Nature-Based Solutions for Sustainable and Climate-Resilient Water Management in African Urban Catchments

Rapid urbanization and climate change are placing increasing pressure on water resources across Africa, contributing to declining river water quality, increased flood risks, and degradation of freshwater ecosystems. Nature-based Solutions (NbS) offer promising approaches to complement conventional infrastructure, but their effectiveness at the scale of African urban catchments remains insufficiently understood.

This project focuses on sustainable water management, environmental resilience, and climate-change adaptation for the Jukskei River catchment in Johannesburg, South Africa. It will examine how urbanization and climate change influence water quality and evaluate the potential of NbS to improve catchment resilience. An extensive monitoring program has already generated a comprehensive water-quality dataset that will support advanced analysis, modelling, and management scenarios. The collaboration will expand the assessment to emerging contaminants, including rare earth elements, PFAS, and microplastics.

Through international research mobility, the QES scholars will receive advanced analytical training, mentorship, and opportunities for interdisciplinary and intercultural knowledge exchange. The partnership will emphasize reciprocal learning between Global North and Global South researchers, recognizing different environmental, socio-economic, and governance contexts while co-developing locally relevant solutions.

The project will generate new scientific knowledge on urban water quality in Africa while providing practical decision-support tools for municipalities, water managers, engineers, and policymakers. Beyond improving understanding of pollution dynamics, the research will help identify where interventions are likely to have the greatest benefit and where Nature-based Solutions can most effectively complement conventional water infrastructure. The work contributes to the growing evidence base needed to support resilient, equitable, and sustainable water management in rapidly urbanizing African cities.