Mtafiti Monthly

A PUBLICATION OF KENYA MARINE AND FISHERIES RESEARCH INSTITUTE (KMFRI)

ISSUE #14
JUNE, 2021

Contents

01 Exploiting marine fisheries resources
02 Exploring L. Turkana's blue wealth
03 Engaging community in coral reef restoration

BY GLADYS MWAKA, DR DAVID MIRERA, & JOSELINE KENDI
#Mariculture@KmfriResearch

KMFRI team explores marine fish cage farming to bridge fisheries gaps

Kenya Marine and Fisheries Research Institute (KMFRI) mariculture scientists have deployed marine cages in an experimental study aimed at addressing fisheries gaps occasioned by overexploitation of natural stocks in marine and coastal waters.

Feasibility studies conducted by KMFRI's mariculture department headed by Dr David Mirera have revealed that cage fish farming is possible in small creeks in Kenya. Others in the project are Ms Gladys Mwaka, a research scientist and aquaculture engineer Ms Joseline Kendi.

In deploying the marine cages, the Institute is relying on her experts from various departments including oceanographers, researchers, divers and aquaculture engineers to design and fabricate the cage technology. GIS surveyors did the mapping and depths profiling, while divers deployed the cage, and lab technologists analyzed water quality, nutrients, phytoplankton, and sediments to assess the feasibility of the cage culture.

Technologists assemble Acoustic Wave current profiler (AWCP)

The sample marine cages for the experimental studies have been deployed at the Mida creek under Dabaso Conservation Group. The cages have been modified to be compatible with the

KMFRI team inspects a fully designed, fabricated and installed cage in Dabaso

creek's dynamics such as depth, wave, current strength and community culture.

Fish cages are usually deployed in marine waters with good circulation and that meet the right water quality criteria. The depth should also be appropriate – ideally more than 4 meters at low tides. The cage designed for the experiments measured 4*2*2 with a capacity to hold 5,000 prawns at a density of more than 300 per M^2.

Research findings show that marine prawns can grow to between 40g and 60g in 5-7 months if appropriate feeds are administered. Initial results indicate marine prawns can grow on average at the rate of 0.01 - 0.035 cm/day with an average length increment of 0.02cm in total length.

Once installed, cage fish farming will help to exploit inshore and offshore marine resources. This will increase fish supply locally, and hopefully bring down the cost of fish, which will ultimately boost efforts in achieving food security and nutrition, a major pillar under the Big Four Agenda.

Prior to rolling out the studies, KMFRI team mobilized communities in Dabaso and held sensitization forums to create awareness, and for project ownership. The dialogues included public barazas which allowed

Mtafiti Monthly

A PUBLICATION OF KENYA MARINE AND FISHERIES RESEARCH INSTITUTE (KMFRI)

ISSUE #14
JUNE, 2021

community members to actively participate and ask questions through face-to-face discussions. The forums are also vital in minimizing community-based conflicts regarding the fisheries resources.

Stakeholder engagement before site selection, fabrication and deployment of marine fish cages.

The experimental study has been implemented in collaboration with like-minded government agencies. Whereas KMFRI team is providing expertise and leadership in cage installation, Kenya Fisheries Service (KeFS) and Kenya Wildlife Service (KWS) are in charge of manning the facilities, and beefing up security in the area. There are risks of vandalism of cages and poaching which necessitate security. Fortunately, the communities in Dabaso where experiments were conducted have not experienced these challenges.

KMFRI researchers, technologists and community members sample marine prawns in Dabaso

Additionally, cages are prone to strong waves and currents that may increase management costs.

Dabaso community's Crab Shack Restaurant offers ready market for the marine prawns, among other seafood. The eco-restaurant has employed 50 workers.

KMFRI research directors and researchers hold talks with National Research Fund (NRF) team at the Crab Shack Restaurant

Despite the numerous benefits that accrue from the cage culture, some potential investors grapple with finding appropriate construction and netting materials such as timber and quality predator nets.

Globally, cage fish farming is bridging seafood deficit in some countries such as Europe and South East Asia. Therefore, if well planned and exploited, cage fish farming will be the solution to over 300,000 tonnes fish production deficit in the country per year.

Cage culture provides opportunities for use of inshore and offshore marine resources for economic growth and to boost community livelihoods. The choice of fish species to be cultured, cage design and sustainability are critical in designing an adaptable cage culture system.

An ecosystem approach to aquaculture management and intensive training of coastal communities on marine cage culture are highly recommended for successful roll out of the cage fish farming and exploitation of marine fisheries.

Mtafiti Monthly

A PUBLICATION OF KENYA MARINE AND FISHERIES RESEARCH INSTITUTE (KMFRI)

ISSUE #14
JUNE, 2021

Contents

02 Exploring L. Turkana's blue wealth

BY JAMES LAST KEYOMBE & JANE FONDA
#FreshWaterResearch @JamesLast@KmfriResearch

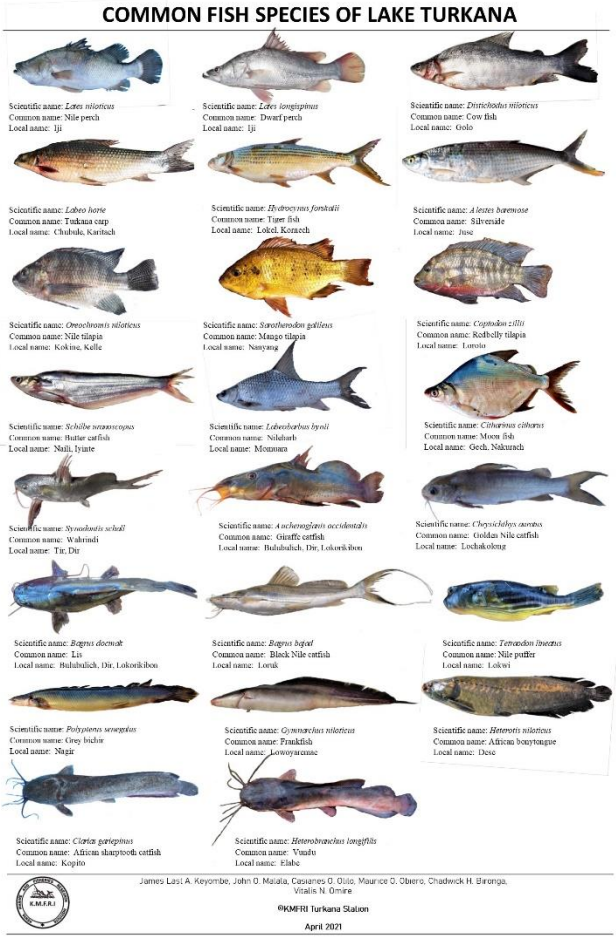
KMFRI researchers tap into L. Turkana's huge potential

Kenya Marine and Fisheries Research Institute (KMFRI) research scientists based in Turkana inland station are tapping into the massive economic potential of Lake Turkana to exploit the vast resources in the water body in support of the government's Big Four Agenda.

KMFRI is undertaking research in post-harvest losses to minimize losses occasioned by lack of cooling facilities in the region. The findings and scientific data obtained from these research undertakings have been handy in harnessing the potential of the lake, with an aim of boosting communities' livelihoods.

Residents learn how to add value to fish to reduce post-harvest losses

The lake's catchment basin covers an area of approximately 130,860km^2 while the lake has a surface area of 7,500km^2. Lake Turkana is 250km long, has an elevation of 360m above sea level and with a maximum depth of 120m, making it the longest, lowest lying and deepest lake in Kenya. Common fish species found in the lake include Nile Perch, Turkana carp, Tiger fish, Mango tilapia, Redbelly tilapia, among others.



Turkana inland station is situated midpoint along the western side of Lake Turkana, within Kalokol town and 60km from Lodwar town. The station is mandated to undertake aquatic research that supports the development and sustainable management of fishery resources in the lake. It also conducts research and in all the water bodies (rivers, ponds, dams and lakes)

Mtafiti Monthly

A PUBLICATION OF KENYA MARINE AND FISHERIES RESEARCH INSTITUTE (KMFRI)

ISSUE #14
JUNE, 2021

within Lake Turkana catchment area. KMFRI's Kisumu centre coordinates research activities conducted by Turkana station.

A fisher sorting fish. Poor fish handling increases post-harvest losses.

KMFRI's research focus on Lake Turkana, formerly Lake Rudolf, is guided by its immense value and the strategic location in the expansive Arid and Semi-Arid Land (ASAL) area of north western Kenya. The area is characterised by very low rainfall and high poverty levels and hence terrestrial agriculture may not be a viable option for the residents.

The lake contributes an average of 7,000 metric tonnes of fish annually valued at KShs 800 million which is only 4% of the total annual inland water fish production in Kenya. It however has a potential of 30,000 metric tonnes valued at over KShs 3 billion.

More than 300,000 people depend on Lake Turkana as a source of livelihood. The uniqueness of L. Turkana, the geomorphological and paleontological features, and a diverse assemblage of aquatic flora and fauna have been critical in the designation of three locations as Ramsar sites by UNESCO.

Fishing in L. Turkana is largely rudimentary

People using water transport. Boats are commonly used in L. Turkana to transport travelers to and from Turkana to Marsabit counties.

Mtafiti Monthly

A PUBLICATION OF KENYA MARINE AND FISHERIES RESEARCH INSTITUTE (KMFRI)

ISSUE #14
JUNE, 2021

Contents

03 Engaging community in coral reef restoration

BY DR JELVAS MWAURA & DR JULIET FURAHA
#CoralRestoration @KmfriResearch @juliet_karisa

KMFRI engages Kenyan coastal communities in coral restoration efforts

Kenya Marine and Fisheries Research Institute (KMFRI) coral reef research scientists led by Dr Jelvas Mwaura have trained the fishing community along the Kenyan coast on coral reef restoration techniques to help recover corals and provide shelter for fish. This collaborative initiative is also aimed at enhancing local stewardships towards reef protection and improving fisheries and tourism sectors.

The reef restoration project was implemented at Shimoni Beach Management Unit (BMU) in Kwale County, in collaboration with United Nations Development Project (UNDP), Gef Small Grants Programme, Kenya Fisheries Service (KeFS) and Seacology Foundation.

And for the first time, more than 30 members of the local communities were trained on reef restoration techniques, and are actively participating in the implementation. This will ensure sustainability of the intervention which largely lowered the cost of running the project because the locals offered the much needed labour and donated their boats for use in the exercise.

Despite the fishers showing scepticism in the initial stages of the project, with time they warmed up to the initiative and are now enthusiastic ambassadors of reef restoration.

What are coral reefs?

Coral reefs are some of the most iconic underwater organisms comprised of the skeletons of colonial marine invertebrates called coral polyps. Coral reefs are among the most diverse and

Monitoring transplanted corals

productive ecosystems in the ocean owing to their high biodiversity, and for the services they generate that support people, economies and environment.

KMFRI's Dr Jelvas Mwaura trains community members

Corals protect coastlines from the damaging effects of wave action and tropical storms, and provide habitats and shelter for many marine organisms including fish. However, this wealth is exposed to various threats due to increasing human activities and are at high risk to the changing global climatic conditions.

Coral reefs on the decline…

Coral reefs have increasingly declined in many parts of the Kenyan coast due to a combination of local-scale anthropogenic impacts such as destructive fishing

Mtafiti Monthly

A PUBLICATION OF KENYA MARINE AND FISHERIES RESEARCH INSTITUTE (KMFRI)

ISSUE #14
JUNE, 2021

methods and regional-global climate change that has led to coral bleaching and mortality events. This has resulted in significant loss of the entire coral functional groups, with *Acropora* spp. coral species being the hardest hit. Consequently, biodiversity, reef- fisheries, tourism and the socio-economic welfare of communities dependent on these reefs has been undermined.

In Kenya, coral reefs generate about $2.5 billion annually mostly from small-holder fisheries and coastal tourism. Sustaining and growing this output can be a challenge if coral reefs decline. Research and monitoring show coral reefs have declined from 40% to 15-20% in the last two decades.

Solutions……

Coral reef restoration is an active intervention aimed at assisting the recovery of reef structure and key reef species in most degraded/destroyed reefs

The community-based reef restoration project in Wasini Island and Shimoni MPAs therefore, was implemented to help recover corals; provide breeding grounds for fish and increase abundance of targeted species.

The project was based on participatory approach principles, and aimed at building capacity of the fishing community. Training is a critical component needed in supporting long-term conservation of reef ecosystems.

Implementation of the project was done in phases, and the research team kicked off by first creating awareness and engaging communities on the need for reef restoration, and equipping them with coral restoration techniques.

The intensive practical training sessions also included lessons on coral gardening, where participants were shown how to collect coral fragments from healthy reefs and raise them in mid-water nurseries. They were equipped with skills on how to transplant grown corals into degraded reef and on artificial/concrete reef substrates, periodic maintenance of corals, and monitor fish recovery in the restored sites.

Collection of coral fragments from donor healthy coral reefs

Over 2,000 coral fragments have been raised in mid-water nurseries and 590 corals outplanted in degraded areas. Monitoring and maintenance of restored sites to track success of the project is still ongoing.

Following the restoration efforts, natural recruitment of corals is already taking place in the restored areas in Shimoni and Wasini, and fish are gradually being attracted to the newly created habitats.

The restored sites full of corals and fish have become an attraction to tourists visiting the area, supplementing income obtained from marine parks. And the residents are now able to meet their families' financial obligations, especially those working as local tour guides in the area.

Recognizing Blue Economy as the "next frontier", it is hoped that the project will promote and support more conservation efforts, protect sensitive habitats, recover fisheries production and enhance tourism opportunities. Further, the restoration efforts will build the capacity of the Shimoni and Wasini BMUs to sustainably manage the Shimoni co-managed area.

As research scientists strive to accelerate climate action to stop global warming, reef restoration is needed to assist the recovery of damaged reefs now and into the future.