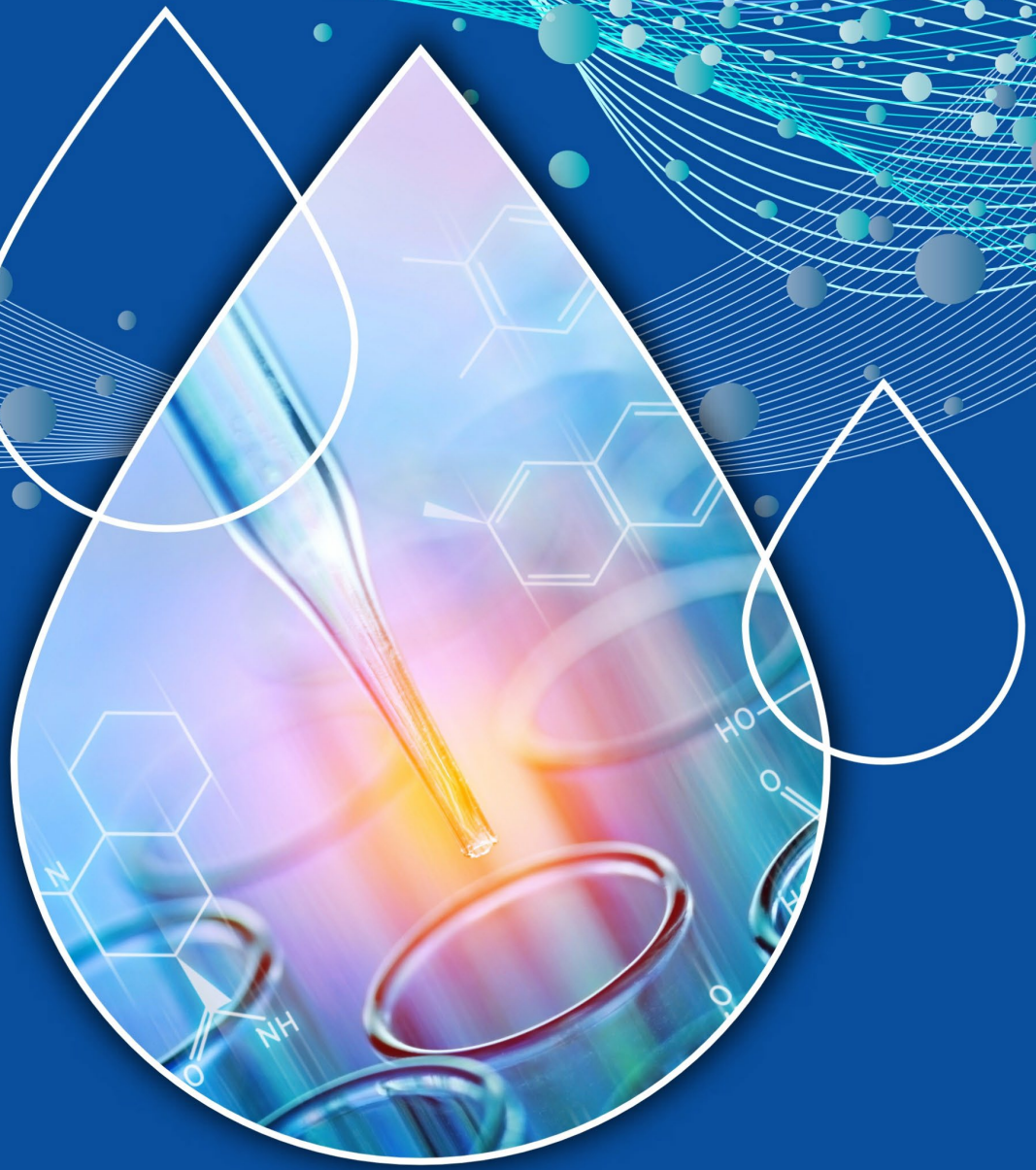

Theme 1: Water Quality and One Health

WATER RESEARCH COMMISSION

OBJECTIVES

- to drive integrated research and innovation activities to generate new knowledge, insights and data to inform the establishment of appropriate health-based targets and thresholds for different water uses, development and deployment of appropriate and innovative water treatment and ecological infrastructure rehabilitation methods, inform adaptive strategies, and support the development of effective interventions to protect public/environmental health, build resilient communities and contribute to the attainment of water security.

1. Consistent with the various water uses, identify and catalogue existing and emerging sources, types, and extent of water pollution.
2. Understanding the impacts of water quality changes / pollution on aquatic ecosystems, humans, animals, plants/crops, and overall ecosystem health.
3. Monitoring the quality of water resources and determining the potential health risks associated with poor water quality.
4. Developing innovative water treatment and nature based ecosystem rehabilitation technologies and solutions to remove or reduce the risks related to exposure to contaminants and improve overall water quality.
5. Enhancing the implementation of integrated, sustainable, and equitable water quality management strategies, practices, and policies to protect water quality and public health.
6. Promoting public, and business awareness and education on the importance of water quality and its relationship to human health.
7. Fostering new partnerships and strengthening collaborations between researchers, organizations, and governments at all water management levels to advance sharing of knowledge, training/capacity building and promoting data exchange to address water quality challenges.

Programme 1: Water quality governance and sector support

supporting and strengthening the implementation of Integrated Water Quality Management Strategies and Policies of South Africa and be targeted at reducing disparities in access to safe water for drinking, sanitation and other essential uses

Programme 2: Global change impacts on water quality and health

Monitoring the status of water quality, tracking the emergence of new water quality threats, and communicating the related risks with smart water quality monitoring and data management,. Furthermore, research on the use of citizen science approaches for scientific data collection and monitoring of water quality

Water Quality

Programme 3: Water quality surveillance and risk communication

development and testing of innovative water treatment and ecological infrastructure rehabilitation as interventions for addressing water quality challenges and improving health outcomes

Programme 4: Development and testing of innovative engineered and nature based solutions

Water quality management in building resilience and promoting adaptation in the face of changing environmental conditions and emerging challenges

Outcomes

Used to guide your own proposal ideas (Open Call)

Expand the understanding on the influence of global change factors on water quality and one health, studying the effects of water quality changes / pollution on human health, biodiversity, habitat degradation, and ecological balance and development of innovations and tools to build communities' resilience and enhance water security at all levels of planning.

Topics of interest

- **Programme 1: Water quality governance and sector support**

- Develop and test a framework for implementing a water pollution register, based on the categorization of polluting industries / water uses based on risk. The framework should include a plan for data collection, storage, analysis, and visualization to facilitate efficient pollution monitoring and management.

- Develop and test a framework for voluntary water quality regulation.

- Investigate the disproportionate impacts of water pollution on vulnerable populations, including low-income communities and marginalized groups, and develop equitable solutions.

- Study the effectiveness of community engagement, education campaigns, and citizen science initiatives in raising awareness about water quality issues and promoting public participation in water protection.

- Examine the potential risks and benefits of water reuse for irrigation and other purposes, considering both water quality and human health concerns.

Topics continued

- **Programme 2: Global change impacts on water quality and health**
- Investigate the multi-faceted costs of pollution, including municipal water treatment; health impacts and healthcare costs; environmental impacts of pollution, such as habitat destruction, biodiversity loss, and degradation of ecosystems; economic losses and productivity reduction; economic losses due to decreased agricultural productivity, reduced tourism, and damage to infrastructure caused by pollution; cost of clean-up and restoration, etc. Conduct case studies in different localities to capture variations in pollution costs based on unique socio-economic, environmental, and geographic factors.
- Research on the Health Vulnerability Index (HVI) in the context of water quality and health focusing on assessing the susceptibility of communities to health risks associated with poor water quality.
- Investigate the contribution and impact of different change factors and water uses on water quality and human health and design an interactive platform that presents water quality data in a user-friendly and informative manner.
- Investigate the effects of urbanization, stormwater runoff, and wastewater discharge on water quality, and develop urban planning approaches to minimize pollution.
- State of inland and coastal aquatic biodiversity services in SA, with focus on fish threats, management, and socio-economic implications

Topics continued

- **Programme 3: Water quality surveillance and risk communication**
- Assess the quality of drinking water sources, including groundwater and surface water, to identify potential contaminants and design an interactive platform that presents water quality data in a user-friendly and informative manner.
- Investigate the occurrence and distribution of priority waterborne pathogens (bacteria, viruses, protozoa) in various water sources, and evaluate their potential health risks.
- Develop methods to trace the sources of microbial contamination in water bodies to better understand pollution origins and prevent outbreaks of waterborne diseases.
- Investigate the presence, sources, and fate of emerging contaminants such as pharmaceuticals, personal care products, and microplastics in water bodies, and assess their potential health impacts on humans and aquatic life.
- Conduct data mining and visualisation from WRC scientific research data records on water quality and develop a framework for water quality data reporting.

Topics continued

- **Programme 4: Development and testing of innovative engineered and nature-based solutions.**

- Development and testing of innovative and cost-effective water treatment technologies for removing pollutants, including disinfection byproducts, from drinking water sources.

- Development and testing of management tools for minimising water pollution, including treatment technologies, best practices, recycling and reuse of water, and recovery of products.

- Development of a nature-based solution framework to guide contesting conservation and agricultural land uses of Lake St Lucia Ramsar/UNESCO site.