

1.8.2025

Wyss Academy PhD research project: Search for Candidate

Land restoration impact on vegetation and water resources in arid and semi-arid landscapes using semi-circular bunds as a case study

Synopsis

Arid and semi-arid landscapes are threatened by population growth, rapid urbanization, climate change, and unsustainable land and water management practices that lead to declining water availability, ecosystem services and biodiversity. Nature-based Solutions, such as semi-circular bunds, are promising approaches to counteract degradation trends and help restore the water cycle, vegetation and biodiversity in these landscapes. The semi-circular bunds restoration approach has already been tested in several parts of Kenya, such as in Naibunga (Laikipia county; [Making Northern Kenya greener](#)) and Kuku (Kajiado county; [Regreening work in Kuku](#)), two arid and semi-arid regions with different microclimate conditions. The bunds have been dug by local communities and monitoring approaches are currently under development for assessing the impact of semi-circular bunds on vegetation, water and biodiversity. This PhD study will assess vegetation and hydrological changes before and after the restoration intervention in these sites, and will put these changes into perspective considering past climate and vegetation variability. The student will combine remote sensing and in-situ observational data to assess vegetation variability and its link with geophysical characteristics (e.g. topography, climate, hydrology) in land restoration sites versus analog sites with similar characteristics but no restoration. If proven successful, the analysis will be replicated to other countries using the same land restoration technique for comparison.

Tasks

- Assess land restoration impact on vegetation and water by comparing interventions and analog (without intervention) sites using various high-resolution remote sensing (e.g. Pléiades Neo, Planet, Landsat 8/9, ECOSTRESS) and in-situ data.
- Investigate climate, water and vegetation natural variability using additional lower resolution satellite data, such as geostationary data, SMOS, ESA CCI soil moisture, SWOT, GRACE.
- Get insights into semi-circular bunds sustainability with respect to climate variability and change (e.g. analyze wet vs dry years).

Requirements

- MSc degree in meteorology, climate, geography or environmental science.
- Good understanding of climate processes and their links with vegetation, water resources; understanding of climate variability and change in East Africa is an advantage.
- Experience in data processing and analysis (e.g. Python or R); experience with remote sensing; experience with climate model data is an advantage.
- Excellent English writing and speaking.

Location and travels

The student will be based at the Wyss Academy Hub East Africa in Nanyuki. The student will also be given the opportunity to travel to Jena (Germany) to collaborate with Dr Gregory Duveiller at the Max Planck Institute for Biogeochemistry where he/she will receive training on remote sensing processing and analysis. This project is part of the Interdisciplinary Water Scarcity project in collaboration with the University of Nairobi. The student will therefore be part of an interdisciplinary research team in climate and biodiversity sciences.

Funding

This PhD position is funded through the Interdisciplinary Water Scarcity project of the Wyss Academy for Nature at the University of Bern, Switzerland.

Main supervisor

Professor Daniel Olago, Department of Earth and Climate Sciences and Institute for Climate Change and Adaptation, University of Nairobi, Kenya.

Application Information

Interested applicants are invited to apply with an application containing 1) a one-page motivation letter, 2) a CV summarizing academic and professional experience, and publications, if any (maximum four pages), and 3) contact information of two referees. **The application deadline is midnight 24th August 2025.**

Applications should be sent to icca@uonbi.ac.ke with the subject heading: **“Wyss Academy PhD research project: Search for Candidate – Remote Sensing”** and should be copied to marie-estelle.demory@wyssacademy.org.

Important Note! The motivation letter, CV and contact information of two referees should be compiled in one pdf.

Women are strongly encouraged to apply.

For further information, please contact icca@uonbi.ac.ke.