

Enhancing water security under uncertain climate futures: surface water formations, management practices and infrastructures in Kenya's drylands



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Introduction

Climate change may have significant consequences on water availability and, subsequently, planning, management practices and infrastructures. This is particularly true for areas already suffering from water stress, such as the tropical drylands.

With a case study in the Athi Basin in Kenya, the objective of this work is three-fold:

- (i) characterize surface water resource formations and assess the seasonal shifts in water availability,
- (ii) evaluate the existing/potential plans, water management practices, infrastructures and other risk reduction measures for responding to these shifts, assess capabilities of actors
- (iii) model the optimal water management practices, climate change adaptation strategies and infrastructures

Preliminary results

Fieldwork phase 1 (RQ1) in August-Oct 2023: Mapped and profiled surface water resource formations & assessed water availability & reliability for users

- Fairly homogenous, but spatially dispersed ephemeral & perennial water resources in the Athi Basin
- Range from small earth dams and water pans, open wells and sand dams in seasonal rivers, and springs emerging at the bottom of hills (small mountains)
- 70% are ephemeral, lasting 2-3 months after rains,
- Surface water resource formations shaped by human interventions, hydrology, land cover, topography and geology
- Multiple users and uses encountered, but over 80% domestic and local agro-pastoral activities
- Reservoir water availability/reliability vary depending on consumption by communities, rainfall seasonality evaporation losses and underground seepage.
- 70% households make changes in water source across seasons

**Study expected to deliver critical information to assist water resource planning and management necessary to support adaptation, build resilience and water security for drylands communities*

Triangulated methods

Fieldwork Phase 1

- Scoping survey: examine the basin surface water formations & select study site
- Ground observation: water resources and users
- GIS Mapping: location & spatial distribution
- Ethnographic encounters with water users

Fieldwork Phase 2

- Further on the ground observation, spatial mapping
- Household surveys and key informant interviews

Fieldwork Phase 3

- Agent Based Modelling with groups and individuals

Remote sensing: spatial-temporal change in water availability – using Planetlab/Sentinel



Sand dam construction across a seasonal river



A diminished multi-purpose water pan