng. Kendi; J. Nyaberi; I. Modesto and L. Atieno), and the Training of Trainers (ToT) drawn from the different villages and NRT officers.

Fabricated cages were to be used in farming crabs sourced from the wild for fattening before they were ready for the market. This strategy will also help reduce mud crabs' documented mortality in the value chain, which has been reported to be 20% due to fishers holding mud crabs at home for many days.

Participants pose for a group photo after the completion of cage fabrication in Mtangawanda, Lamu County.

Each community was provided with materials to fabricate cages that will be instrumental in piloting this livelihood project. The communities were expected to produce 120 cages that would host two crabs each for fattening to enhance value before marketing.

The developed cages represent an improvement over using sticks and bamboo trees, which were originally employed to construct cages. This current material is excellent for building mud crab cages, especially in traditional setups designed to be eco-friendly. It has demonstrated durability and lightweight properties, allowing it to float in intertidal waters and making it easily accessible.

The crabs are then sourced from the wild before they are put in the cages for the fattening process, where they are fed to fatten to the required market standards. The cages are designed to fit different sizes of crabs, as the crab sizes differ geographically. Crabs from the Kiunga area are considered big compared to those from other areas, leading to only one compartment and one crab per cage, compared to other cages that will have two compartments hosting two crabs at once.

Trainer of trainers, together with community members take part in the development of a mud crab cage at Mokowe in Lamu.

Dr. Mirera notes that with this initiative, the communities in the coastal region are able to benefit from job creation through supporting fishermen, traders, and restaurant owners. This will also be an alternative form of generating income from the overdependence on fishing in the waters and provide a sustainable cash flow for the farmers.

With mud crab farming taking the central stage in the development of communities' livelihoods along the coast, proper interventions to ensure the sustainability of projects are given priority, like building the capacity of communities. This will ensure long-term profits, and through such interventions, communities stand to benefit and improve their livelihoods.

The restorative mud crab aquaculture project was co-funded by NRT and TNC with technical guidance from KMFRI and aimed to tap and exploit the potential of restorative Mariculture on the coast to minimize poverty levels, boosting food security as well as nutritional value and creating a ready market, thus boosting the economy of the region and the Country.

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By: Justine Rutto, Ian Mutethia, Faith Mboka, Brian Isoe
Edits: Jane Kiguta

Toxic tide: Uncovering a decade of heavy metal pollution in Mombasa's coastal waters

Mombasa's vibrant blue waters are facing an invisible crisis with dangerous levels of toxic metals steadily building up in marine ecosystems. A comprehensive 10-year review conducted by the Kenya Marine and Fisheries Research Institute (KMFRI) sheds light on the extent, causes, and consequences of heavy metal pollution along the Kenyan coast. This timely study, based on research carried out between 2015 and 2024, reveals significant ecological and health risks affecting both marine life and local communities residing along.

Tudor Creek, Makupa Creek, Port Reitz, and Kilindini Harbor are the most polluted areas. These sites are close to industrial zones, informal settlements, and key maritime infrastructure. Repeated tests showed high levels of lead (Pb), cadmium (Cd), copper (Cu), mercury (Hg), and zinc (Zn), often exceeding international safety standards.

The main sources are untreated industrial discharges, ship maintenance activities, domestic sewage, stormwater runoff, and improper waste disposal. The creeks and estuarine systems act as natural sinks, trapping heavy metals in sediments where they can remain for years or even decades, harming local livelihoods and marine biodiversity.

KMFRI Assistant Research Scientist Justine Rutto conducts sample analysis at the laboratory.

The presence of heavy metals in Mombasa's waters does not stop at the sedimental level but also bioaccumulates in marine organisms, particularly in filter feeders like oysters, mussels, and fish species commonly consumed by coastal communities.

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Lead levels in fish exceeded the Food and Agriculture Organization (FAO) limits. These metals are linked to serious health problems, including kidney damage, neurotoxicity, and developmental disorders. With seafood forming a dietary staple for many coastal communities, these findings signal an urgent public health concern, especially for vulnerable groups such as pregnant women and children.

Ecological and Health Risks

Heavy metals are not just toxic — they are persistent, and these pollutants disrupt vital biological processes in marine organisms. Filter feeders experience reduced immune function and filtration rates, while fish show signs of organ damage, stunted growth, and behavioral changes.

This has led to a visible decline in marine biodiversity, a dwindling of species. The cascading effect is a disruption of food webs, weakened ecosystem services, and reduced resilience of coastal habitats such as mangroves and seagrass beds. For people, the risks are equally alarming.

Consuming contaminated seafood increases exposure to toxic metals, which can cause kidney damage, neurotoxicity, and developmental disorders, particularly for pregnant women and young children who rely on seafood.

What Needs to Be Done: Policy, Practice, and People

The review provides a clear roadmap for reversing this environmental decline. Key recommendations include upgrading wastewater infrastructure in informal settlements through technologies like Decentralized Wastewater Treatment Systems (DEWATS) and the use of wetland waste treatment plants.

Strict enforcement of environmental laws such as EMCA should be implemented through real-time industrial audits and coastal water monitoring.

Nature-based solutions such as bioswales, retention basins, and constructed wetlands are also recommended to capture metal-laden stormwater before it reaches the ocean.

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Industries should adopt Best Management Practices (BMPs), including zero-discharge protocols and advanced filtration systems to keep heavy metals out of coastal waters. In hotspots where sediment-bound metals pose a high ecological risk, targeted dredging or phytoremediation is advised.

Public awareness campaigns are equally vital to educate communities and the masses on pollution risks and encourage responsible waste disposal. Community-based monitoring, involving local fishers and youth groups, is emphasized as a low-cost, high-impact strategy to build local ownership and expand data collection networks.

Call for Action: A Scientific Call to Arms

To sustain any intervention, science must lead the way. The KMFRI study calls for long-term monitoring programs to track pollutant trends in both water and sediment, spatial mapping of metal fluxes using remote sensing and GIS technologies, and research on how metals move through food chains through trophic transfer studies.

Health risk assessments that consider local dietary habits and community exposure are also essential. By combining robust science with policy action and community involvement, Kenya's coastal waters can be safeguarded for future generations.

"Our coastlines are the heartbeat of Kenya's marine economy. Protecting them is no longer optional — it's urgent."

By: Dr. I Githaiga, P. Waluba, H. Akuma, S. Fitzwanga, H. Moyoni, S. Makupe, N. Karani, F. Kimanga, L. Kimbio, P. Kazungu, E. Nyambariga and E. Waiyaki Edits: Jane Kiguta

KMFRI prioritizes employee, environment surveys to drive excellence

In its continued commitment to scientific excellence and institutional growth, the Kenya Marine and Fisheries Research Institute (KMFRI) is embracing a data-driven approach to workforce development through regular Employee Satisfaction (ES) and Work Environment (WE) surveys.

These staff surveys are not mere formalities, they are vital tools that allow KMFRI to track morale, identify areas for improvement, and foster a productive, innovative, and motivated workforce. The surveys serve as both a mirror and a map, offering critical insights that guide policy, resource allocation, and organizational development.

"Employee satisfaction should not be viewed as a soft statistic; it is a strategic necessity," say survey coordinators Dr. Irene Githaiga and her team.

Giving Staff a Voice

Through the ES and WE survey, KMFRI staff are encouraged to share their perspectives on a wide range of workplace issues, including training opportunities, career progression, communication, workload, and overall job satisfaction. These insights

help leadership better understand employee needs and support data-informed decision-making that promotes inclusivity, fairness, and effective governance.

When staff are heard, they become active partners in shaping KMFRI's future, a principle central to the Institute's mission to lead in sustainable marine and blue economy research.

The Cost of Ignoring Feedback

The FY 2023–2024 internal report underscored a concerning trend: over 20 per cent of researchers left KMFRI during the period, contributing to a significant brain drain. This loss highlights the risks of neglecting staff feedback, which include increased turnover, reduced productivity, absenteeism, and loss of institutional memory.

When staff voices go unheard, crucial data to inform management decisions is lost, opportunities for improvement are missed and discontent simmers beneath the surface, delaying much-needed reforms.

Why Satisfaction Matters

A satisfied workforce is the engine behind innovation, productivity, and institutional loyalty. Studies consistently link employee happiness to enhanced service delivery, reduced recruitment costs, and the establishment of a strong organizational culture.

At KMFRI, where research directly impacts national development and conservation efforts, ensuring a positive work environment is not just beneficial—it is essential. Employee satisfaction directly supports KMFRI's vision to be a global leader in blue economy research and innovation.

Building a Feedback Culture

The Institute is investing in feedback systems that foster openness and accountability. Through anonymous surveys, leadership reviews, and workload assessments, KMFRI is creating structured pathways for staff to express concerns and suggest improvements.

However, the true impact lies in action. Survey data must be translated into tangible improvements—whether through leadership training, better communication channels, or targeted staff development programs. "Regular feedback loops and visible follow-up actions are key to building trust and a high-performance culture," the survey team notes.

Best Practices in Survey Implementation

To ensure maximum impact, KMFRI adheres to international best practices in survey design and implementation through clear objectives, assured confidentiality, a mix of question types for deeper insights, concise formats to respect staff time, transparent communication at every stage and most importantly, a commitment to acting on the findings

Moving Forward

KMFRI's dedication to its people is as strong as its commitment to research. By fostering a culture of listening, respect, and continuous improvement, the Institute is creating an environment where staff thrive, and where science can flourish.

As KMFRI builds toward the future, it does so with a clear understanding: the foundation of every great institution is its people. One satisfied employee at a time, KMFRI is growing stronger, smarter, and more responsive to the challenges and opportunities of the blue economy.