"Enhanced Water Security and Community Resilience in the Adjacent Cuvelai and Kunene Transboundary River Basins"

REPÚBLICA DE ANGOLA

COMISSÃO TÉCNICA PERMANENTE CONJUNTA PARA A BACIA DO RIO CUNENE (CTPC)

PERMANENT JOINT TECHNICAL COMMISSION ON THE CUNENE RIVER BASIN (PJTC)

REPUBLIC OF NAMIBIA

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TERMS OF REFERENCE

KUNENE BASIN HYDROLOGICAL ANALYSIS

Enhanced Water Security and Community Resilience in the Adjacent Cuvelai and Kunene Transboundary River Basins (CUVKUN) Project

Financing Agency: Global Environment Facility (GEF)

GEF Implementing Agency: United Nations Development Programme (UNDP)

UNDP Executing Agency: Global Water Partnership Southern Africa (GWPSA)

Location: The Kunene River Basins in Northern Namibia and Southern Angola

Duty station: Remote

Duration: 9 Months (The consultant is expected to begin work no later than two weeks from the notice to proceed)

1. BACKGROUND

The Cuvelai Watercourse Commission (CUVECOM) was established on 16 September 2014 to manage the shared transboundary waters of the Cuvelai Watercourse. The secretariat is currently based in Oshakati, Namibia. Adjacent to the Cuvelai River Basin is the Kunene River Basin. Transboundary cooperation for the Kunene Watercourse is managed through a Permanent Joint Technical Commission (PJTC) established in 1990. Both the Cuvelai and Kunene Watercourses are shared between the Republic of Angola and the Republic of Namibia.

The Global Water Partnership Southern Africa (GWP) is an intergovernmental organisation established in 1996 to support countries in implementing more equitable and sustainable management of their water resources. The network spans 13 regions with 2,400 institutional Partners in 158 countries. The global secretariat is in Stockholm, Sweden. The GWP Africa Coordination Unit is based at GWP Southern Africa in Pretoria, South Africa and coordinates GWP Africa programmes across Africa. GWPSA also hosts the GWP global theme on Climate resilience and is charged with providing global strategic leadership and coordination of the implementation of the GWP strategy on climate resilience.

2. ENHANCED WATER SECURITY AND COMMUNITY RESILIENCE IN THE ADJACENT CUVELAI AND KUNENE TRANSBOUNDARY RIVER BASINS ("CUVKUN PROJECT")

The CUVKUN project aims to improve water resources management in the transboundary Kunene and Cuvelai basins shared by Angola and Namibia. There is increasing water scarcity and hydrological variability, exacerbated by climate change within the region, even though both basins are stark in contrast. The need for the comprehensive monitoring of climate and water resources and the sharing of information has never been greater, as also the need to improve systems that can provide early warning of climate-related disasters.

The USD 11 million project is funded by the Global Environment Facility (GEF) and led by the United Nations Development Programme (UNDP) as the GEF Implementing Agency. The Global Water Partnership Southern Africa (GWPSA) is the Executing Agency, while the Cuvelai Commission (CUVECOM) and Kunene Permanent Joint Technical Commission (PJTC) are the focal custodians of the project implementation.

The project will undertake a suite of activities designed to strengthen joint management and planning capacity and practices at the transboundary basin level. These activities will be implemented under six (6) project components:

- **Component 1:** Strengthening the transboundary and conjunctive water resources management in the Cuvelai River Basin;
- **Component 2:** Strengthening the transboundary water resources management with future development scenario analysis in the Kunene River Basin;
- **Component 3:** Strengthening the governance of the Cuvelai and Kunene River Basins to foster joint management by the two countries in the most cost-effective manner;
- **Component 4:** Strengthening institutional, technical and operational capacity in Angola to sustainably develop and manage the sub-region's water tower located in Central Angola;
- **Component 5:** Enhancing the community participation in Integrated Water Resources Management (IWRM) to build resilience in their livelihoods;
- **Component 6:** Supporting outreach and Knowledge Management for replication, upscaling, and stakeholder engagement.

3. THE KUNENE RIVER BASIN

The Kunene River Basin is a transboundary basin shared between Angola and Namibia, [3](Figure 1) and covers an area of 106 500 km², with 14 700 km² (13.3 %) in Namibia and 95 300 km² (86.7%) in Angola. The Kunene River is 1 050 km long and is one of the few perennial rivers in this region with a mean annual discharge of 5 500 million m^3.

As required by the Third Water Use Agreement of 1969, Article 5.3 of the Special Provisions, the PJTC shall revise the hydrological studies of the Kunene River basin carried out by both Angola and Namibia (referred to in Article 1.2 of the Agreement) for the purpose as hereinafter set out. Such revision shall be made at the commencement of operation of the works to be executed in the first phase of the development of the water resources of the Kunene River basin and thereafter at such intervals as may be agreed upon. The specific purposes of such revision shall be to update the outdated hydrological data and form a basis for assessment of future developments in the Kunene River Basin and for more effective management of the river basin.

In the past, war situations in both Angola and Namibia resulted in the interruption of operations and the destruction of most river flow monitoring stations. The absence of adequate information hampers the joint optimal utilization of the water resources between Angola and Namibia, and this situation must be reversed by the re-establishment of hydrological monitoring stations on the rivers.

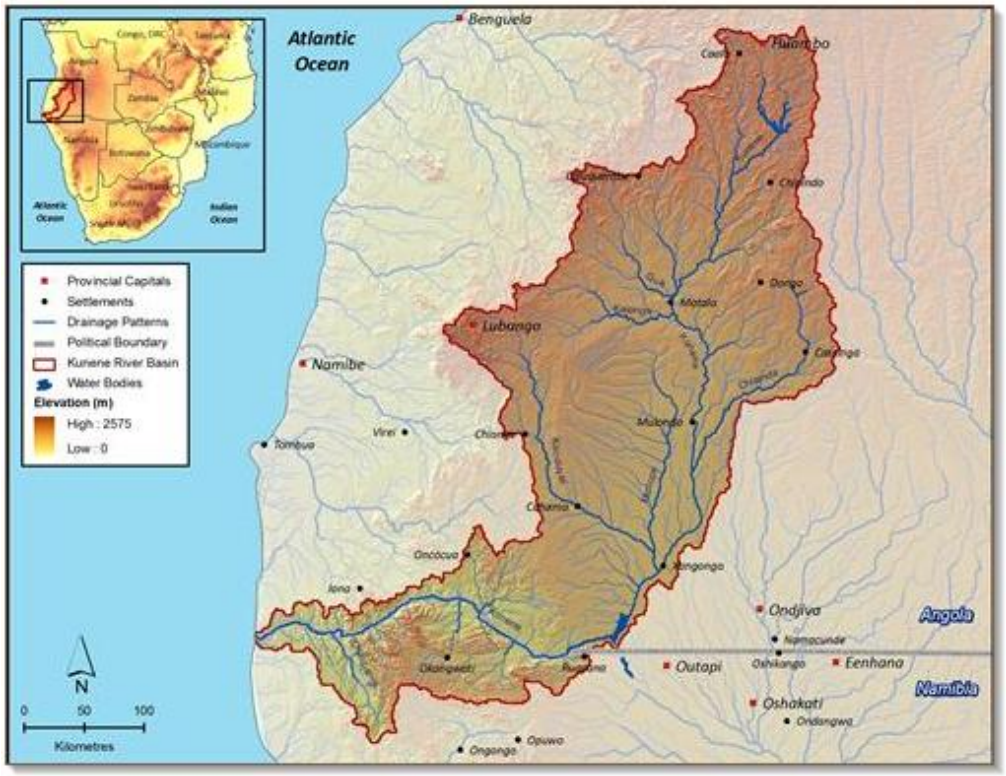

Figure 1: Location of the Kunene River Basin in Angola and Namibia

Joint optimal utilization of the water resources of the Kunene River basin is important for the development of both Angola and Namibia and for this purpose the hydrological analyses and the re-establishment of an adequate hydrological monitoring network are essential. The PJTC seeks to commission a consultancy to conduct hydrological analyses of the transboundary Kunene River basin, which encompasses the multiple multipurpose dams of Gove, Matala, Calueque, and the Ruacana Hydropower plant. The dams are used for domestic water supply, power generation, and irrigation.

For the basin, two hydrological studies of the Kunene River were carried out in 1966. The reports were written in English and Portuguese by HYDROCONSULTS and *"Grupo De Trabalho do Cunene e Cuvelai"*, respectively, which require a joint reassessment and updating of the hydrology of the basin.

4. OBJECTIVE OF THE HYDROLOGICAL ANALYSES

The objective is to develop an understanding of the hydrological and water resources baseline of the transboundary Kunene River basin in Angola and Namibia. A shared understanding of the hydrological baseline is critical to inform sustainable management, especially given that it is a basin with significant hydropower plants (in existence and planned). This ToR therefore provides the scope for a focused hydrological analysis and data systems assessment to improve understanding of water flows, trends, and future development implications in the Kunene River Basin. The initiative will also strengthen data governance and analytical capacity for joint planning under changing climatic

conditions. The outputs of this assignment are expected to directly contribute to the development of the Transboundary Diagnostic Analysis (TDA) for the Kunene River Basin under the CUVKUN Project.

The specific objectives of this assignment therefore include:

- Evaluation of the Kunene hydrometric network and database management system
- Development of comprehensive hydrological model for the basin and establishment of the current level of water resources development.
- Characterization of current and potential water demand and uses.

5. SCOPE OF WORK

The scope of work for the transboundary hydrological analyses and water resources assessment shall encompass the following key components and activities and help with interpretation of Kunene basin agreements.

5.1. Evaluation of the Current Hydro-meteorological Network

Evaluate the spatial distribution and density of monitoring stations and assess whether the network adequately covers the basin.

Building on earlier studies with the same objective, e.g. the GIZ supported assessment in 2023 (Preliminary IWRM Plan Development of an IWRM Plan for the Kunene Watercourse):

- Assess the current distribution and condition of hydro-meteorological monitoring stations
- Collect existing hydrological and meteorological data (e.g., rainfall, flows, instrumentation details, and historical time series).
- Analyze the quality, consistency, and completeness of the data sets: Conduct data consistency analysis to detect inconsistencies and predominant sources of error and produce conclusions on data quality. Prepare a data gap analysis and recommend sources for closing those gaps.
- Identify gaps in spatial and temporal coverage for a transboundary hydro-monitoring network to improve early warning for high flow and critical low flows and recommend improvements, including new monitoring sites, especially those that can be monitored jointly.
- Recommend actions for harmonization of flow information reported between dam operators - central to addressing ongoing flow discrepancies and operational inefficiencies/unexplained losses.
- Incorporate remote sensing data and satellite-derived rainfall estimates to complement ground-based data. The Consultant is expected to make use of relevant remote sensing and satellite-derived rainfall datasets to complement ground-based observations.
- Develop a strategic plan to modernize and expand the hydrometeorological network, incorporating innovative technologies and ensuring interoperability between Angola and Namibia.

5.2. Review and design improvements for the Kunene hydrological database

- Evaluate the structure, tools, and functionality of PJTC's existing hydrological database systems: Assess the current data management architecture, tools, and operational practices used in Angolan and Namibian part of the basin, including associated models and workflows. Provide recommendations to enhance system functionality, ensure full operationalisation, and align with best practices for transboundary hydrological data management.
- Recommend improvements to enhance automated data import, storage, quality control, and analysis: Drawing on feedback from data providers and users, propose a strengthened data management system. This may include migrating the existing database to a more robust platform, expanding and populating it with reliable data sources, integrating new data streams, and establishing clear protocols for ongoing maintenance. Particular emphasis should be placed on improvements related to data critical for reservoir operations.
- Develop a data management and sustainability plan to ensure long-term functionality and integration of future datasets: In consultation with data providers and users, prepare a comprehensive plan to sustain and enhance the existing database. The plan should support the implementation of recommended improvements, ensure long-term operability, and enable seamless integration of future datasets.
- Ensure compatibility with future multi-sensor monitoring systems and modern analytics tools: Design the database management plan to accommodate data from advanced monitoring stations equipped with multiple sensors. Include provisions for automated data validation and quality control to ensure that only reliable and acceptable data values are stored.

5.3. Detailed Hydrological and Water Resources Analyses

- Develop a modelling framework to represent catchment hydrology and reservoir inflows: Set up, calibrate, and validate a rainfall–runoff model to simulate hydrological processes within the basin. This should be followed by a water resource planning model to support system-level analysis and decision-making.
- Establish the hydrological and water resources baseline: Use the calibrated model to characterize the current state of water availability and flows across the basin, providing a robust baseline for planning and analysis.
- Assess future water resource planning scenarios: Apply the model to evaluate and define various water management and water resources development scenarios, as suggested by the Task Force Calueque, to assess trade-offs and guide planning decisions.
- Integrate climate change projections: Incorporate downscaled climate scenarios to simulate the impacts of changing rainfall and temperature regimes on future water availability and system performance.

5.4. Capacity Building and Knowledge Transfer

- Develop capacity building and knowledge transfer plan throughout all stages of the assignment. Conduct bilateral workshops (in-person and virtual) at inception, draft, and final phases.
- Deliver training and mentorship to national experts for post-project sustainability.

- Transfer all models, software, data, and documentation with a 3-year maintenance and support plan.

5.5. Contribution to the development of the Kunene Transboundary Diagnostic Analysis (TDA) and Strategic Action Programme (SAP)

All analyses and outputs shall contribute toward the ongoing TDA and SAP development process, and should include insights relevant to priority environmental concerns, root causes, and governance issues within the basin. The consultant shall develop a synthesis report guided by an annotated table of contents that will be provided by the TDA-SAP process lead.

6. DELIVERABLES

The Consultant shall deliver the following:

- Inception Report detailing the work plan and methodology
- Stakeholder consultation workshops (virtual and/or in-person) in Angola and Namibia
- Final Hydrological Analysis and Water Resources Assessment, with the current and future demand, Reports in both English and Portuguese
- Technical report on climate-sensitive hydrological projections for the basin and respective maps
- Technical presentations to PJTC and relevant national committees
- Capacity Building Plan and implementation for technical teams in both countries
- Handover of all models, databases, software tools, and a 3-year maintenance and support plan
- Operational and policy recommendations for transboundary water planning
- High-Level Executive Summary of the Final Report in both English and Portuguese, summarizing key findings, recommendations, and implications for transboundary water management. Synthesis Hydrology and Water Resources thematic report – input into the development of the Transboundary Diagnostic Analysis for the Kunene River Basin.

7. SUPERVISION AND REPORTING

The Consultant shall report to the Project Implementation Unit. The assignment will include a high degree of consultation with basin stakeholders, and deliverables and reports will undergo an approval process that includes the Regional Project Coordinator, the Specialised committees in the basin countries (key stakeholders mentioned earlier) and the Project Steering Committee. All reports will therefore be submitted as draft, to be finalised after all feedback is addressed.

8. TIMELINES

The Consultancy will be undertaken over a period of nine (9) months from the commencement of the contract. The Consultant is expected to commence work not later than 2 weeks from the date of the notice to proceed. The Consultant must deploy necessary manpower, logistics and all other

necessary items to complete the assignment within the stipulated time and deliverables and reports will undergo an approval process that includes the basin countries and Project Steering Committee. The proposed workplan in the technical proposal should therefore allow for sufficient time for the discussion and approval of the various reports including ensuring that there is knowledge transfer and capacity building for key institutions responsible for water resources management in Kunene River Basin.

Progress meetings will be held between the client and the consultant, and the consultant will also be expected to participate in strategic meetings to make recommendations and give technical opinions and advisory to other project areas linked to this assignment.

9. COMPOSITION OF THE CONSULTANT TEAM

The Consultant is expected to submit a description of the Consultancy team, with staff profiles reflecting the number and levels of professional and support staff required to complete the assignment effectively, efficiently, on-time and on-budget. The Team as a collective must be fluent in both Portuguese and English and must possess excellent communication and report writing skills. Brief descriptions of the expected key staff and the minimum requirements for their qualifications and experiences are as follows:

Team Leader/ Process Specialist: The Team Leader will be responsible for the overall planning and implementation of the consultancy services including team management and coordination; ensuring the achievement of the study objectives; and facilitating stakeholder consultation. He/she will have the overall responsibility for the preparation and finalization of the various reports outlined under this assignment. He/she should have as a minimum, a master's degree in water engineering ,, water resources management, Civil Engineering or any related field, and 15 years of work experience, of which at least 10 years in the field of relevant hydrological studies and other studies like this project, with a significant part of this being in Southern Africa. The Team Leader should have sound understanding of International River Basin Management principles and approaches, demonstrated experience in water policy, governance, stakeholder engagement, and leading hydrological assessments. Excellent and demonstrated communication, consultation, editing and drafting skills and previous experience in Namibia or Angola will be a significant advantage.

The Consultant may propose a schedule of other required staff as they see fit. However, the below areas of expertise and experience is essential:

Hydrologist(s): Minimum qualification of a Bache lor degree in Hydrology/Water Resources Planning/Civil Engineering or related fields, with 10 years of relevant work experience in in undertaking feasibility hydrology studies of large river basins with surface, hydrometrics network design, hydrological modelling, wetland and lake systems; large water pipelines' projects, multipurpose water projects and strategic water assessments.

Water Resources Specialist: 10 years of experience in integrated planning, watershed management, water resources modelling, decision-support systems, and transboundary basin management

Climate Change Specialist: Proven skills in scenario development, impact assessment, and modelling under IPCC frameworks.

The combined team should have a good experience of similar projects in Southern Africa, the inclusion of Angolan and Namibian specialists in the project team is highly recommended, with knowledge of local languages being an added advantage.

10. OTHER PROVISIONS

10.1. Taxes

A withholding tax of 10 or 15% shall be charged to the consultant for fees only, depending on the consultant's home country, and GWPSA will avail the corresponding tax certificates. GWPSA will not be liable for any additional taxes due to tax Authority/ies in the country of origin of the Consultant.

10.2. Travel

The Consultant is expected to engage stakeholders and key role players through a number of regional workshops and field visits. The list will include, but not be limited to, relevant Departments and institutions in the Member states, and project partners as listed in the CUVKUN GEF Project Document.

11. WORKING LANGUAGE

11.1. The working languages are English and Portuguese.
11.2. All final documents will be in both English and Portuguese.

12. TENDERING AND APPLICATION PROCESS

12.1. The applicant is expected to submit separate Technical and Financial Proposals clearly detailing how they would deliver the work as set out in this document with the total number of days to complete work and daily rates inclusive of all anticipated costs in United States Dollars (USD) during the period of assignment.
12.2. The term "all-inclusive" implies that all costs (professional fees, communications, consumables, VAT, etc.) that could be incurred by the consultant in completing the assignment are already factored into the daily fee submitted in the proposal. However, travel costs should be identified separately in line with proposed activities and allocated consulting days.
12.3. Electronic Technical and Financial proposals should be submitted in English with a subject line clearly titled: "Proposal for Kunene Basin Hydrological Analysis – CUVKEN GEF Project" through email to gwpsaprocurement@gwp.org with a copy to Mr Silvanus Uunona silvanus.uunona@gwpsaf.org by no later than 5 October at 00:00 midnight CAT.
12.4. All clarification questions should be directed to gwpsaprocurement@gwp.org with a copy to Mr Silvanus Uunona silvanus.uunona@gwpsaf.org by deadline of 20 September at 00:00 midnight CAT. These response to the queries will be published on the GWPSA website on 26 September, 1 week before the submission deadline.

13. INSTRUCTIONS TO BIDDER

GWPSA will evaluate the proposals received against each other based on the criteria stated above. GWPSA reserves the right to negotiate any aspect of your proposal before conclusion of a Contract for the Assignment. GWPSA furthermore reserves the right to reject all proposals submitted without giving any reason. GWPSA may discontinue or suspend without responsibility or liability to any Bidder including (without limitation) any liability for any costs or expenditure incurred by, or inconvenience caused to, any Bidder. The proposal shall be prepared in the English language.

The financial proposal should be expressed in US Dollar and payment for the Services will be made in the same currency.