

Title: Strengthening Tanzania’s Capacity in Sediment Management: A Landmark Training for the Ministry of Water, 2024



The Permanent Secretary of the Ministry of Water, Eng. Mwajuma Waziri officiates the water training workshop facilitated by the Executive Director of NTWAM, Prof. Preksedis M. Ndomba

Executive Summary:

Sedimentation is the single greatest threat to the longevity of Tanzania’s dams and the carrying capacity of its rivers. To confront this challenge head-on, NTWAM partnered with the Ministry of Water's (MoW) Water Resources Centre of Excellence (WRCoE) to deliver an intensive 8-day training workshop. Targeting 24 engineers and scientists from all nine (9) Basin Water Boards, the programme successfully transferred practical skills in sediment measurement, data analysis, and annual yield determination, culminating in a pioneering action plan for the Internal Drainage Basin.

Key Impact Numbers:

- (i) 24 Water Professionals Trained.
- (ii) 9 Basin Water Boards Represented.
- (iii) 8 Intensive Training Days (Theory, Fieldwork & Computation).
- (iv) 90%+ of Participants Rate Course Content as 'Very Good' or 'Excellent'.

The Challenge: A Silent Crisis in Our Rivers and Reservoirs

Tanzania's water infrastructure is under threat. From the Pangani to the Rufiji, high sediment loads are silently reducing dam storage for hydropower and irrigation, clogging river channels and exacerbating floods. While the Ministry of Water has long recognized this crisis, a critical skills gap existed in the practical application of modern sediment monitoring and analysis techniques. Staff needed more than theory; they needed hands-on experience to plan programmes, use specialized equipment, and translate raw data into actionable management strategies.

The NTWAM Solution: From Classroom to Catchment

NTWAM designed a highly interactive, participant-centered curriculum that bridged theory and practice. The training moved from fundamental concepts to hands-on application, covering:

- (i) Sediment monitoring programme design
- (ii) Field sampling techniques (using USDH-48, US BM-54 samplers)
- (iii) Laboratory analysis (Evaporation & Filtration methods)
- (iv) Sediment rating curve development & bias correction (Ferguson, 1986)
- (v) Annual sediment yield computation

The Facilitator: The workshop was led by **Prof. Preksedis Marco Ndomba, PhD**, a distinguished Water Resources Engineer and Executive Director of NTWAM. Prof. Ndomba's deep expertise and commitment to mentorship were consistently rated 'Excellent' by participants, who valued his clarity and practical guidance.

Testimonials: What Our Participants Said

"The practical field day at Bubu River was invaluable. Seeing the theory in action and actually using the sampler made everything click. Now I am confident we can start a similar programme in our basin."

— **Almas Mala Jafari, Hydrologist, Lake Rukwa Basin Water Board**

"Learning how to develop and, most importantly, correct the bias in sediment rating curves using the Ferguson method was an eye-opener. This is a game-changer for how we will estimate sediment loads."

— **Machela G. Nderimo, Water Resources Engineer, Ministry of Water-HQ**

"The step-by-step exercise on the Meyer-Peter and Müller formula demystified bedload calculation. I came here hoping to understand suspended sediment, but I'm leaving with a full toolkit to tackle the entire sediment problem."

— **Eng. Milvin C. Mwito, Civil Engineer, Internal Drainage Basin Water Board**

Photo Gallery: A Week in Pictures

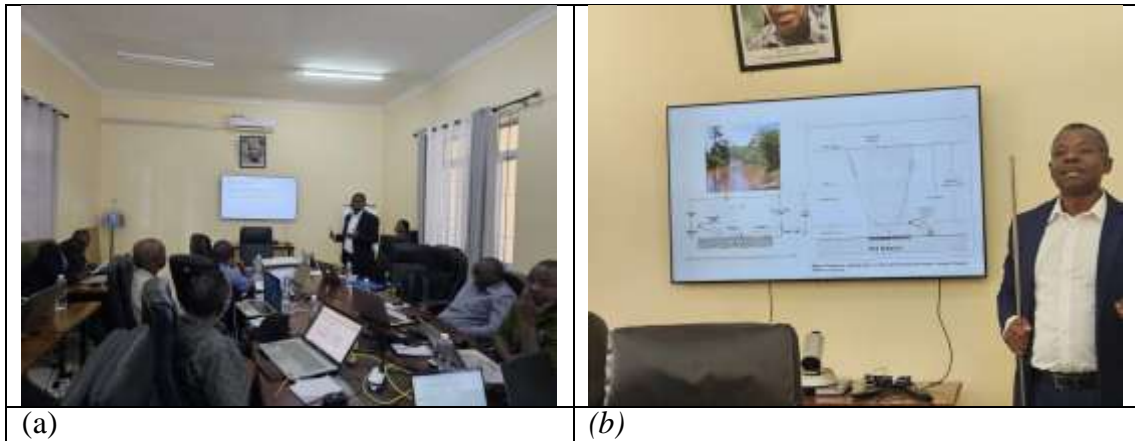


Photo 1: Prof. Ndomba contextualizing the course objectives within real-world engineering applications for the MoW professionals.



Photo 2: Prof. Ndomba is overseeing the pre-fieldwork mobilization and logistical planning with participants at the Bubu River field site.



Photo 3: Participants are actively engaged in the collection of sediment samples, using a DH-48 depth-integrating sampler, from the Bubu River as part of the practical fieldwork component.



Photo 4: Hands-on laboratory analysis of suspended sediment concentration led by Prof. Ndomba



Photo 5: The Permanent Secretary of the Ministry of Water, Eng. Mwajuma Waziri officiates the water training workshop facilitated by the Executive Director of NTWAM, Prof. Preksedis M. Ndomba

Spotlight Interview: Applying New Knowledge

Q&A with Eng. Nareneri Joseph, Environmental Engineer, Pangani Basin Water Board

Q: What was your main takeaway from the training?

A: "For me, it was the integrated approach. We often only think about river flow, but sediment is the hidden partner. This training showed me how to connect erosion in the catchment, transport in the river, and deposition in our reservoirs. It's a complete picture I didn't have before."

Q: How do you plan to apply this knowledge in the Pangani Basin?

A: "Immediately. We have hydropower dams like Nyumba ya Mungu that are affected by sedimentation. I am now equipped to help our team plan a proper sediment monitoring programme upstream. We can start collecting the right data to eventually build a sediment budget for the basin and inform dam operators about the rate of storage loss."

Measurable Impact

While the primary goal was skill transfer, the results were tangible:

- (i) **Practical Proficiency:** By the final day, all 24 participants successfully developed a sediment rating curve and computed a preliminary annual sediment yield using real-world data.
- (ii) **Actionable Planning:** The training produced a draft phased Actionable and Resourced Plan for Sediment Monitoring in the Internal Drainage Basin. This plan, focused on the Bubu River, serves as a replicable model for all other basins.

The Way Forward: Next Steps

This workshop was designed as Phase I of a multi-phase capacity building initiative. To solidify and expand on this foundation, NTWAM proposes the following next steps in collaboration with the Ministry of Water:

- (i) **Phase II – Remote Sensing & Advanced Modelling:** A follow-up training focused on using satellite data to map erosion hotspots and applying tools like MPSIAC and SWAT models to estimate catchment sediment yields and reservoir sedimentation rates.
- (ii) **In-Basin Mentorship:** NTWAM experts to provide on-site mentorship to support the implementation of the action plans developed during the workshop, particularly in the Internal Drainage and Pangani Basins.
- (iii) **National Sediment Yield Mapping:** A collaborative project to produce the first comprehensive sediment yield map of Tanzania. This initiative will directly inform the siting and design of future water storage infrastructure, ultimately supporting the national water security programme.