TERMS OF REFERENCE FOR A SOLICITED WRC PROJECT

THEME:	**Water Availability**
TITLE:	**Development of a business case for the establishment of a regional hydrological modelling centre in southern Africa**
TOR NUMBER:	

1. Rationale for the Study

Hydrological modelling skills are recognised as scarce yet critical for effective water resources management in southern Africa. Southern Africa is at a critical point in its management of water resources. The region is increasingly exposed to complex hydrological challenges, ranging from recurring droughts and devastating floods to the overarching threat of climate variability and change. These pressures are compounded by growing water demand from expanding populations, agriculture, and industry, placing additional strain on already stressed water systems. In this context, the need for accurate, timely and policy-relevant hydrological information remains urgent. Hydrological modelling stands out as one of the most powerful tools available to support water resources planning, disaster risk reduction, and climate change adaptation. Despite its importance, the region suffers from a chronic shortage of modelling capacity and fragmented institutional arrangements that limit the effectiveness and coherence of hydrological decision-making.

At present, hydrological modelling in southern Africa is characterised by inconsistent practices, isolated efforts and variable data quality. Many countries rely on outdated models, operate in silos or lack access to the data and expertise necessary to apply modern tools effectively. This situation is worsened by the decline of monitoring infrastructure across the region, which has led to significant gaps in hydrometeorological data. These gaps undermine model accuracy and the confidence that decision-makers can place in model outputs. Furthermore, institutional capacity to generate, interpret and apply modelling results is unevenly distributed, often concentrated in a few agencies or individuals, and vulnerable to staff turnover or institutional restructuring.

The establishment of a regional hydrological modelling centre offers a compelling response to these challenges. Such a centre would serve as a focal point for consolidating and

advancing modelling expertise, facilitating regional data integration and promoting the use of standardised modelling approaches tailored to Southern Africa's diverse hydrological systems. More than just a technical facility, it would be a platform for knowledge exchange, capacity building and regional collaboration, supporting governments, research institutions and water management agencies in their efforts to make informed, coordinated and forward-looking decisions.

By fostering a shared modelling infrastructure and harmonised methodologies, the centre would reduce duplication of efforts and enable the development of robust, comparable scenarios across national and transboundary basins. It would also enhance the region's ability to attract and coordinate donor investment by providing a credible and technically capable institutional home for hydrological innovation. Importantly, the centre would invest in the training of a new generation of modellers, offering structured programmes, mentoring and practical exposure, thereby addressing the skills shortage that currently limits the scaling of hydrological modelling in the region.

2. Main Objective

To develop a comprehensive business case for the establishment of a regional hydrological modelling centre in southern Africa that will serve as a hub for capacity building, data integration, standardisation of modelling practices, and support for water resources management and climate adaptation.

Specific Objectives

- Assess the current state of hydrological modelling capacity, skills availability, and infrastructure across southern African countries;
- Identify gaps and challenges in hydrological data availability, modelling practices, and institutional coordination;
- Evaluate the benefits and potential impact of a regional modelling centre on water resources management, flood risk assessment, and climate change adaptation;
- Define the operational, technical, and financial requirements for establishing and sustaining the centre;
- Develop a strategic framework for collaboration among regional stakeholders including governments, research institutions, and water management agencies; and
- Propose a phased implementation plan with clear timelines, milestones, necessary resources, governance structures, funding mechanisms, and expected return on investment (ROI).
- Risk assessment to identify potential risks associated with the project and strategies to mitigate them, including a sensitivity analysis.

3. Deliverables

- Inception report detailing the methodology and work plan for the business case development;
- Comprehensive assessment report on current hydrological modelling capacities and gaps in southern Africa;
- Stakeholder analysis and engagement report summarising consultations with key regional actors;
- Detailed business case document including needs analysis, cost-benefit analysis, operational model, funding strategy, and expected return on investment (ROI).
- Strategic implementation plan outlining timelines, milestones, necessary resources, and key deliverables, governance, capacity building, and sustainability measures;.
- Risk Assessment and mitigation strategies
- Presentation of findings and recommendations to the commissioning body and key stakeholders;
- Policy brief to facilitate decision-making by regional water authorities and funders.
- Final print-ready report.

Budget: R800 000

Year 1: R600 000

Duration: 1.5 years