EAST AFRICAN COMMUNITY

LAKE VICTORIA BASIN COMMISSION SECRETARIAT

LAKE VICTORIA ENVIRONMENTAL

MANAGEMENT PROJECT II (LVEMP II)

TERMS OF REFERENCE (TOR)

FOR

PROVISION OF CONSULTANCY SERVICES FOR DEVELOPMENT OF WATER RESOURCES MANAGEMENT PLAN FOR THE LAKE VICTORIA BASIN (WRMP – LVB) – PHASE 2

LVBC

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Kisumu

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1 Background

1.1 The Lake Victoria basin

Lake Victoria is the largest inland water in Africa and the world's second largest freshwater in surface area (around 66,800 km²). It has an average depth of 40 m and contains many islands, most of them being inhabited, and hosts a wide diversity of flora and fauna.

The Lake Victoria Basin (LVB, also see Figure 1-1 below) is 197,700 km² wide (terrestrial area), and hosts 35 million inhabitants, who depend, directly or indirectly, on the Lake's resources. Lake Victoria is shared by Kenya (6%), Uganda (42%) and Tanzania (52%), whereas the Lake Victoria Basin (LVB) terrestrial area is 43% in Tanzania, 22% in Kenya, 17% in Uganda, 11% in Rwanda, and 7% in Burundi (Burundi and Rwanda belong to the basin of the Kagera River, the main Lake Victoria's tributary).

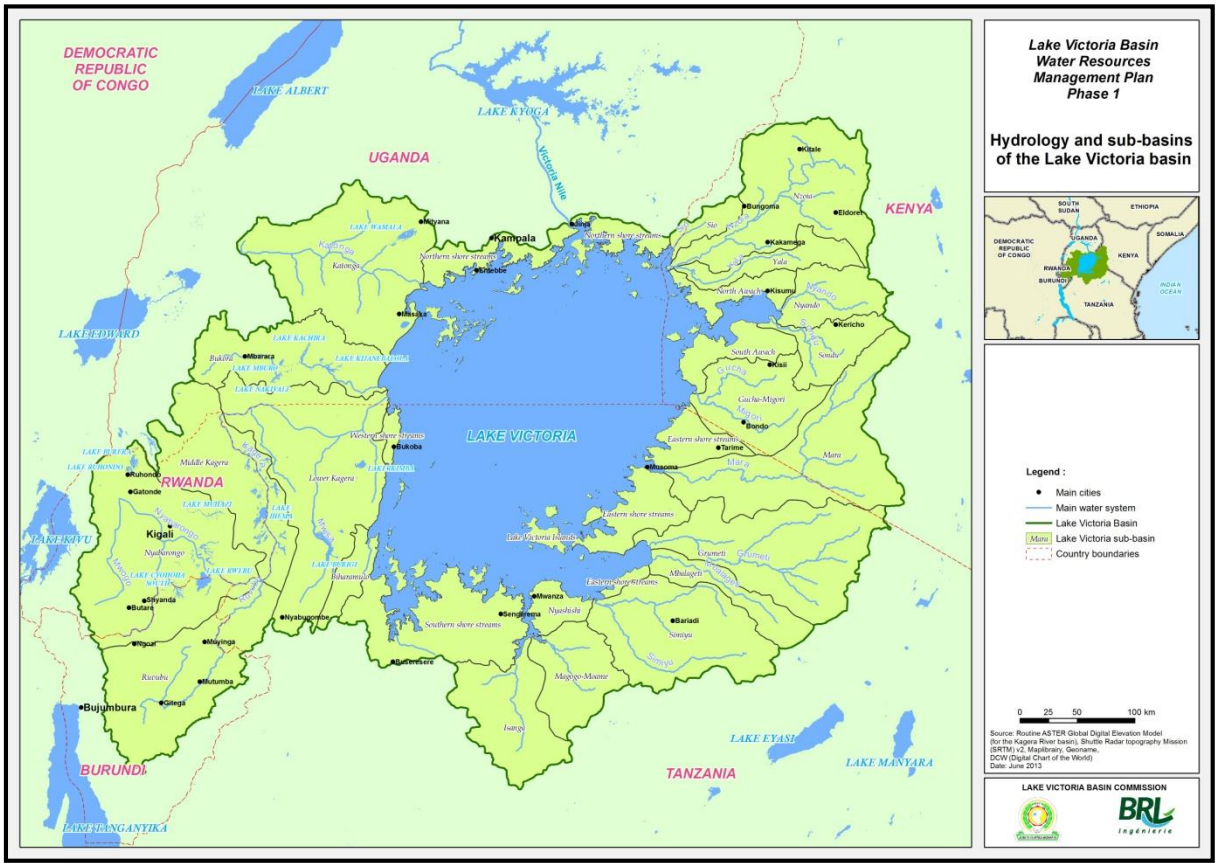

Figure 1-1: The LVB and its sub-basins.

1.2 The Lake Victoria Water Resources Management Plan

Lake Victoria Basin Commission (LVBC), established in 2001, is a specialized institution of the East African Community that is responsible for coordinating the sustainable development agenda of the Lake Victoria Basin, for the basin's and EAC member States (Burundi, Kenya, Rwanda, Tanzania and Uganda). The EAC has indeed designated the Lake and its basin as an "area of common economic interest", and a particular focus has been put on its overall management and the rational use of its shared resources.

In light of the challenges faced by the LVB, the demand for a LVB Water Resources Management Plan (LVB-WRMP) has emerged and been integrated into the LVBC project Lake Victoria Environmental Management Project – Phase 2 (LVEMP II).

The LVB-WRMP overall objective is to develop an integrated consideration of the different water uses, with regard to the available resources. The LVB-WRMP will work on defining water allocation and management rules, along with ensuring that overall social and economic goals are achieved, including stimulating long-term interventions that promote sustainable economic development and biodiversity conservation in the LVB.

The development of the LVB-WRMP is divided into two phases:

- Phase 1 (completed): assessment of the threats to the water resources and ecosystems, comprehensive water resources assessment, sectoral water assessment, institutional analysis and capacity building program.
- Phase 2 (subject of the present ToRs): elaboration of the LVB-WRMP, including the elaboration and use of required decision support systems.

2 Objectives of the Consultancy

2.1 Overall Objective

This consultancy will carry out the activities under Phase 2 of the elaboration of the proposed LVB-WRMP.

2.2 Specific objectives

The specific objectives of the consultancy are to:

- Develop the decision support tools required for the elaboration of the WRMP,
- Propose different Water Resources Management (WRM) scenarios for 2040, at the scale of the LVB but also at the scale of some selected hotspots within the LVB,
- Select the most appropriate scenario through an adapted participation process,
- Elaborate the LVB-WRMP, including a WRM action plan.

2.3 Expected outputs of the Consultancy

This consultancy will prepare and deliver specific reports addressing the various topics above. Such reports will constitute phase 2 of the elaboration of the Water Resources Management Plan for LVB, which will provide the technical tools and the LVB-WRMP itself.

The outputs, detailed hereinafter, should include:

- Inception report,
- Decision support tools
  - Rainfall-runoff and water allocation models for the LVB sub-basins
  - LVB water resources allocation model
  - Land use changes mapping
  - Economic model linked to the water resources allocation model
- Training sessions for the use of the various decision support tools
- WRM scenarios for the LVB
  - A baseline scenario,
  - Land use changes,
  - Water uses changes (hydropower, irrigation, livestock, fish farming, potable water, sanitation)
  - Climate change,
  - Water management changes (including the introduction of environmental flows).
- WRM detailed scenarios for some (minimum 5) specific hotspots within the LVB
- Participation process for the selection of the most appropriate scenario
- LVB-WRMP, including an action plan

3 Detailed tasks assignment

3.1 Elaborate an inception report

The initial studies and investigations will be aimed at collecting information which will form the study basis. These will include:

- Critically review the phase 1 of the study.
- Critically review available data (hydrological and water management data in the LVB).
- Prepare a detailed needs assessment for the further tasks of the study, including about the needs for decision support tools.
- Prepare a draft Inception Report covering the analysis and results of the above subtasks. This report will also include a summary of the consultant's approach to the work, including the process for deployment of staff and a proposed work plan.
- Present the draft inception report to the relevant stakeholders during the consultative regional workshop 1.
- Incorporate comments and feedback from stakeholders and prepare the final Inception Report.

3.2 Develop the decision support tools required for the elaboration of the WRMP

Based on the needs assessment prepared during the inception phase, the Consultant will elaborate various decision support systems. Although this tasks is presented as a stand-alone task, the elaboration of the tools should be an iterative process as the role of these tools will be to contribute significantly to the elaboration of the scenarios and ultimately of the LVB-WRMP.

It is highly recommended that the Consultant elaborates the following decision support tools:

Decision support tools	Why?	How?
Rainfall-runoff and water allocation models for the LVB sub-basins	Assess the hydrological functioning of the LVB sub-basins. Monthly flows during a period of 100 years (for instance 1900-2000). These sub-basins models will contribute to the construction of the following water resources allocation model. The rainfall-runoff interfaces will allow for gap-filling (significantly) and for testing some climate change scenarios.	The phase 1 of the study has shown that rainfall-runoff modelling in the LVB could give significant results. For each LVB sub-basin, the rainfall-runoff models should be combined with a water resources allocation (see the following line) model as the hydrological functioning of the LVB sub-basins also depends on the functioning of the wetlands/lakes and the water uses. It is recommended that the Consultant establishes a partnership with some research facilities in each of the LVB Member States in order to elaborate the sub-basins models. The rainfall-runoff models will include a land-use component as land use change has been identified as a major water management factor in the phase 1.
LVB water resources allocation model	Assess the hydrological functioning of the LVB and of the Lake Victoria itself. Monthly flows during a period of 100 years (for instance 1900-2000). This water resources allocation model will allow the run of different LVB water resources management scenarios.	Link the sub-basins model and improve the existing modelling of the functioning of the Lake Victoria. Consider the evolution of the Lake Victoria water release rule. Model the significant water uses.
Land use changes mapping	As the land degradation has been identified in phase 1 as a key issue for environment and water resources management in the LVB, the Consultant will have to produce land degradation maps, including land use and land condition maps and status of land degradation maps for different dates over the last decades.	It is recommended that the Consultant establishes a partnership with the Regional Center for Mapping of Resources for Development (RCMRD) in Nairobi. They have contributed to the African Monitoring of the Environment for Sustainable Development (AMESD) program. The overall objective of the AMESD program in the IGAD sub-region was to enhance the assessment and monitoring of land degradation and natural habitats for sustainable land management. The Consultant should use the results of the AMESD program. As Tanzania is not part of the IGAD, it was not covered by the AMESD program. Therefore, the Consultant should also acquire the existing data and complete it with supplementary analysis and data creation for the Tanzanian part of the LVB (including field validation).
Economic model linked to the water resources allocation model	Compare the costs and benefits of different LVB water resources management scenarios.	A simple tool should be develop, taking into consideration the significant costs and benefits of the proposed scenarios, including environmental costs and benefits.
Other tools necessary for the following steps of the study	*???*	*???*

The Consultant should propose in its methodology some of the possible software models to be used. The Client will notably take into account, during the proposals' evaluation process, the following factors:

- Cost of the software (a model free of charge would be an advantage),
- Capacity to answer to the necessary water resources management questions,
- Capacity to model the LVB water functioning phenomenon,
- Efficiency of the model (the simpler the better),
- User-friendliness of the model.

The Consultant will train some relevant stakeholders to the use of the tools. The Consultant should propose a training program taking into account the following requirements:

Decision support tools	Stakeholders to be trained	Main objective of the training
Rainfall-runoff and water allocation models for the LVB sub-basins	Research facilities in the LVB Member States Participation of LVBC	On-the-job training. Understand how to develop/use the model. The trained research officers should contribute to the elaboration of the models.
LVB water resources allocation model	LVBC Member States Participation of research facilities in the LVB Member States	Understand the functioning of the model and the role of the model for basin planning.
Land use changes mapping	LVBC Member States Participation of AMESD key stakeholders	Understand the principles of the land degradation mapping
Economic model linked to the water resources allocation model	LVBC Member States	Understand the functioning of the model and the role of the model for basin planning.
Other tools necessary for the following steps of the study	*???*	*???*

3.3 Propose different Water Resources Management (WRM) scenarios for 2040, at the scale of the LVB but also at the scale of some selected hotspots within the LVB

The Consultant will work with LVBC in order to develop a framework for analysis of different possible water resources management scenarios for 2014. This analytical framework will be presented within a specific note. This includes methodology and definition and agreement on criteria for "regional projects/rules" and criteria for prioritization of regional projects/rules, for use in identifying and sequencing potential projects/rules. The water resources management scenarios should include/take into account (but not limited to):

- a baseline scenario,
- land use changes,

- water uses changes (hydropower, irrigation, livestock, fish farming, potable water, sanitation),
- climate change,
- water management changes (including the introduction of environmental flows).

The analysis of the various scenarios, with the objective being to identify investments that spatially optimize water use at a regional level, while aligning with and supporting country-level development plans sectors, will include:

- an assessment of the potential environmental, social and economic impacts of various scenarios,
- an assessment of the costs and benefits of the scenarios,
- an assessment of the downstream impacts (on the Victoria Nile for instance, and further downstream).

The Consultant will work at the scale of the entire LVB but also zoom-in some hotspots (minimum 5) where water resources management is particularly at stake. For these hotspots, the level of details will be more accurate than for the global scenarios analysis. The results of the hotspots analysis should notably influence the elaboration of the global LVB scenarios. As examples, the following hotspots could be selected:

Possible hotspots	Water management issues
Wetland systems in the Bukoba sub-basin	Complex impacts of future scenarios on the functioning of the wetlands. Environmental associated issues.
Upstream Nzoia River basin	Risk of deforestation in the upstream part of the basin.
Middle Kagera River basin	Utilization of marshlands for agriculture
Southern sub-basins	Impacts of significant water abstractions from Lake Victoria
???	???

The Consultant will clearly compare the various scenarios within an Intermediary report and present this comparison during the consultative regional workshop 2.

3.4 Select the most appropriate scenario through an adapted participation process

During this consultative regional workshop 2, one (or more) scenarios will be selected as the best possible future for the LVB water resources management. A timeframe up to 2040 (or later if necessary) will be proposed.

3.5 Elaborate the LVB-WRMP, including a WRM action plan

The selected scenario(s) will be detailed within the LVB-WRMP. The LVB-WRMP will notably include:

- The conclusions of the previous steps of the phase 2 and, as a basis, the conclusions of the phase 1,
- A 2040 vision statement,
- The strategic objectives for the management of the LVB water resources,
- The action plan.

The LVB-WRMP last section, the WRM action plan, will detail the LVB actions to be implemented up to 2040 (or later if necessary). The action plan will include the actions' implementation arrangements, related to:

- Timing (sequencing of actions),
- Institutional arrangements,
- Costs,
- Financing arrangements,
- Monitoring and evaluation,
- Risk assessment,
- Capacity building program (based on the phase 1 recommendations),
- Communication arrangements.

A draft LVB-WRMP will be presented to the relevant stakeholders during the consultative regional workshop 3. The Consultant will then incorporate comments and feedback from stakeholders and prepare the final LVB-WRMP.

4 Qualifications of the Consultant

It is envisaged that the Consultant will have extensive experience with assignments involving water resources management plans and basin planning, and will engage competent and qualified professionals to carry out the assignment. The composition of the team should include the following:

4.1 Team leader / water resource management specialist

Should have at least an MSc in Water Resources Engineering, as well as extensive experience in basin planning. The expert will have at least 10 years of relevant experience. S/he will be required to have broad knowledge and skills on water resources management, and hydrology, water resources modelling, and GIS. The expert should demonstrate proven experience in undertaking consultancy in developing water resources management plans and conversant with the paradigm of the IWRM. Experience within the LVB and EAC will be an advantage.

4.2 Hydrologist

4.3 Water resources modeler

Rainfall-runoff models. Water allocation models.

4.4 GIS expert

GIS. Land use mapping.

4.5 Water supply and sanitation expert

4.6 Agriculture expert

Rainfed, irrigation, livestock, fisheries…

4.7 Hydropower expert

Energy planning.

4.8 Water institutional development expert

Knowledge of LVB institutions.

4.9 Economist

Economic models and analysis.

4.10 Environmentalist

EIA. E-flows.

5 Reports and schedule of deliverables

5.1 Duration

It is estimated that the work will require a maximum input of 26 man-months, spread within 24 calendar months. The work is anticipated to start in January 2015 and is expected to be completed by January 2017, as per the following table.

Tasks		Duration	Level of efforts (in equivalent international man.months)
Elaborate an inception report		2 months	2
Develop the decision support tools required for the elaboration of the WRMP	Rainfall-runoff and water allocation models for the LVB sub-basins	11 supplementary months	25
	LVB water resources allocation model	2 supplementary months	3
	Land use changes mapping	2 months (in parallel)	3
	Economic model linked to the water resources allocation model	2 months (in parallel)	3
Propose different Water Resources Management (WRM) scenarios for 2040, at the scale of the LVB but also at the scale of some selected hotspots within the LVB		3 supplementary months	6
Select the most appropriate scenario through an adapted participation process		2 supplementary months	2
Elaborate the LVB-WRMP, including a WRM action plan		4 supplementary months	6
TOTAL		**24 months**	**50**

5.2 Assignment reporting arrangements

The consultants will produce the following reports:

Report	Time	
	Draft version	**Final version**
Inception report	End of month 1	End of month 2
Training program 1 (for rainfall-runoff and water allocation models for the LVB sub-basins)	End of month 3	End of month 4
Training program 2 (for the use of the other decision support tools)	End of month 12	End of month 13
Analytical framework note	End of month 17	End of month 18
Intermediary report	End of month 19	End of month 20
LVB-WRMP	End of month 23	End of month 24

5.3 Assignment consultation arrangements

The Consultant will participate to the following regional consultation workshops and meetings with stakeholders:

Workshop/meetings	Date
Consultative regional workshop 1	Beginning of month 2
Close consultation with the research centres and LVBC	Between months 2 and 15
First round of training sessions	Around month 4
Second round of training sessions	Around month 15
Meeting with the client for presenting the analytical framework note	Beginning of month 18
Consultative regional workshop 2	Beginning of month 20
Consultative regional workshop 3	Beginning of month 24

6 Responsibilities of the Client

Including supervision arrangements.