

TERMS OF REFERENCE FOR A DIRECTED WRC PROJECT

THEME	Water Quality and Health
TITLE	Quantifying the impacts of water resources pollution and drinking water quality failures
TOR NUMBER	1010026

Rationale

South Africa faces significant challenges in managing its water resources, with increasing pollution from industrial, agricultural, and domestic sources. This pollution not only impacts the quality of water available for domestic use but also poses a threat to public health and the environment. The study aims to quantify the impacts of water resource pollution on drinking water production, examining how global change factors can cause raw water quality degradation, affecting drinking water treatment processes, costs, and the health of consumers. This envisaged study must build on research work done under WRC projects No. K5/2731//3: *The status and extent of de facto reuse in South Africa*¹ and K5/2948/1/21: *A conceptual framework for the costing of deteriorating water quality and identifying mechanisms to better fund water quality management*². Understanding these impacts is critical for designing effective policies and strategies to build resilience, mitigate the risks, improve drinking water quality management, and protect public health.

Scope of work

The scope of work may be structured (but not limited) into the following key tasks:

1. Assess the extent of pollution in South African water resources and develop a spatial map showing water resources pollution hotspots
2. Evaluate the impact of global change factors (including climate change) on drinking water treatment
3. Evaluate public health risks and adverse health effects associated with the consumption of unsafe drinking water
4. Establish the consequences of drinking water quality failures for consumers
5. Using an appropriate economic model, assess the economic consequences of water resources quality degradation on drinking water production, encompassing direct costs for municipal water treatment, maintenance, and infrastructure, as well as costs to the consumer for using alternative supplies during water quality failures, and significant public health costs.

¹https://wrcwebsite.azurewebsites.net/wp-content/uploads/mdocs/TT%20858%20final_web.pdf

² <https://wrcwebsite.azurewebsites.net/wp-content/uploads/mdocs/2948%20Final%20Report.pdf>

6. Develop and test the use of an interactive water flow diagram as means of visually representing the movement and transformation of water throughout the water value chain from source to tap, highlighting the quality and possible effects of pollution at each stage on production costs, water quality, and public health.
7. Stakeholder engagement and knowledge dissemination
8. Final report with recommendations for reducing the impacts of water quality failures on the cost of drinking water production and health.

Objectives

1. Assess the extent of pollution in South African water resources and its effects on drinking water production
2. Assess the impact of global change factors (including climate change) on drinking water production
3. Establish the consequences of drinking water quality failures for consumers
4. Develop a model to estimate the economic and public health impacts of water resources pollution and drinking water quality failures.
5. Test and demonstrate the use of an interactive water flow diagram for drinking water quality management
6. Provide evidence-based recommendations for improving policies related to drinking water quality and water resources management.

Expected Deliverables

The deliverables below may be sub-divided by the proposers, into not more than three deliverables per financial year consisting of the following reports:

- Inception report
- Progress reports
- Final report

The first-year deliverables may NOT include an advance. The final deliverable of the print-ready final report, valued at 20% of the Budget is required.

Total Budget: R 2 000 000.00 (Including VAT)

Year 1: R 400 000.00 (Including VAT)

Duration: 3 years