

2018-04

# The application of nutrient budget models to determine the ecosystem health of the Wami Estuary, Tanzania

Kiwango, Halima

Elsevier

---

<https://doi.org/10.1016/j.ecohyd.2017.10.002>

*Provided with love from The Nelson Mandela African Institution of Science and Technology*

# The application of nutrient budget models to determine the ecosystem health of the Wami Estuary, Tanzania

Halima Kiwango, Karoli N.Njau, Eric Wolanski

## Abstract

Using the LOICZ and the UEE models we estimated the nutrient budget in the Wami River estuary, Tanzania, to better understand the functioning of the ecosystem and assess its health. We found that during the wet season, when river flows are high, the residence time of the estuary is typically one day or less, and thus little of the riverine nutrients are processed in the estuary. During the dry season the residence time is much longer and as a result the nutrients are processed in the system. The nutrient budget reveals the importance of other sources of nutrients than just dissolved riverine nutrients; these include riverine detritus inflow, mangrove litter fall, and nutrients from hippo excretion. We found no sign of eutrophication. The estuarine food web thus appears healthy in the saline region of the estuary. However, excessive water abstraction in the catchment has resulted in severely decreased flows in the Wami River in the dry season, to the point that the freshwater part of the estuary has essentially disappeared, i.e. the estuary is now saline up to the tidal limit during the dry season. Though the estuary is protected by being included in the Saadani National Park, the system is stressed by dry season salinization, which is seriously affecting the freshwater-dependent flora and fauna. This calls for remedial ecohydrology-based measures at both the watershed scale and the local scale.

## *Keywords*

*LOICZ model; UEE model; nutrient budget; net ecosystem metabolism; ecosystem modeling; ecohydrology*