

Water Risks and Resilience in Urban-Rural Areas in Southern Africa - Co-Production of Hydro-Climate Services for an Adaptive and Sustainable Disaster Risk Management

Abstract

Southern Africa is a water stress hot spot, which under climate change is projected to become drastically warmer, and likely also drier, but with more extreme rainfall events in the east. The BMBF-funded project WaRisCo, which is a part of the WASA program, will explore two of the biggest disaster risks South Africa may face in a warmer world:

- 1) the risk of an unprecedented **long-duration ‘day-zero drought’** in its **Gauteng Province**, an event with potentially disastrous socio-economic and environmental impacts, and
- 2) the risk of **mega-flooding** in the rivers of the **larger Durban region** – such floods may be catastrophic in terms of the number of human lives lost.

The project will develop a comprehensive hydrological modelling system integrating state-of-the-art regional climate models and explorative scenarios of land-use, land-management and land-cover change (LUMCC), to obtain for the very first time probabilistic projections of how climate change and LUMCC may alter water security in the Integrated Vaal River System and the KwaZulu-Natal River Systems.

Working with key stakeholders, including the national Department of Water and Sanitation, and the National Disaster Management Centre, WaRisCo will support Disaster Risk Reduction (DRR) and climate change adaptation strategies in both the Gauteng Province and the Durban region. Specifically, WaRisCo will generate research outputs directly relevant to climate-smart DRR and long-term adaptation, and will strive for the uptake of these hydro-climate services in DRR and long-term adaptation, through a co-design process with key stakeholders who have the authority and mandate to implement the project's recommendations. Our research methodology and implementation strategy will be designed to be transferable to other catchments in Southern Africa and beyond.

The project consists of the following work packages (WPs):

- WP1: Integrated Hydrological Model Development
- WP2: Generating climate change projections at cloud permitting scale
- WP3: Development of explorative land use / management and cover changes scenarios
- WP4: Assessment of future hydro-climate hazards
- WP5: Co-design and co-development of DRR and adaptation strategies
- WP6: Capacity development

The project consortium consists of the following partners: Department of Geography, Geographic Information Science (Coordinator), Friedrich Schiller University Jena (FSU), Germany; Global Change Institute, University of the Witwatersrand (WITS-GCI), South Africa; Helmholtz-Zentrum Hereon, Climate Service Center Germany (GERICS) (Hereon-GERICS), Germany; Institute for Geosciences and Geography, Martin Luther University Halle-Wittenberg (MLU-Hal), Germany, SYDRO Consult GmbH (SYDRO), Germany; Motlole and Associates (MA), South Africa, Agricultural Research Council (ARC), South Africa.