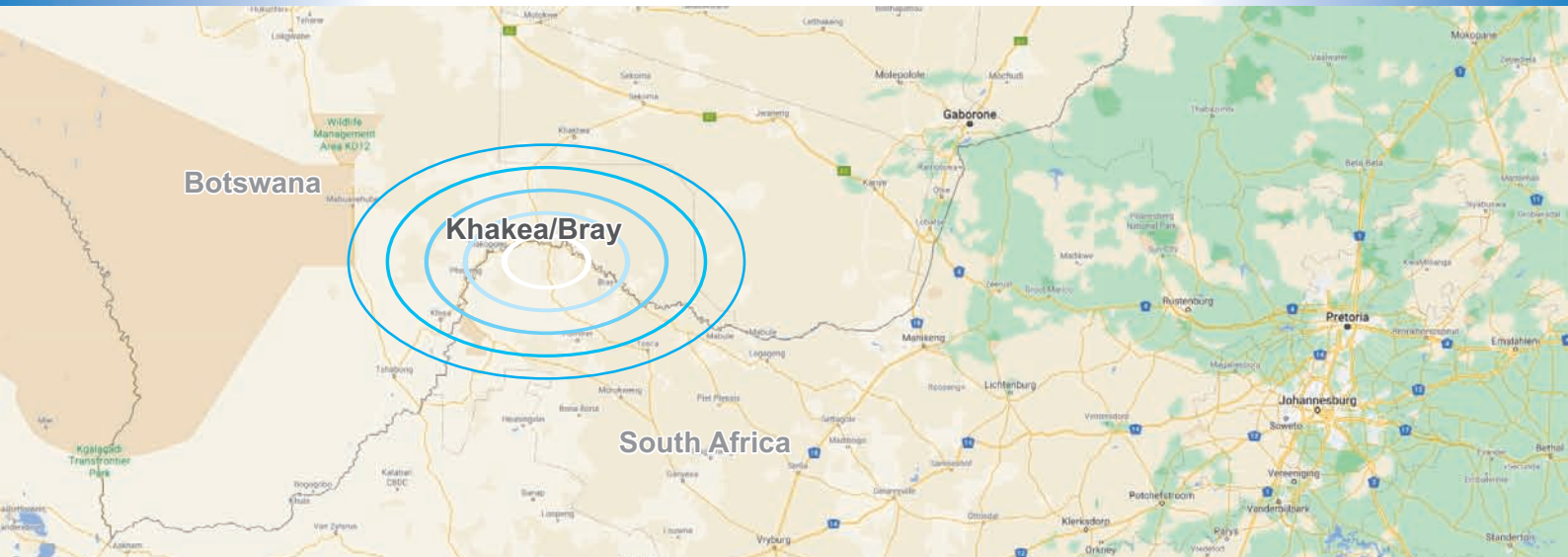




**GROUNDWATER MANAGEMENT INSTITUTE**



## **Groundwater Dependent Ecosystems (GDEs) and Biodiversity in the Khakea/Bray Transboundary Aquifer (TBA)**



# Groundwater Dependent Ecosystems (GDEs) and Biodiversity in the Khakea/Bray Transboundary Aquifer (TBA)

## Background

Groundwater plays an important role in sustaining below-ground and above-ground aquatic ecosystems. However, there is limited data that demonstrate the relationship between groundwater and Groundwater Dependent Ecosystems (GDEs) to inform the sustainable management of the GDEs. In southern Africa, limited research has been undertaken to delineate GDEs, assess their interactions with groundwater, or understand the impacts of anthropogenic changes to the groundwater systems. There is also a lack of biodiversity data specific to GDEs, as well as a lack of joint management of the transboundary aquifers in southern Africa.

The Khakea/Bray Transboundary Aquifer (TBA) shared between Botswana and South Africa is experiencing rapid increase in water abstraction for agriculture and domestic use, which threatens the sustainability of its GDEs. This project will integrate GIS and remote sensing, hydrogeology, and ecology to generate data on the biodiversity of the Khakea/Bray TBA and develop a database linking groundwater information to ecological health. This project aims to define the relationships between groundwater quality, groundwater levels, and the biodiversity in the TBA and ultimately encourage joint management of the Khakea/Bray TBA and other transboundary systems in the SADC region.

## Key Objectives and Activities

This study seeks to examine the key aspects of GDEs in the Transboundary Aquifer (TBA) of Khakea/Bray Dolomite shared by Botswana and South Africa and establish a database linking the state of groundwater to ecological health (ORASECOM, 2018). The inception phase of this three-year project includes a literature review by key experts who will guide and work closely with postgraduate students (MSc and PhD) to collect data relating to the project. Extensive fieldwork across seven research activities will be conducted to collect the data required to develop a GDE atlas, spatial biodiversity database, and create inputs for a Decision Support System (DSS) for the Khakea/Bray TBA. The Khakea/Bray TBA and its GDEs will be delineated using GIS and remote sensing and investigations will be conducted on each identified GDE. Data will be collected on hydrogeology and ground water and surface water biodiversity, and an ecological assessment of each GDE will be performed.

## Long-term Capacity Development for Biodiversity Informatics in sub-Saharan Africa & Stakeholder Engagement:

This project will also increase long-term capacity through two stakeholder engagement workshops and training of 3 PhD students and 4 MSc students who will be assigned activities under the guidance of the experts. Because GDEs are central in maintaining ecosystems, as well as supporting human livelihoods in a region where the majority of the rural population rely on groundwater as their sole source of water for domestic use, a Gender Equality and Social Inclusion (GESI) consultant will be deployed throughout the project to consider the socio-economic aspects of training, data access, data collection, and use.



## Planned Outputs

- An inception report that outlines strategies and a work plan and a stakeholder engagement report.
- Literature reviews in hydrogeology, biodiversity, and mapping.
- Maps of the TBA and the GDEs.
- A hydrogeological model of the TBA.
- A comprehensive species list for all GDEs in the aquifer.
- A biodiversity database available on the SADC Groundwater Information Portal.
- Final reports for hydrogeology, biodiversity, and mapping.
- Management plans for the identified hotspot GDEs.
- Seven post graduate theses submissions.

## Planned Outcomes

This project will generate and mobilize valuable data for the sustainable management of GDEs in the Khakea/Bray TBA and help define the role of groundwater in sustaining below and above ground aquatic ecosystems. There are approximately 30 TBAs in the SADC region, and this project will serve as a pilot from which approaches and best practices can be upscaled to a regional level. Capacity development through post graduate student training will also help fill the gap in limnological and hydrogeological expertise and careers in Africa.

## Sustainability

The SADC-GMI has a mandate in sustainable groundwater management and development in the SADC region and is charged with data sharing. The ownership of the work after the project completion will be through the Groundwater Hydrology Committee of ORASECOM and SADC's sub-committee of Hydrogeology. The sustainability of the programme will be ensured through a number of measures that have been put in place.

## Partners/Funders

The three year project which commenced in August 2020 and will run until July 2023 is funded by the JRS Biodiversity Foundation and implemented by the Southern African Development Community Groundwater Management Institute (SADC-GMI).

## Project Team

James Sauramba (Project Lead): [james@sadg-gmi.org](mailto:james@sadg-gmi.org)

Farai Dondofema: [chinomukutu@gmail.com](mailto:chinomukutu@gmail.com)

Tatenda Dalu: [dalutatenda@yahoo.co.uk](mailto:dalutatenda@yahoo.co.uk)

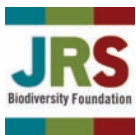
Modreck Gomo: [GomoM@ufs.ac.za](mailto:GomoM@ufs.ac.za)

Brighton Munyai: [brighton@sadg-gmi.org](mailto:brighton@sadg-gmi.org)

Batanayi Mapinde Gwangwawa: [research@walpe.org.zw](mailto:research@walpe.org.zw)

### About SADC – Groundwater Management Institute (SADC-GMI)

SADC-GMI is a regional Centre of Excellence aimed at promoting sustainable groundwater management and provide solutions to groundwater challenges through creating an enabling policy, legal and regulatory environment, capacity development, advancing research, supporting groundwater infrastructure development, and enabling dialogue and accessibility of groundwater information in the SADC region. Visit SADC-GMI online at <http://sadg-gmi.org>.



### About the JRS Biodiversity Foundation

The mission of the JRS Biodiversity Foundation is to increase access to and use of information that will lead to greater biodiversity conservation and more sustainable development in Sub-Saharan Africa. Founded in 2004, the JRS Biodiversity Foundation supports the capacity of institutions and people who collect, manage, and share biodiversity data for Sub-Saharan Africa. Visit JRS online at <http://jrsbiodiversity.org>.

