

NBI Groundwater Project

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Project title: Enhancing conjunctive management of surface and groundwater resources in selected transboundary aquifers

case study for selected shared groundwater bodies in the Nile basin





Groundwater in NBI countries



Current situation:-

More than 60% of the rural population uses groundwater for domestic uses, irrigation and watering of animals.

More Than 70% of the NB countries population are living in rural areas and mostly depending on subsistence agriculture for food supply.

GW is the only consistent source of water for many communities outside the Nile valley.

Most of the drilled wells in rural areas are traditionally constructed and mostly has no records of abstraction quality or quantity.





Current Prevalent Uses of Groundwater

- Domestic Water Supply
- Watering of Livestock
- Irrigation
- Industrial Water Supply













Use of Groundwater for Domestic Water Supply



Groundwater provides 80% of the domestic water supply in urban and rural settlements

- Provision of the water at the point of use thus eliminating the cost of conveyance from surface water sources.
- Provision of clean water not requiring treatment prior to consumption.
- Short construction time.





Factors Hampering the Development of Groundwater Resources



The spread of groundwater development in the Nile Basin particularly for irrigation was historically hampered by a number of factors





Factors Hampering the Development of Groundwater Resources



- The high initial cost of investment and the alternative opportunity for the investment capital.
- The relatively high cost of operation.
- Logistical challenges thwarting the effective operation of the deep boreholes (e.g. fuel delivery, reliable power supply)
- Shortage of well-trained operation and maintenance service providers.
- Lack of sufficient knowledge about the underlying aquifer formation.
- Absence of aquifer development and management plans.







Strain on the surface water resources to meet increasing water demand for agriculture industry and domestic supply is increasingly driving communities and governing bodies towards the development of groundwater resources.





Factors Fostering the Development of Groundwater Resources



- Enhanced infrastructure.
- Improved groundwater development technologies and knowhow.
- Growing potential of using alternative renewable energy sources.









Transboundary Aquifers of Africa, with TBA codes. After: (IGRAC and UNESCO-IHP, 2015a).



The Nile Basin

11 countries

- Burundi
- D.R. Congo
- Egypt
- Eritrea
- Ethiopia
- Kenya
- Rwanda
- Sudan
- South Sudan
- Tanzania
- Uganda



- Longest river (6700 km),
 Area 3.3 million km²
 Diverse geographical, climatological and topographical regions
 Characterized by
 - High climatic diversity and variability,
 - Low percentage of rainfall reaching the main river
 - Uneven distribution of water resources.
 - High evaporation rates
 -vulnerable to drought and CC

Tentative Aquifers from Nile Basin After IGRAC

Aquifer Name	Countries	Total Aquifer Area (Km²)	Aquifer Area in the Nile Basin (Km²)	% area within Nile Basin
Mount Elgon Aquifer	Uganda, Kenya	5,398.32	4,579.49	85%
Gedaref	Ethiopia, Sudan	57,830.51	51,369.10	89%
Mereb	Ethiopia, Eritrea	38,752.68	27,210.24	70%
Rift Aquifer	Kenya, Tanzania	21,145.08	1,780.24	8%
Kagera Aquifer	Tanzania, Rwanda, Uganda	5,778.95	5,218.10	90%
Baggara Basin	Central African Republic, South Sudan, Sudan	239,876.71	196,127.11	82%
Coastal Aquifer Basin	Egypt, Israel, Palestinian Territory	23,338.14	11.72521552	0%
Karoo-Carbonate	Central African Republic, Congo, South Sudan	604,596.15	120,947.00	20%
Tanganyika	Burundi, Democratic Republic of the Congo, Tanzania	184,594.89	2,279.49	1%
Nubian Sandstone Aquifer System (NSAS)	Chad, Egypt, Libya, Sudan	2,892,867.48	567,344.75	20%
Aquifere du Rift	Democratic Republic of the Congo, South Sudan, Uganda	44,632.12	30,023.07	67%
Sudd Basin	Ethiopia, Kenya, South Sudan	370,647.62	324,287.18	87%

Additional Obstacles to the Effective Development of Transboundary Aquifers



- Absence of institutional/regional coordination.
- Competing national development demands and priorities.
- Prevalence of sovereign
 unilateralism approach to resource
 management.
- Politics of reconciling international political borders with groundwater basin boundaries.





Proposed TB Aquifers





- 1 Gadaref: Ethiopia Sudan
- 2 Mount elgon; Kenya Uganda
- 3 Kagera aquifer: Tanzania Uganda





* NBI Groundwater Project

Focus on selected aquifers rather than 'basin wide'

• Geographic coverage:

3 shared aquifers, Algedaref- Adagrat aquifer shared between Ethiopia and Sudan, Mt Elgon shared between Kenya and Uganda; and Kagera Aquifer shared among Burundi, Rwanda, Tanzania and Uganda

Budget 5.3 M USD

Funding – Global Environment Facility (GEF)





• Project components:

Component 1: Furthering knowledge and understanding about availability of groundwater resources in the Nile River Basin and its adjacent areas

Component 2: Development of action plans on groundwater resources governance, management, and protection for inclusion in national, sub-basin and basin-wide

Component 3: Targeted pilot projects to explore conjunctive use of surface and groundwater

Component 4: strengthening capacity to address groundwater issues at the national and regional levels

Component 5: Communications and awareness raising





Component 1: Furthering knowledge and understanding about availability of groundwater resources in the Nile River Basin and its adjacent areas

Output 1.1: Shared aquifers diagnostic analysis reports for all selected shared aquifers that serves as baseline fact-based analysis of current status of the aquifers, historical trends in resource availability, existing governance mechanisms at national and cross-border levels and threats that the aquifers face.

Output 1.2: A regional groundwater knowledgebase for all shared aquifers that draws on data and analysis carried out

Output 1.3: Water balance modelling of the selected aquifers with quantified: recharge, outflows (base flow, deep percolation, etc) and withdrawals.

Output 1.4: Projection of groundwater availability and use under climate change for selected aquifers





Component 2: Development of action plans on groundwater resources governance sin Intrative Du Bassin Du Martine Du Bassin Du Bassin

Output 2.1: Regional Shared Aquifers Integrated Management Action Plan for strengthening cooperative management and utilization of the selected shared aquifers will be developed. The Action Program is envisaged as a collection of recommended measures that are intended to address gaps and threats identified in Component 1 and enhance sustainable use of shared aquifers

Output 2.2: Technical guide on integration of groundwater aspects in NBI's subsidiary action programs for the selected sub-basins targeting key activities





Purpose of component: Pilots will be implemented in the three selected aquifer areas to demonstrate novel approaches for sustainable management of groundwater and conjunctive use of groundwater and surface water resources. The results and lessons will also help to inform the development of national and regional action plans (Component 2). Successful pilots from this project will be scaled up through other national and sub-regional initiatives. Component 3 has two outcomes and two outputs (one for each outcome).





Component 4: Further strengthening capacity to address groundwater issues at the Basin INITIATIVE national and regional levels

Outcome 4.1: Technicians, academics, and senior planners at national, sub-regional and regional levels capacitated on key requisite techniques on groundwater monitoring and sustainable management

Outcome 4.2: Regional and national decision makers have increased their understanding on importance of groundwater and capacitated to develop and adopt recommendations emerging from the analyses related to groundwater governance and conjunctive management facilitating policies.





Component 5: Communications and awareness raising



Outcome 5.1: Groundwater issues and conjunctive use management included in NBI communications and awareness raising activities;

Outcome 5.2: Lessons and experiences on conjunctive use management and the inclusion of groundwater considerations disseminated to IW (and other) projects globally.





