

Nile Basin Initiative (NBI)
Eastern Nile Technical Regional Office (ENTRO)
Nile Cooperation for Result Project (NCORE)

Terms of Reference
For National Consultant for the

Ground Water Availability and Conjunctive Use Assessment in
the Eastern Nile

Sudan Country Report

1. BACKGROUND

The Nile Basin Initiative (NBI) is an intergovernmental partnership of the ten Nile Basin states sharing the Nile (Burundi, D.R. Congo, Egypt, Ethiopia, Kenya, Rwanda, South Sudan, Sudan, Tanzania and Uganda). The NBI was established to develop the river cooperatively; reduce poverty and environmental degradation; share substantial socio-economic benefits, and promote regional peace and security. The NBI is guided by an agreed Shared Vision which envisages achieving “*sustainable socio-economic development through the equitable utilization of, and benefit from, the common Nile Basin water resources*”.

NBI member countries launched a Strategic Action Program with two sub-programs: the basin-wide Shared Vision Program (SVP) that aimed at building confidence, capacity and knowledge base (now phased out), and two Subsidiary Action Programs: The Eastern Nile Subsidiary Action Program (ENSAP) and the Nile Equatorial Lakes Subsidiary Action Program (NELSAP) that initiate concrete joint investments and action on the ground at sub-basin levels.

The Eastern Nile Subsidiary Action Program (ENSAP) was launched by Egypt, Ethiopia and the Sudan (South Sudan joined in 2012 following its independence) to identify and prepare concrete joint investments in the Eastern Nile sub-basin that demonstrate the benefit of cooperation. ENSAP is governed by the Eastern Nile Council of Ministers (ENCOM) of water affairs and implemented by the Eastern Nile Technical Regional Office (ENTRO) headquartered in Addis Ababa, Ethiopia. ENSAP is funded by the four member countries and a number of bilateral and multilateral Development Partners.

The Integrated Development of the Eastern Nile (IDEN) was the first ENSAP project agreed by the member countries in 2002. IDEN consisted of a first set of seven subprojects aiming at tangible win-win on the ground to create confidence and showcase the benefit of cooperation.

Most of the first agreed projects under IDEN have been successfully prepared and implemented by the countries. These included: flood preparedness and early warning, Watershed Management, Irrigation and Drainage, and Ethiopia-Sudan Power Transmission Interconnection projects.

Following the IDEN project, and as part of implementing the projects identified for the second five year Strategic Plan for the period 2104 - 2019, NBI received funding from the Nile Basin Trust Fund/Cooperation in International Waters in Africa (CIWA) titled Nile Cooperation for Results Project (NCORE) supporting the three NBI centers (Nile-SEC, NELSAP-CU and ENTRO). As part of this CIWA fund; ENTRO received support to conduct component (3) which consists of two sub-components:

Sub-component 3.(a): *Strengthening the knowledge base and analytical framework for Eastern Nile water resources planning and management, and*

Sub-component 3(b): *Promoting sustainable development and growth in the Eastern Nile*

One of the important studies conducted by ENTRO under the NCORE project is the Eastern Nile Multi-Sector Investment Opportunity analysis (ENMSIOA). An important finding of the ENMSIOA is that, in the Eastern Nile, water shortage will be the single most important determinant of water resources investments. This will be more aggravated by the anticipated impact of Climate Change which is expected to increase surface temperatures and therefore evapotranspiration rates, contributing to growing water shortage. The ENSAP Climate change approach paper has adaptive strategy that envisages a two-pronged approach: (a) demand management and (b) supply enhancement. Exploring the conjunctive use of ground waters was identified by the ENMSIOA as one of the options of the former approach. It can be an important source to supplement surface water for irrigation and therefore release the pressure on the Eastern Nile water.

2. RATIONALE

Water bearing geological formation covers most of the Eastern Nile surface area in all four countries. It is of good quality and is available throughout the year. Yet, the use of ground water for irrigation is limited to very small areas for small scale irrigation. The traditional wisdom was to exploit the surface water because it is cheaper to develop. Now, increasing shortage of surface water calls for considering the exploration of other sources to supplement surface water. In addition to that, with Climate Change now in the picture, ground water can constitute a powerful tool in building resilience because of its very slow response to climate variability.

Information on the availability and use of groundwater in the Eastern Nile is scares and fragmented into different countries and different institutions within the same country. This study is an attempt to start addressing the ground water regional knowledge gab and

start to build a comprehensive Eastern Nile groundwater knowledge base and a regionally harmonized groundwater monitoring system.

Like surface water, groundwater does not conform to national or political boundaries. Most of groundwater aquifers extend into more than one country. Intervention in one country on ground water may have impact on other countries. As such, proper understanding, monitoring and managing these aquifers requires transboundary approach. This study is the first attempt to deal with groundwater in the Eastern Nile from a transboundary prospective.

3. OBJECTIVES

The study objective is to contribute to capacity building for improve knowledgebase and planning of groundwater development planning at national and regional level and harmonize of groundwater data and monitoring system between Eastern Nile countries. This is through the develop of a comprehensive picture and initiate a baseline data on the groundwater resources in the Easter Nile Region, their use and recharge in order to facilitate future exploitation of the potential for conjunctive use with surface water for irrigation and other purposes.

1. Specific Objective

- a. To make assessment of the existing and readily available knowledge of groundwater resource potential in the Eastern Nile that includes characterization, mapping, recharge and safe yield.
- b. Using already existing information initiate the establishment of a comprehensive groundwater data base in the Eastern Nile. This data base can further be expanded as more data and information became available.
- c. Harmonize groundwater monitoring practice between Eastern Nile countries
- d. Start a process to initiate and facilitate future inclusion of groundwater considerations into national and transboundary Eastern Nile water resources planning and management activities.
- f. Establish a common understanding of groundwater policies, institutional issues and data and capacity gabs in the Eastern Nile riparian countries.

4. SCOPE AND TASKS OF THE STUDY

The study area for the assessment of availability and use of groundwater covers the four sub-basins of Eastern Nile i.e. the Abbay- Blue Nile, the Tekeze - Atbara, the Baro - Akobo - Sobat and the Main Nile in any of the four Eastern Nile countries of Egypt, Ethiopia, South Sudan and Sudan. In each of the four countries the study will be limited to the aquifers that fall partially or totally in the catchment of one of the four Eastern Nile sub-basins.

The study will encompass four major components; these components are outlined below:

4.1) Scoping of Ground Water Availability and use:

Collect data and information on groundwater resources availability and use in each of the Eastern Nile Basin Countries. The data and information could be collected from the respective countries and other secondary data sources such as IGAD, UNESCO, IAE etc. Remote sensing data should also be considered.

The data and information to be collected includes: Mapping of Geographical Coverage, depth, recharge, safe yield, quality and suitability for domestic and irrigation use. This will be in addition to a review of groundwater monitoring practices, data monitoring gaps and groundwater management institutional setup in each of the Eastern Nile countries.

4.2) Harmonize Groundwater Monitoring

- Assess the groundwater monitoring practices in each of the Eastern Nile Basin Countries including water quality measurement, data storage and sharing and water quality laboratories.
- Identify groundwater monitoring gaps.
- Building on the existing monitoring practices give recommendations on how to harmonize these practices between Eastern Nile countries in terms of parameters to be monitored, monitoring techniques and data formatting.

4.3) Develop Indicative EN Ground Water Atlas.

The indicative Groundwater Atlas of the Eastern Nile Basin will be developed based upon available information collected from different sources. It will be prepared in such a manner that it can be updated as more and detailed data and information is available.

4.4) Regional validation and consultation workshop:

One regional consultation workshop shall be organized for stakeholders from the three ENSAP countries of Ethiopia, South Sudan and Sudan for the review, validation and obtaining feedback for enhancing the draft report. The workshop is also expected to come out with countries agreement on recommendations on how to deal with gaps in data and capacity and agree on guidance to ENTRO on the next step.

5. SCOPE AND TASKS FOR SYDAN NATIONAL CONSULTANT

For conducting the study, ENTRO will hire one International consultant and three national consultants (one from each of Ethiopia, South Sudan and Sudan). The Ethiopian National Consultant scope of work shall include but not limited to:

- 5.1. Collect data and information on groundwater resources availability and use in Sudan. The data and information to be collected includes: Mapping of Geographical Coverage, depth, recharge, safe yield, quality and suitability for domestic and irrigation use. The data and information could be collected from the country and other secondary data sources such as IGAD, UNESCO, IAE etc. Remote sensing data should also be considered.
- 5.2. Identify the type and magnitude of groundwater use for different purposes in each aquifer in the country with particular emphasis on transboundary aquifers.
- 5.3. Identify and analyse the institutional arrangement, the legal and policy framework, human and institutional capacity at national level as related to groundwater in Sudan describing if possible strengths and weakness.
- 5.4. Assess the extent of conjunctive use of ground and surface water for different purposes.
- ~~5.5. Review the existing groundwater monitoring practices in Sudan.~~
- 5.6. Identify major constraints and challenges that may limit utilization of ground water for irrigation development.
- 5.7. Identify any important data gaps and challenges and recommendations for additional work to fill data gaps
- 5.8. Explore and evaluate the potential for groundwater development for domestic and irrigation uses in Sudan.
- 5.9. Prepare and give summary presentation of the Sudan national report in a regional validation workshop

4. Approach and Methodology

For Sudan, the study will make use of available data and information at the disposal of respective Sudanese institutions. These data and information shall be collected, reviewed and organized into a systematic database. The study will also maintain a close relationship with custodians of the data and information at national, state and local level for the timely provision of data and consultation. The Ministries and other agencies in charge of groundwater, irrigation, water supply, meteorology and geological investigation

will be involved in the process of the study. Private operators, NGOs that support programs for borehole developments for water supply or other purposes and consultants who have direct linkage with various aspects of groundwater development and management could also be involved as necessary.

Using the information collected on groundwater policies, institutional setup and monitoring practices in the country, the Consultant can give any preliminary recommendations on how to improve them.

7. IMPLEMENTATION ARRANGEMENTS

ENTRO shall assign a Project Coordinator who will be responsible for overseeing the work and contract administration and to whom each Consultant shall report. All the Consultants shall discuss and agree with ENTRO a detailed work plan which will be reviewed and amended as necessary during the course of the contract negotiations.

ENTRO shall also provide:

- Adequate support to the Consultants by facilitating gathering of data, access to relevant information and authorities,
- Adequate office space and support facilities (such as internet) when the Consultant is in Addis Ababa.
- Organize the regional consultation workshop for the stakeholders.

It is the responsibility of the Consultant to acquire the necessary relevant data and information required for the Consultancy. ENTRO will only provide the data available at ENTRO and facilitate the Consultant's access to the different Government departments/utilities/institutions with data and information relevant to the consultancy. The Consultants shall discuss and agree with ENTRO a detailed work plan which will be reviewed and amended as necessary during the course of the contract negotiations.

6. DELIVERABLES

Sudan National Consultant shall prepare a short inception report describing his understanding of the assignment, the methodology for conducting the study including any amendments to the scope of work and also describe his work plan. The inception report shall also include a draft table of content of the final report. Upon completion of the study the consultant shall also prepare a draft final report including a summary. The Consultant shall prepare a summary presentation from the draft report to be presented at a regional workshop. The National Consultant will be expected to provide technical comments on the draft reports of the International Consultants, and vice versa.

Following the workshop presentation and receipt of comments from ENTRO, the Consultant shall finalise his report taking account of issues raised and comments made by different stakeholders during the course of the assignment. The final report shall include a separate Executive Summary and shall be submitted in 10 hard copies together with an electronic copy.

The anticipated deliverables of each of the national consultant and time line are listed below.

Deliverable	Main Study Milestones	Planned Date from Commencement of Study
Report No 1	Inception Report	At the end of one Month
Report No 2	Draft Final Report with summary presentation for the regional workshop	At the end of nine Month
Report No.3	Final report incorporating comments from ENTRO and other stakeholders	At the end of twelve Month

8. LEVEL OF EFFORT, BUDGET AND SCHEDULE:

The National consultant for the Republic of Sudan will provide a total of 30 (Thirty) person-days during the course of this study. . ENTRO will pay the consultant a fixed fee per day in US dollars.

The national consultant from the Republic of Sudan may undertake up to three trips to the Eastern Nile countries during his assignment period. Payments against these trips shall be effected upon submission of invoices by the consultant. Reimbursable expenses will include international travel (economy class) and daily subsistence allowance, in accordance with ENTRO policies.

9. QUALIFICATIONS & EXPERIENCE

The National Consultant shall have the following qualifications and experience:

- Advanced university degree M.Sc. (or above) in Hydro-geology, Hydrology, Geology or Water resources related field
- At least 10 years of relevant experience and exposure to hydrological and/or ground water resource investigation or regional geological mapping. ;
- Knowledge of natural resources management.
- Relevant work experience in the Republic of Sudan.

10. Application

The National Consultant shall give a CV and express interest to conduct the intended job. ENTRO will evaluate all applications received, select three of them and conduct contract negotiation accordingly.