

# Technical Assessment of Conjunctive Management and Managed Aquifer Recharge Potential in Transboundary Basins

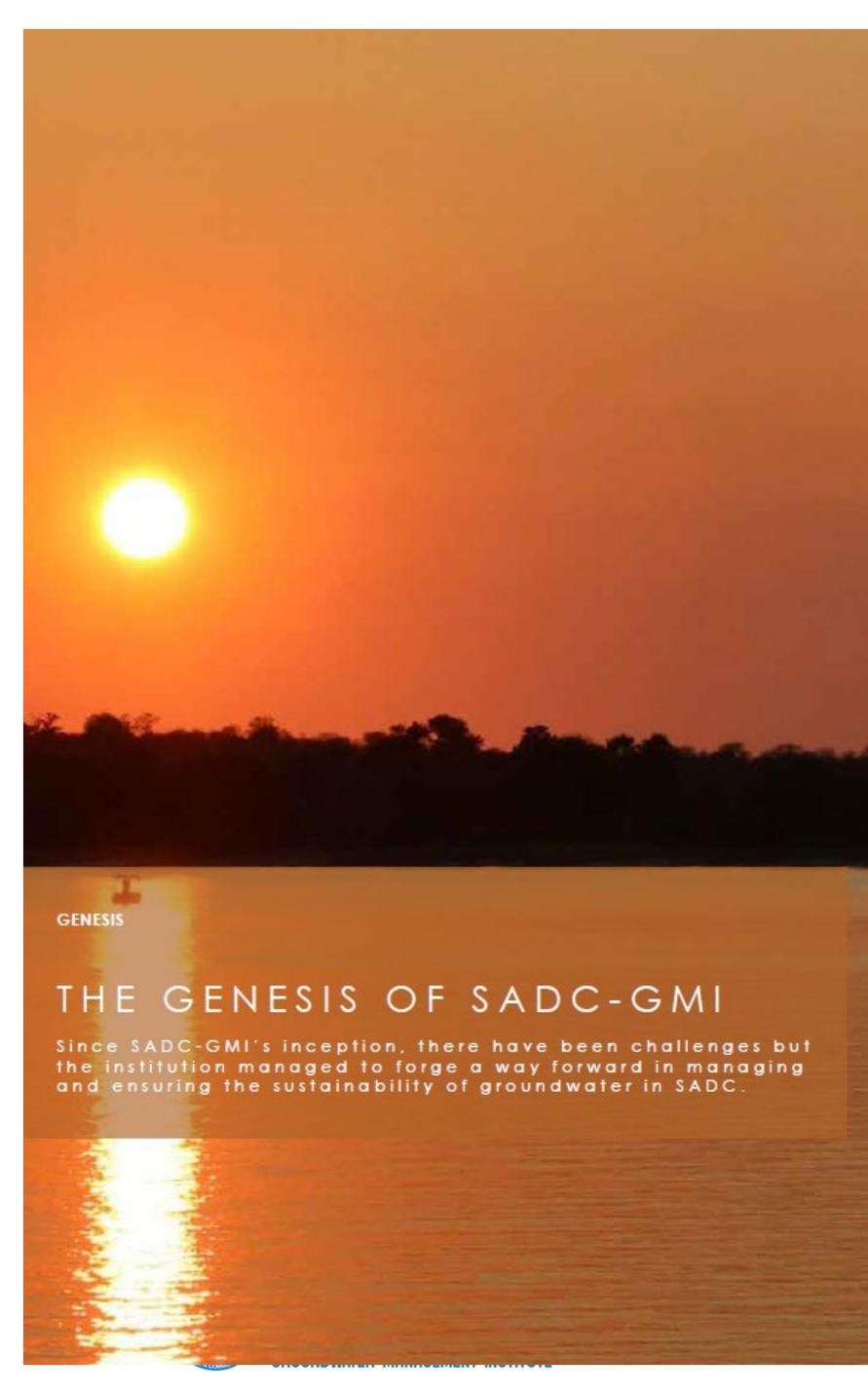
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Global workshop on conjunctive management of surface water and groundwater: National to Transboundary level  
16 - 17 October 2023  
Salle V, Palais des Nations Geneva, Switzerland



# SADC-GMI core mission

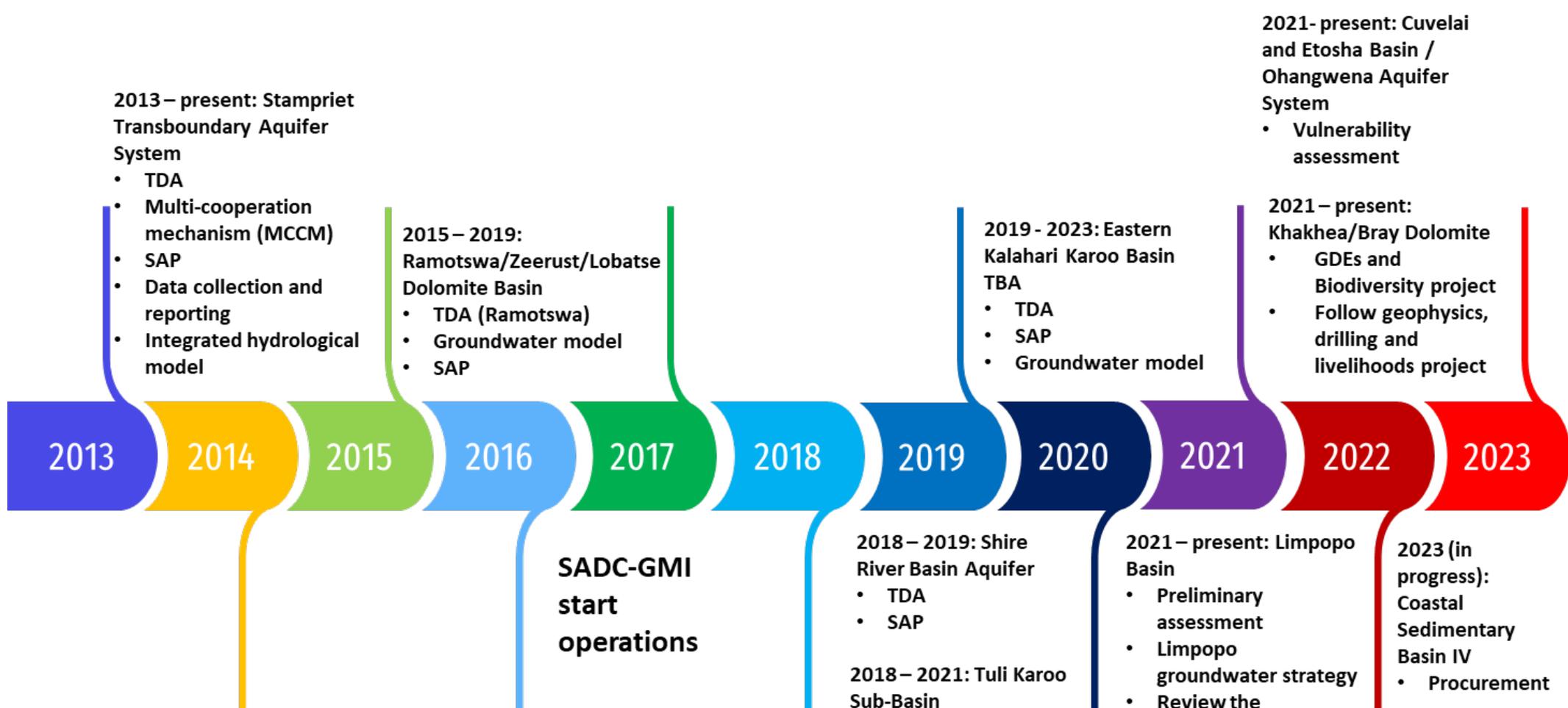
- Promote the conjunctive management of the SADC surface and groundwater resources at community, national, transboundary and global levels through...
  - ...advocacy and providing technical support
  - ...creating an enabling policy, legal and regulatory environment
  - ...the provision of evidence-based and actionable information
  - ...promoting impact-oriented solutions for capacity-building training
  - ...leading and promoting multi-sectorial coordination
  - ...supporting infrastructure development for sustainable groundwater management



GENESIS

## THE GENESIS OF SADC-GMI

Since SADC-GMI's inception, there have been challenges but the institution managed to forge a way forward in managing and ensuring the sustainability of groundwater in SADC.



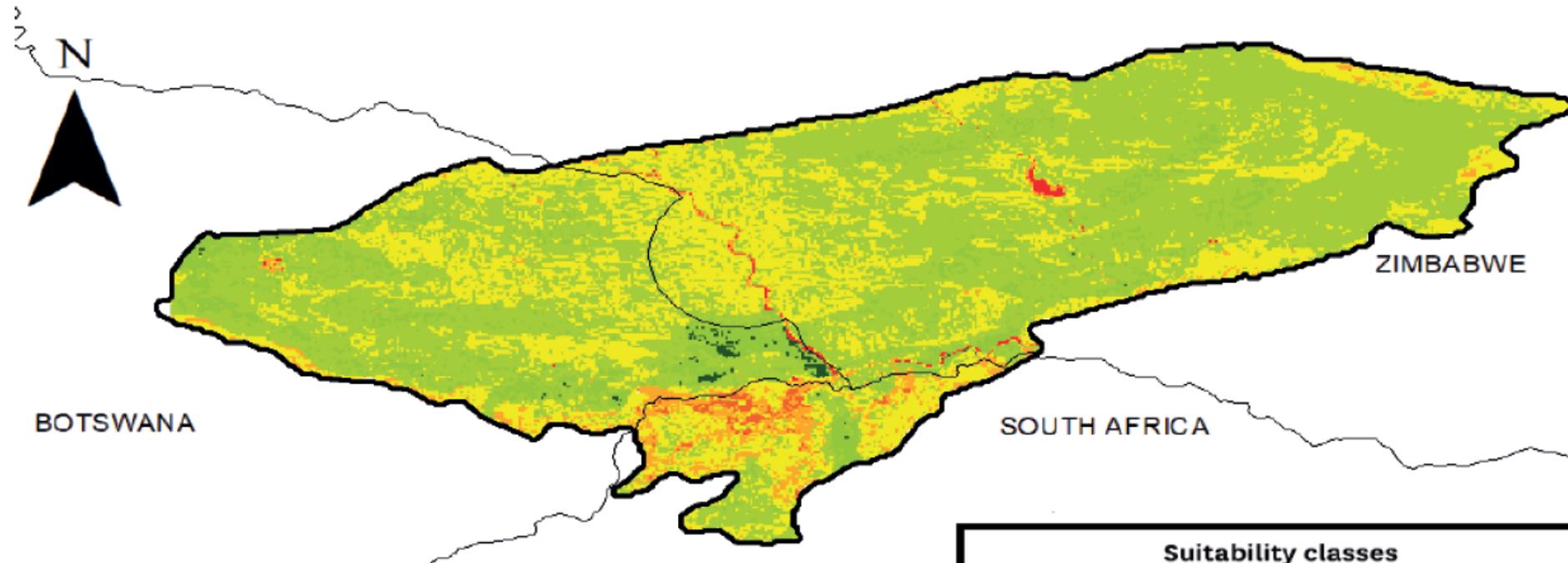
# TBA timeline of investigations

# Conjunctive transboundary water resources management in the Shire River Basin

- Project implemented by IWMI in collaboration with the University of Strathclyde, Scotland, the Department of Water Resources, Malawi, and the National Directorate of Water Resources Management, Mozambique for SADC-GMI
- TDA and SAP
- Six priority actions
  - Establish a joint Shire River Basin Committee for coordination and cooperation in conjunctive water development and management over the Shire River Basin and its shared aquifers
  - Identify areas for joint study and research
  - Develop a Memorandum of Understanding on data sharing between the two Member States, considering the existing ZAMCOM protocol on data sharing
  - Develop a data sharing portal between Malawi and Mozambique that facilitates a joint information system in consultation with Zambezi Water Resources Information System (ZAMWIS) developed under ZAMCOM
  - Promote joint proposals to mobilise funds for specific projects within the Shire River Basin for sustainable catchment and natural resources management activities
  - Train personnel involved in data collection and research related to surface water and groundwater and water quality issues

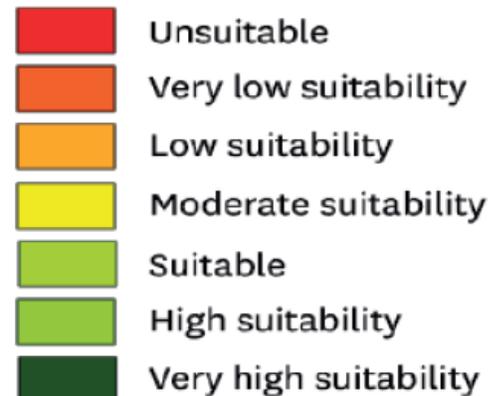


# MAR suitability map for the Tuli Karoo Transboundary Aquifer Area

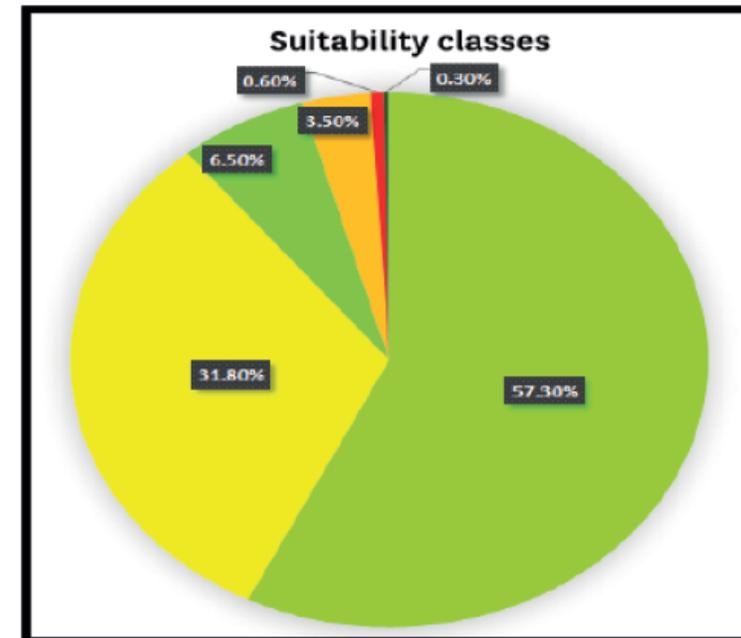


Geographic Information System-based Multi-Criteria Decision Analysis (GIS-MCDA)

## MAR suitability classes



0 12.5 25 50 Kilometers



# Investigating groundwater-surface water interaction processes in the Pungwe River Basin

- Characterisation of the hydrology and hydrogeology of the Pungwe Basin.
- Assessment of groundwater contributions to river flows from base flow separation using a digital filter on observed daily flows
- Prediction of the base flow contribution proportion in each Pungwe sub-basin using basin attributes.
- Evaluation of representation of base flows in simulated daily flows to be used for environmental flow assessment (e-flow)
- Inferring SW-GW interactions at each (e-flow) Site from (a) hydrogeological interpretation of lithology, (b) analysis of hydraulic gradient within the river valley using altitude, and (c) channel forms

## Stream Hydrograph Separation Methods



# MAR Implementation

- Limited implementation at field-scale in a transboundary context
- Examples in national context
  - Botswana
  - Namibia
  - South Africa
- Assessment of Groundwater Resources Development Priority Intervention Areas in the SADC Region
  - Proposed interventions for the hotspots in Member States

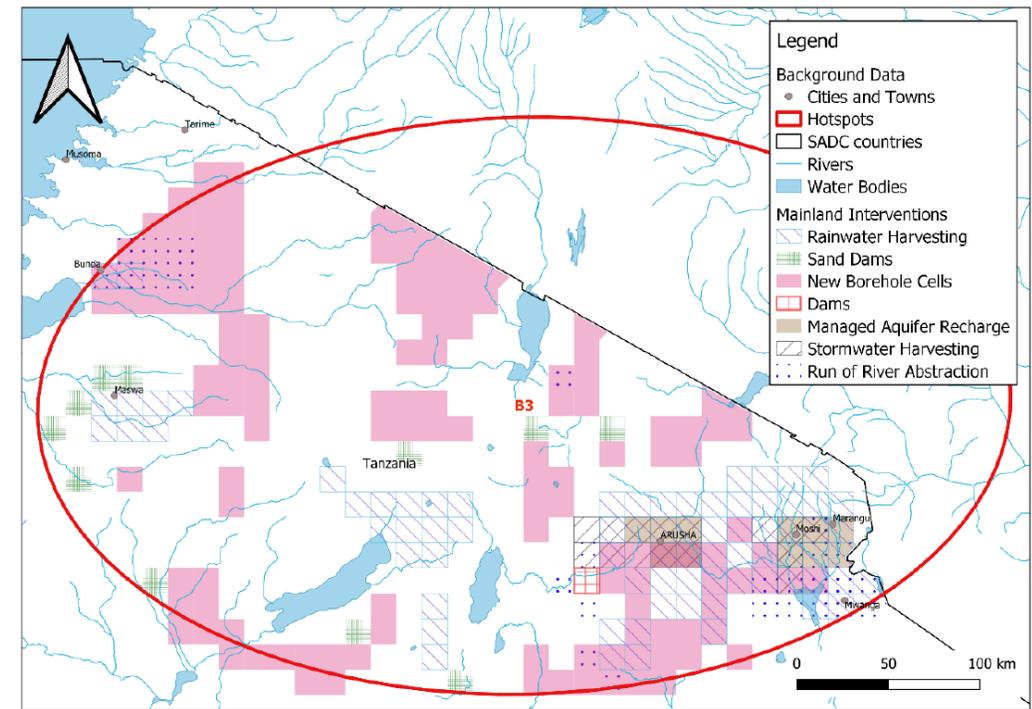


Table 1: Proposed interventions for the hotspots in Member States

Member States	Hotspot ID	Sand Dams	Rainwater Harvesting	Stormwater Harvesting	Dams	Run of River Abstraction	Desalination	Water Reclamation and Reuse	Managed Aquifer Recharge	New Boreholes
DRC	B1	No	Yes	Yes	Yes	No	No	Yes	Yes	No
	B2	Yes	Yes	No	Yes	Yes	No	No	No	Yes
Tanzania	B2	No	Yes	No	Yes	Yes	No	No	No	Yes
	B3	Yes	Yes	Yes	*Yes	Yes	No	No	Yes	Yes
	B4	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Malawi	B5	*Yes	Yes	No	Yes	Yes	No	No	Yes	Yes
	B6	*Yes	Yes	Yes	*Yes	Yes	No	No	Yes	Yes
	B7	No	Yes	Yes	*Yes	Yes	No	No	No	Yes
Mozambique	B8	Yes	Yes	Yes	*Yes	*Yes	No	No	Yes	Yes
	B7	Yes	No	Yes	No	Yes	No	No	No	Yes
	B8	No	Yes	Yes	*Yes	Yes	No	No	*Yes	Yes
Zambia	B12	*Yes	*Yes	No	No	No	No	No	No	Yes
	B13	No	Yes	*Yes	No	Yes	*Yes	No	Yes	Yes
	B6	Yes	Yes	No	No	Yes	No	No	No	Yes
Zimbabwe	B9	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
	B9	*Yes	*Yes	No	No	*Yes	No	No	No	Yes
	B10	Yes	Yes	No	No	No	No	No	No	Yes
	B11	Yes	Yes	No	*Yes	No	No	No	No	Yes
Eswatini	B12	*Yes	Yes	No	No	No	No	No	No	Yes
	B13	Yes	Yes	No	Yes	Yes	No	No	No	No
	B11	Yes	Yes	No	*Yes	No	No	No	No	Yes
South Africa	B14	No	Yes	Yes	No	No	No	Yes	No	Yes
	B16	No	No	No	No	No	*Yes	*Yes	Yes	Yes
Lesotho	B15	No	Yes	No	Yes	Yes	No	No	No	Yes
Namibia	B17	No	No	No	No	No	*Yes	*Yes	Yes	Yes
	B18	No	No	No	No	Yes	No	No	No	*Yes

# RBO support

- SADC-GMI established formal cooperation with RBOs in SADC through MOUs, the establishment of GW Committees, Training for conjunctive water resources management and Technical Assistance
  - ORASECOM Groundwater Hydrology Committee
  - LIMCOM Groundwater Committee
  - ZAMCOM to establish a sub-committee of the ZAMSCOH (the G-Water Committee)
  - OKACOM's Technical Reference Group on Groundwater.
  - CUVECOM ON G/W Management related ACTIVITIES
  - KOBWA
  - INMACOM

