# Enhancing the sustainable management of Senegalo-Mauritanian Aquifer System to ensure access to water for populations facing climate change (SMAS)

## Part I: Project Information

**GEF ID**
10784

**Project Type**
FSP

**Type of Trust Fund**
GET

**CBIT/NGI**
CBIT **No**
NGI **No**

**Project Title**
Enhancing the sustainable management of Senegalo-Mauritanian Aquifer System to ensure access to water for populations facing climate change (SMAS)

**Countries**
Regional, Gambia, Guinea-Bissau, Mauritania, Senegal

**Agency(ies)**
UNEP

**Other Executing Partner(s)**
Sahara and Sahel Observatory (OSS) and others to be determined

**Executing Partner Type**
Others

GEF Focal Area

International Waters

Taxonomy

Focal Areas, Land Degradation, Sustainable Land Management, Improved Soil and Water Management Techniques, Biodiversity, Biomes, Wetlands, Rivers, Climate Change Adaptation, Climate Change, Ecosystem-based Adaptation, Climate resilience, Climate information, Least Developed Countries, International Waters, Strategic Action Plan Implementation, Freshwater, Aquifer, River Basin, Pollution, Nutrient pollution from Wastewater, Transboundary Diagnostic Analysis and Strategic Action Plan Preparation, Strengthen institutional capacity and decision-making, Influencing models, Convene multi-stakeholder alliances, Transform policy and regulatory environments, Demonstrate innovative approache, Stakeholders, Local Communities, Beneficiaries, Civil Society, Non-Governmental Organization, Community Based Organization, Academia, Trade Unions and Workers Unions, Communications, Education, Awareness Raising, Type of Engagement, Consultation, Information Dissemination, Partnership, Participation, Gender Equality, Access and control over natural resources, Gender results areas, Participation and leadership, Capacity Development, Access to benefits and services, Knowledge Generation and Exchange, Gender Mainstreaming, Gender-sensitive indicators, Sex-disaggregated indicators, Women groups, Integrated Programs, Food Security in Sub-Sahara Africa, Integrated Land and Water Management, Resilience to climate and shocks, Capacity, Knowledge and Research, Targeted Research, Knowledge Generation, Innovation, Knowledge Exchange, Learning, Theory of change, Adaptive management

Rio Markers

Climate Change Mitigation

Climate Change Mitigation 0

Climate Change Adaptation

Climate Change Adaptation 2

Duration

48 In Months

Agency Fee($)

299,250.00

Submission Date

10/15/2021

A. Indicative Focal/Non-Focal Area Elements

| Programming Directions | Trust Fund | GEF Amount($) | Co-Fin Amount($) |
|---|---|---|---|
| IW-3-5 | GET | 700,000.00 | 9,500,000.00 |
| IW-3-6 | GET | 750,000.00 | 9,230,000.00 |
| IW-3-7 | GET | 1,700,000.00 | 38,600,000.00 |
| | **Total Project Cost ($)** | **3,150,000.00** | **57,330,000.00** |

B. Indicative Project description summary

Project Objective

Foster multi-country cooperation and institutional capacity for the protection and sustainable management of the transboundary Senegalo-Mauritanian aquifer system and its dependent ecosystems in order to improve water and food security, and resilience to climate change.

| Project Component | Financing Type | Project Outcomes | Project Outputs | Trust Fund | GEF Amount($) | Co-Fin Amount($) |
|---|---|---|---|---|---|---|
| Component 1: Improving the understanding of the status and functioning of the Sengalo-Mauritanian Aquifer System (SMAS), and of its, and of their interactions with the Senegal and Gambia rivers. | Technical Assistance | Outcome 1.1<br><br>Improved shared knowledge of the current status and potentialities of the SMAS, of its dependent ecosystems and of its interactions with surface waters, reinforces transboundary cooperation and enables joint priority setting.<br><br>*Indicator 1:*<br>*Target:*<br>- 1 regional data base at the SMAS scale;<br>- 1 Hydrogeological and transport conceptual model; | 1.1.1. Regionally harmonized groundwater management tools (Database; GIS; aquifer's hydrogeological and transport conceptual model including water balance; monitoring network design and protocols), and data sharing mechanism.<br><br>1.1.2 Transboundary Diagnostic Analysis (TDA) identifying SMAS's challenges and opportunities and trans-boundary issues of concern, jointly developed by the countries sharing the aquifer, with consideration of future climatic scenarios, ecosystems health, and socio-economic aspects, including gender. | GET | 1,100,000.00 | 3,500,000.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | - 1 common monitoring protocol<br>- 1 data sharing mechanism.<br><br>*Indicator 2*: TDAs (regional and national) submitted for approval to the Project Steering Committee (PSC).<br>*Target*: PSC approves the TDA | | | | |
| Component 2 Developing a regional Strategic action program (SAP) for the Senegalo-Mauritanian aquifer system and facilitating conjunctive surface and groundwater management | Technical Assistance | Outcome 2.1<br>SMAS Strategic Action Program (SAP) developed and endorsed by the participating countries enables the sustainable management of the transboundary SMAS.<br>Indicator: SAP, submitted for endorsement by countries at ministerial level<br><br>Target value: 1 regional SAP<br><br>Outcome 2.2. Countries posed to consider overall | 2.1.1. The Strategic Action Program for the sustainable management of the transboundary SMAS, developed and submitted for countries' endorsement at ministerial level<br><br>2.1.2 Partners' and donors' roundtable organized for resource mobilization for the implementation of the SMAS SAP<br><br>2.2.1 Governance options for the conjunctive surface and groundwater management in the Senegal and the Gambia river basins developed and submitted for countries' consideration. | GET | 900,000.00 | 8,000,000.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | Regional governance frameworks for the conjunctive management of their surface and groundwater resources.<br><br>Indicator: Report on regional governance options for the conjunctive surface and groundwater management submitted for approval by the Steering Committee.<br><br>Target value: Report approved by the SC | | | | |
| Component 3: Demonstrating groundwater-based solutions | Investment | Outcome 3.1<br><br>The successful joint implementation of small-scale demonstration measures strengthens transboundary cooperation and feeds into the SAP formulation process.<br><br>*Indicator*: number of pilots<br><br>*Target:* at least two transboundary pilots. | 3.1.1 Small pilots demonstrating the role of groundwater in addressing major concerns such as the need for improved water use efficiency in agriculture, for climate change adaptation, and for expanded water resources availability. | GET | 500,000.00 | 38,600,000.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Component 4: Capacity development, Communication and Knowledge management | Technical Assistance | Outcome 4.1<br><br>Stakeholders' enhanced knowledge and capacity facilitate coordinated action for the sustainable management of the SMAS<br><br>Indicators:<br><br>Number of persons receiving training, participating to dissemination events, and of Experience Notes.<br><br>Target: At least 500 gender balanced participants to training modules and dissemination events.<br><br>At least 4 Experience Notes published | 4.1.1 Regional information and data exchange platform for conjunctive water resources management established<br><br>4.1.2. Communication and dissemination plan prepared and endorsed<br><br>4.1.3. Based on a need assessment, capacity building modules (in Database, GIS, Modeling, TDA/SAP, groundwater resources monitoring, collection of sex-disaggregated water data, etc.) organized for member countries and basin organizations.<br><br>4.1.4 Project results and lessons learned disseminated at the local, national, and regional levels through *ad hoc* interactive learning events.<br><br>4.1.5. Project visibility improved by establishment of a project website, and lessons learned shared for broader adoption through cooperation with IW:LEARN, including participation to IWCs, and production of Experience Notes. | GET | 500,000.00 | 4,500,000.00 |

| | | | |
|---|---|---|---|
| | **Sub Total ($)** | **3,000,000.00** | **54,600,000.00** |
| **Project Management Cost (PMC)** | | | |
| | GET | 150,000.00 | 2,730,000.00 |
| | **Sub Total($)** | **150,000.00** | **2,730,000.00** |
| | **Total Project Cost($)** | **3,150,000.00** | **57,330,000.00** |

C. Indicative sources of Co-financing for the Project by name and by type

| Sources of Co-financing | Name of Co-financier | Type of Co-financing | Investment Mobilized | Amount($) |
|---|---|---|---|---|
| GEF Agency | UNEP | In-kind | Recurrent expenditures | 130,000.00 |
| Recipient Country Government | Gambia | In-kind | Recurrent expenditures | 15,000,000.00 |
| Recipient Country Government | Guinea Bissau | In-kind | Recurrent expenditures | 7,750,000.00 |
| Recipient Country Government | Mauritania | In-kind | Recurrent expenditures | 12,730,000.00 |
| Recipient Country Government | Senegal | In-kind | Recurrent expenditures | 12,000,000.00 |
| Other | Sahara and Sahel Observatory (OSS) | In-kind | Recurrent expenditures | 320,000.00 |
| Other | Senegal river basin Organization (OMVS) | In-kind | Recurrent expenditures | 300,000.00 |
| Other | Gambia river basin Organization (OMVG) | In-kind | Recurrent expenditures | 100,000.00 |
| Other | African Development Bank (AfDB) | Grant | Investment mobilized | 9,000,000.00 |
| | | | **Total Project Cost($)** | **57,330,000.00** |

**Describe how any "Investment Mobilized" was identified**

The investment is being mobilized through the African Development Bank (AfDB) partner is and has been engaged in transboundary water management and conjunctive management of surface and groundwater. OSS approaches AfDB and conducted some exchanges in order to mobilize finance in the SASM basin. The Water Development and Sanitation Department (AHWS) - (Water Coordination and Partnerships Division)) launched a call for proposals in July 2020 to develop priority projects, around Infrastructure Development, Climate Change, Livelihoods Improvement, Institutional Development, etc. In this regard, OSS submitted outline projects concept notes on Water Resources Management Development /water security that can be screened by the Bank for further preparation and possible support. Then the AfDB considered our project and accepted to support the elaboration of the Master Plan for the Development and Sustainable Management of shared water resources of the Senegal-Mauritania aquifer basin. The AHWS is developing the concept note to be submitted in November 2021. The approval window is January 2022.

D. Indicative Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

| Agency | Trust Fund | Country | Focal Area | Programming of Funds | Amount($) | Fee($) | Total($) |
|---|---|---|---|---|---|---|---|
| UNEP | GET | Regional | International Waters | International Waters | 3,150,000 | 299,250 | 3,449,250.00 |
| | | | | **Total GEF Resources($)** | **3,150,000.00** | **299,250.00** | **3,449,250.00** |

**E. Project Preparation Grant (PPG)**

PPG Required **true**

| PPG Amount ($) | PPG Agency Fee ($) |
|---|---|
| 150,000 | 14,250 |

| Agency | Trust Fund | Country | Focal Area | Programming of Funds | Amount($) | Fee($) | Total($) |
|---|---|---|---|---|---|---|---|
| UNEP | GET | Regional | International Waters | International Waters | 150,000 | 14,250 | **164,250.00** |
| | | | | **Total Project Costs($)** | **150,000.00** | **14,250.00** | **164,250.00** |

## Core Indicators

### Indicator 3 Area of land restored

| Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Ha (Achieved at MTR) | Ha (Achieved at TE) |
|---|---|---|---|
| 4636.70 | 0.00 | 0.00 | 0.00 |

### Indicator 3.1 Area of degraded agricultural land restored

| Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Ha (Achieved at MTR) | Ha (Achieved at TE) |
|---|---|---|---|
| 4,636.70 | | | |

### Indicator 3.2 Area of Forest and Forest Land restored

| Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Ha (Achieved at MTR) | Ha (Achieved at TE) |
|---|---|---|---|
| | | | |

Indicator 3.3 Area of natural grass and shrublands restored

| Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Ha (Achieved at MTR) | Ha (Achieved at TE) |
|---|---|---|---|
| | | | |

Indicator 3.4 Area of wetlands (incl. estuaries, mangroves) restored

| Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Ha (Achieved at MTR) | Ha (Achieved at TE) |
|---|---|---|---|
| | | | |

Indicator 4 Area of landscapes under improved practices (hectares; excluding protected areas)

| Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Ha (Achieved at MTR) | Ha (Achieved at TE) |
|---|---|---|---|
| 61213.00 | 0.00 | 0.00 | 0.00 |

Indicator 4.1 Area of landscapes under improved management to benefit biodiversity (hectares, qualitative assessment, non-certified)

| Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Ha (Achieved at MTR) | Ha (Achieved at TE) |
|---|---|---|---|
| | | | |

Indicator 4.2 Area of landscapes that meets national or international third party certification that incorporates biodiversity considerations (hectares)

| Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Ha (Achieved at MTR) | Ha (Achieved at TE) |
|---|---|---|---|
| | | | |

Type/Name of Third Party Certification

Indicator 4.3 Area of landscapes under sustainable land management in production systems

| Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Ha (Achieved at MTR) | Ha (Achieved at TE) |
|---|---|---|---|
| 61,213.00 | | | |

Indicator 4.4 Area of High Conservation Value Forest (HCVF) loss avoided

| Ha (Expected at PIF) | Ha (Expected at CEO Endorsement) | Ha (Achieved at MTR) | Ha (Achieved at TE) |
|---|---|---|---|
| | | | |

## Documents (Please upload document(s) that justifies the HCVF)

| Title | Submitted |
|---|---|

Indicator 7 Number of shared water ecosystems (fresh or marine) under new or improved cooperative management

| | Number (Expected at PIF) | Number (Expected at CEO Endorsement) | Number (Achieved at MTR) | Number (Achieved at TE) |
|---|---|---|---|---|
| **Shared water Ecosystem** | Senegalo-Mauretanian Basin | | | |
| **Count** | 1 | 0 | 0 | 0 |

Indicator 7.1 Level of Transboundary Diagonostic Analysis and Strategic Action Program (TDA/SAP) formulation and implementation (scale of 1 to 4; see Guidance)

| Shared Water Ecosystem | Rating (Expected at PIF) | Rating (Expected at CEO Endorsement) | Rating (Achieved at MTR) | Rating (Achieved at TE) |
|---|---|---|---|---|
| | | | | |

| | | |
|---|---|---|
| Senegalo-Mauretanian Basin | 1 | |

Indicator 7.2 Level of Regional Legal Agreements and Regional management institution(s) (RMI) to support its implementation (scale of 1 to 4; see Guidance)

| Shared Water Ecosystem | Rating (Expected at PIF) | Rating (Expected at CEO Endorsement) | Rating (Achieved at MTR) | Rating (Achieved at TE) | |
|---|---|---|---|---|---|
| Senegalo-Mauretanian Basin | 2 | | | | |

Indicator 7.3 Level of National/Local reforms and active participation of Inter-Ministeral Committees (IMC; scale 1 to 4; See Guidance)

| Shared Water Ecosystem | Rating (Expected at PIF) | Rating (Expected at CEO Endorsement) | Rating (Achieved at MTR) | Rating (Achieved at TE) | |
|---|---|---|---|---|---|
| Senegalo-Mauretanian Basin | 2 | | | | |

Indicator 7.4 Level of engagement in IWLEARN throgh participation and delivery of key products(scale 1 to 4; see Guidance)

| Shared Water Ecosystem | Rating (Expected at PIF) | Rating (Expected at CEO Endorsement) | Rating (Achieved at MTR) | Rating (Achieved at TE) |
|---|---|---|---|---|

| | | |
|---|---|---|
| Senegalo-Mauretanian Basin | 2 | |

Indicator 11 Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment

| | Number (Expected at PIF) | Number (Expected at CEO Endorsement) | Number (Achieved at MTR) | Number (Achieved at TE) |
|---|---|---|---|---|
| **Female** | 83,253 | | | |
| **Male** | 79,988 | | | |
| **Total** | 163241 | 0 | 0 | 0 |

Provide additional explanation on targets, other methodologies used, and other focal area specifics (i.e., Aichi targets in BD) including justification where core indicator targets are not provided

## Part II. Project Justification

### 1a. Project Description

*Project Description*

*The Senegalo-Mauritanian transboundary aquifer System (SMAS) context*

The Senegal-Mauritania Aquifer System (SMAS) is extending over a total area of 300,000 km$^2$ and shared by four countries – Gambia (9,900 km²), Guinea Bissau (20,100 km²), Mauritania (111,000 km²) and Senegal (159,000 km²) – with a coastal line of 1,400 km. It lies approximately between 10° (southern limit) and 21° (northern limit) north latitude. The aquifer area/basin is crossed by two important trans-boundary watercourses, the Senegal - and the Gambia Rivers.

The Senegalo-Mauritanian aquifer system is composed of three major aquifers i.e. the Maastrichtian (lower aquifer) and the Paleocene (middle aquifer), which are hydraulically connected, and the upper superficial Quaternary aquifer. Due to the structure of the horst and graben system, these aquifers are also compartmentalized into three hydrogeological units, i.e. the Diass compartment in the center, the confined Sébikotane compartment in the West and the confined/unconfined Pout compartment in the East. The predominant source of recharge is through precipitation on the aquifer area. The natural discharge mechanism is through river base flow in Gambia, through discharge of springs in Mauritania, and through submarine outflow in Senegal[1].

The climate in the area is of Saharan and desert climate in the North (average annual rainfall less than 100 mm/year) and a humid tropical climate in the South (average annual rainfall more than 1,200 mm). The basin is also characterized by:

-A great diversity of terrestrial, river and marine or coastal ecosystems;

- -A very high potential for arable lands ;
- -Groundwater reserves with fairly known potential and renewability.

SMAS is of strategic importance to social and economic development for the countires.The area hosts the largest urban cities, such as Dakar, Nouakchott, Banjul, etc. with approximately 23 million people (in 2015) and almost 33 million inhabitants projected by 2030. The aquifer system provides drinking water to the whole population in the area as well as to other economic activities such as agriculture, livestock, industries, etc.. Over-abstraction in some parts of the Pout compartment, in the East (Senegal) has resulted in change in the groundwater flow regime and has led to salinisation of parts of the aquifer. Abstraction along parts of the coast is also resulting in salinisation due to sea water intrusion. In addition, the four countries are experiencing water stress and intense water cycle disturbances, which will increase significantly due to the effects of climate change, population growth and urbanization. More attention needs to be given to this aspect with regard to management from a transboundary perspective[1]. Currently, there is no regional cooperation framework for the development of knowledge or the concerted management of this shared aquifer system.

All the countries have a weak economy with some variability from one country to another where the Gross Domestic Product (GDP) per capita in 2018 was: Gambia US$ 716; Guinea Bissau US$ 778; Mauritania US$ 1,730 and the Senegal US$ 1,502[2].

*1a.1 Global environmental and/or adaptation problems, root causes and barriers that need to be addressed (systems description)*

General lowering of water table due to excessive groundwater extraction

Water exploitation remains poorly controlled and the resulting withdrawals are increasingly important due to population growth and the development of the agropastoral and industrial sectors in the basin. Over-abstraction has led to strong drawdowns and the further lowering of the water table in some parts of the aquifer. One example is the typical case of the Diass horst, located at 50 km east of Dakar and home to one of the largest well-fields in the aquifer area, that has been subject to intensive pumping for more than 50 years to supply drinking water to the localities of Dakar, Sébikotane, Pout, Mbour as well as to their industrial and agricultural needs. This intensive exploitation has led to a continuous drop in the water table of more than 30 m in two decades (from 1989 to 2009). This situation is one of the critical concerns happening in the basin.

Some major urban centers - such as Dakar are feeded from groundwater (Dakar gets over 50 % of its water from groundwater). This will be part of water pollution/water degradation as one of the major transboundary risks and is part of the TDA/SAP process in order to maintain the cities water resource (quantity and quality).

Degradation of water quality

One of the most common problems include groundwater quality degradation. This problem resulted from a combination of several factors, mainly water salinization and pollution from agricultural and industrial sources. In some places, there is also contamination originating from natural sources such as high fluoride concentrations in the groundwater. Several areas with high contamination risks and where groundwater is potentially affected or likely to be affected have been identified across the whole aquifer system.

- *Water salinization*

Water in the coastal parts of the aquifer is to a large extent subject to high salinity concentrations. This high salinity is generally attributed to two main factors: *(i)* mixing with deep saline waters dating from very ancient periods (connate waters) and *(ii)* salt intrusion resulting from the overexploitation of aquifers. The second phenomenon is the most important one[3], especially around the pumping fields where drinking water is abstracted to supply the abovementioned large cities.

As mentioned above, in the Diass horst region, the intensive pumping that has caused the continuous drop in the water table level has resulted in changes in the flow regime and salinization by marine intrusion in the Sebikotane and Mbour parts of the aquifer [4].

Another significant root cause of the groundwater salinization is linked to rising sea level causing submersion and erosion of the floodable areas resulting in rise in salinity in estuaries and in shallow coastal water tables.

- *Anthropogenic Pollution*

Some anthropogenic pollution of the aquifer has been reported in all the four countries. These are mainly pollution related to (*i*) widespread use of agricultural chemical inputs, (*ii*) industrial and mining discharges without compliance with environmental standards, (*iii*) and poor hygiene and basic sanitation conditions. These contaminations affect in particular the upper layers of the aquifer. The most significant cases of pollution are recorded in the Gambian part of the aquifer. However, there is lack of recent data to accurately assess the extent of these pollution pressures.

- *Natural hazards effects on groundwater quality in some areas*

High fluoride contents (up to 12 mg/l) are recorded in the aquifer, particularly in the Paleocene layers (compared to 1.5 mg/l for the WHO guide value for drinking water). The localization of high levels of fluoride is associated with the presence of natural deposits of phosphate mineral, that is the main source of fluoride in the water table. High fluoride levels are localized around Diourbel, Kaolack and horst de Diass. The health consequences associated with the consumption of water with high concentrations are dental and bone fluorosis. Distribution of Fluoride concentration is illustrated in the figure bellow (AIEA, 2017)[1], in Senegal where the phenomenon is more accurate.

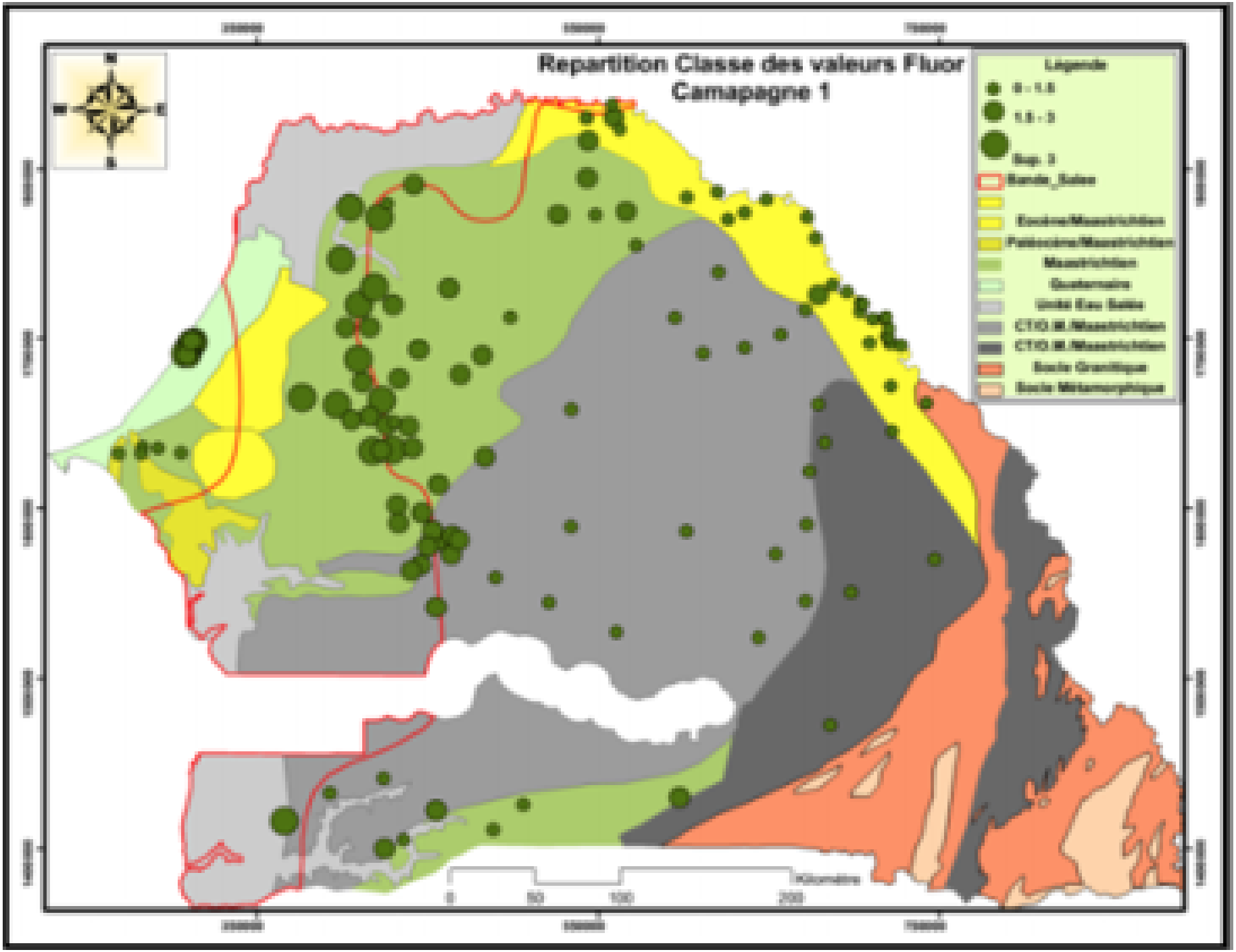


Figure: Distribution of Fluoride concentration in Senegal (Source: AIEA, 2017)

This is an important phenomena and a literature review will be undergone in PPG in order to ensure to build on the latest scientific findings.

[1] AIEA (2017) : Gestion intégrée et durable des systèmes aquifères et des bassins partagés de la région du Sahel. RAF/7/011 ; Bassin Sénégalo-Mauritanien

Soils salinization which results in a significant loss of ecosystem services and arable lands

Soil salinization represents a major risk for the development of agriculture and especially irrigation in some areas with dramatic impacts on food security, household income and poverty levels. In Senegal, for example, more than 5% of the national territory is affected by soil salinity and more than 25% of irrigated land is experiencing this problem. The most affected areas are those neighbouring the Senegal River Delta, in particular Saint Louis with an extension to Richard Toll and Podor, etc. The high salinity of the soils is controlled both by cropping and actual morphodynamics and is manifested on the surface by a white layer of saline efflorescence. In the Senegal River Delta (an area with high agricultural potential with nearly 60,000 ha of agricultural land), the occurrence of a saline water table close to the soil surface (fluctuating between 1 and 3 m) during the year emphasizes this risk through significant capillary upwelling of salts to the surface outside irrigation periods during dry seasons. In case of flood irrigation, the implementation of a surface drainage is then recommended to avoid the rise of the water table and ensure the evacuation of salts from the water table.[1].

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[1] (Faye S. (2005): Apport des outils géochimiques et isotopiques à l'identification des sources de salinité et à l'évaluation du régime d'écoulement de la nappe du Saloum. Thèse de Doctorat d'État, ès Sciences, Université Cheik Anta Diop, Dakar.
Diaw M. (2008): Approche hydrochimique et isotopique de la relation eau de surface/nappe et du mode de recharge dans l'estuaire et la basse vallée du fleuve Sénégal. Thèse de 3$^{e}$ cycle, Université de Dakar, 210 p
Madioune D. (2012) : Étude hydrogéologique du système aquifère du horst de Diass en condition d'exploitation intensive (bassin sédimentaire sénégalais) : apport des techniques de télédétection, modélisation, géochimie et isotopie. Thèse de doctorat en sciences de l'ingénieur, Faculté des sciences appliquées, Université de Liège, 325 p.

Climate change

Forecasted changes in climate (i.e. temperature increase and variability in rainfall) will further impact the groundwater availability in the region. The recent information from climate change predictions on water resources are[5]:

- About 50% decrease in the rainfall at St-Louis (period 1893 -2005);
- About 50% decrease of the annual river flow from 30 000 to 15 000 million m3 over the century;
- Climate variability would have impacts on recharge, groundwater salinity, water logging and salinisation of soils, water dependant ecosystems and water supply for rural population;
- Depending on geomorphological settings, recharge regimes will be affected differently by climate change;
- Sea level rise is a major threat to the social-ecological system of the coastal area, as salinity can creep up the rivers and cause a decline in the productivity of the soil.

The late arrival of rainfall, the uneven distribution in space and the premature end of the rainy season, considerably influence the water resources available. They will significantly affect the basin due to its geographic coastal location. The low population incomes, lack of technology and low institutional capacity increases food insecurity in the sub-region of the basin. In conclusion, climate change impact will most probably intensify the effects of all of the problems listed above[1].Temperature increases over West Africa countries in all the months under each of the scenarios (Adefisan, 2018)[1]. A period with abnormal soil moisture deficit is observed, which results from combined shortage of precipitation and excess evapotranspiration (IPCC, 2021)[3].

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[1] AFD (2021) : Etude de faisabilité d'un projet de démonstration visant à améliorer de façon durable la zone de captage des forages de Pout au Sénégal. Adelante, Stantec, OSS, Adelante.

[2] Adefisan (2018): Climate Change Impact on Rainfall and Temperature Distributions Over West Africa from Three IPCC Scenarios. J Earth Sci Clim Change 2018, 9:6; Federal University of Technology Akure Akure, Nigeria

[3] IPCC (2021) : Climate change 2021. The physical science basis; summary for policy makers. Working Group I contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change

*Root causes:*

The root causes of the various problems outlined above are as follows:

- Increasing of demography with high demand for water is leading to higher water withdrawals and pressure on the aquifers and its dependent ecosystems;

The situation regarding water abstraction is not well known in the basin. The most recent estimates available date to 2012. The overall pumping rate was estimated at 200 million $m^3$/year in 2000 (30 million $m^3$/year in Mauritania, 115 million in Senegal and 55 million in Gambia and Guinea Bissau). The COWI[6] study (2002) estimates withdrawals in Senegal at around 182 millions $m^3$/year. Mohamed, A.S[7]. (2012) estimates withdrawals in Idini (Mauritania) at around 28 millions $m^3$ in 2010. Pumping at the basin level could be around 300 millions $m^3$/year in 2010[8]. This situation makes the planning and sustainable management of water resources very difficult and is also being affected by the following additional factors:

- Weakness of policies and strategies for sustainable planning and management of water resources together with limited data and information on the groundwater in the countries continues to be a major constraint for the establishment of reliable policies and strategies;

- Until recently a lack of systematic collaboration among the riparian countries to establish a framework for cooperation and concerted management of the aquifer system. The two key basin organizations (OMVS and OMVG) have a mandate for surface water management but not groundwater consideration. There is a need for a conjunctive water management approach to be implemented; so far a detailed evaluation of its exploitable potential has not been carried out. Since 2019 a regional working group was established driven by the active participation of the river basin organisations for the coordination of activities around the management of the aquifer.

- Poor management of irrigation in the Senegal River Valley region has contributed to an intensification of soil salinization problems.

*Barriers*

Based on the root causes of the main problems outlined above, the following barriers that need to be addressed are:

§ **Barrier 1: Limited knowledge:** Insufficient knowledge of the transboundary aquifer systems and the increasing demand for water, adverse effects of variability/climate change, degradation of water quality due to pollution from various sources and uses (agriculture mainly in some areas). The hydrological linkages between groundwater and surface water (from Senegal and Gambia rivers mainly) are also insufficiently appraised. The abstraction in the basin are not well known.

§ **Barrier 2: Lack of institutional, technical and financial capacity at regional scale** for joint planning and management at the transboundary aquifer level. For example, there are currently no planning tools such as a transboundary diagnostic analysis (TDA) available, or a strategic action plan (SAP) for the aquifer to identify transboundary socio-economic and environmental problems and sustainable solutions to these problems. In addition, there are no joint governance tools or harmonized aquifer management instruments.

§ **Barrier 3: Lack of a long-term strategy and policy planning efforts at the aquifer system scale**, supported by realiable data, scientific information and knowledge as well as strong political commitment. These limitations represent significant barriers for basin organisations and managers in implementing appropriate water management planning tools and choosing appropriate adaptation options.

§ **Barrier 4: Limited engagement of various stakeholders and resource users** in the planning and implementation of the IWRM in the basin to address global and local challenges in the basin

*1a.2 Baseline scenario and any associated baseline projects*

The following lines provide an overview of past, current and planned investments related to the Senegalo-Mauritanian aquifer. The majority of existing initiatives do not address groundwater and focus on surface water.

v *The regional context*

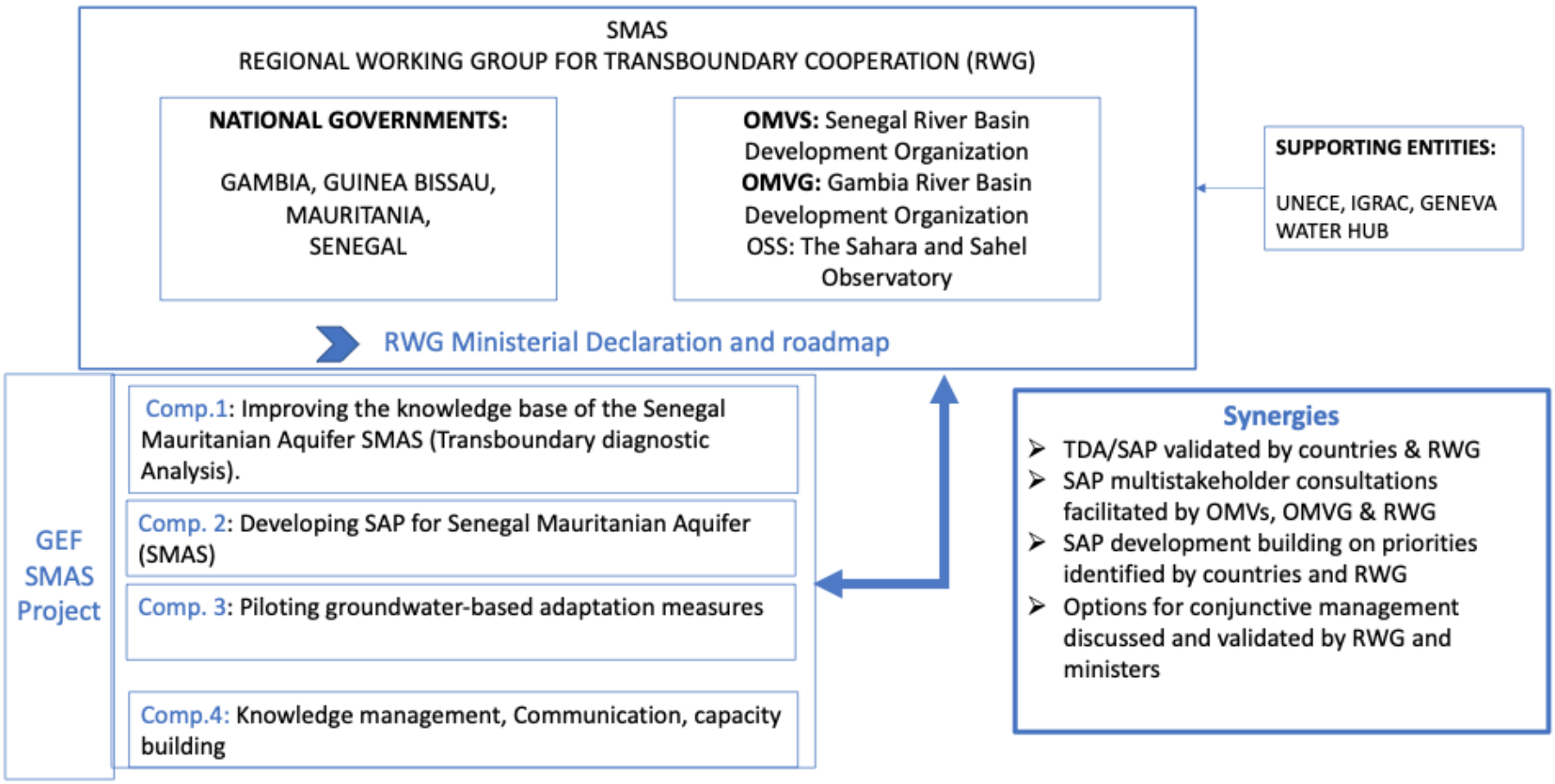
This project will mainly focus on strengthening knowledge of the Senegal-Mauritanian aquifer as a whole with the development of a Transboundary Diagnostic analysis and a participative, inclusive multistakeholder process for the establishment of a Strategic Action Plan for the sustainable and efficient use of the aquifer's resources. These TDA/SAP tools will support the regional governance framework for cooperative and sustainable management (science and hydrodiplomacy). This level of interventions will be the first on a regional scale for this particular water body and countries in the basin have repeatedly requested assistance to operationalize such an initiative. In this context, the 4 riparian countries had officially mandated the Sahara and Sahel Observatory (OSS) in 2003 to draft a request for funding of such support. A first draft was elaborated in 2004. Then, several financial partners was approached with this concept note (2014-2015) such as the DDC-Suisse, the FFEM (French GEF), AfDB, Canadian Cooperation, etc. without success because of change of strategy or other internal factors. A "Writeshop" workshop was organized in May 2017 with the countries and resulted in the development of a project concept note entitled: "Master Plan for Development and Sustainable Management of Shared Water Resources in the Senegalo-Mauritanian Basin: Satisfaction of water needs / Adaptation to climate change in the region". The AfDB has maninfested interest in may 2021 in supporting the Master plan development of the SASM.

More recently, in February 2019, a dialogue on the Senegalo-Mauritanian aquifer system began with a roundtable discussion which took place in Geneva (Switzerland) and brought together the four State members of the aquifer system, as well as the main transboundary basin organizations of the region: the Senegal River Basin Development Organization (OMVS) and the Gambia River Development Organization (OMVG). The dialogue allowed the definition and

approval in October 2019 of a roadmap for the development of a joint vision and of a programme for establishing long term cooperation on the basin. Since May 2020, pursuant to a ministerial mandate, a Regional Working Group (RWG) was established with the aim of driving the transboundary cooperation and advising States and River Basin Organisations (RBOs) on the creation of a long-term mechanism for the concerted management of the SMAB, notably through the creation of a joint project aimed at initiating transboundary cooperation. The political dialogue and RWG benefited from the support of the Geneva Water Hub (GWH) and the Secretariat of the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (herein, the Water Convention), provided by the United Nations Economic Commission for Europe (UNECE), as well as the technical support from the International Groundwater Resources Assessment Centre (IGRAC). Five technical and institutional studies were developed to support the work of the RWG: a study on the extent and recharge of the aquifer, an assessment of available groundwater data, a capacity needs assessment, a report on legal and institutional frameworks for water management, and a review of existing models of transboundary groundwater cooperation.

Figure 2: overview of synergies between the project and the RWG on the SMAS

## SYNERGIES - SMAS & RWG – REGIONAL GOVERNANCE



| Synergies between the Regional Working Group for the Senegalo Mauritanian Basin and the UNEP GEF financed SMAS project |
| --- |
| The RWG has been given the mandate in the Ministerial Declaration to establish a transboundary cooperation framework for the SMAS in conjunction with surface water and to launch a negotiation process to define this governance framework (point 5 of declaration). This project will support this vision and commitment by developing a governance options report to be submitted to the countries under the auspices of the RWG. The RWG is facilitated by the Water Convention secretariat (UNECE), Geneva Water Hub and IGRAC.<br><br>This project proposal builds on the recommendations arising from a number of key initiatives (such as implemented projects) and will be guided by the roadmap of the Regional Working Group and closely coordinated, through the RWG itself, to realize the overall vision of the RWG to promote resilience, sustainability and stability in the region through the strategic, integrated and concerted management of groundwater resources. On 29 September 2021, the Ministers signed in Geneva a Declaration on the Senegalo-Mauritanian Aquifer Basin which endorsed the vision and the regional project elaborated by the RWG . The Declaration also established the RWG (that OSS has joined) as a key regional mechanism to guide the next steps in the development of the cooperation and coordinate and harmonize various initiatives on the Senegalo Mauritanian Basin (SMAB). Several meetings were conducted with the RWG and the PIF was harmonized with the work of the RWG. All stakeholders will be involved in the project. The Ministerial declaration also welcome the UNEP and OSS project proposal to the GEF which will allow implementing some elements of the vision and the project of the RWG.<br><br>UNECE, GWH, IGRAC will contribute to the definition of the UNEP/ OSS project and will be invited to participate in the PPG phase and to support implementation of activities as part of their support to the regional working group and defined roadmap.<br><br>The project will support the strategic planning of the SMAS resources, while ensuring their ecological viability. To this end, the project will support the development of a SMAS concerted management master plan (as part of the RWG roadmap) which will include the identification of the financial resources required for its implementation. This process will combine sectoral SMAS use projections at the top-down management level, as well as consultations with authorities and local stakeholders promoting bottom-up groundwater management. |

Other past interventions that have specifically related to the aquifer system have focused on certain aspects of knowledge of water resources where the actions are localised, particularly in the Senegalese and Mauritanian parts of the aquifer. These interventions include:

- *The project MAU8/002 (National project supported by the IAEA, MAU/8/002). This project entitled "Use of isotope hydrology techniques for the study of the Trarza aquifer and discontinuous aquifers of southern Mauritania" was carried out between 2007 and 2010 and aimed at characterizing and managing the portion of the aquifer located in the Trarza region in the coastal zone of Mauritania;*

- *The Regional Project RAF/7011, entitled "Integrated and Sustainable Management of Shared Aquifer Systems and Basins in the Sahel Region", implemented by the IAEA between 2013 and 2017 and which focused on hydrogeochemical investigations in selected sites. This project investigated the water recharge and mineralization processes, marine intrusion and soil salinization particularly in the Senegalese and Mauritanian parts of the aquifer;*

- *UNESCO/IHP and IGRAC studies and publications on shared aquifers within the framework of the global multi-stakeholder initiative on Internationally Shared Aquifer Resources Management (ISARM), launched in 2002. This initiative established an inventory of transboundary aquifers on a global scale with updated data and information on their hydrogeological characteristics, socio-economic, environmental, legal and institutional aspects. The work also made it possible to formulate recommendations to the States in terms of sustainable management of shared groundwater resources. More than 600 transboundary aquifers including about 80 in Africa were identified within the framework of this work. In addition, UNESCO-IHPand IGRAC have developed, within the framework of the UNEP led "Transboundary Water Assessment Programme" (TWAP )funded by the GEF, an indicator-based assessment methods to evaluate transboundary aquifers at the global and local/regional. All these studies have updated important data and information with respect to the Senegal-Mauritanian basin which will be very useful for this project;*

- *The "Cellule eaux souterraines de l'OMVS/USAID" Project (January 1985 and June 1990). The Project was designed and oriented towards the identification and control of changes in the groundwater regime related to the operation of dams and the intensive development of irrigated agriculture in the alluvial formations of the Senegal River basin.*

- *In February 2019, a roundtable on transboundary collaboration on the Senegalo-Mauritanian aquifer system brought together the four Aquifer States sharing the basin and the main transboundary basin organizations of the region: the Senegal River Basin Development Organization (OMVS) and the Gambia River Development Organization (OMVG). In the framework of this cooperation, a Regional Working Group (RWG) was established with a mandate to induce transboundary cooperation and to advise the SMAS states and transboundary basin organisations towards the establishment of a Permanent Mechanism for transboundary concerted management of the SMAS. The United Nations Economic Commission for Europe (UNECE), the Geneva Water Hub, and the IGRAC are supporting this process. A number of meetings have taken place with the Regional Working Group in order to ensure that the current GEF initiative is aligned with these developments. Synergies and complementarities have been identified and particular attention has been given in this PIF to provide the Basin organisations OMVS and OMVG with key executing partner roles in the current GEF SMAS project. This will facilitate the necessary coordination and alignment with the priorities of the Regional Working Group during the Project Preparation phase and the future effective implementation of the project within the governance framework of the Basin. The TDA/SAP development within this GEF supported project will contribute to the long term planning of the River Basin organisations including support to the development of hot spot investments.*

- *The preparation, deliberations and recommendations of the Ninth World Water Forum scheduled to take place in Dakar in March 2022 will be taken in consideration during the development of this project into a full fledged proposal.*

Besides the above listed initiatives, other regional surface waters initiatives of the two main basins of the Senegal and Gambia Rivers were implemented by OMVS (for the Senegal River Basin) and OMVG (for the Gambia River Basin). Some of these initiatives, although mainly focusing on surface water, contribute on groundwater; and these achievements will be essential elements in the development of the baseline for the proposed project. Some of the most important of these initiatives are:

§ ***OMVS for the Senegal River Basin***

The Senegal River Basin is currently endowed with fundamental tools for concerted and sustainable governance, planning and management of water resources, especially surface waters. These include an institutional governance body (OMVS), a Water Development and Management Master Plan, a TDA/SAP adopted by all the countries. All current initiatives are carried out within the framework of these tools. The main initiatives in the basin are:

- The PASIE[9] Programme (1999-2005) is co-financed by the World Bank, the African Development Bank, the French Cooperation and the Canadian Cooperation and aims to define and implement a series of actions that integrate in a global strategy of protection and preservation of the environment. It covers several activities that integrate, in particular, the Reservoir Management Optimization Program (POGR), the Program to Combat Water-borne Diseases, the Environment Observatory, rural electrification, income-generating micro-projects, harmonization of national legislation, etc.

- **Reducing Dependence on POPs and other Agro-Chemicals in the Senegal and Niger River Basins through Integrated Production, Pest and Pollution Management (2005-2010).** This regional project is focused on the two principal river basins in the West African sub-region, the Niger and Senegal River Basins, and addresses riverine contamination issues related mostly to irrigated-farming activities in six countries. The Project Development objective is to protect transboundary waters in the Niger and Senegal River Basins through elimination of POPs pesticide-use and substantial reduction and elimination of other toxic pesticides used in agriculture while augmenting agricultural productivity and net economic benefits to farmers.

- **The Senegal River Basin Water and Environmental Management Program (2003-2009).** Funded by the World Bank, the overall objective of the project is to ensuring the sustainable management of the basin's water resources, biodiversity and environment with four main components: (i) The Environmental Management Structure Component, aiming at establishing effective institutional structures and mechanisms for the correct management of the Senegal Basin, both at regional and national level; (ii) The Knowledge Base Component, which would consist of a thorough inventory of the socio-economic and bio-physical conditions, and of easily accessible data bases established in each country and at OVMS (Basin Authority); (iii) The Priority and Opportunities Analysis Component, involving the identification of priority transboundary issues, the definition of mitigation measures, the identification of priorities and opportunities percieved by the public in the Basin; (iv) The Action Program for the Global Environment, including the integration of measures identified under (iii) in an action program featuring both national and regional/global components, and the implementation of necessary reforms, and of elements qualifying for GEF funding.

- **The Senegal River Basin Climate Change Resilience Development Project (2014-2019)** funded by the World Bank has for objective to **strengthen transboundary water resources management in the Senegal River Basin including climate change adaptation and implementation of priority actions of the Strategic Action Plan.** Some outcomes of this project incorporate transboundary IWRM principles (including environment and groundwater) and policy/ legal/institutional reforms into national/local plans.

§ *OMVG for the Gambia River Basin*

Like the Senegal River Basin, the Gambia River Basin also has fundamental tools for the governance, planning and management of the basin's water resources. These include the OMVG (for institutional governance), a River Basin Scheme and a Hydraulic Scheme.

Since its creation, OMVG has carried out baseline studies on the basin's resources that have led to the design and implementation of several development projects and programs. The main initiatives among those projects whose results are in line with the objectives are :

- The Project for the development and management of natural resources in joint Senegal, Guinea, Guinea Bissau and Gambia border areas: Funded mainly by the African Development Fund (2002-2007), this project aims to increase agro-forestry and pastoral production, rationalize the exploitation of natural resources and improve the social infrastructure of the basin.

- The project of Integrated Water Resources Management (IWRM) in the Kayanga-Geba River Catchment. Its objectives are the concerted and integrated management of the water resources of the Kayanga-Geba river basin and the strengthening of the technical and institutional capacities of the member States of the basin. The project consists of support to OMVG for the IWRM of the Kayanga-Geba river basin, in order to provide the organization with the needed tools to enhance a concerted and shared management of the resources and for sustainability exploitation and use conflicts preventing.

v *The national context*

In each of the 4 countries, there are tools for planning and management of water resources (including groundwater), i.e. sectoral policies, strategies and plans required to frame various interventions in the sector. Within this framework, various initiatives have links with the groundwater of the Senegal-Mauritanian aquifer complex that have been implemented within the countries. The most concerned initiatives are: the following.

- *Gambia*

o *Improving Water Availability in The Gambia's Rural and Peri-Urban Communities for Domestic and Agricultural Use (GEF 7 – Concept Approved: 01 June 2019) (Project First review : 04 August 2021)*

o *Landscape Planning and Restoration to Improve Ecosystem Services, and Livelihoods, Expand and Effectively Manage Protected Areas (GEF 6 – approval fiscal year 2017) ; (Project Approved for Implementation for 5 years : 28 Mar 2020 (expected Completion Date 2025)*

o *Strengthening Climate Services and Early Warning Systems in the Gambia for Climate Resilient Development and Adaptation to Climate Change – 2nd Phase of the GOTG/GEF/UNEP LDCF NAPA Early Warning Project (GEF 6 – approval fiscal year 2013); Start of implementation: 2015- Completion Date : May 2021)*

o *Enhancing Resilience of Vulnerable Coastal Areas and Communities to Climate Change in the Republic of Gambia (GEF 5 – approval fiscal year 2012); Start date: 2013; End Date 2017)*

- *Guinea Bissau*

o *Strengthening climate information and early warning systems for climate resilient development and adaptation to climate change in Guinea Bissau (GEF 7 – approval fiscal year 2019) (Expected Implementation Start : 1 July 2021- Expected Completion Date : 30 June 2027)*

o *Managing Mangroves and Production Landscapes for Climate Change Mitigation (GEF 6 – approval fiscal year 2016) (Project Approved for Implementation: 2018 - Expected Completion Date : 2023)*

o *Strengthening the Resilience of Vulnerable Coastal Areas and Communities to Climate Change in Guinea Bissau (GEF 6 – approval fiscal year 2017) (Project Approved for Implementation: 24 Jan 2019; duration 5 year; - Expected Completion Date : 2024)*

o *Strengthening Resilience and Adaptive Capacity to Climate Change in Guinea-Bissau's Agrarian and Water Sectors (GEF 4 – approval fiscal year 2010) (Implementation Start : 2010 - Project Closing : 2015)*

o *LDC/SIDS Portfolio Project: Sustainable Land Management in Guinea-Bissau (GEF 3 – approval fiscal year 2005) (Implementation Start : 2008 - Project Closing : 2013)*

- *Mauritania*

o *Continental Wetlands Adaptation and Resilience to Climate Change (GEF 6 – approval fiscal year 2017) (Implementation Start : 2017 - Expected Completion Date: 2021)*

o *Improving Climate Resilience of Water Sector Investments with Appropriate Climate Adaptive Activities for Pastoral and Forestry Resources in Southern Mauritania (GEF 5 – approval fiscal year 2013) (Implementation Start : 2015 - Completion Date: 2018)*

o *Community-based Watershed Management Project (GEF 3 – approval fiscal year 2006) (Implementation Start : 2006 - Project Closing: 2013)*

- *Sénégal*

o *Strengthening Land & Ecosystem Management Under Conditions of Climate Change in the Niayes and Casamance regions- Republic of Senegal (GEF 5 – approval fiscal year 2014) (Project Approved for Implementation: 16 June 2015 - Expected Completion Date : 2021)*

o *Project for the Restoration and Strengthening the Resilience of the Lake de Guiers Wetland Ecosystems (PRRELAG) (GEF 5 – approval fiscal year 2013) (Project Approved for Implementation: 22 Oct 2015 - Expected Completion Date : 2021)*

o *Climate Change adaptation project in the areas of watershed management and water retention (GEF 5 – approval fiscal year 2011) (Implementation Start : January 2012 - Completion Date: January 2016)*

o *Groundnut Basin Soil Management and Regeneration (GEF 3 – approval fiscal year 2006) (Implementation Start : October 2007 - Completion Date: September 2012)*

o *SIP: Integrated Ecosystem Management in Four Representative Landscapes of Senegal, Phase 1 et 2 (GEF 4 – approval fiscal year 2007) (Implementation Start : 2007 - Completion Date: 2011)*

In addition to the previous, there are numerous scientific research works (PhD theses and other scientific publications)[10],[11],[12],[13] in the national portions of the aquifer with important results and information. These investigations are all localized and scattered but can nevertheless provide good bases for the realization of the activities planned within the framework of this project.

*1a.3 Proposed alternative scenario with a brief description of expected outcomes and components of the project*

With respect to the baseline, the barriers and other background elements outlined above, the following components, outcomes, outputs and activities are proposed to address the existing challenges and barriers. They are in support to the outcomes of past and ongoing actions in the area concerning the Senegalo-Mauritanian aquifer complex and its dependant ecosystem. These will precisely contribute to fulfil the needs of water for all economic activities and help ensuring food security and reduce poverty in accordance with the national strategy frameworks.

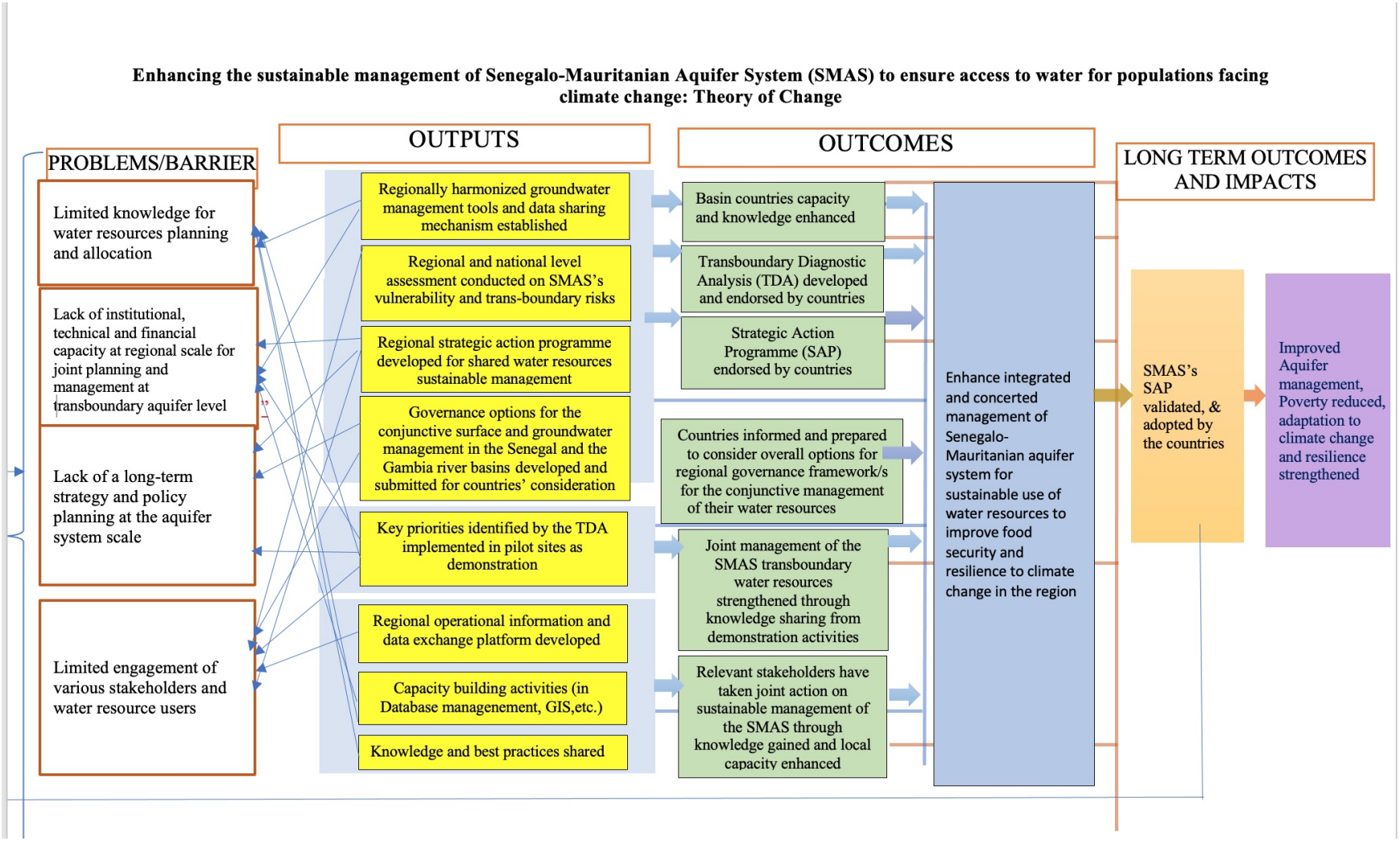
**The preliminary Theory of Change of this project in a diagram format is presented below:**

The current project will be developing a knowledge base and planning tools to support the long term regional governance platform for the SMAS.

The development of regional cooperation mechanisms will be supported by the knowledge base and tools developed by the project and provide a basis for the long term sustainable management of the aquifer. In that sense the development of a TDA and then SAP for groundwater management for the basin will be guiding the regional coordination provided by the recently established Regional Working group for the SMAS. The participating countries as well as the River Basin Organisations OMVS and OMVG have vouched to work jointly on a long term vision and roadmap towards conjunctive water management building on synergies and avoiding duplications. At national level, it will be ensured that institutions responsible for water resources are effectively exchanging through intersectoral ministerial committees to address the multiple level management issues required for the aquifer. Opportunities for stakeholders to engage in more sustainable practices will be enhanced, for example, by devising mechanisms to ensure the approaches demonstrated in pilot actions can be replicated and lessons learnt exchanged across the Basin.

The project will provide the knowledge and information basis supporting the enhanced, integrated and conjunctive management of the SASM for sustainable use of water resources and to improve food security and resilience to climate change in the region. SMAS's Strategic Action Plan (SAP), validated and adopted by the countries will provide a valuable planning tool to the relevant competent authorities such as the respective river basin organsations (OMVS and OMVG) to ensure improved Aquifer management and poverty reduction by strengthening adaptation to climate change and resilience. The project will facilitate the development of an options assessment to help identify the optimal regional governance mechanism/ptoesses for long term conjunctive management of the surface and groundwater resources of the SMAS.

Revised Figure 3: draft ToC




The project components, together with outcomes, outputs and activities are presented as follows.

Component 1: Improving the understanding of the status and functioning of the Sengalo-Mauritanian Aquifer System (SMAS), and of its, and of its interactions with the Senegal and Gambia rivers.

Water resources management can only be efficient if appropriate and reliable scientific knowledge and information is available. The main purpose under this outcome is to develop the scientific tools required to provide the reliable information needed for the development of the SMAS water resources planning and sustainable management foreseen in the framework of this project. This will essentially consist of setting up a regional database, defining the conceptual model of the SMAS, and establishing the SMAS's water balance with identification of the aquifer's hydraulic relationship with the surface waters (Senegal and Gambia rivers). A 3D mapping of aquifers and aquitards using a hydrostratigraphic model to visualize and determine recharge zones, runoff directions and interactions with surface water, the technical and economic feasibility of the exploitation of the aquifer system in some specific zones (i.e., aquifer depth), volume of available water, vulnerability to contamination, etc. ). To construct that model, a cartographic synthesis of available data and information on groundwater at the SMAS scale, by compiling and harmonizing available knowledge on aquifers, uses, natural and anthropogenic contamination, etc. will be realized.

Outcome 1.1: Improved shared knowledge of the current status and potentialities of the SMAS, of its dependent ecosystems and of its interactions with surface waters, reinforces transboundary cooperation and enables joint priority setting

*Outcome Indicator 1: C*ommon scientific management tools established

- *Target value:*

o a common regional data base established, gathering data at the SMAS scale
o a 3D hydrostratigraphic basin models developed
o a Hydrogeological and transport model developped
o a common monitoring protocol establised
o a data sharing mechanism established
o georeferenced maps with available data and information on groundwater at the SMAS scale elaborated

*Ouput 1.1.1:* Regionally harmonized groundwater management tools (Database; GIS; aquifer's hydrogeological and transport conceptual model including water balance and transport of e.g. Nitrogen, Floride, etc….; monitoring network design and protocols), and data sharing mechanism established: The main activities under this output are:

- *Collecting existing data and information at the regional level and identifying gaps*
- *Developing common Database for SMAS*
- *Characterizing the geometry of the aquifer*
- *Establishing hydrogeological thematic maps (hydrogeology, water quality, etc.)*
- *Developing Hydrogeological and transport model*
- *Using climate prediction existing models in the sub-region for better water resources management planning*.

Existing Data collection from countries will allow establishing a Common regional Database which will feed the hydrological model and Transport model. The transport model will also allow to connect water quality data to study sea water intrusion on one side, and also fluoride or Nitrogen contamination or pollution. OSS internal expertise on modeling bring expertise (so the activity will be less expensive).

Unsaturated zone (surface to groundwater) is an important area to study nitrogen concentration in the aquifer. In irrigated areas, pesticides contamination may occur, depending on the velocity to get to groundwater. Rice agriculture is using agro-chemicals. Data on concentration of nitrogen and fluoride to be introduced in transport model will be collected from different sources (countries data, Litterature, International Atomic Energy Agency studies carried out in the countries).

*Existing models for climate predictions in the sub-region will be used to understand and take account of climate impact on hydrological conditions (including on aquifer recharge, Groundwater abstraction, etc.…) in the model, with the objective of more leading to more informed and effective water resources management planning. These models will also help assessing climate risks.*

Ouput 1.1.2: Regional and national level diagnostic assessment (TDA) identifying SMAS's challenges and opportunities and transboundary issues of concern, jointly developed by the countries sharing the aquifer, with consideration of future climatic scenarios, ecosystems health, and socio-economic aspects, including gender

*Outcome Indicator 2:* TDAs (regional and national) submitted for approval to the Project Steering Committee (PSC).

- *Target:* PSC approves the TDA

The main technical role of the TDA is to identify, quantify, and set priorities for environmental problems that are transboundary in nature with in particular aiming to:

- Identify & prioritise the respective transboundary problems of the SMAS
- Gather and interpret information on the environmental impacts and socio-economic consequences of each of these problem
- Analyse the immediate, underlying, and root causes for each problem, and in particular identify specific practices, sources, locations, and human activity sectors from which environmental degradation arises or threatens to arise.

The transboundary diagnostic analysis will be performed in the first step for the national portion of the aquifer in each of the 4 countries and in a second step a regional TDA at the SMAS scale will be established. It will obviously be based on the scientific data and information carried out from Outcome 1.1 and will address the analysis of thematic aspects such as: environment, hydrology, geomorphology, climate change, water uses of natural resources, socio-economics, institutional, regulatory and governance aspects of water resources, cultural aspects, etc.

The TDA is part of a process of engagement of stakeholders through the initial TDA development steps and the subsequent development of alternative solutions during the formulation of the SAP. The main technical role of a TDA is to identify, quantify, and set priorities for environmental problems that are transboundary in nature.

The countries representatives in the PSC are key officials and competent authorities from countries that are entitled to approve the TDA. Additionally, the OMVS and OMVG will engage in the necessary stakeholder involvement for TDA approval. This process will be reinforced and supported by the regional governance framework of the RWG.

The achievement of a coherent TDA is essential for the proposal of a strategic plan and framework for cooperative governance of the SMAS water resources.

The main activities are the following:

- *Identifying and prioritizing transboundary risks in the SMAS taking into account the major problems in the Senegal and Gambia rivers basins*
- *Assessing vulnerability of aquifers to climate variability*
- *Assessing anthropogenic and marine intrusion impacts on the SMAS*
- *Analyzing local populations resilience to climate change*
- *Establishing Causal Chain analysis for the major transboundary risks identified*
- *Water governance: Diagnostic analysis of national water resources management strategies (groundwater in particular) taking into account the Senegal and Gambia basins Organisations' strategies*

Component 2: Developing a regional Strategic Action Program (SAP) for the Senegalo-Mauritanian aquifer system and facilitating conjunctive surface and groundwater management

The aim under this outcome is to establish a planning tool for efficient and coherent allocation of water resources in general and groundwater resources in particular at the SMAS scale over the medium and long term. Specifically a Strategic Action plan (SAP) will be setting out clear priorities for action at national and regional level (ie. policy, legal, institutional reforms, or investments) to resolve the priority transboundary threats and opportunities identified in the SMAS TDA. This enables a clear distinction between actions with purely national benefits and those addressing transboundary concerns with regional benefits. This tool will be discussed and approved by the four countries. The SAP will also be submitted to different financial partners in order to solicit their support for the proposed actions implementation.

Another key element in the cooperation process involves the development of institutional mechanisms at the regional and national levels for implementing the SAP and monitoring and evaluation procedures to measure effectiveness of the outcomes of the process.

Planning activities are among others:

Outcome 2.1: SMAS Strategic Action Program (SAP) developed and endorsed by the participating countries enables the sustainable management of the transboundary SMAS

*Indicator :* SAP submitted for endorsement by countries at ministerial level (i.e. by at least one minister from each SMAS country)

*Target :* 1 regional SAP

*Ouput 2.1.1.* The Strategic Action Program for the sustainable management of the transboundary SMAS, developed and submitted for countries' endorsement at ministerial level

A jointly prepared Strategic Action Programme for the sustainable and efficient use of the aquifer's resources including legislative and policy reforms, and investments will be developed.

The strategic action programme (SAP) for the SMAS will form the negociated policy document established based on the Transboundary Diagnostic Analysis (TDA). The SAP will be adopted and signed by at least one Minister from each country. It will help to define the strategic priorities to be addressed in the Aquifer, the needs, hot spots and funding gaps major TDA and find multistakeholder consultation from the very beginning of the process to find negotiated solutions.

The SAP will be based on the informed commitment by the countries and will be developed and approved by the four countries concerned with support of the consultation framework of the OMVS, OMVG technical advisory committees and guided by a common vision for cooperation on the SMAS provided by the by RWG. The SAP will also be submitted to different financial partners in order to solicit their support for the proposed actions implementation.

This will be achieved by the following activities:

- *Organizing national and regional consultations process (strategic thinking workshops)*
- *Formulating and validating the Strategic Action Programme (SAP)*

*SAP endorsement by the countries at the highest level, adopted and signed by at least one Minister from each country and validated through the RWG for the Basin.*

The activities under this output will be guided by the TDA/SAP methodology (IW:Learn) to develop the SMAS SAP through an inclusive multistakeholder consultation process. In the case of the SMAS SAP this will be driven by the four countries concerned that have been working under the cooperation framework of the Regional working group for the Basin (consisting of the countries, OMVS, OMVG and facilitated by the UNECE, Geneva Water Hub and IGRAC). The RWG was formalized by a declaration signed by the Minister on 29$^{th}$ September 2021, during the conference of parties. At the conference, the Ministers in charge of water of the four countries also signed a Ministerial Declaration on the Basin reinforcing their commitment to (i) strengthen the RWG including the extension to other sector Ministries such as Environment and Foreign Affairs (point 6) and (ii) establishing a legal and institutional framework for transboundary cooperation for the sustainable management of the waters of the Senegalo-Mauritanian Aquifer Basin in conjunction with surface waters (point 5 of the Declaration).

The Ministerial Declaration also welcomes this GEF project which allow implementing some of the key elements of the vision of the RWG. In that sense , the SMAS SAP development process will benefit from these recent regional commitments and the consultation process for the SAP will be driven by the countries and be embedded into the new regional cooperation structure provided by the RWG in order to coordinate and harmonise the various initiatives (point 10 of the Declaration).

*Ouput 2.1.2*. Partners' and donors roundtable organized for resource mobilization for the implementation of SAP

*The main activity under this ouptut is the organization of a partners' and donors roundtable to facilitare adoption of the regional strategic framework for conjunctive managmment and resource mobilization to support SAP implementation.*

Outcome 2.2:. Countries informed and prepared to consider overall options for regional governance framework/s for the conjunctive management of their surface and groundwater resources

Indicator: Report on regional governance options for the conjunctive surface and groundwater management submitted for approval by the Steering Committee (SC)
Target value: Report approved by the SC

*Ouput 2.2.1*. Governance options for the conjunctive surface and groundwater management in the Senegal and the Gambia river basins developed and submitted for countries' consideration

The RWG has been given the mandate in the Ministerial Declaration to establish a transboundary cooperation framework for the SMAS in conjunction with surface water and to launch a negotiation process to define this governance framework (point 5 of declaration). This project will support this vision and commitment by developing a governance options report to be submitted to the countries under the auspices of the RWG.

Under the current project a governance options report for the conjunctive management of water resources of the SMAS will be developed which will include the assessment of the existing legal and institutional structures and processes within the SMAS, and the subsequent assessment of the regional framework of the SMAS to be developed with the RWG.
The options report will be developed together with the countries, OMVS, OMVG and presented to the RWG for discussion and final validation in line with their mandate and vision.
The assessment of options will take into account the SAP of OMVS, noting that, apart from Guinea Conakry which is upstream, 3 countries of OMVG are concerned by the TDA/SAP of SMAS (see table below).

The fact that the RWG has invited those members of OMVS and OMVG that do not share the Senegalo-Mauritanian Aquifer Basin, namely Guinea and Mali, to participate as observers will complete the whole basin coverage demonstrating the aim for a systems approach and move towards conjunctive management of shared surface and groundwater resources.
Activities under this outcome will benefit from the strengthening of the RWG mandate under the Ministerial declaration (see Annex of the declaration) and be embedded into the cooperation framework chosen to harmonise all initiatives to be implemented in the Basin including discussion of options for the institutional cooperation mechanism chosen to ensure sustainable, equitable and efficient use of the SMAS resources. The RWG is facilitated by the Water Convention secretariat (UNECE), Geneva Water Hub and IGRAC.

Financial support for the implementation of priority activities identified under SAP and related capacity building needs will be addressed through the organization of a donors round table for the SMAS.
Options and recommendations for expanding through the RWG the mandate of the two basin organizations (OMVS, OMVG) to include groundwater, and for reinforcing their capacity to implement conjunctive surface and groundwater management will be part of the comprehensive options paper assessment. These recommendations will be developed with the RBOs and then validated through the RWG and presented to the Ministers.
As the underlying agreements of the River basin organisations (RBOs) do not cover the whole SMAS groundwater resources, recommendations for expanding, through the RWG, the mandate of the two basin organizations (OMVS, OMVG) to include groundwater, and for reinforcing their capacity to implement conjunctive surface and groundwater management will be assessed in the options report. These recommendations will be adopted and expanded through the RWG to the Council of Ministers (COMs) of the RBOs for them to be amended by the Ministers. That will allow implementing conjunctive surface and groundwater management of the SMAS (see table below).

Table 1: Member countries of SMAS and RBOs

| Country | SMAS countries | OMVS member con utries | OMVG member con utries | Remarks |
|---|---|---|---|---|
| Gambia | X | | X | |
| Guinea Bissau | X | | X | |
| Mauritania | X | X | | |
| Senegal | X | X | X | |
| Guinea Conakry | | X | X | upstream of the S MAS and observers of the RWG |
| Mali | | X | | |

X : Country that is a riparian of either river or has part of the aquifer
NB. Guinea Conakry and Mali are not SMAS countries but have been invited as observers to the RWG as they are upstream and are indirectly concerned by the conjunctive management.

Component 3: Piloting the implementation of groundwater-based adaptation measures to mitigate the impacts of climate change and related hazards

Outcome 3.1: The successful joint implementation of small-scale demonstration measures strengthens transboundary cooperation and feeds into the SAP formulation process

*Indicator 5: Number of pilots*

- *Target:* at least two transboundary pilots

In a context of growing demand for high-quality water, strengthening capacities for preventing and managing conflicts over use at various levels - local, national and regional - is vital. A programme of four field pilot projects implemented in the four countries will allow testing and implementing climate-smart policies and measures promoting the sustainable and equitable allocation of water resources, their efficient use, the protection of their quality and the artificial recharge of the aquifer.

The pilot projects will be carefully selected, including on the basis of the results of diagnostic studies, for their national (e.g. “hotspots”) and regional (e.g. representative of common regional problems, or, if possible, implementation in border zones) impact.

The selection and the design of the pilots will be anticipated while awaiting finalization of the TDA in order to prepare for implementation within the project timeframe. The of Scope of pilots will be to further clarified during PPG and for each pilot all relevant stakeholders, end users, civil society, rural communities will be identified.

As part of these pilot projects, small investments, including on monitoring, will allow equipping national and local users and institutions, with tools and infrastructures fostering climate change adaptation and the sustainable management of the aquifer and training will strengthen the capacity of authorities and water users.

Moreover, experience between the pilots will be exchanged at the regional level among stakeholders and countries.

*Ouput 3.1.1*. Small pilots demonstrating, in a transboundary context, ways to address major concerns such as the need for improved water use efficiency in agriculture, for climate change adaptation, and for expanded water resources availability

*The pilot demonstrations sites and scope will be identified and further fine-tuned during the project preparation process (PPG).*

*During the project preparation process (PPG) particular attention will also be given to the participative identification of adaptation actions in the pilot zones.*

Component 4: Communication and knowledge management

Outcome 4.1: Stakeholders' enhanced knowledge and capacity facilitate coordinated action for the sustainable management of the SMAS

*Indicators:* Number of persons receiving training, participating to dissemination events, and of Experience Notes

*Target:*

- At least 500 gender balanced participants to training modules and dissemination events
- At least 4 Experience Notes published

Under this outcome, stakeholders capacity bulding (material and human) will be undertaken and the project's achievements and learning will be disseminated to a wide range of stakeholders for maximum outreach.

There will be an initial capacity building and training needs assessment in the inception period of the project with emphasis on TDA/SAP training as requested by RBO and countries.

The main activities will include:

*Ouput 4.1.1.* Regional information and data exchange platform for conjunctive water resources management established

- *RBO do not have comprehensive Database systems covering the groundwater quality and quantity on SMAS. The Database to be developed will be feeding into the modele and supporting the OMVS and OMVG information systems.*

*Ouput 4.1.2:* Communication and dissemination plan prepared and endorsed;

- *Formulating and implementing the project communication and dissemination plan*
- *Elaborating communication and knowlege products for dissemination*

*Ouput 4.1.3.* Based on a need assessment, capacity building modules (in Database, GIS, Modeling, TDA/SAP, water resources allocation, etc.) organized for member countries and basin organizations;

- *Organizing training workshops on various thematics (database, GIS, modeling, TDA/SAP, water resources allocation, etc.). Training needs assessment would also aid to define the target groups in the countries*.

*Ouput 4.1.4.* Project results and lessons learned disseminated at the local, national, and regional levels through *ad hoc* interactive learning events

- *Participating to national, regional and international events for project's results sharing and dissemination. This will be integrated into the Knowledge Management Strategy taking into dissemination and interactive training as well as emphasis on awareness raising of all the key stakeholders including the district and national level. Exchanges with other RBOs in Africa and eslewhere will be engaged in working on integrating groundwater into the river basins and*

*in some cases legal agreements - e.g. Niger_Ittas; Orange-Senqu and Stampriet; Limpopo basin and underlying aquifers; etc.*

*Output 4.1.5.* Project visibility improved by establishment of a project website, and lessons learned shared for broader adoption through cooperation with IW:LEARN, including participation to IWCs, and production of Experience Notes

- *This will include cooperation with IW-Learn (participation in regional IW:Learn meetings and global IW Conferences; delivery of results notes; a project website or webpages within the sites of the RBOs, etc.).*

*1a.4 Alignment with GEF focal area and/or Impact Program Strategies*

In summary, this proposal will strengthen a concerted and conjunctive management as well as sustainable exploitation of the resources of the Senegalo-Mauritanian aquifer complex through the implementation of appropriate tools following the GEF innovating approach: an TDA/SAP development and its implementation. Therefore, the objectives and interventions of this project are consistent with the GEF Strategy on the International Waters such as the GEF-7 programming directions, in particular with objective 3 of "International Waters Focal Area": Enhancing water security in freshwater ecosystems. The project interventions are specifically most relevant to three strategic actions under this focal area, namely :

· *IW-3-5: Enhance water security in freshwater ecosystems through advance information exchange and early warning;*

· *IW-3-6: Enhance water security in freshwater ecosystems through enhanced regional and national cooperation on shared freshwater surface and groundwater basins*

· *IW-3-7: Enhance water security in freshwater ecosystems through investments in water, food, energy and environment security*

*1a.5 Incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and co-financing*

The funding requested from the GEF will support the implementation of the proposed project interventions, including strengthening governance and sustainable management of the Senegalo-Mauritanian aquifer. At the same time, these interventions will contribute to strengthening the resilience of communities and ecosystems in the 4 target countries. The aim is to produce a Transboundary Diagnostic Analysis with a Strategic Action Plan (TDA/SAP) through the GEF approach and to support its implementation, to promote appropriate concerted governance mechanisms and water resources conjunctive management as well as the assessment of climate variability and change.

While GEF funding has been provided in the past for surface water interventions in the Senegal River Basin, including the development of its TDA/SAP and its implementation, the Senegalo-Mauritanian aquifer system has not yet benefited from GEF funding. Interventions relating to this transboundary aquifer complex are rather limited in terms of spatial extension and financial consistency. These interventions are often fragmented and focused on the needs at national level with a lack of options financing at regional governance level. Planning processes are often driven by sectoral interests of each country, resulting in insufficient systemic integrated approaches and thereby non-sustainable developments. So far, much of the financing provided depends on external aid and the sustainability of actions is often not guaranteed. It is expected that the actions planned under the current project will help enhance the achievements of previous GEF international waters initiatives and complement past and ongoing initiatives taken by countries in the national portions of the aquifer basin. GEF support will also increase the institutional and technical capacity of member countries and the sustainability of interventions, contributing to lasting transboundary benefits. GEF support will fill some significant knowledge gaps and will result in a long-term strategic document (the SAP) for this shared

aquifer. The SAP document will guide any future investment by national governments or international cooperation partners in order to ensure that it is aligned with the agreed strategic priorities for the shared aquifer system. GEF funding will also support both the implementation and investment plans for the SAP in the basin. This will provide evidence of the priority and investment potential of the identified actions.

In terms of co-financing, the project partners have pledged their commitments to the implementation of this project. Additionally a number of key partners such as the World Bank, African Development Bank, the European Union, the Geneva Water Hub, and the UNECE are active in the region and have expressed their interest to contribute and assess options for financial and technical support for the future implementation of the project. In the project preparation phase particular attention will be given to the mapping of partners and donors and their contribution to future investment coordination. Considering the current momentum around the work of the Regional Working group this project will have opportunity to attract and leverage additional resources and funding. The details and level of commitment of these will be confirmed during the preparatory phase of the project.

*1a.6 Global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF)*

The project concerns a specific geographical area in terms of environmental issues and socio-economic poverty. Indeed, this area is among the most vulnerable to climate change and the four countries concerned are among the least developed countries in the world with very limited capacities of adaptation of the populations. As mentionned, the aquifer water resources and their dependent ecosystems are facing significant environmental challenges from both anthropogenic and natural sources. The water sector has also been identified as one of the most vulnerable sectors in the four countries and its vulnerability affects all other sectors and economic activities. Thus, in order to strengthen the resilience of socio-environmental and economic systems, it is essential to address the challenges of the water sector. This requires, first of all, effective management and governance of these resources. The present project proposal interventions are targeted, through the provision of scientific information, knowledge management and development of strategic planning tools to support the processes of concerted, conjunctive management and governance of groundwater in the Basin Aquifer. With the inclusive development of the Transboundary Diagnostic Analysis (TDA) the project will promote more comprehensive knowledge base of the resources and thereby assist to prevent environmental degradation due to overexploitation of water resources and strengthen the resilience of the local populations. Building on the results of the TDA a Strategic Action Plan for the Sengalo Mauritanain Basin will be facilitated as a key planning tool for OMVS and OMVG and the Regional Working Group. Priorities drawn up by beneficiary countries in a participative consultation process will provide the Basin organisations with a solid framework for identifying, updating and implementing priorities and idenfify future funding to address these priorities. These planning tools con contribute to the development of Implementation/Action Plans and investment roadmaps for the Senegalo-Mauritanian aquifer at the whole aquifer scale. These planning tools can help promote an appropriate distribution between concurrent uses, an equitable distribution of benefits and burdens, an adequate and equitable participation of all stakeholders concerned (with particular attention given to addressing women and youth) and the consideration of sustainability in water resource management.

Ultimately, through project interventions, the Senegalo-Mauritanian aquifer system will be managed as a shared resource by the four member countries. One of the most important benefits will be the complementary detailed strategic TDA/SAP assessment for the Gambia which will lead to a comprehensive coverage of the Aquifer Basin and the necessary step for conjunctive surface and groundwater management of the resource leading to the improvement of dependent ecosystem services and the enhancement of the resilience of the populations.

*1a.7 Innovation, sustainability and potential for scaling up*.

Innovation

This project is specifically addressing the sustainable management of an overexploited and threatened transboundary aquifer (The Senegalo-Mauritanian aquifer), and the establishment of a framework for cooperative and concerted governance for this aquifer. These specific conjunctive management and governance frameworks and interventions on groundwater bodies are essential for the sustainability of these rare resources. In the Western Africa Region, this

is the second GEF supported intervention of its kind after the one supporting the shared aquifer of Iullemeden Taoudéni Tanezrouft , even though the region contains more than ten shared aquifers. Most of the time, the interventions target shared surface water, while groundwater is very strategic for different dependant-ecosystems and especially for socio-economic activities and community resilience, including the drinking water supply.

The project will develop a Strategic Action Plan for groundwater management for the aquifer linking with the existing surface water master plan of the Senegal River Basin to strengthen the conjunctive water management supported by the GEF. The Strategic plan aims to ensure an equitable distribution of uses according to the various uses at the scale of a transboundary aquifer basin. The innovative approach of the project is that the tool relates to a shared aquifer, combining with surface water and will be developed using an integrated, intersectoral, inclusive and participatory approach.

In terms of hydro-diplomacy, this project, beyond the aspects of cooperative management of water resources and the environment, will support the ongoing dialogue and collaboration between the riparian countries and communities and provide tools that could serve as a peace preservation tool in the region.

Sustainability

The project's interventions are consistent with each country's water sectoral priorities with a particular emphasis on capacity building, including intensified learning, both for institutional actors and for community and local actors. This aims to guarantee the ownership of the project's achievements and outcomes by the stakeholders. This should give them ability to preserve, to sustain and to replicate the project achivements later on. Particular attention will be devoted to the sustainability strategy during the project designing step. A regional governance mechanism for the entire Aquifer will be supported as part of this PIF; building on existing frameworks (Regional Working Group, OMVS, OMVG) and consultation initiatives in the Basin. The project supports the transboundary process for the development of management tools to ensure the protection of resource and sustainability of the project actions. This project will benefit from the experience of OSS in terms of transboundary aquifers gouvernance mechanism establishment aquired in the framework of North Western Sahara Aquifer System (NWSAS) project and ongoing for the Iullemeden-Taoudeni/Tanezrouft Aquidefer System (ITTAS).

Potential for scaling up

The project intends to develop a Strategic Action Plan (SAP), and to support its implementation through pilot demonstration activities (Component 3 of the project). The pilot activities will address priority issues of the aquifer complex and will be designed taking into consideration some key criteria, including replicability and scalability. These actions, which will initially be carried out on a limited scale with a strong foundation, can be replicated and scaled up in a later process. It will also demonstrate stakeholders involvement and community resilience and adaptive capacity bulding. Best practices and lessons learned from demonstration projects will be codified and disseminated to further promote the potential for replication. Similarly, the achievements and lessons learned from the project implementation may be useful for future interventions in other transboundary aquifers and sustainable management of shared waters.

[1] ILEC, UNEP-DHI, UNESCO-IHP, UNESCO-IOC and UNEP (2016). Water System Information Sheets: Western & Middle Africa. In: Talaue-McManus, L. (ed). Transboundary Waters: A Global Compendium, Volume 6-Annex F. United Nations Environment Programme (UNEP), Nairobi. 344p

[2] https://unstats.un.org/unsd/snaama/Index

[3] ILEC, UNEP-DHI, UNESCO-IHP, UNESCO-IOC and UNEP (2016). Water System Information Sheets: Western & Middle Africa. In: Talaue-McManus, L. (ed). Transboundary Waters: A Global Compendium, Volume 6-Annex F. United Nations Environment Programme (UNEP), Nairobi. 344p

[4] Madioune, Hélène (2012). Etude hydrogéologique du système aquifère du horst de Diass en condition d'exploitation intensive (bassin sédimentaire sénégalais) : apport des techniques de télédétection, modélisation, géochimie et isotopie. *Thèse de Doctorat, ULiège.*

[5] **Diaw, Moktar et al. (2010).** Status of Water Resources in Senegal : Potential, Issues and Opportunities, Policies and Strategies. Conference paper. Scientific Conference of the NASAC-KNAW Collaboration Initiative on "Water Management Issues in Africa", 28-31 March 2012, Boname Hall, MSIRI, reduit, Mauritius.

[6] COWI (2002) : Modèle hydrogéologique du système aquifère Maastrichtien du Sénégal. 224 p

[7] Mohamed A.S. (2012) : Approches hydrodynamique et géochimique de la recharge de la nappe du Trarza, sud-ouest de la Mauritanie. Thèse de doctorat ; Université de Paris Sud. 180p

[8] UNESCO (2014): TWAP Groundwater; Regional report for Northern, Western and Eastern Africa. OSS. 68p

[9] Programme d'Atténuation et de Suivi des Impacts de l'Environnement

[10] BRGM et al. (2011) : Vers une Gestion Concertée des Systèmes Aquifères Transfrontaliers. PARTIE II – Analyse de quelques cas à forts enjeux. 148p

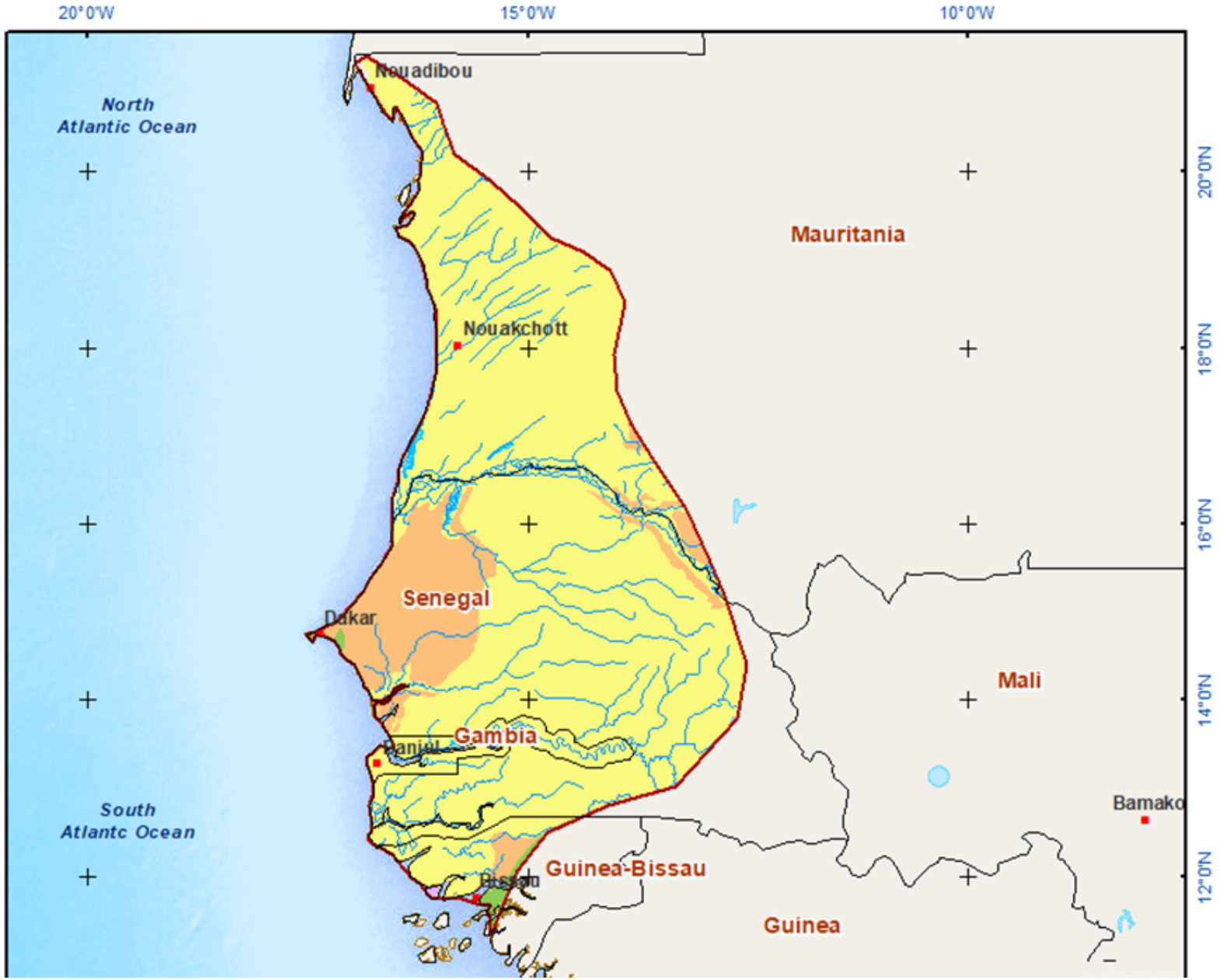
[11] Sarr B. (2000): Contribution à l'étude hydrogéologique des aquifères de l'ouest du bassin du Sénégal. Docteur de 3$^{ème}$ cycle en Géologie appliquée. 164p

[12] Dieng, B., Ledoux, E. and de Marsily, G. (1990): Palaeohydrology of the Senegal sedimentary basin: a tentative explanation of the piezometric depressions. J. Hydrol., 118: 357-371. 15p

[13] Mohamed A.S. (2012) : Approches hydrodynamique et géochimique de la recharge de la nappe du Trarza, sud-ouest de la Mauritanie. Thèse de doctorat ; Université de Paris Sud. 180p

1b. Project Map and Coordinates

Please provide geo-referenced information and map where the project interventions will take place.



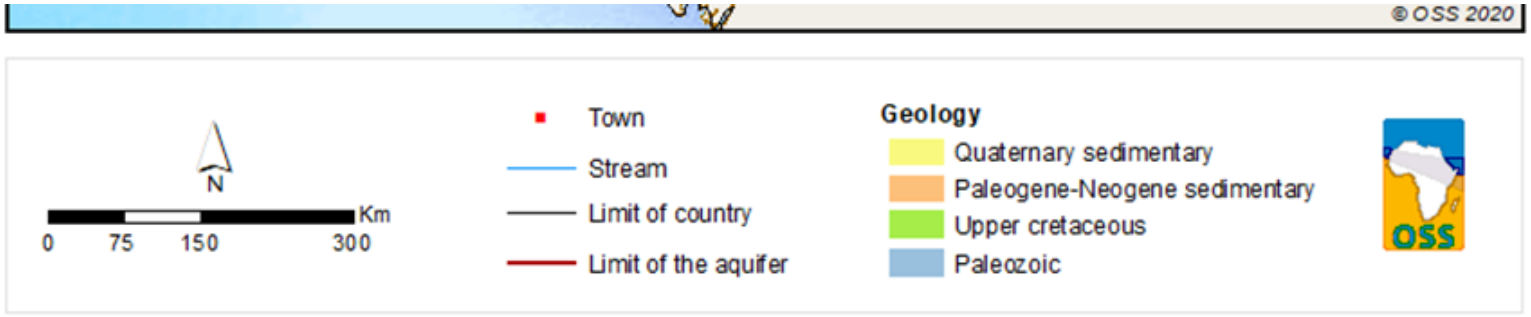



**Figure:** Hydrogeological framework of the Senegal-Mauritanian Aquifer System
Source of Data: Aquastat, FAO (2011).

2. Stakeholders

**Select the stakeholders that have participated in consultations during the project identification phase:**

**Indigenous Peoples and Local Communities** Yes

**Civil Society Organizations** Yes

**Private Sector Entities**

**If none of the above, please explain why:**

**In addition, provide indicative information on how stakeholders, including civil society and indigenous peoples, will be engaged in the project preparation, and their respective roles and means of engagement**

This project concept has been in development since 2003 when the four states sharing the aquifer requested UNEP and the Sahara and Sahel observatory (OSS) to identify potential funding and provide technical assistance for its full project development. A first draft was elaborated and formally endorsed by the participating countries in August-November 2014-February-August 2015, as well as the two main basin organizations (OMVS (24 august 2015) and OMVG (25 august 2015)). In 2017 (25-26 May), the 4 SMAS countries formally mandated OSS to prepare a project and seek funding to strengthen the knowledge and management of this aquifer system. A project concept note was elaborated for this purpose and submitted to the countries for approval. On 26 November 2015 UNEP prepared a support letter for the project to be submitted to AfDB for finance and exchanges with UNEP continued.

UNEPs International Water unit then approached the Global Environment Facility in 2019 with a request for funding of the project identification form (PIF) under this GEF 7 cycle.

In addition, the 4 countries, with the facilitation of UNECE, IGRAC and Geneva Hub have established a Regional Working Group (RWG) in February 2019 with the main mission of strengthening the governance framework of the aquifer system and to this end, developed a road map to guide the implementation of a comprehensive cooperation programme for the Basin.

The PIF was then further developed in 2021 with inputs from the regional working group (RWG) which had in the meantime been mandated to drive cooperation and advise participating countries and the respective River Basin Organisations (RBOs) OMVS and OMVG on the creation of a long-term mechanism for the concerted management of the SMAS. UNEP and OSS were able to present and discuss the SMAS PIF and its alignement to the RWG roadmap at a number *dedicated* meetings of the RWG on June 09, 2021 and September 3$^{rd}$ and 10$^{th}$ 2021. The UNEP led PIF was reviewed by the members of the RWG and facilitators and their comments on alignment and synergies were taken into account in this new revision of the PIF. Minutes of the meeting of September 10$^{th}$ 2021 and exchanges with the RWG coordinator thereafter confirm the RWGs (and its facilitators UNECE, Geneva Water Hub and IGRAC) their support to the GEF PIF and their welcoming and facilitation of this project as a contribution to the implementation of the RWGs overall roadmap for the Senegalo Mauritanian Basin.

On 29 September 2021, Ministers of the the participating countries of the RWG ( Gambia, Guinea Bissau, Mauritania, Senegal),signed in Geneva a Declaration on the Senegalo-Mauritanian Aquifer Basin which endorsed the vision for the regional cooperation platform of the RWG . The Declaration established the RWG as a key regional mechanism to guide the next steps in the development of the cooperation and coordinate and harmonize various initiatives on the Senegalo Mauritanian Basin (SMAB). A number of meetings were conducted with the RWG and the current PIF was harmonized and synergised with the work of the RWG. The Ministerial declaration also welcome the UNEP project proposal to the GEF which will allow implementing some elements of the vision and the project of the RWG.  UNECE, GWH, IGRAC, as facilitators of the RWG, have and will continue to contribute to the definition of the SMAS GEF project and will be active part to  participate in the PPG phase and to support implementation of activities.

Other stakeholders:

There is a wide range of stakeholders that have demonstrated their interest and engagement in the aquifer.

The following is a non-exhaustive list of major stakeholders which will be updated the PPG phase:

1. - Regional intergovernmental organizations, particularly ECOWAS (centre for water resources management) and the African Union (AMCOW, relevant technical departments, etc.) Civil society actors, national and international NGOs, socio-professional organizations, local and/or indigenous communities, women's groups, etc. Will be further identified and involved in the process of defining interventions during the ppg and in future implementation of the project. UNEP and OSS will continue regular exchange with key partners and countries on the developments in the aquifer.

- The NGOs Hub Rural NGO (West Africa), Tenmiya and Egire (Mauritania), and Enda tiers monde (Senegal) will be involved in the project implementation to ensure better impact of the projects results at the local level.
- University Cheikh Anta Diop (UCAD) of Dakar (senegal) and University of Nouakchott Al-Aasriya (Mauritania) will be involved in the SMAS knowledge improvement.

This list is indicative and a comprehensive mapping of stakeholders will be carried out and a plan for their engagement will be designed during the participatory development of the project document (PPG).

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Table: Stakeholders and their roles

| Country | Stakeholders | Regional, National or Local level | Role |
|---|---|---|---|
| Guinea Bissau | Representative of the Ministry of Water Resources - Bissau | National | In charge of water resources management at national level; to define activities and their alignment with national priorities |
| | Local NGO | Local | Participate to implement activities |
| Gambia | Representative of the Ministry of Water Resources - Banjul | National | In charge of water resources management at national level; |
| | Local NGO | Local | Participate to |

| | | | |
|---|---|---|---|
| | [illegible] | [illegible] | [illegible] implement activities |
| Mauritania | Representative of the Ministry of Water Resources - Nouakchott | National | In charge of water resources management at national level; |
| | Local farmers | Local | Implementation of pilot demonstration |
| | Local NGO | Local | Participate to implement activities |
| Senegal | Representative of the Ministry of Water Resources - Dakar | National | In charge of water resources management at national level; |
| | Local farmers | Local | Implementation of pilot demonstration |
| | Local NGO | Local | Participate to implement activities |
| OMVS | Representative of the river basin organization - Dakar | Regional | Implementing and facilitating activities |
| OMVG | Representative of the river basin organization - Dakar | Regional | Implementing and facilitating activities |

3. Gender Equality and Women's Empowerment

**Briefly include below any gender dimensions relevant to the project, and any plans to address gender in project design (e.g. gender analysis).**

The project will take into consideration the political and strategic orientations in terms of gender (gender parity, vulnerable groups) of the different entities involved, namely: GEF (donors), UNEP (implementing agency), OSS (executing agency), other stakeholders (ECOWAS, AMCOW, Geneva Water Hub, etc.).

UNEP believes gender equality and women's empowerment is recognized as a cross-cutting priority across all aspects of UNEP's work. Therefore UNEP promotes men and women's participation in all environmental protection and sustainable development activities. Finally, as the lead organization to coordinate environmental matters within the United Nations System, UNEP has the responsibility to drive the achievement the System's gender equality mandate in its environmental assessments and analyses, norms, guidelines and methods, for use by stakeholders looking for guidance on how to effectively manage the environment for their sustainable development and economic growth (UNEP, 2021).

Finally, the purpose of the present Gender Policy is to provide a framework for guiding its efforts to achieve Gender equality and particularly to support women's diverse roles in the different development programs, projects and actions conducted at the level of its zone of action. The overall objective of the OSS Gender Policy is to promote a participatory and fair development for women and men, and to ensure an equal and fair access to resources and opportunities for both of them with the full respect of their fundamental rights.

The same will apply to gender policies in the different countries where all involved have designated ministries to promote gender equality: the Gambia Ministry of Women's Affairs, Guinea Bissau  Ministry of Woman, Family and National Solidarity, Mauritania and Senegal respectively have the Ministry of Women, Children and the Family .

. The project is also in line with SDG 5 on Gender Equality and Empowerment of Women and Girls, and will seek to improve women's participation in decision-making particularly in groundwater management and transboundary governance and water resources development. For instance SDG 5 target 5a aims to undertake reforms to give women equal right to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws.Gender strategies[1] promoting gender related activities and planning tools will be integrated and a dedicated gender specialist will accompany project development and implementation .

Gender mainstreaming will be promoted at the earliest stages of the PPG phase to take into consideration the contribution of women to project activities in key areas where women already figure prominently. Their participation will be guided by the gender expert in order to ensure their active contribution to the planned consultation process as part of the PPG phase and the definition of project activities. Their role in stakeholder fora, as well as contribution to tool and policy development will be given particular attention. The socioeconomic benefits and gender mainstreaming will help to strengthen the impacts of the interventions on the management of the SMAS basin. There is a mutually reinforcing effect between and among the objectives of improving the effective andsustainbale management of water resources, optimizing economic benefits and improving the role of women in project formulation and implementation. Women's skills and knowledge are crucial for the effective and efficient management of water and their participation will lead to more informed decision making.

A dedicated Gender Mainstream Strategy will include a gender analysis that looks at the relations (differences, inequalities, power imbalances, differential access to resources, etc.) between and among women and men and how these are negotiated.

The gender strategy will be prepared, describing gender action points for each project output during the project designing phase to take into account how women and vulnerable groups are effectively and efficiently involved in decision-making processes.

As an indication, this plan will address the following elements (non-exhaustive):

- A gender analysis in the 4 participating countries of the project in order to have an overall assessment of women's roles in the development, participation and contribution to the implementation of the project;

- Identification of specific activities targeting women to ensure that they benefit from the project and to improve their participation in decision-making processes;

- Develop a dedicated approach to integrate women and vulnerable groups in decision making

- Proposal of effective and gender-sensitive monitoring and evaluation indicators will be included in the overall project monitoring and evaluation system.

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[1] Including those developed by GEF, UNEP and OSS

**Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment?** Yes

**closing gender gaps in access to and control over natural resources;** Yes

**improving women's participation and decision-making; and/or** Yes

**generating socio-economic benefits or services for women.** Yes

**Will the project's results framework or logical framework include gender-sensitive indicators?**

Yes

## 4. Private sector engagement

### Will there be private sector engagement in the project?

Yes

### Please briefly explain the rationale behind your answer.

In the four riparian countries of the Senegalo-Mauritanian aquifer, particularly in the Senegal and Gambia river basins, the agricultural and industrial sectors are experiencing a growing trend towards modern irrigation and mechanization. These two sectors are run by private operators for the majority through public-private partnership contracts. These activities entail an increased use of groundwater from the aquifer with significant impacts in terms of quantity and quality in some regions (drastic drop in piezometric levels, saline intrusion, soil salinization, etc.).

The development of agriculture (irrigated agriculture in particular) will intensify in the forthcoming years with regard to the regional political vision in this area. The Dakar Declaration of 2013 made by the High Level Forum of the six Sahelian countries (Burkina Faso, Mali, Mauritania, Niger, Senegal and Chad) on irrigation has the ambition to "significantly increase investment in agricultural hydraulics to increase from 400,000 hectares today to 1,000,000 hectares by 2020. The realization of this ambition is underway through the establishment of the Regional Project termed « Sahel Irrigation Initiative Project (SIIP) ». Within the framework of this initiative, the exploitation of groundwater is mainly targeted in the areas where the involvement of private sector in water resources planning and management reflections is of prime importance. This also has the advantage of allowing to explore the potential of the private sector and to create favorable conditions for its contribution to the financing of water resources management.

In the demonstration pilots, private sector operators (e.g. in agriculture) and NGOs will be involved in targeted awareness raising activities in order to enable them to act as multipliers of proposed options and and amplifiers of impacts.

During the project preparation phase particular attention will be given to identifying the different groups of actors from the private sector that are to be implicated in the formulation and then eventual implementation of the project activities. At this stage a clearer picture will be defined of on the one hand (i) the participation of the different private stakeholder groups (local small holders and larger industrial or agricultural private sector entities) in the implementation of innovative efficient water use systems and on the other (ii) how the project intends to support the mobilization of finance for the private sector.

Discussions will be conducted during the project development phase to define effective approaches for private sector implication.

5. Risks to Achieving Project Objectives

**Indicate risks, including climate change, potential social and environmental risks that might prevent the Project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the Project design (table format acceptable)**

| Risks | Level | Mitigation |
|---|---|---|
| High level of water abstraction from agricultural activities increasing due to higher pressure from private investors Impacting on aquifer | Moderate/Significant | The Regional Working Group for the Senegalo Mauritanian Basin will provide the platform for cooperation, communication and targeted awareness raising and work with the relevant stakeholder groups to sensitize the actors to water resources vulnerability and impact of climate changes and anthropogenic activities on the water resources. This will be supported by the consultations facilitated by the Regional Basin Organisations (OMVS and OMVG). The project development of the SAP will further assist in identifying alternative scenarios for private investors. |
| Political and Institutional risks | Moderate | Working closely with the Project Steerng Committee and Regional Working Group and relevant government offices and mandated partners to resolve any issues to be addressed. Ensure regular meetings of efficient coordination mechanisms (Steering committee, technical direction, national coordination unit, etc.) and adaptive management measures.. |
| Climate variability and/or climate change impacts on functioning of the aquifer system | Moderate | Efforts will be made to understand the functioning of the aquifer system and the expected impacts of climate variability and change, which will be considered in the planning and management of the system (component 1) |
| Weak adhesion to regional governance structures or national contributions fail to materialize | Medium | Efforts will be made in project implementation to raise awareness about the responsibilities of adhering to such regional governance mechanisms. The signing of the Ministerial Declaration for the SMAS continues to strengthen the Regional Working Group as the regional governance structure and with the convening role for wat |

| | | |
|---|---|---|
| ntributions fail to materialize | | vernance structure and with the convening role for wat er cooperative management through regional bodies O MVS or OMVG for surface shared water will facilitate c ommitments from countries concerned. |
| Countries and the Regional bodi es (OMVS and OMVG) show littl e political will for conjunctive w ater management approach | Low | The signing of the Ministerial Declaration for the SMAS continues to strengthen the Regional Working Group a s the regional governance structure and with the conve ning role for water cooperative management through r egional bodies OMVS or OMVG Following the assess ments from the baseline project, the project will create awareness about the linkages and interdependencies b etween the surface water (mainly Senegal and Gambia River) and the Senegalo-Mauritanian Aquifer System (S MAS). Policy and governance activities in components 1 and 3 will reinforce and enshrine these linkages in re gional and national policies, strategies and plans. |
| Low participation of communiti es, specifically women | Low/medium | A stakeholders participation plan will be developed dur ing PPG and applied during project implementation. Ke y gender markers indicators will be developed and mo nitored |

COVID related adaptive management, risks and opportunities

The project will give particular attention to developing an adaptive management strategy for dealing with the COVID 19 pandemic, both ensuring the safe and efficient implementation of project activities in terms of partners participation in meetings, trainings and capacity building as well as smooth implementation of the pilots on the ground. In that context the project will respect the specific national COVID measures and provide guidance for regional activities to be optimally implemented (ie. hybrid meetings with access to internet and translation offered where in presence is not possible; stakeholder consultations online, regrouping of meetings to avoid multiple travel and through special facilitation of circulation and clearance of documents ).

This might also include supporting the smooth implementation of the activities on the ground to respond to local and regional water management needs, the possibility of hybrid meetings to ensure maximum flexibility in the participation of consultation processes for the TDA and in particular SAP.

As the region works through and beyond the COVID-19 pandemic, the scope of interest for regional cooperation and guidance will play an important role. The RBOs for example, have an important convening potential to regroup stakeholder meetings at regional level and provide a solid and well known framework for coordination for the participating countries. The project activities themselves provide opportunities for addressing COVID related concerns when developing the options for the Basins groundwater management and future conjunctive water management. The River Basin Organisations will have an important role to play in guiding countries and other partners involved in the implementation of the project activities on the necessary capacity building support, to jointly identify and integrate risks associated with the COVID 19 pandemic.

6. Coordination

**Outline the institutional structure of the project including monitoring and evaluation coordination at the project level. Describe possible coordination with other relevant GEF-financed projects and other initiatives.**

v *Institutional Structure of the Project and M&E Coordination at the Project Level*

The four countries together with the two main River Basin Organizations (OMVS and OMVG) and the support of key partners, will be guided by the vision and roadmap of the Regional Working Group (RWG) to ensure alignment with a long term, sustainable transboundary cooperation for the concerted management of the SMAS. This current UNEP led project will support the commitments made in the context of the Regional Working Group by the two Basin organisations and riparian countries.
More detailed assessment of synergies and opportunities for catalysing the vison of the Regional Working Group, will be part of the PPG work. Since the OMVS and OMVG and its Member States will be driving the regional governance process of the Aquifer, they will be fully involved in the PPG and in the implementation of this project and will lead a number of key governance related activities. According to their mandates and experience, they will have key roles in the execution of the project activities.
The key institutional governance organisations that will be strengthened through the activities of this project are the 2 Basin Organisations (OMVS and OMVG).

OMVS and OMVG will lead and implement key activities such as the pilot demonstration and facilitating the multistakeholder consultations related to the governance activities. UNECE and GENEVA Water Hub will be supporting OMVS and the OMVG on the governance aspects as well as capacity bulding and project communication. OSS will be mainly in charge of the component 1 activities on TDA/SAP due to its extensive technical experience on the topic. In this context, IGRAC could be the main technical partner for scientific tool development (database, modeling, etc.). In each country, the technical departments of Ministries in charge of water will be the key actors of the field activities implementation.

The current project outputs such as TDA/SAP will be developed within this vision and with the key competent authorities of OMVS and OMVG where the Project coordination unit will be housed.

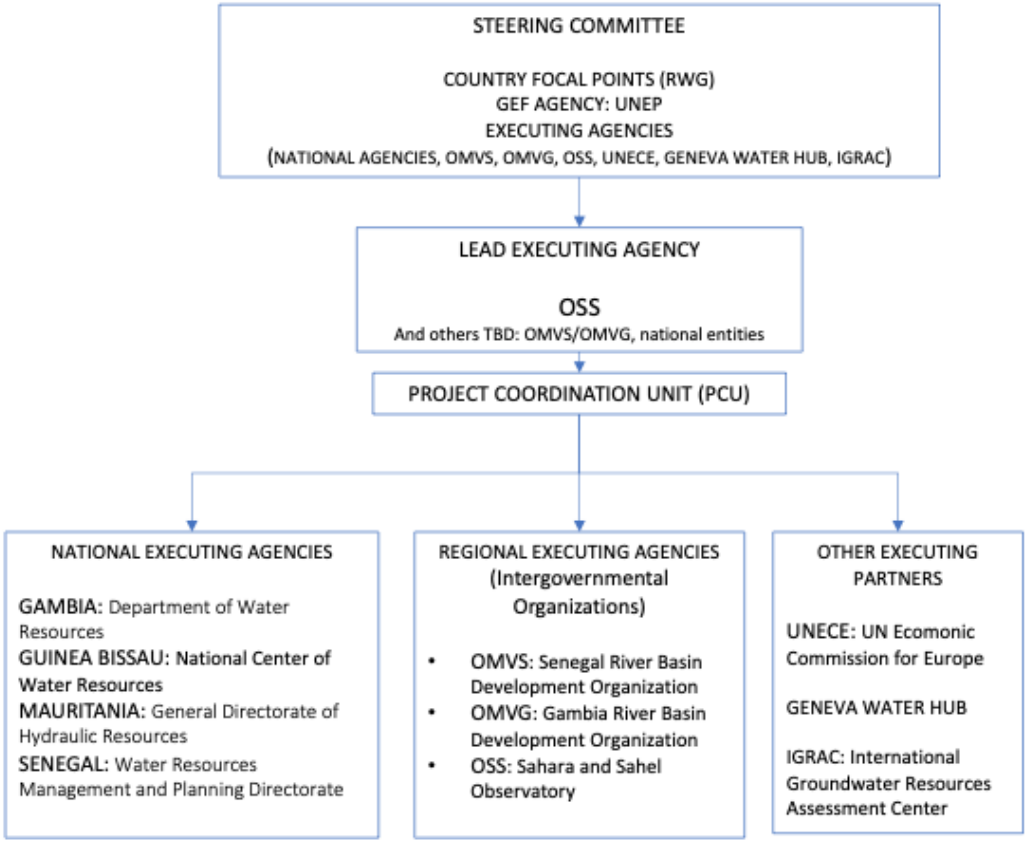
The following diagram shows the organizational structure of the UNEP led project.

The lead executing agency will be chosen during PPG phase among the three executing agencies OMVS, OMVG and OSS. This decision has been postponed due to ongoing developments within the RWG. Likewise, a decision on the location and hosting agency/government of the PCU will be decided during the PPG phase.

Other relevant actors will be identified at the full proposal development stage.

Figure 2: Proposed project organisational structure

## PROJECT ORGANISATION STRUCTURE




The institutional implementation framework will include :

- A Regional Project Management Unit (PMU), with a mission to support daily implementation and overall coordination of the project activities. It will be in charge of the management of all technical, administrative and financial aspects of the project, as well as the processing of procurement files and the monitoring and validation of studies. It will also be in charge of accounts and budgetary monitoring of the project's activities.

- National Coordination Committees will be set up and led by a *National Focal Point* inside the respective countries to ensure the coordination and monitoring of actions in the country. This committee will consist of the main ministerial sectors involved in water management issues (Agriculture, Environnement, Land management, Helth, Etc.) and will lead activities implementation at national or local/pilot level. The *National Focal Point* who is member of regional Working Group (RWG) driving this project at national level. The synergy and complementarties with other initiatives will be considered, sush as

Sahel Irrigation Initiative financied by tha Word Bank, the Permanent Interstate Committee for drought control in the Sahel (CILSS). This PIF can contribute by adding the missing groundwater elements in these past or ongoing regional initiatives. The National Coordination Committee will be coordinated by the national institution in charge of water resources management in each country:

- Gambia : Department of Water Resources
- Guinea Bissau : General Directorate of Hydraulic Resources
- Mauritania : National Center of Water Resources
- Senegal : Water Resources Management and Planning Directorate

• A scientific committee consisting of scientific entities (Universities, research centers) from the region and represented by renowned scientific experts will be in charge of the scientific follow-up of the activities and will ensure their scientific consistency. IGRAC will also be member/lead of this committee. The scientific committee will take minimum one meeting per year preferably before the Regional Steering Committee meeting.

• A Regional Project Steering Committee (RPSC), which is the highest decision-making and strategic orientation body for the project. It will be made up of UNEP (GEF Implementing Agency), the executing structures (OMVS, OMVG, OSS); the Regional Working Group (WRG) through the representatives of the 4 countries, UNECE, and Geneva Water Hub; representatives of Non Government partners (civil society, private sector), etc. The RPSC will provide guidance for an effective project management; and will periodically evaluate (once a year, or more if needed) the degree to which project results meet forecasts.

*For all the bodies listed, the composition, attributions and functioning will be refined during the full project preparation phase.*

v *Coordination with other relevant GEF-financed projects and other initiatives*

The project will complement and work directly with the following GEF-funded initiatives in the area (see table).

| Project name | Objectives | Involved countries | Type (National or regional) |
|---|---|---|---|
| Promoting Innovative Finance and Community Based Adaptation in Communes Surrounding Community Natural Reserves (Ferlo, Niokolo Koba, Senegal River Bas Delta & Saloum Delta), Senegal | Promote sustainable financing mechanisms and community based adaptation in communes surrounding community natural reserves (Ferlo, Niokolo Koba, Bas Delta Senegal, Delta du Saloum), Senegal | Senegal | Regional |
| Senegal River Basin Climate Change Resilience Development Project | To strengthen transboundary water resources management in the Senegal River Basin including climate change adaptation and implementation of priority actions of the Strategic Action Plan. | Guinea, Mali, Mauritania, Senegal | Regional |
| Reducing Dependence on POPs and other Agro-Chemicals in the Senegal | To raise awareness of problems and altern | Mauritania | |

| | | | |
|---|---|---|---|
| and Niger River Basins through Integrated Production, Pest and Pollution Management | atives, determine baseline values for agricultural practices and water quality | Mauritania, Senegal[1] | Regional |
| Strengthening of The Gambia's Climate Change Early Warning Systems | To enhance adaptive capacity and reduce vulnerability to climate change through a strengthened early warning and information sharing mechanism for a better informed decision making by government and affected population. | Gambia | National |
| Strengthening Climate Services and Early Warning Systems in the Gambia for Climate Resilient Development and Adaptation to Climate Change – 2nd Phase of the GOTG/GEF/UNEP LDCF NAPA Early Warning Project | To strengthen the climate monitoring capabilities, early warning systems and available information for responding to climate shocks and planning adaptation | Gambia | National |
| Adapting Agriculture to Climate Change in the Gambia | To promote sustainable and diversified livelihood strategies for reducing the impacts of climate variability and change in agriculture and livestock sector | Gambia | National |
| Strengthening Resilience and Adaptive Capacity to Climate Change in Guinea-Bissau's Agrarian and Water Sectors | To increase resilience and enhance key adaptive capacity to address the additional risks posed by climate change to the agrarian and water sectors in Guinea-Bissau | Guinea Bisseau | National |
| Improving Climate Resilience of Water Sector Investments with Appropriate Climate Adaptive Activities for Pastoral and Forestry Resources in Southern Mauritania | To improve rural communities' livelihoods and means to combat poverty through managed water investments and adaptative activities for pastoral and forest resources in the southern Wilayas of Mauritania | Mauritania | National |
| Support to the Adaptation of Vulnerable Agricultural Production Systems | Increase the resilience of rural communities in response to the harmful effects of climate change on the water resources and agricultural production systems. | Mauritania | National |
| Senegal National Adaptation Plan | Strengthen the capacity of sectoral Ministries and local governments to better assess the implications of climate change and to a | Senegal | National |

| | | | |
|---|---|---|---|
| Senegal National Adaptation Plan | djust existing policies and budgets for the i ntegration of medium and long-term climat e change risks and adaptation measures | Senegal | National |
| | | | |
| Strengthening Land & Ecosystem Ma nagement Under Conditions of Clima te Change in the Niayes and Casama nce regions- Republic of Senegal | To strengthen the enabling environment for the implementation of appropriate adaptati on measures based on ecosystem manage ment in Niayes and Casamance Regions. | Senegal | National |
| Project for the Restoration and Stren gthening the Resilience of the Lake d e Guiers Wetland Ecosystems (PRRE LAG) | Strengthen the conservation of the natural habitats and the effectiveness of the mana gement of the Reserve Spéciale d' Avifaune du Ndiaèl ( RSAN) | Senegal | National |

[1] These are the involved countries among the aquifer area. The project includes other countries outside of area: Benin, Guinea, Mali, Niger.

7. Consistency with National Priorities

Is the Project consistent with the National Strategies and plans or reports and assesments under relevant conventions?

Yes

If yes, which ones and how: NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc

National Bio Strategy Action Plan  (NBSAP)
- CBD National Report
- Cartagena Protocol National Report
- Nagoya Protocol National Report
- UNFCCC National Communications (NC)
- UNFCCC Biennial Update Report (BUR)
- UNFCCC National Determined Contribution
- UNFCCC Technology Needs Assessment
- UNCCD Reporting
- ASGM National Action Plan (ASGM NAP)
- Minamata Initial Assessment (MIA)
- Stockholm National Implementation Plan (NIP)
- Stockholm National Implementation Plan Update
- National Adaptation Programme of Action Update
- Others

# Consistency with national relevant priorities

This project is consistent with national priorities of the 4 countries as stipulated in their sectoral development plans and strategies. These priorities concerns include mainly water resources management, food security through irrigation, wetland management and conservation, land degradation, institutional capacity bulding.

Gambia national priorities

The proposed project takes into account the policy and strategic orientations of the Government of The Gambia regarding the management and development of the country's water resources. The main sectoral strategic documents include in particular : *The Gambia's "Vision 2020", the National Development Plan (NDP) (2018-2021), the Water Policy (2006), the Sanitation Policy (2015-2020), the National Adaptation Programme of Action (NAPA) and the Agricultural Policy*. In all these documents, the issue of water is recognized as a priority for the Government whose vision for the sector is : "improved equitable access to safe and affordable water and sanitation, proper hygiene practices and environmental protection for all". To achieve this, the Government aims to improve water governance and to address the impacts of climate change on water resources. In agricultural sector, the Gambian Government ambition is to increase irrigation protection, particularly through groundwater uses to reduce future water shortages impacts and stress on the agricultural productivity.

Guinea Bissau national priorities

Water sector is considered as priority by the Bissau Government and a wide range of policies, strategies and plans have been designed and adopted to address challenges regarding water resources management issues. These are among others:

· Guinea-Bissau's Poverty Reduction Strategy Paper (2007), which stressed the importance of food security and water availability as fundamental goals in the fight against poverty;
· The Water Master Scheme (1997) encompasses actions regarding the rehabilitation and expansion of water; infrastructures, noting the important role played by water resource management in the agricultural sector;
· Strategy for Water Supply and Sanitation with reference to MDGs (final draft 2010);
· The Water Code, also approved by Government in 1992 sets out the general framework for water resource management, utilisation and conservation, and defines their institutional framework;
· The 2010-2020 Water and Sanitation Master Plan;
· National Plan for Natural Resource Management;
· National Environmental Management Plan (2004);
· Programme of Action to Fight Drought and Desertification (2006, 2011);
· Coastal Zone Master Plan (1993);
· Sustainable Financing Strategy of Adaptation to climate change in the short, medium and long term (2013).

The current proposal is consistent with the priorities of these national policy and strategy instruments and will contribute substantively to their implementation.

Mauritania national priorities

The water and sanitation sector remains as a priority in Mauritania's development policy. The country has been promoting the IWRM process for decades, particularly through the *Organisation pour la Mise en Valeur du Fleuve Sénégal (OMVS)* since 1972. The government has also set up a political, legislative, institutional and general framework that is adapted to the sectoral challenges. The main available instruments include:

- The "*Stratégie de Croissance Accélérée et de Prospérité Partagée (2016 - 2030)*" adopted in 2016. Water is one of the pillars of this framework document;

- The Water Code (2005), in coherence with other relevant sectoral laws (environment, agriculture, health, etc.), provides the framework for water sector legislation;

- The National Strategy for Sustainable Access to Water and Sanitation (SNADEA – 2030). It was adopted in 2016 with 5 strategic axes (***Axis 1:*** to know, to monitor and to protect water resources; ***Axis 2:*** to provide access to drinking water to most people; ***Axis 3:*** to improve access to water for agriculture and livestock; ***Axis 4:*** To improve access to sanitation and hygiene; ***Axis 5:*** To improve sectoral governance). This strategy emphasizes the major challenges related to integrated water resource management, particularly in terms of knowledge, monitoring and protection of water resources. This strategy has tight link with other sectors (agriculture, environment, health) orientations of strategies.

The project is in line with the efforts made by the Government to achieve the objectives contained in these various strategic orientation documents.

Senegal national priorities

ıe Government of Senegal has adopted an action plan for IWRM (PAGIRE) with an IWRM Priority Action Program (PAP-IWRM) covering the period 2008-2015 for its st phase. The second phase of the plan implementation covers 2018-2030. The plan has five (05) strategic objectives, as follows:

- To strengthen water resources governance and management instruments.
- To preserve water bodies' integrity and sustainably improve the water quality and services.
- To promote integrated and sustainable water management in a Climate Change context.
- To promote water valorization for growth and food security.
- Improve and disseminate knowledge on water resources.

ıe PAGIRE takes into account the new issues and challenges related to the implementation of the orientations of the Sectoral Development Policy Letter (LPSD) )16-2025, the requirements related to the implementation of the Sustainable Development Goals ( SDGs), participatory water governance, gender and climate ıange.

the environmental area, the PAGIRE promotes the necessity to preserve and sustainably protect aquatic resources and ecosystems against pollution from various ıurces and overexploitation, and to mitigate the effects of climate change on the renewal freshwater bodies and on water and sanitation services.

addition, national climate-related policies and plans identify water as core priority for enhancing adaptation and resilience to climate change. Indeed, the UNFCCC rst National Communication (1997) and Senegal's National Adaptation Programme of Action (NAPA) (2006) recognized water resources as a key sector for short ıd medium-term interventions to address the effects of climate change. Specifically, the NAPA identifies improving water retention capacity and increasing irrigation ficiency as key activities to address the effects of climate change on water resources. The NAPA also clearly identifies the links between climate change, induced ater scarcity and groundwater depletion and the increased risks of reduced agricultural production and food insecurity. In 2009, the government further specified the pe of activities to be supported and revised the costs associated with adaptation activities related to watershed management and water efficiency.

ıe current proposal supports the implementation of the priorities contained in all of these different strategies that are listed above.

Consistency with international relevant conventions and regional sectoral strategies

The project is consistent with, and will contribute to the implementation of the three Rio Conventions on Biological Diversity (CBD), the United Nations Framework Convention on Climate Change (UNFCCC) and the United Nations Convention to Combat Desertification (UNCCD). The 4 countries are all signatories to these conventions and have adopted various national instruments for the implementation of these conventions. All the conventions and the associated implementation instruments recognize water as a central element of their respective objectives.

The project is also consistent and will contribute to the implementation of the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention). Senegal and Guinea Bissau are Parties to the Water Convention; the other two countries are considering accession.

At the regional level, the project is in line with the African Water Vision 2025 to which the 4 countries have adhered. This vision is stated as follows: "An Africa where water resources are used and managed in an equitable and sustainable manner for poverty reduction, socio-economic development, regional cooperation and environmental protection. It encourages the strengthening of knowledge and regional cooperation for the sustainable management of shared water bodies. The interventions of the project will also enable the implementation of the 2018-2023 strategy of the African Ministers' Council on Water (AMCOW) and that of African Network for Basin Organization (ANBO) 2020-2024. These two strategies focus on groundwater management and governance in view of their strategic role in meeting the water needs of African countries.

8. Knowledge Management

**Outline the knowledge management approach for the Project, including, if any, plans for the Project to learn from other relevant Projects and initiatives, to assess and document in a user-friendly form, and share these experiences and expertise with relevant stakeholders.**

To share the knowledge generated from this project a strategic approach will be developed and refined during the development phase of the project.

The approach will include:

- Use of the GEF IW Learn tool, which will be strongly used to learn from other similar experiences;
- Implementation of a web platform, as in other projects, to disseminate the results and achievements of the project. Data and information generated by the project will be systematically shared on this platform as well as on the project main implementing partners websites, particularly OSS, OMVS and OMVG.
- Communication around project results. This project combines science and development and will promote the production of high-level scientific information for the benefit of decision-makers. To strengthen and maximize the assets and opportunities, Universities and Research Centers will be strongly involved in the implementation of the project. In each of the countries, a Scientific Committee will be set up within this framework. Scientific information will be presented during international events (workshops, seminars, symposia, GEF conferences on international waters, etc.) and published in high impact scientific journals. It is also in the interest of maximizing the sharing of the knowledge capital generated by the project with beneficiaries and various audiences beyond the countries and project area.
- Development and strengthening of mechanisms for information, data, monitoring indicators and best practices exchanging between countries.

Through its activities, particularly those planned under component 3, the project will implement the various actions described above. An appropriate budget (at least 1% of the total project budget, as required by the GEF) will be allocated to ensure the proper implementation of the knowledge management activities.

## 9. Environmental and Social Safeguard (ESS) Risks

Provide information on the identified environmental and social risks and potential impacts associated with the project/program based on your organization's ESS systems and procedures

**Overall Project/Program Risk Classification***

| PIF | CEO Endorsement/Approval | MTR | TE |
|---|---|---|---|
| Medium/Moderate | | | |

**Measures to address identified risks and impacts**

Provide preliminary information on the types and levels of risk classifications/ratings of any identified environmental and social risks and potential impacts associated with the project (considering the GEF ESS Minimum Standards) and describe measures to address these risks during the project design.

Please see attached UNEP Safeguard Risk Identification Form (SRIF) document outlining the details; the form has now been updated and completed.

**Supporting Documents**

Upload available ESS supporting documents.

| Title | Submitted |
| --- | --- |
| UNEP SRIF_PIF_V2_rev1 12 10_final | |

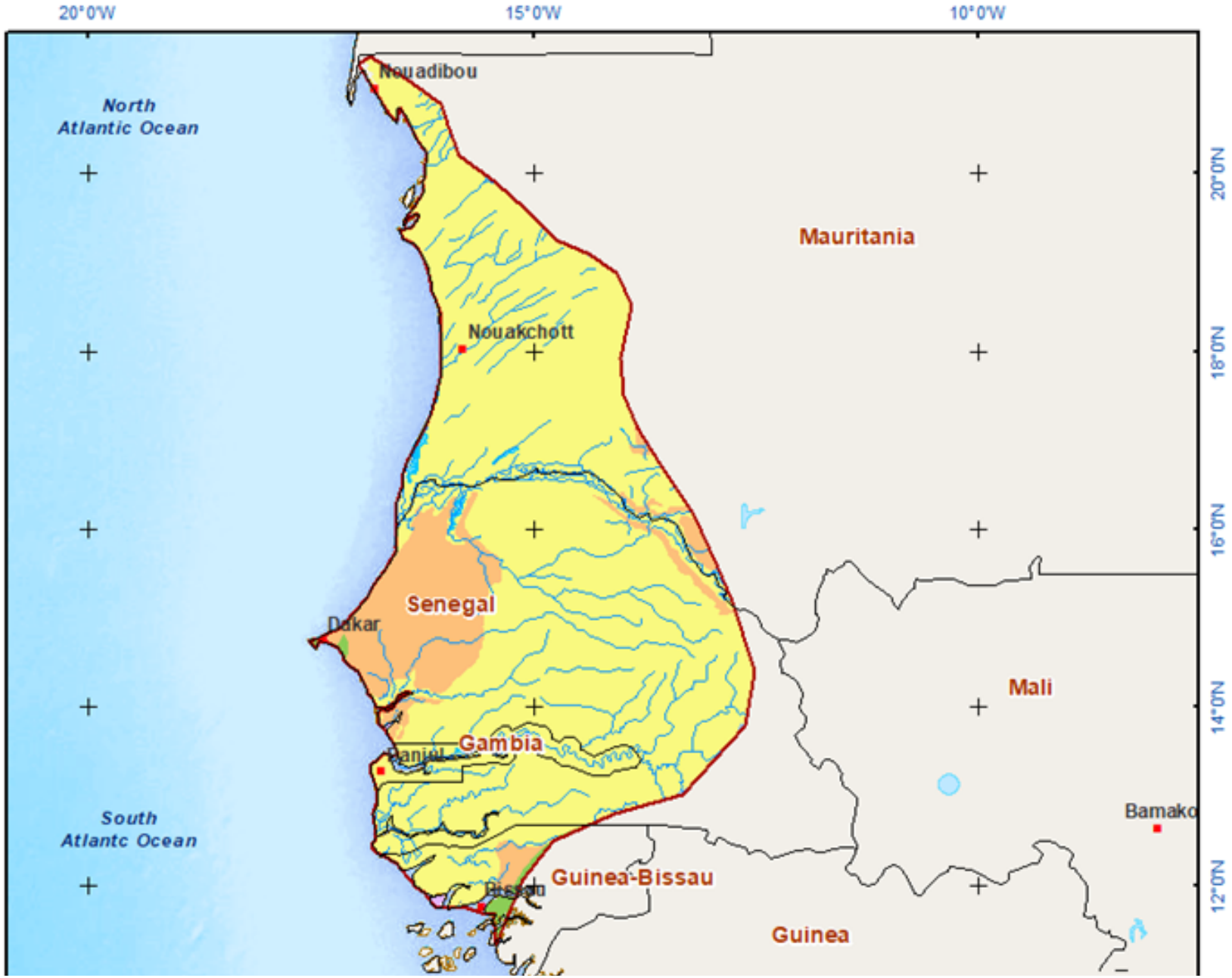
## Part III: Approval/Endorsement By GEF Operational Focal Point(S) And GEF Agency(ies)

**A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S): (Please attach the Operational Focal Point endorsement letter with this template).**

| Name | Position | Ministry | Date |
|---|---|---|---|
| Mr. Dodou Trawally | GEF OFP Gambia | National Environment Agency - Gambia Environment House, Jimpex Road, Kanifing. Banjul, GAMBIA Tel: +00220 9961049 Email: dtrawally(at)gmail.com; nea(at) gamnet.gm | 4/14/2021 |
| Mr. Lourenco Antonio Vaz | GEF OFP Guinea-Bissau | Ministry of Natural Resources P O Box 399 Bissau, - Guinea-Bissau Tel: 011 245 721 2741/245 664 0959 Email: vaz_coni61 at yahoo.com.br | 10/8/2021 |
| Dr. Mohamed - Yahya LAFDAL CHAH | GEF OFP Mauritania | Ministry of Environment and Sustainable Development 838. Street 21-185. P.O. Box 170 Nouakchott, - Mauritania Tel: + 222 46 00 86 86, + 222 22 30 31 28 Email: lafdal(AT) environnement.gov.mr | 5/8/2021 |
| Mr. Baba Drame | GEF OFP Senegal | Ministere de l'Environnement et du Developpement Durable ; Parc Forestier de Hann B.P.4055 ; Dakar, - Senegal Tel: +221 33 859 14 58 / +221 33 826 01 17 / +221 518 03 13 Email: Baba.drame(AT) environnement.gouv.sn; babadrame(AT) gmail.com | 10/12/2021 |

ANNEX A: Project Map and Geographic Coordinates

Please provide geo-referenced information and map where the project intervention takes place



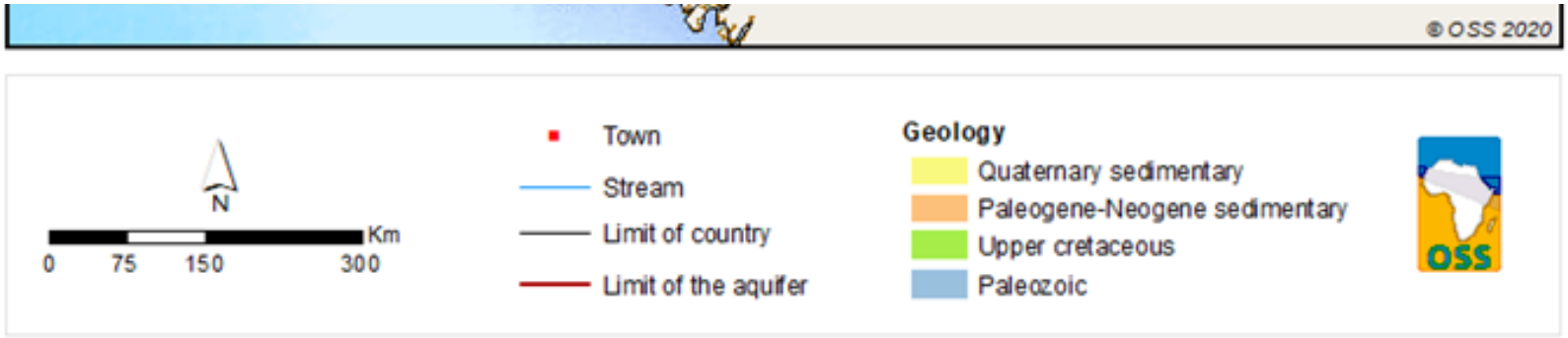



**Figure:** Hydrogeological framework of the Senegal-Mauritanian Aquifer System
Source of Data: Aquastat, FAO (2011).