



Contents

- ❖ KMFRI's Dr James Kairo a major player in mangrove conservation
- ❖ KMFRI among agencies manning Tsunami warning centres in Lamu and Mombasa

BY JANE KIGUTA & HEZEKIEL GIKAMBI

KMFRI's chief scientist appointed expert to UN's Decade advisory board

Kenya Marine and Fisheries Research Institute's (KMFRI) Chief Scientist Dr James Kairo is among 15 expert members appointed to the Decade Advisory Board out of the 243 nominations received by the Board.

The 15 from across the globe are drawn from government, private sector, philanthropy, civil society, and the scientific community, or are serving in their individual capacity. They will serve in the board for two years.

Early last year, the United Nations officially announced the Decade of Ocean Science for Sustainable Development (2021-2030) to support efforts to reverse the cycle of decline in ocean health.

In a letter dated 13th December 2021, the Head of the Marine Policy and Regional Coordination Section of the Intergovernmental Oceanographic Commission (IOC) Julian Barbière, on behalf of the Decade Coordination Unit of the IOC-UNESCO Secretariat, congratulated Dr Kairo on his new appointment and thanked him for his engagement and commitment.

Dr. Kairo is a Pew Fellow and Chief Scientist at KMFRI where he heads a dedicated team working on mangroves and associated blue carbon ecosystem.

He is also a member of the International Scientific Working Group on Blue Carbon. Previously, Dr Kairo

served as the coordinating lead author of the



KMFRI's Chief Scientist Dr James Kairo

Intergovernmental Panel on Climate Change's Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC).

Speaking after receiving the communication, elated Dr Kairo humbly accepted the nomination and thanked the Board for the confidence placed in him, assuring the members of his unwavering commitment in the execution of the board's mandate.

This is the second time this year Dr Kairo is being nominated to serve in a high profile UN advisory board. Early 2021, Dr Kairo bagged a nomination as a member of the Science Board for the UN's Decade on Ecosystem Restoration during its 2021 mandate.

The aim of the UN Decade is to prevent, halt and reverse the degradation of ecosystems both on land and in the ocean.

Also referred to as the Kenyan's Mangrove man by *InfoNile* journal, Dr Kairo is the co-founder of the award winning Mikoko Pamoja – the first community-type project to restore and protect mangroves through sale of carbon credits.



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Mikoko Pamoja has been trading in mangrove carbon credits since 2013. Revenue generated (of about KSh 2.4 million per annum) is used to support community projects in water and sanitation, education, and environmental conservation.

Local people make spending decisions democratically and investments including purchase of new schoolbooks, games kits, furniture and provision of water to the communities. At least 73% of the 6,000-resident population in Gazi and Makongeni villages rely on water provided by Mikoko Pamoja.

This innovative carbon offset project has been replicated and expanded in the neighboring mangroves of Vanga in Kwale County; through generous support from UNEP/ Global Environment Facility (GEF) Blue Forest, Blue Action Fund of Germany, and the Blue Natural Carbon Financing Facility (BNCF) that is coordinated through International Union for Conservation of Nature (IUCN).

During the 31st session of the IOC Assembly (UNESCO) held between 14th and 15th June 2021, IOC Member States, UN agencies and partners expressed strong support for the UN Decade of Ocean Science for Sustainable Development, and to the IOC in its role as coordinator of the implementation phase of the Decade.

The Decade Advisory Board will be a multi-stakeholder advisory body that will assist the IOC Secretariat in performing its function as coordinator of the Decade. The Board will also report both to the IOC governing bodies and the IOC Executive Secretary and advise on implementation of decade's priorities to address societal needs.

It is also expected to review the Decade progress towards improving the quality and quantity of research outputs that address the Decade's challenges, identify gaps and opportunities, advise on research data, stewardship strategies, development of resource mobilization strategies,

and supporting the development of a monitoring and evaluation framework of the Decade. The Board will also provide advice and operational support to the IOC Executive Secretary to facilitate the endorsement process of Decade Actions, specifically at the programme level.

Dr Kairo's colleagues in the board are Dr Frida Maria Armas-Pfirter (Argentina), Dr Tamatoa Bambridge (France), Dr Silvia Elena Chacón-Barrantes (Costa Rica), Prof Dato' Dr Nor Aieni Haji Mokhtar (Malaysia), Vidar Helgesen (Norway/Sweden), Prof Gideon Henderson (UK), Charlotte Hudson (USA), Dr Margaret Leinen (USA), Angelique Pouponneau (Seychelles), Bente Pretlove (Norway), Dr Fangli Qiao (China), Dr. Katy Soapí (Solomon Islands), Dr Alexander Turra (Brazil), and Prof Kouadio Affian (Côte d'Ivoire).



Dr James Kairo monitoring mangrove restoration in the Gambia

In addition to the 15 expert members, UN Legal Counsel/DOALOS, which is the Secretariat and focal point of UN-Oceans and the United Nations Convention on the Law of the Sea, will have one permanent seat on the Decade Advisory Board.

The IOC Secretariat as coordinator of the Decade will also have a permanent seat on the Board. Three more seats will be reserved for UN Agencies and will be identified through consultations via UN-Oceans.



BY SCIENCE WRITER

2004 Tsunami raised Kenya's preparedness level to combat disaster

When the deadliest tsunami in history swept halfway around the world from Asia to East Africa on Boxing Day in 2004, the government of Kenya issued an alert, instructing people to vacate the beaches immediately. However, most people were reluctant to leave because they did not know what a tsunami is and the seriousness of the situation.

"Out of curiosity, some were even trying to move closer to the beaches to 'see' the tsunami," recalls Charles Magori, a scientist with the Kenya Marine and Fisheries Research Institute (KMFRI).

But this was no tourist attraction. It was a disaster in waiting triggered by a 9.0 magnitude earthquake on the seafloor near Aceh, about 100 miles off the coast of Indonesia's Sumatra Island. Waves as tall as 30m moving at a speed of 800km/hr were travelling 6,000km to Africa.

And though they shrunk and slowed significantly by the time they reached, they still wreaked havoc on the East African coastline from Somalia, where 110 were killed, to Tanzania, which lost 11 lives. Though only one Kenyan, Samuel Njoroge, was killed, the country's unpreparedness made it a sitting duck. Rising sea levels and loss of coastal vegetation also make Kenya vulnerable to worse impacts in future.

Countries closer to the epicenter bore the brunt. Overall, the tsunami killed more than 230,000 people,



Raging Tsunami wave

left millions homeless and caused between Sh800 billion and Sh1.5 trillion in damages across India, Indonesia, Sri Lanka and Thailand.

Following this tragedy, the international community urged the prompt establishment of a tsunami early warning system in the Indian Ocean, with the intention of extending it to be a multi-hazard system with global coverage.

Kenya had tide gauge stations in Lamu and Mombasa, but there was no official information, warning and response networks. This called for change. "The 2004 tsunami was a wake-up call for all the countries surrounding the Indian Ocean," Magori said.

Locally, the fishing industry in Malindi suffered the most due to the destruction of fishing gear and boats and the loss of man-hours.

"Malindi Bay at the Coast was the most affected because it is wide, shallow and open, and there are no coral reefs to shield the bay from the waves propagating from the deep sea," the scientist said.

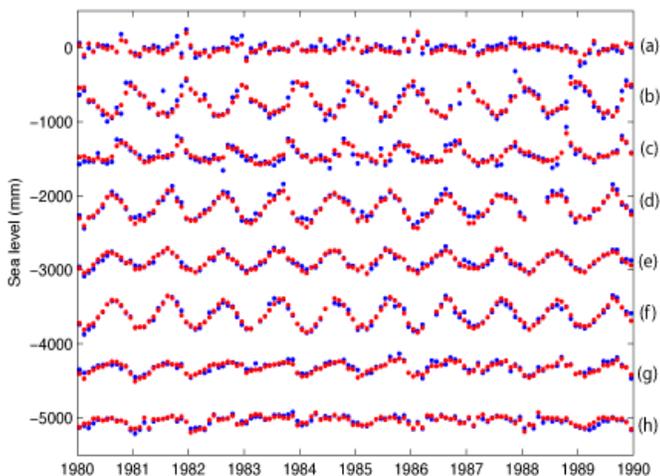


Measures taken...

A National Tsunami Warning Centre has since been set up at the Kenya Meteorological Department. It works closely with KMFRI and the National Disaster Operation Centre.

In Lamu, the tide gauge station is now a dedicated component of the Indian Ocean Tsunami Warning System (IOTWS). Through regional collaboration, the IOTWS was established to assist countries in the region share data and information.

The Lamu station was established in 1996 as part of the Global Sea-Level Observing System network of tide gauges for monitoring sea-level rise as a result of global warming. The Mombasa station was set up a decade earlier, in 1986. Both are maintained and operated by KMFRI.



Tide gauge record

Magori says data from the stations and others like them in the region can be used to either confirm or cancel a tsunami warning throughout the region. In addition, the stations can detect and record other extreme oceanic events, such as storm surges and tropical cyclones. During the 2004 tsunami, the Lamu

tide gauge was able to capture and record the tsunami wave that had struck the Kenyan coastline.

Magori says there is a possibility of a tsunami happening in Lamu but says it will all depend on the epicenter and magnitude of an undersea earthquake. "Tsunamis move silently and most are unnoticed. That was the situation in 2004, when a tsunami came from Sumatra Island in Indonesia. But with the station in place, we won't be caught off-guard," Magori said. "For instance, if the epicenter of the tsunami wave is in Indonesia, the waves will be detected and recorded in countries like India, Sri Lanka, Maldives and

Mauritius before they finally hit the Kenyan coastline." Through the network, offshore countries will alert the Kenyan station of the wave before it arrives. It takes about one and a half hours for the wave to arrive in Lamu from Mauritius, which Magori says allows for enough time to alert and evacuate people before the tsunami arrives.

How the station works...

Magori says the tide gauge station measures sea level and sends data in real time to the global sea level database at the University of Hawaii's Sea Level Centre in the United States.

The data is used to monitor short- and long-term trends of sea-level variations as part of climate change studies. It is also used by KMFRI to produce tide predictions for Lamu, after which such predictions are distributed to stakeholders and ocean users to facilitate research, navigation and recreation activities.

There are only two tide gauge stations in Kenya: The Mombasa station at the Liwatoni Jetty in Kilindini harbour, and the Lamu station at the Lamu Mangrove Jetty in Lamu Island.

Magori explains that tide gauge stations rely mostly on three sensors: the encoder, pressure sensor and radar sensor, which work concurrently to generate and process data. The encoder consists of a floater



and weight, which move vertically, depending on the tidal level and record the water levels.



KMFRI Lamu tide gauge Technician John Ochengo explains how the equipment at the station works.

The pressure sensor is installed below the water to measure the hydrostatic pressure and converts this to water levels, while the radar sensor is installed above the water and sends a radar signal to the water surface. It then receives an echo back and automatically calculates the water level. "Any slight change in water level is recorded and the sensors are also able to show why," Magori said.

The station also makes use of satellite antenna for real-time data transmission, solar panels and rechargeable batteries for running the equipment.

The equipment was donated by UNESCO-IOC, with financial support from the governments of Finland, Germany, Japan, Netherlands, Norway, Sweden and the European Commission. KMFRI has deployed two technical staff at the station to manage and ensure a smooth operation.

Achievements...

Magori says the station has been crucial in generating data and information that has been used to produce tide tables for Mombasa and Lamu. The tables have assisted ocean users to plan well for their respective activities. The scientist explains that analysis of data collected from both the Mombasa and Lamu stations has revealed that the sea level is rising at a rate of about 2mm per year, which is consistent with projections by the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.

He says currently, KMFRI, with the support of partners, is building up the two sea-level databases, something he says is crucial in the coastal management and planning as well as mitigation measures. "What we are saying is, as a country, we are ready in the event a tsunami hits us. And that's why the government, together with our partners, continues to invest in the best technology to ensure we record and interpret the smallest of occurrences under the sea," Magori said.

In Kenya, the tsunami hazard is classified as medium which means that there is more than a 10% chance of a potentially-damaging tsunami occurring in the next 50 years.

Research shows that a rise in the sea level can significantly increase the tsunami hazard, which means that smaller tsunamis in future can have the same adverse impacts as big tsunamis would today. Kenya has only experienced one recorded tsunami, which arose from the Indian Ocean earthquake of 2004, the impact of which was relatively minor. According to assessments, the Kenyan coast is vulnerable to 2m-high waves and water reaching 500m inland.

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