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**TERMS OF REFERENCE FOR PROFESSIONAL
CONSULTANCY SERVICES TO FACILITATE THE
DEVELOPMENT AND AGREEMENT OF
BASIN-WIDE ENVIRONMENTAL
FLOW REGIME FOR THE
ORANGE – SENQU RIVER BASIN**

October 2021

1. Background

1.1 The Orange Senqu River Commission (ORASECOM)

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.

The Orange-Senqu River originates in the Lesotho Highlands, from where it flows westwards to its mouth at Alexander Bay/Oranjemund on the Atlantic West Coast. The river basin is the third largest in Southern Africa, after the Zambezi and the Congo, covering a total area of 1,000,000 km² of which almost 600,000 km² is inside the Republic of South Africa. Four countries – Botswana, Lesotho, Namibia and South Africa - share the Basin, and the river forms the border between South Africa and Namibia at its lower reaches.

Lesotho, the upstream country falls entirely within the basin and contributes over 40% of the stream flow from only 3.4% of the total basin area but is one of the smallest users of water from the basin. The basin is a highly complex and an integrated water resource system, characterized by a high degree of regulation and several major Inter-Basin transfer schemes to manage the resource availability between areas of relatively plentiful precipitation and the areas of greatest water requirements.

South Africa is by far the biggest user of water from the Orange-Senqu River Basin, and this use drives the economic heartland of South Africa. The Botswana part of the Basin is entirely covered by the Kalahari Desert with very little surface runoff, but groundwater contributes to the water demands in this portion of 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 prioritized the establishment of a Shared Watercourse Institution under the revised Southern African Development Community (SADC) Revised Protocol on Shared Watercourses. ORASECOM was one of the first of the Shared Watercourses Institutions to be established in SADC.

ORASECOM is an advisory body, issuing recommendations to its Member States (The Parties) aimed at optimizing the development and management of the water resources of the Orange-Senqu River Basin for the benefit of all the people in the Parties.

1.2 The ORASECOM Agreement

The 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) 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;
- (c) exchange available information and data regarding the hydrological, hydrogeological, water resources quality, meteorological and ecological condition of the watercourse;
- (d) 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;
- (e) take appropriate measures to prevent the causing of significant harm to the watercourse within their respective and other Parties' territories; Article 4 of the Agreement empower the Council to take all measures to make recommendations on *inter alia*; water availability in the basin, equitable and reasonable sharing of water, studies on the development of the River System, the extent to which stakeholders should be involved in management of the system, the prevention of pollution, the control of aquatic weeds, and plans for emergency situations.
- (f) take appropriate measures to prevent the causing of significant harm to the watercourse within their respective and other Parties' territories;

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 the UNDP, managed to secure further financial support from the GEF to implement selected priority activities of the Strategic Action Programme (SAP). The UNDP-GEF project is titled Support to the Orange-Senqu River Strategic Action Programme (SAP). The project will be implemented by the UNDP and executed by ORASECOM in the next 5 years so as 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 basin's water and related resources can proceed.

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

Component 3 of the UNDP GEF ORASECOM SAP implementation project focuses on Addressing Changes to the Hydrological Regime through the application of the "Source-to-Sea concept". This will contribute in a critical way to the removal of Barrier: the adverse effects of a changed hydrological regime and the subsequent geomorphological changes and water quality. The hydrological regime in the Orange Senqu basin has been highly altered. As part of Phase 2 of the work carried out in preparation of the IWRM Plan, a regional downscaling exercise was carried out aimed at evaluating and localising potential climate change impacts. The findings of this work were integrated into the highly detailed and advanced basinwide water resources yield and planning models. These models also take into account environmental flow requirements (e-flows) so both climate change and e-flows considerations are integrated into the planning and management process. The use of these models will be central to the application of the source to sea concept.

Key areas will include agreement on environmental flows and their implementation and the implementation of measures to sustainably rehabilitate the Orange-Senqu River Mouth. Within the work to achieve the outcome: **Basin-wide environmental Flows regime agreed, and implementation supported Basin-wide water resources quality monitoring system established**, the following outputs will be achieved during this project:

- **Output 3.1.1: Existing E-flows work harmonised and integrated**

Historically, Orasecom, as part of the TDS-SAP and other undertakings, with the support of various ICPs, has undertaken substantial work on Ecological Water Requirements in the basin in line with global best practices. Moreover, large infrastructure projects undertaken individually and jointly by Member States have analyzed the EWR for downstream ecosystems. There is need to facilitate focused engagements on continuous

assessment of EWR for critical sites and areas that represent significant sections of the river that are currently covered by ORASECOM.

The technical work encompasses the preparatory phase of integrating the existing information on the hydrology and ecosystems needed to assess options and make decisions, and the legal and administrative provisions that need to be in place before a basin-wide e-flows regime can be implemented. This will include consolidation of all outcomes of EWR assessments done in the basin and to further encourage Member States to negotiate and agree on the same, together with the prioritization thereof. This undertaking shall be conscious of variations in the methodologies employed by Member States. The hydrological and ecosystem work required is complete, but needs to be harmonised in order to ensure comparability of findings. This work will also have to take the latest finding on climate change into account.

The following e-flows studies have been conducted in the basin and need to be assessed. (The following list is not meant to be exhaustive):

- i. Determination of ecological water requirements for surface water (rivers, estuaries and wetlands) and groundwater in the Lower Orange WMA conducted by the Department of Water and Sanitation in South Africa (2015 – 2017);
- ii. Noordoewer / Vioolsdrift Dam (NVD) Feasibility study undertaken by ORASECOM; (2020)
- iii. Research project on environmental flow requirements of the Fish River and the Orange-Senqu River Mouth undertaken by UNDP-GEF and ORASECOM (2011 – 2013);
- iv. High confidence Reserve determination study for surface water, groundwater and wetlands in the Upper Orange Catchment initiated by the Department of Water and Sanitation in South Africa. This project has just been initiated in 2021.

- **Output 3.1.2: Basin-wide flow regime agreed through consultative process**

There is need to facilitate focused engagement and ultimate commitment on the standardisation of the legislation that govern the determination and implementation of EWR.

There needs to be a standardised process of determining e-flows in the basin for any water resource namely rivers, wetlands, estuaries and groundwater where such determinations have not been done. This will ensure that the same methods are adopted in the basin. The project also needs to ensure that there is an alignment between the work undertaken under ORASECOM with the legislative requirements of all basin states.

Based on the harmonised existing e-flows work, a suite of basin-wide and realistic scenarios covering a range of socio-economic development options and showcasing the resulting ecosystem protection levels will have to be developed and agreed. The scenarios and their associated impacts on the yield and the ability to meet the e-flows in the long term will be presented to the basin states and an agreement on a basin-wide e-

flows regime for implementation will be facilitated through that consultative process. The national and regional intersectoral committees will have important roles to play in reaching agreements.

A scenario model has been set up for the basin as part of the DWS Lower Orange Catchment Reserve study and as part of feasibility study for the Vioolsdrift dam. This information is very useful in this study and can be used as part of the scenario analysis.

- **Output 3.1.3: Develop, Set-up, implementation and compliance monitoring of basin-wide e-flows regime supported**

Following the adoption of an agreed basin-wide e-flows regime, interpreted also in terms of the operating rules of the dams, the basin states **will be supported** in setting up the necessary implementation and compliance monitoring systems required for making sure that the e-flows are being met. Particular emphasis is placed on the coordination of national-level activities in order to ensure that a coherent and harmonised basin-wide e-flows regime is implemented in practice. The e-flows are determined for 52 nodes in the basin, several of which are below the outflow points of dams. Any adjustments to the agreed e-flows at these nodes would require a change to the dam operating rules, which if and where required, will be one of the key elements of developing the basin-wide implementation regime.

The Department of Water and Sanitation in South Africa has also started a project spearheading the implementation of Reserves (e-flows) where they have been determined. This can be one area in which there can be synergies with this proposed project.

2. Objective

The objective of this assignment is to support the ORASECOM Secretariat to facilitate the consultation process and standardisation of e-flows leading to agreed basin-wide environmental flows by state parties.

The process shall be two-pronged: 1. The consolidation of all outcomes of EWR assessments done in the basin and to further encourage Member States to negotiate and agree on the same, together with the prioritization thereof. 2. Facilitation of engagements on identification and prioritization of key nodes within specific river reaches as well as agreement on the same among Member States; 2. **This will cover the whole Orange-Senqu river basin from the Lesotho to the river mouth.**

3. Scope

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

1. Harmonise legal and administrative information on environmental flows. This needs to cover all water resources; rivers, wetlands, estuaries and groundwater.
2. Harmonise information on hydrology, geohydrology and water use.
3. Harmonise information on water ecosystem and resource use. This needs to cover rivers, wetlands, estuaries and groundwater.

4. Develop a shortlist of basin-wide development/protections scenarios for evaluation by state parties.
5. Facilitate basin-wide consultations on the environmental flow regimes for the development/protection scenarios shortlisted.
6. Prepare clear pathway to endorsement of the jointly agreed environmental regime.
7. Prepare an implementation plan for the agreed on e-flows with a monitoring and evaluation system.
8. Based on the agreed environmental flows regimes, draw up a document clearly stating the operating procedures for each of the 52 defined e-flow nodes
9. What will happen to sub-basins where no E-flow exists? It is noted that most tasks are centred on harmonization. It would be good to see the task on quantification and determination of E-flows where such does not exist come out strongly.
10. Capacity development and support to member states that do not have capacity in determination and implementation of e-flows.

The Specific Terms of Reference for this assignment are as follows:

| General task description | Specific related activities |
|--|---|
| 1.Harmonise legal and administrative information | <ol style="list-style-type: none"> a) Assess and summarise legal and administrative frameworks relative to environmental flows and related areas of each of the basin states and at the regional level (SADC especially) and in line with the international best practices. b) Highlight areas of legal and administrative differences and make recommendations for addressing these. Member countries can commit to standardising legal and administrative aspects related to environmental flows. c) Draft Report with clear conclusions and recommendations for the standardisation of legal and administrative frameworks relative to environmental flows and present to ORASECOM and stakeholders |
| 2.Harmonise information on hydrology, geohydrology and water use | <ol style="list-style-type: none"> (a) Draft short review report for decision-makers summarising the findings of previous hydrological, geohydrological and water use analysis and consolidation with recommendations on how they can be harmonised basin wide. General hydrological and water use reports are available and have been updated and harmonised during recent ORASECOM Studies. (b) Present report to ORASECOM and key stakeholders for approval |

| | |
|--|--|
| <p>3.Harmonise information on water ecosystem and resource use</p> | <p>(a) Review and draft short report for decision-makers summarising the findings of previous ecosystem, and resource use analysis and consolidation with recommendations on addressing the gaps in such studies and how they can be standardised basin wide. The following reports need to be reviewed:</p> <ul style="list-style-type: none"> i. Determination of ecological water requirements for surface water (rivers, estuaries and wetlands) and groundwater in the Lower Orange WMA conducted by the Department of Water and Sanitation in South Africa. ii. Noordoewer / Vioolsdrift Dam (NVD) Feasibility study undertaken by ORASECOM iii. Research project on environmental flow requirements of the Fish River and the Orange-Senqu River Mouth undertaken by UNDP-GEF and ORASECOM iv. High confidence Reserve determination study for surface water, groundwater and wetlands in the Upper Orange Catchment initiated by the Department of Water and Sanitation in South Africa. This project has just been initiated. <p>The recommendations need to cover;</p> <ul style="list-style-type: none"> i. Rivers; ii. Wetlands; iii. Estuaries; and iv. Groundwater <p>Gaps in these reports need to be identified and mechanisms of addressing the gaps identified through undertaking further e-flows studies. Boost capacity for member states with gaps to determine environmental flows.</p> <p>(b) Present report to ORASECOM and key stakeholders for approval</p> |
| <p>4.Develop a shortlist of basin-wide development/protections scenarios for evaluation by state parties</p> | <p>(a) Draw up a set of exploratory realistic scenarios covering the range of development and protection levels together with evaluation systems and agree with stakeholders and Parties.</p> <p>(b) Carry out water resources scenario modelling. This will involve incorporating the scenarios in the hydrological yield model and assess the consequences each of the scenarios. This will assist in coming up with recommendations that can be adopted as such will meet the requirements of the environmental flows.</p> <p>(C) Compile reports and presentations aimed at comprehensive of evaluation of results by stakeholders</p> |

| | |
|--|---|
| <p>5. Facilitate basin-wide consultations on the environmental flow regimes for the development/protection scenarios shortlisted.</p> | <p>(a) Draw up a proposal for the consultation process</p> <p>(b) Facilitate Consultations at National and Regional levels. The consultations can be done as follows:</p> <ul style="list-style-type: none"> • A minimum of 2 stakeholder consultations can be done for each member state • The consultancy team shall be responsible for all the technical work, notices, facilitation and communication whilst the venue shall be organised in conjunction with the hosting member state. <p>(c) The PSP shall plan and convene the Final Regional Workshop, wherein member states can agree on the recommendations to the basin-wide e-flows regime.</p> |
| <p>6. Prepare clear pathway Conduct roadshows for the endorsement of the jointly agreed environmental flow regime.</p> | <p>(a) Arrange one on one and regional presentations to the key stakeholders and decision makers (government departments/ministries, water authorities, water bodies, environmental NGOs, water users etc) in the ORASECOM member states</p> <p>(b) Strategise on how to get Basin states to jointly agree on the implementation of the E-flows regime</p> |
| <p>7. Prepare an implementation plan for the agreed on e-flows with a monitoring and evaluation system.</p> | <p>Member states agree on how to monitor and evaluate the implementation of the e-flows in their areas of jurisdiction.</p> |
| <p>8. Based on the agreed environmental flows regimes, draw up a document clearly stating the operating procedures for each of the 52 defined e-flow nodes</p> | <p>Come up with operating procedures for the different nodes within the river basin. The operating rules will be shared among all the member states of the ORASECOM.</p> |

4. Deliverables

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

- i. An Inception Report that contain a clearly defined programme of work and methodology to be used for the assignment associated budget;
- ii. A gap analysis report outlining where e-flows have been determined and where they have not been determined in the member states;

- iii. Draft Report with clear conclusions and recommendations for the harmonisation of legal and administrative frameworks relative to environmental flows and their implementation and present to ORASECOM and stakeholders;
- iv. Draft short review report for decision-makers summarising the finding of previous hydrological and water use analysis and consolidation with recommendations on how they can be harmonised basin wide;
- v. Draft short review report for decision-makers summarising the finding of previous water ecosystem, and resource use analysis and consolidation with recommendations on how they can be harmonised basin wide;
- vi. Compile a report of exploratory Scenarios covering the appropriate range of development scenarios and protection levels together with evaluation systems and the Draft Environmental Flow regime and agree with stakeholders on a way forward and the Draft in a regional workshop
- vii. Compilation of an implementation plan for the agreed on e-flows with a monitoring and evaluation system.
- viii. Firm deliverables on
 - ix. Compile **the final draft version of Environmental Flow Regime** with a clear pathway for endorsement by state parties.

All Outputs must be produced in English, and presented as one electronic copy in MS Word/Excel format.

5. Time Schedule

The Consultancy will be undertaken over a period of Eighteen (18) months from the commencement of the contract. The Consultant shall 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.

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. Composition of the Study Team

6.1 The Consultant's required key staff

The Consultant is expected to provide in its proposal key staff, based on the needs of the assignment. When the same expert has several domains of skills enabling for occupying several positions, the corresponding Curriculum Vitae (CV) must clearly show such capabilities through education background and experiences. Each CV must be maximum 5 pages. The Consultant will determine the number and levels of professional and support staff required to complete the assignment effectively, efficiently, on-time and on-budget. Brief descriptions of the key staff and their responsibilities under the assignment and the minimum requirements for their qualifications and experiences are as follows:

- (i) **Team Leader/Water Resources Specialist / Environmental Scientist with Strong Water Resources Management Background (TL):** 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. The TL 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 / Environmental Sciences, water resources management, environmental management, law or social science, or any related field and 15 years of work experience, of which at least 10 years in the field of relevant ecological studies and other studies similar to this project, partly in Africa and have a proven track record of leadership in managing multi-disciplinary teams. The TL should be registered with any relevant statutory body in any Member State. He/she should have acted as a TL for at least 3 similar projects. Previous experience and knowledge of the relevant laws and regulations related to this study Lesotho, Botswana and RSA will be a significant advantage. Experience in the undertaking and preparing of Environmental Flows projects and reports. The TL must be fluent in English and must possess excellent communication and report writing skills. General Working Knowledge of Southern African region, and in particular familiarity with the Orange-Senqu River Basin will be an added advantage.
- (ii) **River Hydraulics Engineer**

Minimum qualification of a Bachelor's Degree in Civil or Agricultural Engineering or any other relevant fields and 10 years of work experience in planning and development of concept and preliminary designs of large hydraulic structures.
- (iii) **Hydrologist / Water Resources Modeller:** Minimum qualification of a Bachelor's degree in Hydrology/Water Resources Planning or related fields, with 10 years of relevant work experience in hydrology of large river basins with surface, wet land and lake systems; large water pipelines' projects, multipurpose water projects and strategic water assessments, including in Africa.
- (iv) **Hydrologist (rivers)**

Minimum qualification of a Bachelor's degree in Hydrology / Civil Engineering or related fields, with 10 years of relevant work experience in undertaking feasibility hydrology studies and.

Further to the above, the PSP / The Consultancy Team MUST have at least the following in the team:

- Wetland Specialist (Wetlands)
- Estuary Specialist (estuaries)
- Geohydrologist (groundwater)
- Water Quality Specialist
- Environmental experts: will require in various fields
- Legal expert
- Public participation and communication expert

6.1.1 Non Key Staff

The Consultant shall propose a schedule of other required non-key staff. This list may include but not limited to Water Sector Economist/Financial Planner.

6.2 Company experience:

- In operation for more than 5 years
- Registered offices in at least one of the countries: Botswana, Lesotho, Namibia or RSA
- Proven track records in undertaking similar Ecological Studies
- Sound financial position

7. Other Provisions

7.1 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.

7.2 Travel

The Consultancy Team will be expected to conduct consultations with key role players on 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. The list will include, but not be limited to relevant Departments and institutions in the State Parties.

8. 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 the Development and Agreement of Basin-Wide Environmental Flow Regime for the Orange – Senqu River Basin”** 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.

