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The WRC operates in terms of the Water Research Act (Act 34 of 1971) and its mandate is to support water research and development as well as the building of a sustainable water research capacity in South Africa.

TECHNICAL BRIEF

Groundwater

South African Groundwater Governance Case Study

A recent WRC-funded study investigated the relevance of groundwater governance in South Africa for the World Bank to do recommendations to improve the effectiveness of existing governance.

World Bank project

The World Bank with the support from other partners undertook an economic and sector analysis (ESW) titled "***Too Big to Fail: The paradox of groundwater governance***". The ESW objectives were to understand the impediments to better governance of groundwater, and to identify the opportunities for ensuring that groundwater forms a key element of integrated water resources management (IWRM) in developing countries; and to explore opportunities for using groundwater to help developing countries adapt to climate change.

The ESW includes case studies on groundwater governance in seven selected countries – India, Kenya, Peru, Morocco, Philippines, South Africa, and Tanzania – with the aim to identify governance issues (including cross-sectoral linkages) and develop key policy to propose activities to support management needs under different socio-economic and hydrogeological settings.

South African case study

This report presents a case study on groundwater governance in South Africa at national and local levels. At the local level, groundwater governance was studied for four highly productive aquifer systems demonstrating various degrees in the implementation of groundwater governance: (i) Botleng Dolomite Aquifer (Delmas area); (ii) Gauteng Dolomites (Steenkoppies and Bapsfontein compartments); (iii) Houdenbrak Basement Aquifer (Mogwadi (Dendron)-Vivo area); and (iv) Dinokana-Lobatse Transboundary Dolomite Aquifer.

An analysis on groundwater governance

The study builds upon a vast amount of work carried out in recent years on groundwater governance in South Africa. Especially the National Groundwater Strategy which addresses deficiencies in groundwater provisions in the National Water Resource Strategy, the Department of Water Affairs (DWA) Implementation of Dolomite Guideline Project – Phase 1 and a multi-stakeholder workshop proved to be invaluable sources of data and information.

At the national level, the case study includes an analysis of the policy, legal and institutional frameworks for groundwater provisions, knowledge and capacity availability and gaps and financing arrangements to strengthen groundwater governance. For each aquifer system the governance status was determined based on an evaluation of potential threats. Technical, legal and institutional, cross-sector policy coordination and operational groundwater governance provisions and institutional capacity for implementation were evaluated using a priority list of 20 benchmarking criteria.

The relevance of groundwater governance arrangements for coping with impacts of climate change was reviewed according to a risk-based framework.

At national level

Technical, legal and institutional and operational governance provisions are reasonable but weak for cross-sector policy coordination. Institutional capacity is weak across all thematic areas except for the technical provisions

At local level

There is similarity in governance provisions for the dolomite aquifers across all thematic areas with the Steenkoppies dolomite aquifer consistently scoring higher. Basic technical provisions such as hydrogeological maps and aquifer delineation with classified typology are in place for all case study aquifers. Other governance provisions across all thematic areas are weak or non-existent. Institutional capacity across all thematic areas is weak or non-existent except for the Steenkoppies dolomite aquifer where the situation is better.

Climate change adaptation

At national and local level, adaptation measures to climate change are not yet a consideration in planning. Only at the national level an artificial groundwater recharge strategy was developed and awaits implementation.

Governance provisions & institutional capacity

Analyses of the effectiveness of groundwater governance provisions and institutional capacity at local aquifer level are combined in table format. The table is complemented with an analysis at national level. Results indicate that:

At national level:

- Technical, legal and institutional and operational governance provisions are reasonable but weak for cross-sector policy coordination.
- Institutional capacity is weak across all thematic areas except for the technical provisions.

At local aquifer level:

- There is similarity in the governance provisions for the dolomite aquifers across all thematic areas with the Steenkoppies dolomite aquifer consistently scoring higher.
- Basic technical provisions such as hydrogeological maps and aquifer delineation with classified typology are in place for all case study aquifers.
- Other governance provisions across all thematic areas are weak or are non-existent:
  - Steenkoppies dolomite compartment scores highest; Bapsfontein dolomite compartment and Houdenbrak basement aquifer score lowest
  - Groundwater monitoring is weak and assessment of groundwater resources is poor, both in terms of quantity and quality (e.g. lack of numerical groundwater model)
  - There are fair provisions for water well drilling and groundwater use rights but provisions to control groundwater abstraction and pollution are weak (poor compliance monitoring)
  - Provisions for establishment of aquifer management organisations are weak or non-existent
  - Cross-sector policy coordination is weak
  - From an operational point of view, a groundwater management action plan which includes both water quantity and water quality aspects only exists for the Botleng aquifer but has not been implemented to date
- Institutional capacity across all thematic areas is weak or non-existent except for the Steenkoppies dolomite aquifer where the situation is better.

Recommended management measures

Groundwater management measures are recommended at national and at local level for each of the case study aquifers to address existing and potential hazards as well as to improve the effectiveness of existing groundwater governance provisions and institutional capacity.

The recommended management measures were grouped into macro-policy adjustments, regulatory provisions and community participation.

Most critical are the following:

- The integration of the National Groundwater Strategy into the National Water Resource Strategy (NWRS), Catchment Management Strategies (CMSs) and other strategies;
- Strengthening of the groundwater related regulatory environment; and
- Strengthening of the institutional capacity, both in terms of existing institutions (DWA) and establishment and operationalising of Catchment management Agencies (CMAs) and Water User Associations (WUAs). Regarding the inadequacy of groundwater expertise it is recommended DWA to develop a strategy to augment national GW capacity.

Furthermore, investigation and implementation of climate change adaptation measures at local aquifer level are recommended.

Specific catchment recommendations

Recommendations were made in general on governance and also to the specific catchments included in the study:

- Strengthening and implementing of groundwater governance measures should preferably follow a 'parallel track and adaptive approach' within the existing legal and institutional framework. Such an approach would strengthen the said frameworks without disruption, taking cognizance of capacity and willingness to implement.
- Pilot projects in the case study aquifers have been recommended to improve on the groundwater governance provisions and institutional capacity.
  - Botleng Dolomite Aquifer: "Implementation constraints at local and regional level" (DWA Regional Office (RO) and Delmas Local Municipality (LM))
  - Gauteng Dolomite Aquifers:
    - Steenkoppies compartment: "Strengthening institutional framework" (DWA RO and establishment and operation of WUA - Stakeholders)
    - Bapsfontein compartment: "Licensing of groundwater use and compliance"
  - Houdenbrak Basement Aquifer: "Perspectives on sustainable groundwater management and use" (Irrigators, DWA RO and stakeholders)
  - Dinokana-Lobatse Dolomite Aquifer: "Water allocation" (DWA RO, local government and irrigators)

The same methodology which was used in this case study can be applied to identify management measures for other aquifer systems in South Africa such as the Karoo aquifer of Beaufort West.

Further reading:
To obtain the report, *South African Groundwater governance case study* (**Report No: KV273/11**) contact Publications at Tel: (012) 330-0340; Fax: (012) 331-2565; Email: orders@wrc.org.za or Visit: www.wrc.org.za to download a free copy.