

Project Title:

"Improving marine water quality in Mtwapa Creek by use of constructed wetland technology"

***7th WIOSAP PROJECT STEERING COMMITTEE
DARES SALAAM, TANZANIA
29TH JANUARY 2025***

Name of IP:

Kenya Marine and Fisheries Research Institute (KMFRI)

Why the Project

- **Rationale/Justification**

- Shimo la Tewa prison has a population of between 3000-5000 people drawn from the men and women prisons, courtroom, clinic and residential houses.
- Produces between 300-400m³/day of wastewater.
- Wastewater was being discharged into Mtwapa Creek when partially treated by dysfunctional facility, thus polluting the Creek and negatively impacting on the marine environment.
- Need to address the issue of point source of pollution by use of innovative technology in form of constructed wetland system.

- **Objective:**

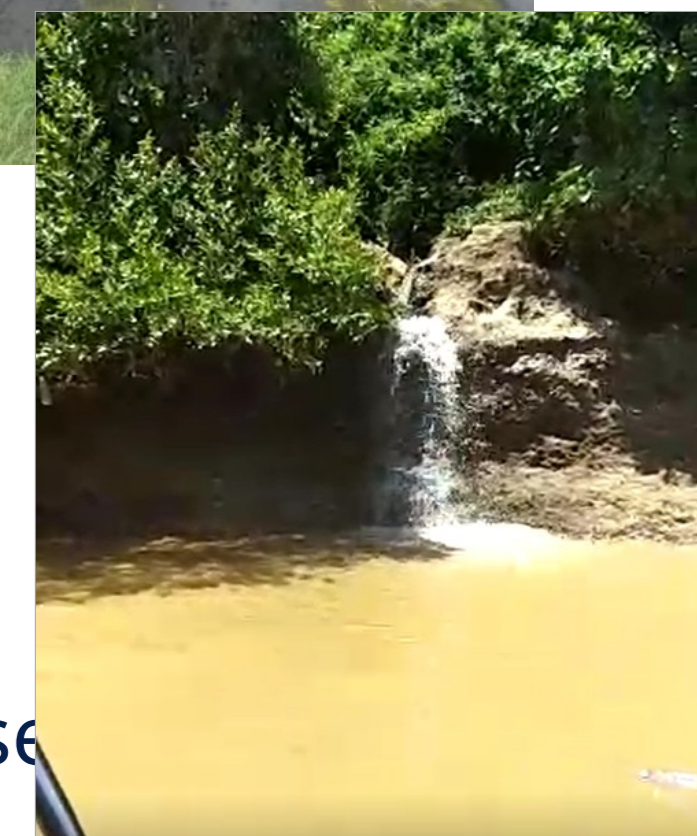
- To enhance conservation of marine resources in Mtwapa Creek and adjacent area **through reduction of land-based sources of pollution** from Shimo La Tewa prison facility using **constructed wetland system**.

- **Where:**

- **Shimo la Tewa prison adjacent to Mtwapa creek, Mombasa**

- **Partners:**

- ❑ Kenya Marine and Fisheries Research Institute (KMFRI)-Lead institution
- ❑ Shimo la Tewa Prison (under Kenya Prisons Service) –hosting site
- ❑ GreenWater Environmental water and sanitation solutions -Technical support
- ❑ National Environment Management Authority (NEMA)-assessment and monitoring for compliance to standards



Key Achievements

- ✓ **Redesigning** an efficient and easy to maintain constructed wetland system (CWS).
- ✓ Construction of an effective Constructed Wetland System that involved.
- ✓ **Desludging of existing septic tank,**
- ✓ Conversion of septic tank into an **Anaerobic Baffled Reactor (ABR)** for primary treatment of wastewater,
- ✓ Construction of **Vertical and Horizontal Flow Reed Beds** for secondary and tertiary wastewater treatment,
- ✓ Production of CWS effluent water meeting NEMA standard for reuse,
- ✓ Construction of **water tower and water storage** and water reticulation system **for greening/irrigation**
- ✓ Fencing of CWS for safety and security,
- ✓ Improvement of **sanitation** within the prison by **renovation of 20 toilets and bathrooms in the men's and 6 within women's prisons** by putting tiles on the floor and walls, installation of Asian type sinks and enhancing water quantity to the prison -**minimizing the risk** of prisoners, staff and residents **contracting diseases,**
- ✓ **Dissemination of the technology done in different fora** (These include electronic media, conferences and symposia, site visits and workshops).



1. Anaerobic baffled reactor



2. Dosing chamber



3. Vertical Flow Reed Bed (VFRB)



4. Horizontal Flow Reed Beds (HFRB)



4. Water tower equipped with tank-fenced site

Key Lessons Learnt

- ❖ The innovative technology in form of constructed wetland system was effective in treatment of sewage/wastewater emanating from the prison.
- ❖ Product water from the constructed wetland is suitable for reuse in greening the environment and in crop production.
- ❖ Beneficiaries of the intervention includes the marine ecosystem/environment (improved water quality), community living near the facility (healthy environment), improved nutrition (crop production).

Challenges:

Silt entry into the CWS is a challenge-affects the ABR and VFRB.

High flow of storm water can affect the operation and efficiency of the CWS.

Availability of land for the construction can be a challenge especially in urban setup.

Opportunities

- The success of this demo project presents **an opportunity to replicate the technology** to other correctional facilities and institutions locally and regionally..
- Demo project **replicated in Mikindani, Kenya** supported by Go Blue project by UNEP.



Project Sustainability

- ❑ Capacity building on Operations and maintenance
 - Kenya prison service (KPS) availed 14 members of staff that were capacity built.
 - ✓ An operation and maintenance team has been trained through the project to ensure smooth operations of the system.
 - ✓ The team follows site specific **maintenance schedule** which will indicate daily, weekly and monthly activities to ensure continual operation of the system and early detection of issues.
 - ✓ An operations and **maintenance manual** was produced for use and reference .
- ❑ KPS have committed to set aside budget to cater for operations and maintenance of the Constructed Wetland after handing over (EOP).
- ❑ Monitoring of CWS performance and receiving water in the creek
- ❑ Good working partnership arrangement established among implementing partners (KPS, KMAEP and UNEP) at management level

