Terms of Reference
For
Determining dependency and vulnerability of groundwater of Coastal Cities (Cape Town & Dar-es-Salaam)
ZA-SADC-GMI-418181-CS-CQS

1. Background

Southern Africa is home to about thirty (30) transboundary aquifers (TBAs) and numerous national strategic aquifers that support the primary water needs and livelihoods of a significant portion of the region's population. Because of climate change, reliance on groundwater has increased. Although there is a fair understanding of the strategic aquifers, increased data collection will enhance the capacity of institutions to sustainably manage groundwater resources. Furthermore, developing groundwater-specific data-sharing protocols among riparian states contributes to the integrated management of shared aquifers. There is a unique opportunity to establish groundwater monitoring networks and strengthen institutional frameworks for shared water management.

SADC-GMI, a subsidiary of the SADC Secretariat, is established as a Section 21 Not-for-Profit Company under South African law. The vision of the SADC-GMI is to ensure the equitable and sustainable use and protection of groundwater and be a Centre of Excellence in groundwater management and management of groundwater-dependent ecosystems in the region. The role of the SADC-GMI is to:

- Promote sustainable groundwater management and provide solutions to groundwater challenges in the SADC region through building capacity, providing training, advancing research, supporting infrastructure development, and enabling dialogue and exchange of groundwater information
- Conduct and support the SADC Member States in groundwater research, and serve as a focal interlocutor with national, regional, and international groundwater initiatives.
- Promote the sustainable conjunctive use of surface and groundwater.

Groundwater Dependency and Vulnerability in the Coastal Cities of Dar es Salaam and Cape Town

The dependency and vulnerability of Coastal Cities emanates from several factors. Firstly, rapid urban growth and population increase lead to higher demand for water, often met by groundwater due to inadequate surface water sources. Due to the inability by many urban authorities to supply water through the reticulated schemes, many informal settlements rely heavily on shallow wells and boreholes for water supply.

By virtue of their location on the coastline, megacities face the risk of saltwater intrusion into aquifers, especially during dry seasons or due to excessive groundwater extraction. Pollution from urban runoff, industrial activities, agricultural activities and improper sanitation can degrade groundwater quality, making it unfit for consumption. Climate Change has also given rise to changing precipitation patterns and rising temperatures are affecting groundwater recharge rates and may also increase demand due to higher temperatures and evaporation, or reduced surface water availability, potentially leading to over-exploitation.

The urban sprawl in Coastal cities, inadequate enforcement of regulations and improper management of groundwater resources can exacerbate these vulnerabilities.

These TORs pertain to generating an understanding of the Dependency and Vulnerabilities in the selected Coastal Cities in the SADC region.

2. Objective of the Assignment:

The overall objective of this assignment is to determine the dependency and vulnerability of groundwater in the Coastal cities of Cape Town and Dar-es-Salaam.

3. Scope of work and specific tasks of the consultancy Firm

Groundwater Dependency and Vulnerability in the Coastal Cities of Dar es Salaam and Cape Town

Determining groundwater dependency and vulnerability in coastal cities of the Southern African Development Community (SADC) involves several critical tasks due to their unique hydrological and environmental characteristics. The tasks should be implemented collaboratively with stakeholders to enhance the understanding of groundwater dependency and vulnerability. This knowledge is required to guide policy and management decisions to ensure sustainable use of groundwater resources, protect ecosystems, and safeguard water security for future generations:

a. Conduct consultations with identified stakeholders for data collection and issue identification.
b. Conduct a high-level hydrogeological situational analysis to identify aquifer locations, extents, and characteristics to generate an understanding of the spatial distribution of groundwater resources and their potential for sustainable use and vulnerability assessment.
c. Conduct a gap analysis to understand the groundwater monitoring network across the respective cities, including wells, boreholes, and piezometers and extract data to monitor groundwater levels, quality parameters (e.g., salinity, contaminants), and trends over time to assess changes and vulnerabilities
d. Conduct vulnerability assessments to identify risks such as saltwater intrusion, over-extraction, and contamination. Evaluation factors contributing to vulnerability should include sea-level rise, groundwater pumping rates, and land use practices affecting recharge and water quality
e. Assess the potential impacts of climate change on coastal aquifers, including changes in precipitation patterns, temperature, and sea levels and possible changes in demand for

groundwater, due to increased consumptive needs or reduced surface water availability. Predict future groundwater availability and quality under different climate scenarios to inform adaptive management strategies

f. Conduct socioeconomic assessments, GESI analyses to identify gender dynamics and socio economic drivers of groundwater dependency and vulnerabilities, and assess institutional capacity for effective groundwater management, understand water demand dynamics, population growth, urbanization trends, and industrial activities affecting groundwater use.
g. Develop an integrated water resource management strategy to ensure coordinated efforts among stakeholders (government agencies, communities, industries) to manage groundwater sustainably, mitigate risks, and enhance resilience to climate and environmental changes specific to coastal groundwater resources, incorporating sustainable use practices, land use planning, and pollution prevention measures.
h. Conduct a workshop with SADC-GMI staff, respective stakeholders, riparian states and interested parties to discuss the deliverables.
i. Hold monthly progress review meetings with the SADC-GMI and selected stakeholders from the project sites.

4. Key Deliverables and Outputs

The stated deadlines require the following deliverables:

Deliverable No.	Deliverable/Output	Deadline Due Date
1	Minutes of kick-off meeting with SADC-GMI staff	2 weeks
2	Inception report detailing the various tasks to be undertaken with important milestones	6 weeks
3	Technical Report on groundwater dependency in each of the 2 Coastal Cities	16 weeks
4	Technical Report on groundwater vulnerability in each of the Coastal Cities	20 weeks
5	2 draft conjunctive management strategic action plan developed for each one of the 2 Coastal Cities	32 weeks
6	Validation Workshops held for the 2 conjunctive management strategic action plan in the respective cities and 2 Workshop Reports produced	48 weeks
7	2 Final conjunctive management operating rules developed for each one of the 2 Megacities	52 weeks

NB: Completion deadlines stated above are the end dates and the Consultant can deliver outputs incrementally before the deadline date. The Consultant shall therefore define and provide a schedule of interim incremental milestones, deliverables and a breakdown of the associated Professional fees per completed and approved deliverable to enable the Client to make payments

as and when interim deliverables are submitted and approved. E.g., if 5 outputs are to be delivered by week 10, the Consultant may deliver 1 output every 2 weeks and subsequently claim payment after completing each output.

5. Eligibility

i. This assignment targets a firm with a track record of more than 10 years of proven experience conducting similar urban water dependency and vulnerability assessments in sub-Saharan Africa.
ii. Demonstrate at least 5 years of experience in the groundwater sector within the SADC region.
iii. The successful firm must demonstrate experience in at least three projects undertaking detailed work in similar urban water resources assessment and planning in the SADC region.

6. Team Composition

The minimum qualifications, skills and experience for key experts, whose CVs are to be evaluated as part of the assessment of proposals, are as defined below. The Services are expected to be performed, mostly virtually, with occasional travel to the SADC Member States to convene workshops and gather data as needed.

Team composition with the estimate of key experts' Levels of Effort (LOE) is as follows:

Key Expert 1: Principal Researcher - Team Leader (estimated 70 workdays)

The key expert must have at least a master's degree in engineering and 15 years of experience working in conjunctive management of surface and groundwater. At least 5 years should have been n water resilience in cities. Demonstrated team leadership on at least 3 similar research projects, 1 of which should have been in the SADC region in an urban context at the Member State level. Demonstrated team leadership on at least 3 similar research projects, 1 of which should have been in the SADC region in an urban context at the Member State level. The expert must have proven proficiency with the conjunctive water resources management concept and engagement of public sector stakeholder institutions and issues. The Team Leader should be fluent in English. Professional proficiency in the other SADC Languages (French and Portuguese) is desirable.

Key Expert 2: Hydrogeologist (Estimated 80 days)

At least a Master's degree in hydrogeology or geosciences with a bias to water sciences and 10 years of working experience in the groundwater field, 5 of which should have been in SADC. The hydrogeologist should know key issues pertaining to managing groundwater resources in national and transboundary aquifers in the SADC region, including recharge, pollution and impacts of climate change and droughts. They should have participated in at least 2 projects where similar skills required for this assignment were applied. Demonstrated skills in applying and interpreting groundwater modelling and water quality models, including using related software and

demonstrated expertise in developing conceptual and numerical groundwater models. The hydrogeologist should be fluent in English. Professional proficiency in Portuguese is desirable.

Key Expert 3- Hydrologist (Estimated 50 Days)

At least a Bachelor's degree in an engineering discipline (Civil/Water), Hydrology or similar. 10 years' experience in hydrological modelling of large river basins, working in areas with scare data, knowledge of groundwater surface water interactions and GIS and Remote sensing applications in Groundwater studies. Should have experience of at least two projects of a similar magnitude in Southern Africa. Fluency in English is mandatory, and working knowledge of French and Portuguese is desirable

Key Expert 4: Water quality expert (estimated 30 workdays)

The water quality expert must have at least a master's degree in Hydrogeology (or any relevant field) and 10 years of experience working in groundwater. At least 5 years should be in groundwater quality monitoring. They must have demonstrated experience in implementing at least 3 similar projects, 1 of which should have been done in the SADC region at the Member State or regional level. The expert must have proven understanding of the conjunctive water resources management concept and engagement of multi-country transboundary watercourse stakeholder institutions and issues. They must be fluent in English. Professional proficiency in the other SADC Languages (French and Portuguese) is desirable.

Key Expert 5: Institutional and governance expert (Estimated 30 days)

Should ideally possess at least a master's degree in international development, institutional development, development studies or similar with at least 10 years in institutional assessment and organisational development in the public sector/national government ministries, departments and agencies, and private sector. Urban water resources assessment, planning and development is mandatory. Familiarity with country specific contexts is essential, particularly in the groundwater sector, through participation in at least 2 institutional assessment and development projects implemented in the SADC region. Experience with national and transboundary water courses, governance structures and institutional strengthening is required.

Key Expert 6 - Environmental Expert (Estimated 20 Days)

The successful candidate, who should be a SADC citizen having at least a degree in biological sciences/ environmental studies, social ecology , or related studies with experience working in Groundwater Dependent Ecosystems (GDEs), will have knowledge of key issues about the management of groundwater resources, specific knowledge of ecology with in-depth understanding of the impacts of groundwater, climate change, groundwater-surface water interactions and e-flows on Groundwater Dependent Ecosystems, understanding of Modelling of water resources in an interdisciplinary setting, should have 2 years of experience in ecology

working in areas with scarce data, knowledge of groundwater-surface water interactions and baseflow calculations, e-flows, and Groundwater Dependent Ecosystems.
Fluency in English is mandatory, and working knowledge of Portuguese is desirable

Key Expert 7 – Gender Equality and Social Inclusion (GESI) Specialist (Estimated 20 Days)

The successful candidate, who should be a SADC citizen having least a bachelor's degree in social sciences, will have knowledge of key issues about the management of groundwater resources in national and transboundary aquifers of the SADC region.
Specific knowledge of GESI issues and how they relate to groundwater use, climate change and GDE ecosystem services within the urban context is essential. Experience working on water resources issues in an interdisciplinary setting. Should have 2 years of experience in GESI work focusing on national water issues
Fluency in English is mandatory, and working knowledge of Portuguese is desirable

Non-Key/Other Expert Staff

The consultant shall select and hire other experts and support staff as required according to the deemed requirement to deliver the Services. The hiring of a Young Professional based in each respective City to assist with data collection and stakeholder liaison is recommended. CVs for such other experts should not be submitted in the Technical Proposal. Although hiring other expert staff will not be subject to the prior review of the Client, such staff shall otherwise meet the professional standards and possess adequate experience to conduct their work safely and professionally.

NB: The Consultancy firm shall include in their submission a refined proposal for the deployment of the key experts and any non-key experts deemed necessary to timely deliver the objectives of the assignment.

7. Schedule and Duration of Assignment

This is a once-off assignment without any obligation for follow-up work and is expected to run for eighteen (18) months with an estimated aggregate level of effort of 300 person-days for key experts only, all-inclusive of field, travel and office work.

The Consultant shall include in their submission a proposal for the deployment of the key experts and any non-key experts and support staff deemed necessary to timely deliver the objectives of the assignment.

8. Liaison and Logistics

On a day-to-day basis, the consultant will liaise with the SADC-GMI through a Project Manager designated by the Executive Director of SADC-GMI.

Logistics pertaining to international air and road travel and cross-border travel are the responsibility of the consultant. However, if required, SADC-GMI can arrange and directly pay the costs for lodging, car hire, road and air travel as necessary. If also required, SADC-GMI can also issue letters of support to facilitate the authorities issuing necessary access to the Member States. The Consultants will meet visa and necessary cross border charges. These should therefore be included in the Consultant's technical and financial proposal.

9. Data, services & Facilities to be provided by the Client

The Client will facilitate for letters of introduction to SADC Member States and avail documents as well as data during the desk review phase. The Consultants will be expected to work from their respective offices. All costs resulting from the execution of this assignment will be incorporated in the Consultant financial proposal.

10. Contract Management and Other Information

This is a lump sum contract since the scope of is well defined and the contract amount is fixed, and all payments will be linked to the contractual milestones. The Client will provide the Consultant with data and information to facilitate execution of the assignment including introduction letters to relevant stakeholders.

11. Submission date

Bidders must submit Expressions of Interest (EOI) by e-mail to procurement@sadc-gmi.org by 12:00 noon (RSA Time) on or before 06 September 2024**.**