



TERMS OF REFERENCE FOR INDIVIDUAL CONSULTANT

Project Title: Consultancy Services Hydrological Information and Products Expert.

- Duration of the Contract: from 1st April 2024 to 31 March 2025.
- Level of effort: up to 50 man-working days.

INTRODUCTION

The NBI developed a Nile River basin monitoring strategy (2010) to guide its activities for enhancing the monitoring system in the basin, and therefore to provide the data required to facilitate the implementation of various projects and programs. Within the context of operationalization of the Nile Basin Monitoring Strategy, the Nile Basin Initiative (NBI) designed and implemented a basin-wide hydro-meteorological monitoring system (in short Hydro-Met system) whose objective is to strengthen collaborative monitoring of the basin for optimal utilization and sustainable management of the shared water and related natural resources.

Through the financial support from the German Federal Ministry of Economic Cooperation and Development (BMZ) and European Union (EU), the NBI has implemented the first phase of the Hydromet system focusing on establishment of the hydrological monitoring networks and data management system as per the approved design and implementation plan by the Nile Council of Ministers in its 23rd meeting on 4th June 2015, in Dodoma-Tanzania and reviewed in 2020. The implementation plan involved; (i) Updating the system design specifications and implementation plan, (ii) Civil works constructions undertaken by national/local contractors, (iii) Procurement of monitoring equipment for the regional stations, (iv) bench testing and installation, (v) Upgrading National and Regional Data Centers, (vi) Capacity building for national expert to support the hydrometric system installation, operations and maintenance, and (vii) Information products from the system.

The first phase of implementation envisioned designed 60 hydrometeorological stations complete with the Data Management System (DMS) upgraded in nine countries national data centres and two regional data centres within the basin. However, a total of 43 stations complete with the DMS have been established in collaboration with the Member States: Burundi (2/2), Kenya (6/6), Rwanda (6/6), South Sudan (5/7), Sudan (2/13), Tanzania (8/8), and Uganda (14/15). Security and other challenges in DR Congo (1/1), Sudan (11) and Ethiopia (2/2) halted the progress of the implementations. The national data centers have been upgraded in nine countries and two regional data centres.

The DMS is configured with data collection and transmission deployed using dual telemetry systems including Global System for Mobile Communications/ General Packet Radio Service (GSM/GPRS) and satellite telemetry based on EUMETSAT communications to provide robust telemetry using low profile, low power antennas and transmitters. Data storage and archiving is achieved through DataSight provided by Aquamonix with each country with unique credentials to access and manage their own data and reports.

As part of the sustainability plan, capacity building and training of the national experts on the system have been conducted in the member states countries. NBI continues to provide the necessary technical support to member states through the Established Help Desk at the Nile Secretariat to support countries with operations and maintenance of the system and development of information products from the system demonstrating value for the investment. In addition, NBI has also established Regional Expert Group (REWG) on Hydrology consisting of three nominees for reach country to coordinate the hydromet activities.

The second phase of the hydromet project is supported by BMZ through GIZ and is mainly focusing on the operations and maintenances of the monitoring and development of information products and applications based on the data and information from the monitoring system.

CONSULTANCY/ASSIGNMENT OBJECTIVES:

The purpose of this assignment is to provide technical and professional expertise in hydrological information development to support water resources management decisions while leveraging on the established regional hydrological monitoring station and system within the Nile River Basin.

SCOPE OF WORK

The scope of the consultancy includes the review of existing river rating information and development of the new rating curve for newly established hydrological monitoring stations as well as ingestion into the DMS for the development of hydrological information products and application for sustainable water resources management and fostering of cooperation within the Nile Basin.

The assignment is expected to be spearheaded with the REWG on Hydrology following the international best practice of hydrology. It aims to enhance the capacity of Member States in development and review of rating curve leveraging on the latest technology and platforms including a combination of flow measurements, hydraulic and hydraulic modelling of the river reach section being monitored. Therefore, facilitating the development of information products from the hydromet systems for sustainable water resources management within the basin as key priority.

The Hydrological Information and Product Services Expert will undertake assignments in the following areas:

- Support to water agencies in the Nile countries to improve water data by reviewing and strengthening systematic data acquisition procedures and QAQC routines for the entire water data acquisition and management process.
- Support to water agencies in the Nile countries to improve streamflow data by strengthening station rating curve review development, including applying the ‘hydraulic approach to rating curve development’.
- Combine both technical training sessions, field work, and office support to apply the rating curve approach for key Nile hydromet stations, pointing toward broader deployment by national teams.
- Provide support water agencies in the Nile countries to improve flood measurements by establishing effective procedures for post-event flood analysis. These efforts are specifically aimed at improving the high-flow segment of the rating curve—which are currently undefined for most hydromet stations in the Nile basin.
- Support water agencies in the Nile countries to develop and strengthen strategic field monitoring programs that make effective use of the available budgetary resources while producing high quality data and information products.
- Technical assistance to working groups on information product design and development for multiple applications to multiple competing interests within the basin.
- Training and capacity building of the Regional Expert Working Group (REWG) on Hydrology on the streamflow monitoring, data quality assessment and control, station rating review and development of hydrological information products to support water resources management activities within the basin i.e water resources assessment, planning, allocation and management, forecasting of hydrological extremes such as flood and drought for disaster risk reductions and enhanced preparedness, hydropower generation planning and shipping and navigation advisories.
- Support National Hydrological Services and REWG in the development of operational information products and application case use of the regional hydromet system.
- Provide support as required to consider the application of data and information products to address diverse complex transboundary water resources policy and management issues.

The assignment activities are broken down into the following **Six (6)** tasks in a stepwise manner as follows.

Task 1: Development of workflow and methodology on river rating station and information

This will involve the development methodology based on the recent technological advancement field hydrological flow measurements, field surveys (cross-section and longitudinal and the geometry of the hydraulic structure controlling the station /section flow), hydrologic and hydraulic modelling and applications. This task is envisioned to take advantage of the availability of field hydrological equipment provided by NBI to Member States and existing hydrological equipment at the National Hydrological Services (NHS) such as Acoustic Doppler Current Profiler (ADCP) to measure streamflow, depth, velocity at the station reach. The number of stations for the rating review are distributed in six countries as: Burundi (2), Kenya (6), Rwanda (4), Tanzania (8), South Sudan (5) and Uganda (10).

Task 2: Conduct training and capacity building on the developed workflow and methodology

The Consultant will discuss the workflow and methodology with the NBI for capacity building and training of the REWG on Hydrology at the regional workshop where any adjustment will be made to fit country needs. The training to include steps and procedures for data collection including survey, flow measurement, hydrological and hydraulic modelling and extraction of rating curves for the country level regional stations. Two (2) REWG on Hydrology workshops are envisioned; One for data collection and the other for hand-on on rating curve development and review and importation into the DMS (DataSight). The training is aimed to build the capacity of REWG through hands-on training using a tailor-made program for review of the station rating information and application for regular information and products to support water resources management.

Task 3: Support field data collection and review of the river station rating

This task involves remotely coordinating with the NBI Secretariat and National Team/REWG on Hydrology to conduct fieldwork data collection which include flow measurements and field surveys. It also involves remote follow up fieldwork activities for each country for any challenges and opportunity for adjustment of the fieldwork plan. The task is aimed at collecting optimal field information on the river reach to enable hydraulic set-up, calibration and simulation of the surface water profiles and hydraulic characteristics of the station reach for comprehensive understanding of flow controls (upstream, downstream, channel, section and flood plain). NBI will support the National Expert (four to five) for the fieldwork activities within the reasonable means.

Task 4: Supervise the review and development river rating information

The field data collected will be used to build capacity and train the National Experts on the development and review of the river station rating information through a regional workshop on REWG. It is envisioned that 3 experts per Member States will be available to participate in the training on approach and methodology, participate in the field data collection and actual river rating information review/development workshop for their own country stations to maturity.

Task 5: Ingestion of the rating into the DMS

It is envisioned that this consultant will also work together with the DMS Consultant to ingest the reviewed and developed mature rating information into DMS for river flow computation. The two consultants will support the REWG to ingest their reviewed and developed river rating information into the Hydromet DMS and cross transfer to other country DMS as guided.

Task 6: Development of information product

Leveraging on the availability of both river water level and discharge data and information, the consultant will support the national and regional experts on the application of the available river flow information to develop information products. The envisioned information products include water resources assessment and planning for competing interests such as ecosystem services, water supply, irrigation, and hydropower generation and other industrial processes. Others include flood forecasting; prediction and early warning information generation for disaster risk reduction and community resilience; navigation and shipping advisories; and hydropower production forecasting. This also will include leveraging on the available hydrological information for monitoring and forecasting of hydrological drought for early warning information using flow indices such as Standardized streamflow index (SSI). The consultant will also support the development of operational visualization platform

for the key information products from the hydromet systems. Support project case use of the operational system for various projects within the basin.

IMPLEMENTATION MODALITIES FOR THE CONTRACT

The following procedure applies:

1. The NBI and the Consultant will agree on an indicative rolling ~~six~~-month workplan to help facilitate timely planning on both sides, which will be subject to continuous review and update.
2. The contract is a standard contract and will be implemented through specific assignments.
3. For every assignment under this contract specific TORs will be signed between the NBI and the consultant specifying:
 - a. the objective and scope of work of the assignment
 - b. the deliverables
 - c. the time period / schedule
 - d. the number of days agreed for the assignment
 - e. the ~~agreed~~ travel plan (destinations, duration and budget).
4. Travel will be approved by NBI as part of the assignments TORs.
5. No work may be invoiced under this contract without prior written TORs for an assignment having been agreed upon and signed by both parties.
6. After completion of each assignment a separate invoice for each assignment is made to NBI.
7. The Consultant will provide the NBI with a completion report for each assignment.

QUALIFICATIONS

Education:

- i. First level degree in water resources management, river basin planning, hydrology, or civil engineering.
- ii. Advanced degree (master's or equivalent) in relevant field is desirable

Experience:

- i. Ten years demonstrated experience in operation and maintenance of hydrological monitoring systems, development of rating curves for complex rivers, and hydrometeorological data management systems.
- ii. Experience in preparation of at least 5 catchment management plans and/or hydrological studies.
- iii. Five years working experience on transboundary water resources in the Nile basin or basin with equivalent complexity and size.

The Water Hydrologist/Hydrologic Services Expert must have 10 years of experience working in developed and developing countries in

- Regional hydrological monitoring system
- Producing defensible water data
- Streamflow monitoring, hydrography, and field hydrology
- Defensible rating curve development for complex rivers
- Working with modern time series Data Management Systems
- Transboundary water management
- Preparing basin diagnostics, catchment management plans, and water resources assessments for large river basins

Expert should be familiar with the Nile basin and the Nile Basin monitoring network and must have relevant experience in transboundary water resources management and operations. Field experience in streamflow monitoring is necessary.

Expert should have demonstrated skills and capacity in

- project planning,
- institutional and capacity development,
- stakeholder facilitation,
- coordination and leadership
- capacity to organize multi-spectrum tasks and activities
- coordinating non-homogenous teams.
- Directing multi-national programs and teams

LEVEL OF EFFORT

This assignment is expected to take a total of UP TO 50 man-working days distributed over the contract period from 1st April 2024 to 31st March 2025.

The Client shall pay the consultant professional fees (to be determined based on agreed daily professional fee rate) against deliverables (assignment) accepted by the client. The proposed deliverable and payment will be based on the delivery of the six specified tasks. Daily subsistence allowance will be provided for fieldwork based on the standard NBI/UN rates for the agreed number of days in the specific terms of reference.

REPORTING:

The consultant shall report to the Regional Hydrological Coordination Expert with oversight by Deputy Executive Director of Nile Basin Initiative.

HOW TO APPLY

Interested candidates should send their application letters and CV including contact details of at least two referees The applications must be sent to the email wrmconsult@nilebasin.org no later than April 05 2024.