NILE BASIN INITIATIVE
INITIATIVE DU BASSIN DU NIL

ENHANCING CONJUNCTIVE MANAGEMENT OF SURFACE AND GROUNDWATER RESOURCES IN SELECTED TRANSBOUNDARY AQUIFERS

CASE STUDY FOR SELECTED SHARED GROUNDWATER BODIES IN THE NILE BASIN

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PROJECT DESCRIPTION

The interaction between groundwater and surface water systems (rivers, wetlands, lakes) has not been adequately considered in the Nile Basin. Water demand for various uses is rapidly growing and will outstrip the supply of conventional surface based sources in the near future. Groundwater holds the promise of closing the gap between water supply and demand, and in buffering the effects of climate variability. However, pressure on groundwater resources, through over exploitation and pollution, is already felt in many small aquifers in the upper Nile riparian countries.

The project aim is to overcome the different barriers limiting effective utilisation and protection of shared aquifers in the upper riparian countries of the Nile. Recent studies show that groundwater availability (or depletion of it) in the region, has a strong bearing on poverty, migration, conflict, school attendance, and human health. Three aquifer areas have been selected for the current intervention and these are located in diverse ecological zones.

EXECUTING AGENCY
NILE BASIN INITIATIVE

PROJECT DURATION
2020 - 2025

BUDGET
USD 5.3 MILLION (GLOBAL ENVIRONMENT FACILITY THROUGH UNDP)

CO-FINANCING
USD 27.9 MILLION (FROM COUNTRIES AND PARTNERS)

PARTICIPATING MEMBER STATES
BURUNDI, ETHIOPIA, KENYA, RWANDA, SUDAN, TANZANIA, UGANDA

Aquifer name	Countries	Total aquifer area (km2)	Aquifer area in the Nile Basin (km2)	Total area within the Nile Basin)
Gedaref-Adigrat	Ethiopia, Sudan	57,830	51,369	89%
Kagera Aquifer	Tanzania, Rwanda, Uganda	5,778	5,218	90%
Mount Elgon Aquifer	Uganda, Kenya	5,398	4,579	85%

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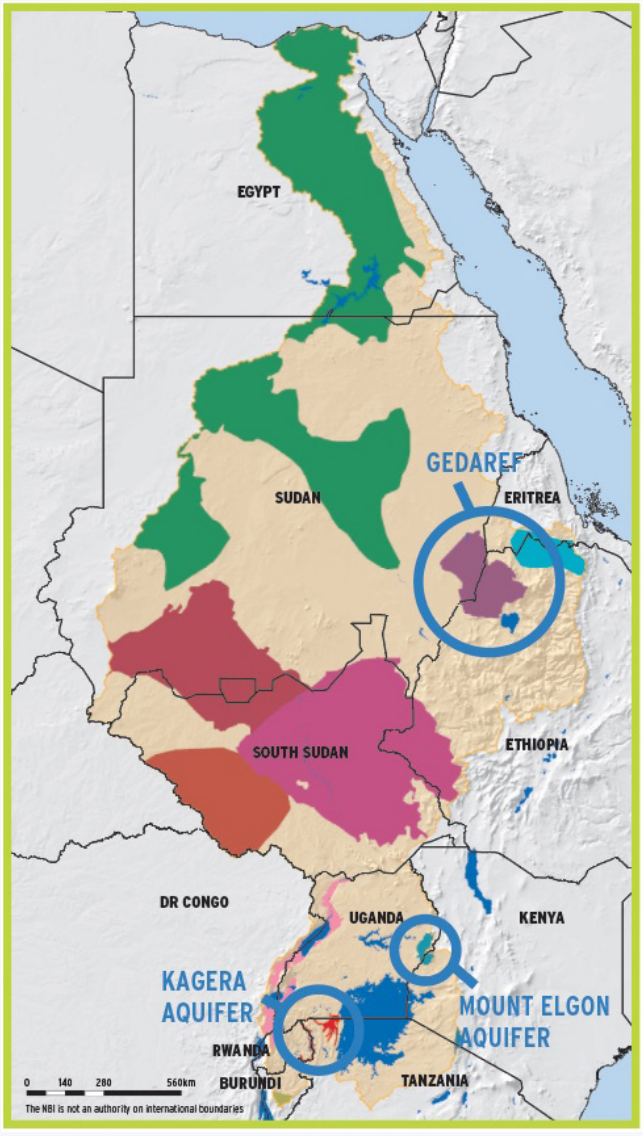


DEVELOPMENT CHALLENGES

The Nile Basin countries are faced with a multitude of water security challenges that may hinder their ability to continue meeting water needs for socioeconomic development. The ability of the countries to meet Sustainable Development Goals (SDG) targets (e.g. access to drinking water) may thus be jeopardised. The challenges related to groundwater include the following.

- Due to climate change and variability, many of the perennial rivers are now becoming seasonal, some lakes are shrinking from their original dimensions and there is increasing dependency on groundwater resources in all the aquifer areas under consideration.
- Reliance on groundwater is rapidly increasing with significant populations (especially in poor rural areas) dependent on it around the Basin.
- Interaction between groundwater and surface water systems (rivers, wetlands, lakes) is poorly understood and has not been adequately considered in the Basin.
- Evidence that aquifers are under threat from unsustainable exploitation, climate change, and pollution that are impacting water availability and quality.
- Recent studies show that groundwater availability (or depletion of it) in the region, has a strong bearing on poverty, migration, conflict, school attendance, and human health.
- Threats on transboundary aquifers are severe because of lack of common governance and management mechanisms.

OBJECTIVE

The objective of the project is to strengthen the knowledge base, capacity and cross-border institutional mechanisms for sustainable use and management of selected transboundary aquifers in the Nile Equatorial Lakes and Eastern Nile sub-basins.

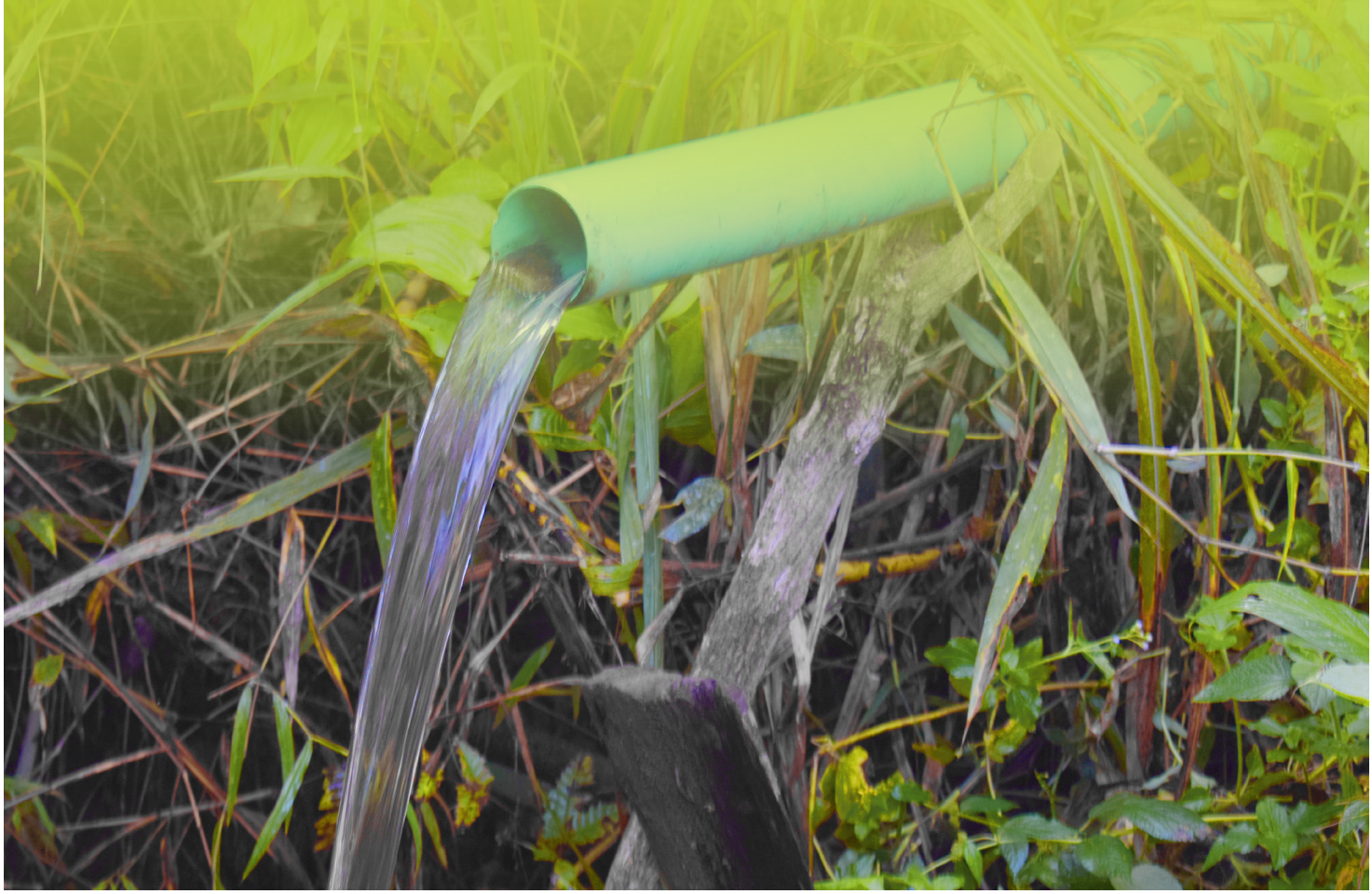
IMPLEMENTATION APPROACH

The project is divided into 5 interrelated components as described below

1. **Knowledge management**: This will build and expand on the understanding of groundwater resources through detailed mapping and assessment of selected aquifer systems. The analysis will consider the implications of impacts of potential climate change on the overall Basin surface and groundwater resources in the Nile. The work will also document the current groundwater abstraction/ use and anticipated groundwater abstraction trends (in irrigation, industry and drinking water) from the aquifers of basin wide significance to inform modelling, decision support systems, etc.
2. **Action plans on groundwater resources governance, management, and protection**: Development of guidelines (technical and policy) on sustainable exploration and use of groundwater together with its conjunctive use with surface water. The component will support the development and agreement of an overall Basin approach to groundwater, in ensuring a harmonization of use and management of ground waters within and the River Nile Basin.
3. **Pilot projects to explore conjunctive use of surface and ground waters:** 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 help to inform the development of national and regional action plans and scaling up through other national and sub-regional initiatives.
4. **Strengthening capacity at the national and regional levels:** The project will strengthen the capacity for groundwater management at both the national and regional levels. It will address multiple levels of society (decision makers, technicians, academics, local authorities and communities) and assist with sector-specific training for policy makers, researchers, and private sector. This component will aid the post-project sustainability of the project results/ outputs
5. **Communications and awareness raising:** This component will support the overall implementation of national action plans and to guide sub-regional policy development. It shall support the work of the NBI and national authorities to understand and explain to their stakeholders the importance, values and benefits of conjunctive use of surface and groundwater in protection the environment and supporting livelihood development within the selected sub-basins.

PILOT PROJECTS

- ***Managed Aquifer Recharge (MAR) in Gederef-Adigrat Sandstone aquifer system (Sudan and Ethiopia):*** The pilot shall include the detailed study, design and on-site implementation of the MAR measures integrated with appropriate instrumentation for monitoring effectiveness of the measures. The MAR pilot will target meeting the growing water demands for the pilot towns (Gedaref in Sudan and Humera in Ethiopia) under selected Shared Socio-economic Pathways (SSPs) and climate change scenarios. The pilot action shall demonstrate how wadi flows, e.g. through improving design, can be better captured to enhance water availability for communities.
- ***Water fund for sustainable watershed services (Burundi, Kenya, Rwanda, Tanzania, Uganda):*** Groundwater in the Mt Elgon and the Kagera aquifers system has connection to the surface water systems, especially the forests and wetlands which play an important role in sustaining water quality and quantity, providing a storage medium for water and in supporting complex ecosystem niches of economic and environmental importance. Degradation of the ecosystems has resulted in increasing in silt load in rivers which increases the costs for water treatment/production. This pilot aims to demonstrate the benefit for downstream users of the importance investing in upstream land and water management.
- ***Use of advanced remote sensing for monitoring and management of shared groundwater aquifers:*** This pilot will be implemented in all the three aquifer areas and in the seven countries. The pilot aims to demonstrate the use of remote sensing for detecting changes in groundwater recharge, storage, availability and quality. The presence of expertise within the region (e.g. The Regional Mapping Center in Kenya) will aid the upscaling of the outcome of the piloting. The monitoring tools will then be mainstreamed at the relevant national institution to support sustainable management of the groundwater resource.



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PROJECT RESULTS

Anticipated project results include:

- A regional knowledgebase on the status of the aquifers, historical trends in resource availability, effectiveness of governance mechanisms and threats the aquifers face.
- Water balance modelling for selected aquifers. Projection of groundwater availability and use under different pressures e.g. climate change.
- Shared aquifers integrated management action plans for strengthening cooperative management and utilization of the aquifers.
- Pilot projects demonstrating techniques for sustainable conjunctive use of groundwater and surface water resources implemented.
- Increased capacity for sustainable groundwater management.
- Communication and awareness raising products generated and disseminated to national stakeholders.

PROJECT BENEFITS

- Improved understanding and knowledge of groundwater and how it interacts with surface water and the pressures on them.
- Increased convergence of national approaches, policies and governance mechanisms for protection and sustainable use of shared aquifers at regional level.
- Integration of groundwater in their programmes and scaling up pilot project results in national and regional programmes.
- Enhanced conservation and efficient use of water resources and promote water-efficient land use activities, strengthening livelihoods.
- Technicians, academics, and senior planners at national, sub-regional and regional levels capacitated on key requisite techniques on groundwater monitoring and sustainable management.

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