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Terms of Reference (ToR) For Services To Facilitate Water Resources Modelling and Capacity Building For ORASECOM Member States

October 2021

1. Background

1.1 The Orange Senqu River Commission (ORASECOM)

The Orange-Senqu River Basin originates in the highlands of Lesotho and runs for about 2300 km to its mouth on the Atlantic Ocean on the border between Namibia/South Africa. The River system is one of the largest river basins in Africa with a total catchment area of about 1.0 million km² and encompasses all of Lesotho, a significant portion of South Africa, Botswana and Namibia. In terms of spatial coverage, about 64.2% of the basin lies in South Africa, 24.5% in Namibia, 7.9% in Botswana and 3.4% in Lesotho. The mean annual runoff is estimated as 11.5 billion m³ of which 53% is from South Africa, 41.5% from Lesotho, 5.2% from Namibia and 0.3% from Botswana.

The Orange-Senqu River basin is a highly complex and integrated water resource system characterized by a high degree of regulation and major inter-basin transfers to manage the mismatch between location of relatively abundant precipitation and the location of greatest demands.

The basin is of major economic importance to its Member States. In South Africa it contributing 26% to South Africa's Gross Domestic Product (GDP) from the Vaal and Orange Rivers' development for agriculture, mining, energy production and manufacturing. In Lesotho, all economic activities (agriculture, livestock and manufacturing) lie within the Orange-Senqu River Basin as the entire country is in the basin. The basin also contributes to the GDP of Botswana and Namibia, where mining and agriculture are the main areas of water usage.

Development of water resources management infrastructure for assuring water for sustaining agriculture and other economic activities and domestic needs has been taking place over the past decades. The existing infrastructure includes many storage dams and water transmission systems to demand centers that are in some cases outside of the basin. The system yield is also augmented by several inter-basin transfer schemes, delivering water from other catchments.

Water scarcity is the main challenge in the basin and requires rigorous joint development, management and conservation of the shared water resources system. There are concerns around the changes in precipitation and temperature due to climate variability and climate change. Increase in water demand and degradation of the water resources quality in the basin, together with the highly variable nature of the rainfall and hence hydrology, makes management of the water resources highly challenging. The negative impacts of climate variability and change will lead to adverse losses and damages to key livelihood and economic activities in the basin.

The water requirements in the lower reaches of the river are driven primarily by irrigation demands from both Namibia and South Africa, and the need to maintain environmental flows to the estuary. As the most downstream portion of a heavily used basin, water resources quality in this stretch is a concern. Similarly, the middle and lower reaches of the river are subject to periodic and often devastating floods. The Orange River estuary is ranked as one of the most important wetland systems in Southern Africa but has experienced environmental degradation. This wetland system

was re-designated as a Ramsar Site, but because of its threatened status it was placed on Montreux Record in 1995.

The effective management of the Orange-Senqu River Basin is, therefore, particularly complex, but is also vital to the economy of the region. As a result, the riparian States prioritised this basin for the establishment of a Shared Watercourse Institution under the revised Southern African Development Community (SADC) Revised Protocol on Shared Watercourses. The Orange-Senqu River Commission (ORASECOM) was one of the first of the Shared Watercourses Institutions to be established in SADC.

ORASECOM was established in 2000 by the Governments of four States, namely, Botswana, Lesotho, Namibia and South Africa, for managing the transboundary water resources of the Orange-Senqu River Basin and promoting its beneficial development for the socio-economic wellbeing and safeguarding of the basin environment. Over the past decade, ORASECOM, with the support of key development partners, has been assessing the water resources management conditions in the basin, and commissioning specific studies to understand the challenges, and design appropriate responses to ensure sustainable management of the basin's water resources. This has led to the development of a basin level Integrated Water Resources Management (IWRM) Plan adopted in February 2015, by the ORASECOM's State Parties. The IWRM Plan articulates strategies and measures for promoting sustainable development and management of the water resources of the basin and forms a basis for interventions and projects to realize optimized utilization of the resources.

1.2 Water Resources Modelling in ORASECOM

ORASECOM is mandated to promote exchange of available information and data regarding the hydrological, hydrogeological, water resources quality, meteorological and ecological condition of the watercourse among its Member States. As part of the endorsed IWRM Plan for the basin, scheduled and, in case of emergencies like drought, adhoc interstate water resources modelling are planned. This is meant to understanding the water resources of the basin, information sharing, optimise water infrastructure planning, development and operations, as well as ensure that all member countries are fully involved in the decision-making process and satisfied with the allocation of water and satisfaction of environmental flow requirements. Moreover, the outcome of such interstate Water Resource Modelling will enhance the existing Water Information System (WIS) in existence, previously developed as part of the TDA-SAP.

Historically, Water resources modelling was already considered an integral part of understanding the dynamics of the resources as early as 2000. Already 31 specific interventions clustered into 6 groups were identified and had to be undertaken for joint management of the river system to happen.

ORASECOM through ICPs funding conducted extensive water resources modelling on an adhoc basis. This was done utilising the modelling capabilities of each member state to understand the water resources of the basin. Extensive modelling has been undertaken by member states in various processes to support Water Resource Management.

In 2009, a decision was taken by ORASECOM based on a review of water resources modelling assessment to use the Pitman-based Water Resources Planning and Water Resources Yield models used by South Africa as a model for the entire river basin. It was recognised that South Africa had used, tested and validated the model over a 30-year period hence it could be relied upon.

1.3 The ORASECOM Agreement

The ORASECOM Agreement established the Council as a technical advisor to the Parties on matters relating to the development, utilization, and conservation of the water resources in the River System. The objective of the Commission is to initiate, enhance and maintain greater collaboration between the Parties on matters relating but not limited to; the development and utilisation of water resources in the watercourse, the control of catchment degradation, the mitigation of the effects of environmental degradation and climate change, watercourse-wide environmental flow regimes as well as the Orange–Senqu Watercourse sources and mouth management. The Parties may also assign other functions pertaining to the development and utilization of water resources to the Commission.

In giving effect to the objectives of the Agreement, and in particular relevance to this assignment, **ARTICLE 4** of the Agreement empowers the Commission to:

- (a) maintain a proper balance between resource development for a higher standard of living for their people and conservation and enhancement of the environment to promote sustainable development;
- (b) ensure the respect for and application of existing rules of general or customary international law relating to the utilisation and management of the resources of the watercourse and, in particular, to respect and abide by the principles of community interests in the equitable utilisation of the watercourse and related resources;
- (c) establish and pursue close cooperation with regard to the study and execution of all projects likely to have an effect on the regime of the watercourse;
- (d) exchange available information and data regarding the hydrological, hydrogeological, water resources quality, meteorological and ecological condition of the watercourse;

- (e) utilise and develop the watercourse in an equitable manner with a view to attaining optimum utilisation thereof and obtaining benefits therefrom consistent with adequate protection of the watercourse;
- (f) take appropriate measures to prevent the causing of significant harm to the watercourse within their respective and other Parties' territories;
- (g) notify potentially affected Parties and competent international organisations, without delay, of any emergency originating within their respective territories;
- (h) ensure that in the event that the implementation or execution of any planned measures is of the utmost urgency in order to save life, or to protect public health and safety, or other equally important interests as a result of an emergency situation, the Party planning the measures may, notwithstanding the provisions of paragraph (h), immediately proceed with implementation or execution, provided that in such event a formal declaration of the urgency of the measures shall be communicated to the other Parties; and
- (i) maintain and protect the watercourse and related installations, facilities and other works in order to prevent pollution or environmental degradation.

It should further be noted that the utilisation of the watercourse in an equitable manner requires taking into account all relevant factors and circumstances including but not limited to geographical, hydrographical, hydrological, climatical, ecological and other factors of a natural character; the social and economic needs of the Parties; the effects of the use of the watercourse by one Party on the other Parties; existing and potential uses of the watercourse; as well as the guidelines and agreed standards to be adopted.

The above are further buttressed by the corresponding provisions in Article 2 of the "Protocol on Shared Watercourse Systems in the Southern African Development Community (SADC) Region" as ratified by all Member States.

1.3 The ORASECOM UNDP-GEF Project to support the Strategic Action Programme Implementation

ORASECOM, with support from UNDP, managed to secure further financial support from GEF to implement selected priority activities of SAP. The UNDP-GEF project titled, Support to the Orange-Senqu River Strategic Action Programme (SAP) Implementation, will be implemented by UNDP and executed by ORASECOM in the

next 5 years to support ORASECOM and its member states to implement SAP. The project has been built on the Transboundary Diagnostic Analysis (TDA) which has carried out the necessary causal chain analyses in order to identify the transboundary threats to the sustainable development and management of the water resources of the Orange-Senqu Basin. Having identified and understood the threats and their causes, it was possible to identify the barriers which are preventing the removal of these threats, so that sustainable development/management of the basins water and related resources can proceed.

The overall objective of the SAP Implementation project is the strengthening of joint management capacity for implementation of the basin-wide IWRM Plan and demonstrating environmental and socio-economic benefits of ecosystem-based approach to water resources management through the implementation of SAP priority actions in the Orange-Senqu River basin.

One of the expected outcomes of the UNDP GEF ORASECOM SAP implementation project is;

ORASECOM's joint basin planning capacity strengthened through improved data, information, and basin management support systems.

Achievement of this outcome will play a major role in enhancing the joint basin planning and water resources management. It demonstrates the importance of empowering ORASECOM's transboundary management capabilities through strengthening of a shared information forum that will support transparent and integrated water resource management. An ORASECOM Water Information System (WIS) was set up and implemented at the Secretariat as part of the TDA-SAP Project. Further work is required to improve and transform the WIS for effective role in supporting improved data, information and basin water resource planning and management systems.

The steps leading to change are as follows:

- Enhance the power, usefulness and sustainability of the ORASECOM WIS through improved functionalities, maintenance and promotion of the services offered by the WIS.
- Integrate the basin-wide environmental monitoring systems into the WIS such that the system can provide all the necessary information for transboundary planning and management
- Carry out annual water resources modelling making use of up-to-date information provided by WIS in order to support optimised operation of infrastructure for equitable allocation and provision of environmental flows
- Integration of modelling results and management plans into WIS

2. Objective

The objective of this assignment is to procure the services of a Consultant or team of Consultants to **Facilitate basin wide** annual water resources modelling to optimise planning, development as well as infrastructure operations for equitable allocation and provision of environmental flows.

3. Scope of Services

This Consultancy will include (but may not be limited to) the following tasks:

1. Produce an Inception Report

The appointed PSP shall within three (2) months of commencement / contract signing produce a detailed assignment inception report. It will be required from the appointed PSP to do thorough research and review all the relevant previous studies as well as all the available information relevant to this assignment. It will be necessary to update and maintain a list of such studies and their relevance to this assignment. It will be required to liaise with all relevant stakeholders in preparation for the undertaking of this assignment.

The PSP shall compile an Inception Report that will consist of a detailed description of tasks, a study programme and study budget. The Inception Report will form part of the Contract and stipulate the scope of work for the study, the Contract Amount and the Contract Period which, upon signing of the Contract by both parties, allows the PSP to start with their work. In it, the PSP's proposal will be discussed with the Client and all aspects and uncertainties will be clarified. It will result in the final Terms of Reference for the study together with the final study cost. These will serve as a basis for and will be recorded in the Agreement with the Client.

The purpose of an Inception Report is to capture important work that would be necessary for the successful completion of this assignment, which may for some reason or another have been overlooked in the compilation of the original Terms of Reference (ToR) or the proposal submitted by the PSP during tendering. Omission of this additional work is usually only detected once work on the assignment has started and most of the team members have had time to familiarize themselves with the detailed requirements of the tasks necessary to ensure the successful completion.

The Inception Report is a formal document that will cover all the aspects of the original proposal plus the additions to the scope of work, Contract Amount, Contract Arrangements and Contract Period that may be required. The Inception

Report will list all tasks required, all the team members for each task and their time allocation as well as their hourly rates per task, anticipated disbursements, revised study programme, etc. The rates of all new team members need to be approved before they can be engaged. The Inception Report can therefore be considered a revised Technical and Financial Proposal.

Methodology

The PSP shall propose an approach that is benchmarked on global best practices as well as informed by lessons from similar works executed elsewhere preferably from within Africa; The Consultant shall review all previous reports relating to the study. Any changes or adjustments in the proposed SoW as well as the affiliated tasks are to be agreed with the Client and incorporated into the Study Plan. The Consultant shall:

- Prepare a Study Plan consisting of detailed descriptions of the various tasks that must be undertaken, and deliverables produced in order to achieve the objectives of the assignment.
- Derive a consolidated modular budget schedule, and study programme containing the activities as described in the Study Plan. The consolidated schedule must be based on the individual schedules of the various activities that define this feasibility study.
- Develop a precise description of all key Task Reports and indicate when these are to be delivered.
- Carry out a comprehensive stakeholder analysis and develop a comprehensive Stakeholder Management Plan.

The Client shall review the Inception report within 2 weeks.

2. Review existing Water Resources Models in each of the Member States.

The PSP shall review existing Water Resources Models in each of the Member States and identify common areas and variances. The PSP shall produce a report on status of Water Resources Models of Member States.

Other Associated Deliverables for the Task:

- A report on Findings to be submitted to ORASECOM Secretariat for Review

- Review of Scope of Work, if any, informed by the findings,

3. Facilitate discussions among Member States (selected water modelling officers) for joint agreement on modalities and frequency of “Annual” / Regular Joint Water Resources Modelling Sessions

- Facilitate a water resource modelling session to investigate allocation issues and satisfaction of environmental flow requirements and publication of the conclusion and results.
- Design a Programme for approval by Secretariat, to Workshop results;
- Facilitate the updating of the current situation on the water resources model.
- Facilitate sharing of water demand data, current status of reservoir storage.
- Allocation of Water, compliance with environmental flows requirements and publication of results.
- Update of ORASECOM WIS situation and subsequent agreed planning.
- Facilitate the setting of monitoring Indicator Variables.

4. Undertake Training, Skills Transfer and Capacity Building on Water Resources Modelling

The basic objective of this task is to impart and transfer skills to the project stakeholders with a goal of increasing the skills base in undertaking similar tasks as covered in this project. The stakeholders shall include but not limited to Key System Operators (regional and national employees of Departments of Water) in all member States as well as ORASECOM Secretariat personnel.

The PSP shall endeavour to strengthen institutional capability of DWS through well-structured and goal-oriented Capacity Building Strategy. This shall be achieved through conducting accredited and non-accredited courses relevant to this assignment in consultation with the Client.

The PSP, together with the specialists, shall develop a capacity building programme as part of the final inception report. This programme should include specific quantifiable measures to ensure capacity building take place throughout the project,

The Consultant will be required to hold training sessions for capacity building to selected Officers. Nominally, one training session per each member state shall be conducted during the study as well as one overall regional training session for all member states. The appointed PSP facilitate concurrence among member

states on modalities and frequencies of scheduled annual joint water resources modeling sessions.

Deliverables

A detailed Skills development and Capacity Development Strategy / Report document with detailed description and related figures / matrix demonstrating compliance to the task requirements shall be developed and implemented as part of this study. The Consultant will have to design the Capacity Building/ or Technology Transfer Programme for approval by Member States.

5. Integration and Updating of Water Resources Modeling Results into ORASECOM WIS;

The outcome of inter-state Water Resource Modelling shall enhance the existing Water Information System (WIS) in existence, previously developed as part of the TDA-SAP.

Upon approval of the implementation report by the member states, the appointed PSP shall facilitate provisions for the ORASECOM WIS to be regularly integrated and updated with Water Resources Modeling Results.

4. Deliverables

It is envisaged that this Consultancy will produce the following deliverables: -

- i. An Inception Report
- ii. Report on the water model and Capacity building plan for the ORASECOM Water resources modelling group;
- iii. Report on the running and analysis of the water resources model with details on Integration of the modelling results with WIS and monitoring indicator values;

All Outputs must be produced in English, and presented in 10 hard copies, as well as one electronic copy in MS Word/Excel format

5. Time Schedule

The Consultancy is expected to run on a retainer basis for 2 and a half years ending on 30th July 2024. This will require agreement on the paid for days in each year in line with the deliverables and the repeat activities in each year.

The Project will pay for a maximum of **60 Consultancy days** spread over a 1-year period. The Consultant shall commence work not later than 4 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.

Since there will be several parties involved in the project whose views and interests are to be considered and reflected in the study, the schedule must allow for sufficient time for the discussion and approval of the various reports. There shall be progress reports and meetings between the Client and Consultant during the implementation of the project.

All reports shall be submitted as Draft and will receive comments from ORASECOM. Where not defined otherwise, the Consultant is obliged to present the final version of any report not later than 2 weeks after receiving the ORASECOM's comments to the respective Draft Report.

6. Requirements

The Consultant or Consultancy Team must have at least the following:

- i. The Consultant should have at least Minimum qualification of a Bachelor's degree in Engineering / Hydrology / Water Resources Planning/ Water Resources Management and/or Water Resources Modelling; or any other related fields, with at least 15 years of relevant work experience in hydrology / Water Resource Modelling of large river basins with inter and intra basin water transfer schemes, surface, groundwater, wetland and lake systems; large water pipelines' projects, strategic water assessments, including in Africa.
- ii. The Consultant must have at least 15 years' relevant experience Post Registration in undertaking similar projects;
- iii. The Consultant must be registered with a statutory board in any one of the ORASECOM Member States.
- iv. Experience in Water Resources Modelling within the Southern African region;
- v. Familiarity with the Orange-Senqu River Basin.

7. Institutional Arrangements

The Consultant is expected to commence work as soon as possible after concluding all necessary contractual arrangements with UNDP GEF ORASECOM SAP Implementation Project.

The successful Consultant will work under direct supervision of the Environment/Water Quality Expert. The Project shall be responsible for arranging meeting venues as well as transport, meals and accommodation (if required) for participants (including the consultant(s) during national workshop consultations). Unforeseen costs incurred may be reimbursed based on acceptable justification and documentation. However, the Consultant(s) shall be

responsible for supplying own office facilities, equipment, transport, meals and accommodation during fieldwork.

ORASECOM and its partners will not be responsible to arrange visa requirements for Consultant/s; however, can facilitate where necessary by giving supporting letters and will oversee arranging translation services during workshops only.

8. Other Provisions

8.1 Taxes

The statutory levels of taxes – if relevant – shall be invoiced by the Consultant and reimbursed by ORASECOM in addition to the remuneration (Tax Invoice). ORASECOM shall not be liable for any taxes due to tax Authority/ies in the country of origin of the Consultant. The onus is on the Consultant to submit the tax returns and declare all income/monies received from ORASECOM to the tax Authority/ies in her own country.

8.2 Travel

The Consultant will be expected to conduct consultations with key role players in the subject matter of the assignment in the Orange-Senqu River Basin. The details of officials and institutions to be consulted will be agreed to with the Secretariat and the CTT. The list will include, but not be limited to relevant Departments and institutions in the State Parties.

9. Submission of the tender

The bidder should submit a separate **Technical and Financial Proposals** clearly detailing 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. 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. Travel costs and daily allowance cost should be identified separately in line with allocated consulting days.

Electronic Technical and Financial proposals should be submitted with a subject line clearly titled: "**Consultancy Services to Facilitate Water Resources Modelling and Capacity Building for ORASECOM Member States**" through email to Mr Michael Ramaano (mike.ramaano@orasecom.org) with a copy to communication.orasecom@gmail.com and mike.ramaano@gmail.com no later than 1600hrs on Monday 08th November 2021.

Request for clarifications should be **emailed (preferred mode of communication)** to the above contacts, mobile +27 843051002, no later than 1600hrs on 01st November 2021.