



TOWARDS A ROAD MAP FOR GROUNDWATER MANAGEMENT CAPACITY DEVELOPMENT FOR THE SADC REGION

Theme 5: Groundwater Education and Capacity Building

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Groundwater Management Capacity in the SADC

- The **potential for Groundwater** to ensure **long-term water supply to meet the increasing demands** brought by the anticipated **climate variability remains subdued** by limited capacity of National and regional Institutions to effectively



- The **SADC-GMI supports capacity development for national and transboundary** groundwater management in the SADC Region. This includes capacity and expertise for sustainable groundwater management including **monitoring and protection** and linking transboundary aquifer management, **research on groundwater challenges** and groundwater infrastructure promotion in Member States.

THIS PRESENTATION IS ON THE CAPACITY NEEDS ASSESSMENT CONDUCTED BY THE SADC-GMI IN 2018 AND HOW IT INFORMS THE REGIONAL APPROACH TO CAPACITY DEVELOPMENT.

PREVIOUS GW CAPACITY ASSESSMENTS

Year	Author	Main Findings
2001	(Groundwater Consultants (Lesotho)	There is not enough personnel at professional and technical level and training at all levels is seen as a priority for most of the national governments in the Region.
2003	WCS and BGS	In the area of capacity building and training the study recommended to: -Identify critical skills deficits and training needs - initiate a way forward with respect to improving the technical capacity within the SADC groundwater sector
2007	WRC, BGR, CapNet, WaterNet	Reviewing undergraduate course modules in hydrogeology and existing technician training courses (hydrogeological mapping, database management, drilling, pumping tests, monitoring, etc.)
2009	SADC-GDMP	Training on the use of tools, methods and the data requirements needed for adequate integrated groundwater management. Training courses for data base managers
2013	WRC	Groundwater management performance continues to be hamstrung by a serious lack of capacity at national, river basin and local level, inadequate resource monitoring and assessment, lack of institutional development at the important local level, general lack of awareness and appreciation of its role.
2013	BGR	Capacity development should focus on building understanding of the integrated role and strategic importance of groundwater, of the present issues and conceptual functioning of groundwater in the basins, and the associated required monitoring and data collection needs
2016	Pietersen and Beekman	In several countries there is also a lack of appropriate hydrogeological capacity in both the private and public sector, leading to overall weak groundwater management in most of the SADC Member States.

RESPONDING TO THE CHALLENGE: CAPACITY NEEDS ASSESSMENT & A ROAD MAP- PROJECT SCOPE (SADC-GMI 2018)

- ❑ Undertaking a **baseline assessment on groundwater management capacity needs** in the SADC Member States, with particular emphasis on:
 - ✓ **Capacity for national groundwater management** in the Ministries and departments responsible for groundwater in SADC Member States.
 - ✓ Capacity for **sustainable transboundary groundwater management** in the Ministries and departments responsible for groundwater in SADC Member States.
 - ✓ Determining **priority challenges** facing Member States.
 - ✓ Assess capacity and expertise in **raising finances** for sustainable **groundwater monitoring, management, and protection** among Member States;
- ❑ Identifying **existing capacity initiatives** in the SADC member states and assessing the **availability of capacity training materials and initiatives at groundwater institutions.**
- ❑ Outlining a process of selection and design of training linking transboundary aquifer management, research on groundwater challenges and groundwater infrastructure promotion.

PROJECT APPROACH AND METHODOLOGY

The approach to the project comprised of the following

- ❑ **Document review**-The primary was to gain a deeper understanding of the state of existing groundwater and related capacity at national and regional level in the SADC member states,
- ❑ **Questionnaire** to all 15 member states
- ❑ **Semi structured interviews**-with important regional organisations and individuals.



Category	Sub-category	Criteria
Capacity	Human resources	Number of staff responsible for groundwater management
	Technical resources	Number of training of groundwater professionals in the last 5 years
Infrastructure	Equipment	Number of boreholes drilled for groundwater management
	Facilities	Number of boreholes drilled for groundwater management
Financial	Budget	Number of boreholes drilled for groundwater management
	Expenditure	Number of boreholes drilled for groundwater management
Policy	Regulation	Number of boreholes drilled for groundwater management
	Enforcement	Number of boreholes drilled for groundwater management
Institutional	Coordination	Number of boreholes drilled for groundwater management
	Collaboration	Number of boreholes drilled for groundwater management
Information	Availability	Number of boreholes drilled for groundwater management
	Accessibility	Number of boreholes drilled for groundwater management
Management	Planning	Number of boreholes drilled for groundwater management
	Implementation	Number of boreholes drilled for groundwater management
Monitoring	Measurement	Number of boreholes drilled for groundwater management
	Reporting	Number of boreholes drilled for groundwater management
Research	Investigation	Number of boreholes drilled for groundwater management
	Development	Number of boreholes drilled for groundwater management
Education	Training	Number of boreholes drilled for groundwater management
	Publicity	Number of boreholes drilled for groundwater management
Publicity	Media	Number of boreholes drilled for groundwater management
	Community	Number of boreholes drilled for groundwater management
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GW CAPACITY DEVELOPMENT IN THE SADC REGION META-DATABASE: REPORTS AND OTHER TYPES OF INFORMATION

ID	Document Link	Document Title	Authors	Year	Publisher	Document Type	Synopsis
1	Document Link	Development of a code of good practice for groundwater development in the SADC Region - Situation Analysis Report 1 (Final)	Groundwater Consultants, Botswana, Lesotho	2001	SADC/WCD	Report	Document Link
2	Document Link	Planning, Implementing and Evaluating Capacity	Stephen Horton	2002	ICRAR Working Paper	Paper	Document Link
3	Document Link	Southern African Development Community Regional Director	J. L. Fari, R. Gumbanele, J. Davis and B. C. Retse	2002	BRITISH GEOLOGICAL SURVEY	GWV progress Report	Document Link
4	Document Link	Capacity Development as a Research Design: Framework, Approaches and Analytics	Suresh Chandu Babu and Debajit Sengupta	2008	International Food Policy Research	Paper	Document Link
5	Document Link	Groundwater Resource Sustainability	Jacobus Vries and Annette Lippman	2007	IFRECO	Report	Document Link
6	Document Link	Capacity Building for Groundwater Management in Rural and Southern Africa	SCM Venter, Louise & Cap-Hel	2007	Cap-Hel	Report	Document Link
7	Document Link	Protocol for the Assessment of the Status of Groundwater Resources with Special Reference to Southern Africa	E. Steyn, E. Volzgenhart, Y. Liu, M. He, S. Bahad & H. Schreier	2008	WCD	Report	Document Link
8	Document Link	Hydrogeology in Sub-Saharan Africa: Making and employment opportunities-A survey conducted on behalf of the Subsoil Network of the International Association of Hydrogeologists (IAH)	Jude Cobbing	2008	Water Resources Consulting	Report	Document Link
9	Document Link	SADC Groundwater and drought management project-SADC Groundwater Resilient Policy	SADC Groundwater and drought management project	2008	Groundwater management	Report	Document Link
10	Document Link	Improving Access to Southern Africa's groundwater "grey data"	Jude E. Cobbing & Jeff Davis	2011	Hydrogeology Journal	Paper	Document Link

- ❑ **Analysis and reporting**-data gathered during the first two phases was collated and analysed using a formally structured Framework Approach.

OUTCOMES OF THE GROUNDWATER MANAGEMENT CAPACITY NEEDS ASSESSMENT

❑ Groundwater challenges-

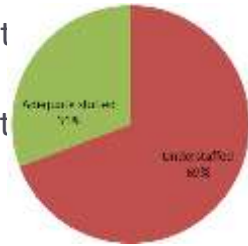
- ✓ The groundwater challenges facing Member States have been elucidated in a number of reports and forums (Farr et al. 2005; Pietersen et al. 2010; Pietersen and Beekman 2016).

❑ Public sector data collection remains patchy:

- ✓ Groundwater data collection in several SADC countries is relatively poor, and in certain countries is virtually non-existent with, recurrent funds for data collection may be difficult to secure.
- ✓ Databases may be in complicated or proprietary formats that are difficult to access or require large internet bandwidth to function.

❑ Human and resource capacity:

- ✓ There has been a steady decline of hydrogeological capacity in Member States with most Ministries and Utilities understaffed
- ✓ Most of the Member States are understaffed with regard to a professional hydrogeologist at country level
- ✓ There is a continuous loss of skills to the private sector



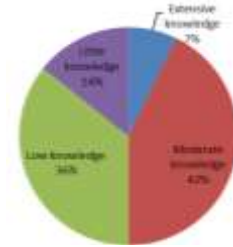
❑ Availability and access to information and science:

- ✓ There is low to moderate knowledge about the natural state of groundwater resources in the respective member States.

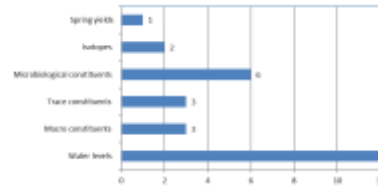
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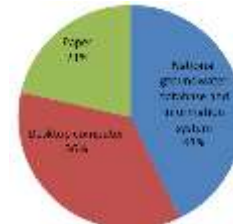
- ✓ There is low to moderate knowledge about the natural state of groundwater resources in the respective member States. The availability and disparate state of data was also identified as a constraint to better understanding the region's groundwater resources.
- ✓ Most countries have national groundwater monitoring networks in place, which are mainly used for water level monitoring.
- ✓ Some countries have a national (on-line / web-based) groundwater database and information system whilst others hold the monitoring data and information on a desktop computer and others that only have paper systems. With Access to data and information is mostly limited



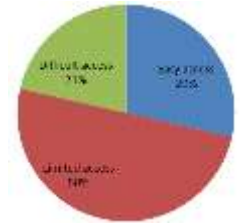
State of Groundwater knowledge



Use of Monitoring networks



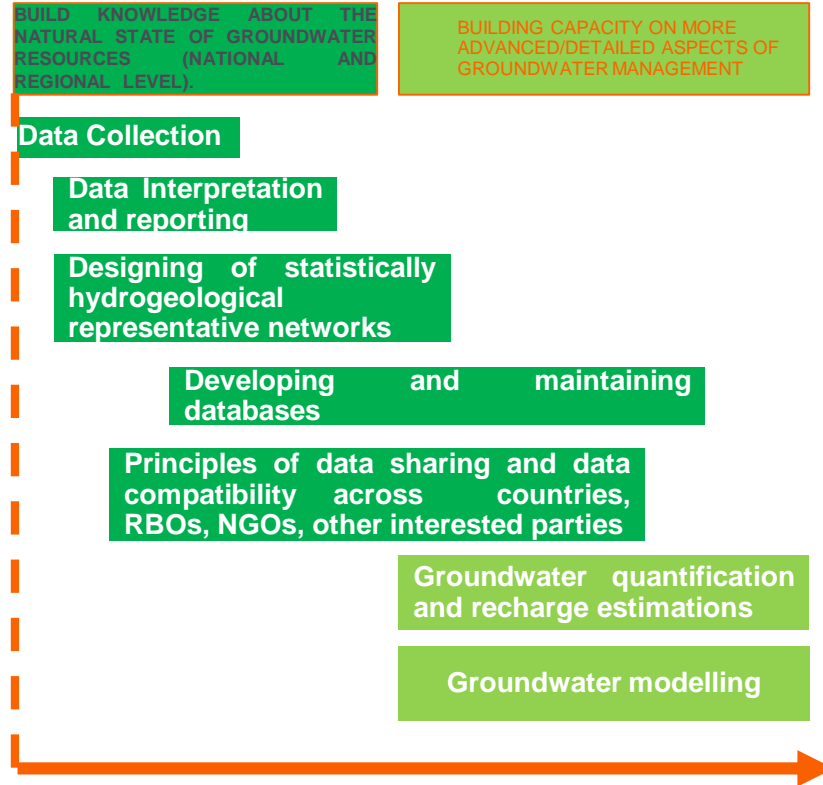
Data storage



Access to data and information

THE ROAD MAP

- ❑ The roadmap focuses on groundwater monitoring which was identified as the common area of interest among most Member States.
- ❑ Lack or inadequate data will weaken efforts for effective groundwater management and should become a focal point for implementation and capacity development for national and transboundary groundwater management.



INTERVENTION MEASURES

- ❑ The following strategies are proposed for capacity development by the SADC-GMI by focusing on empowering and strengthening **endogenous** capabilities.
 - ✓ **Advocacy and awareness creation-** The capacitating of decision-makers is crucial for attracting resources.
 - ✓ **Training and professional development-** Training programmes must focus on the day-to-day functions of hydrogeologists in Line Ministries.
 - ✓ **Facilitation and mentoring-**it is crucial to prioritize the building of capacity of the weaker states with respect to groundwater practical skills, in order to promote equal and competent participation in decision-making
 - ✓ **Networking-**There is a clear need to support RBOs with hydrogeological capacity, which can be done through use of existing capacity development organizations/networks and programmes in Africa.
 - ✓ **Collaborative research programmes-** The involvement of academics in international research programmes must form part of project requirements.
 - ✓ **Feedback, to promote learning from experience-** As a focal interlocutor of groundwater issues in SADC, the SADC-GMI needs to capture, share and exchange groundwater knowledge in the region.

IMPLEMENTING THE ROADMAP-INTERVENTIONS TO ENHANCE GW DATA COLLECTION MANAGEMENT AND SHARING

- ❑ **4 PILOT PROJECTS FOR GW MONITORING** -Eswatini, Lesotho, Tanzania, Zimbabwe
- ❑ **TBA PROJECTS IN SADC PRODUCING DATA FROM TDA's & JSAPs**
Ramotswa, Stampriet, Shire, Tuli-Karoo, Eastern Kalahari-Karoo, Khakea/Bray
- ❑ **TRAINING INTERVENTIONS ON DATA COLLECTION & MANAGEMENT**
 - a. **65 Internships** from Young Professionals from SADC Member States including on **QGIS, Data Collection**, etc
 - b. **Private Sector skills** Dev through Regional Drillers' Directory, **Training on Professional Borehole Drilling Supervision and Sustainable Borehole Yield Testing**



IMPLEMENTING THE ROAD MAP- INTERVENTIONS FOR INFORMATION AND DATA SHARING

- ❑ SADC GROUNDWATER INFORMATION PORTAL (SADC-GIP) - up to 30 links & map layers

<https://sadc-gip.org/>

- National GW databases
- RBO databases
- TBA databases
- **Improved data sharing capabilities on the Geonode platform.**

- ❑ NATIONAL GROUNDWATER DATABASE IMPROVEMENT PILOTS

- Botswana, Malawi and Namibia (**Namibia includes Realtime data**)

- ❑ SADC GROUNDWATER LITERATURE ARCHIVE <http://sadc-gla.org/SADC/> up to 600 records

