



ADAPTATION FUND

REGIONAL PROJECT PROPOSAL

ARCC-SRB Project

Strengthening the resilience of climate-vulnerable communities in the Senegal River Basin using a multi-hazard early warning system and building adaptive capacity
Guinea, Mali, Mauritania and Senegal

Title of Project:	Strengthening the resilience of climate-vulnerable communities in the Senegal River Basin using a multi-hazard early warning system and building adaptive capacity	
Countries:	Guinea, Mali, Mauritania and Senegal	
Thematic Focal Area:	Transboundary water management	
Type of Implementing Entity:	Regional Implementing Entity (RIE)	
Implementing Entity:	Sahara and Sahel Observatory (OSS)	
Executing Entities:	Regional level: Organization for the Development of the Senegal River (OMVS)	
	National level: National Coordination Institutions	
	Guinea	OMVS National Coordination Unit hosted by the Ministry of Energy, Hydraulics and Hydrocarbons)
	Mali	OMVS National Coordination Unit hosted by the Ministry of Mines, Energy and Water)
	Mauritania	OMVS National Coordination Unit hosted by the Ministry of Oil, Mines and Energy
	Senegal	OMVS National Coordination Unit hosted by the Ministry of Water and Sanitation
Amount of Financing Requested	14,000,000 in U.S Dollars Equivalent	

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ACRONYMS

ADRS	Valley Rural Development Agency
AF	Adaptation Fund
DESD	Directorate of Environment and Sustainable Development
ECOWAS	Economic Community of West African States
EES	Executing Entities
ESIA	Environmental and Social Impact Assessment
ESP	Environmental and Social Policy
ESRMP	Environmental and Social Risk Management Plan
FPIC	Free, Prior and Informed Consent
GDP:	Gross Domestic Product
HILO	High Intensity Labor Force
HIPC	Heavily Indebted Poor Country
IE	Implementing Entity
INBO	International Network of Basin Organizations
IPCC	Intergovernmental Panel on Climate Change
MH-EWS	Multi-Hazard satellite-based Early Warning System
NAPA	National Adaptation Plan of Action
NCC	National Coordination Committee
NDA	National Designated Authority
NDC	National Determined Contribution
NEE	National Executing Entities
N-PMU	National Project Management Unit
OiEau	Office International de l'Eau
OMVS	Organisation pour la Mise en Valeur du fleuve Sénégal
OSS	Observatoire du Sahara et du Sahel
PNDA	National Agricultural Development Policy
PNDES	National Economic and Social Development Plan
PNIASA	National Agriculture Investment and Food Security Plan
R-PMU	Regional Project Management Unit
RPSC	Regional Project Steering Committee
SDAGE	Schéma Directeur d'Aménagement et de Gestion des Eaux
SOGED	Société de Gestion et d'Exploitation de Diama
SOGEM	Société de Gestion de l'Energie de Manantali
SOGENAV	Société de Gestion et d'Exploitation de la Navigation
SOGEOH	Société de Gestion des Ouvrages du Haut-bassin guinéen du fleuve Sénégal
SRB	Senegal River Basin
UNEP	UN Environment Programme
WAF	West Africa
WWCA	World Water and Climate Alliances

PART I PROJECT INFORMATION

1. Project/Program Background and Context:

1.1 The Senegal River Basin (SRB): Physical setting and outlook

1. The Senegal River Basin is located in the western part of Africa, between 10°30' and 17°30' North latitudes and 7°30' and 16°30' West longitudes¹. It covers approximately 300,000 km² and extends over the north highlands of Guinea (11% of the basin), the western part of Mali (54% of the basin), the southern regions of Mauritania (26% of the basin) and the northern regions of Senegal (10% of the basin).

1.1.1 Hydrology: Surface water and groundwater

2. The Senegal River with 1,800 km long flows into the Atlantic (at Saint-Louis, Senegal) and feeds into extensive delta complexes and estuaries on the Atlantic coast, including the Senegal River Delta Complex, the Sine Saloum Delta, and the Casamance Estuary.
3. The main tributaries of the Senegal River are the Bafing (760 km), and Bakoye (560 km) which meet in Bafoulabe, the Kolombine, Karakoro and Gorgol on the right bank, and the Faleme on the left bank. Smaller tributaries and water plans include Lake Guiers in Senegal, Lake R'Kiz in Mauritania, Ferlo, Gorgol and Doue. The Senegal River flows into the Atlantic Ocean through a mouth located south of the city of Saint Louis. The average flow of the Senegal River at Bakel station was 700 m³/s (on average 22 billion m³/year) for the period 1903-1970 but decreased to 400 m³/s for the period 1970-1990. Since then, Senegal's average flow at Bakel has remained stable between 300 and 400 m³/s.
4. The Senegal River has a strong irregular regime and depends entirely on monsoon rains. The seasonal flooding of the alluvial plain of the Delta provides valuable ecosystem services (biodiversity, aquifer recharge, maintenance of grasslands, forests and fish stocks) that benefit the riparian communities (flood recession crops, livestock, forestry, fishing, etc.).
5. The river and its floodplain contribute strongly to the recharge of the underlying groundwater, which is mainly located in the transboundary aquifer known as the "Senegalo-Mauritanian aquifer" and shared by four countries (Gambia, Guinea Bissau, Mauritania and Senegal).
6. **The Senegalo-Mauritanian aquifer is a multi-layer system which are from top to down:**
 - The alluvial aquifer (2 and 15 meters deep) covers the major bed of the river. The flow of this water table is reversed between the flood and the low water level of the river. This aquifer has hydraulic link with the underlying aquifer one.
 - Quaternary aquifer which is made up of a portion of clays and fine sands that correspond to Post-Nouakchottian deposits and on the other hand, deposition of coarse or gravelly alluvial, clayey sands corresponding to the formations of the Ogolian and ancient and middle Quaternary periods.
 - The Continental Terminal (CT), also known as the "Trarza groundwater", is the most important and regular groundwater in the entire coastal sedimentary basin of Mauritania. The continuity of the groundwater is linked to the general permeability of the CT formations made up, as in Senegal, of sands, sandstone with lenticular intercalations of variegated clays.
 - The Eocene aquifer is also represented over the entire Senegalo-Mauritanian sedimentary basin, except for the Maastricht outcrop or sub-crop zone where it has been eroded. The supply of this groundwater is dependent on rainwater, river water (infiltration following floods) or water from the Maestrichtian aquifer by vertical drainage. The Maestrichtian aquifer, the Eocene aquifer, the Continental Terminal, the alluvial or quaternary aquifer and the basement aquifer.
 - The deep Maestrichtian aquifer (100 to 350 meters deep) is present throughout the Senegalo-Mauritanian sedimentary basin.

1.1.2 Bioclimatic zones of the SRB and their hydro-climatic characteristics

7. In general, the climate of the Senegal River Basin is tropical, characterized by the alternation of two seasons: one dry and one rainy. Both seasons are marked by the alternation of the monsoon and the hot and dry winds of the Harmattan. The rains that water the Fouta massif Djallon from April to October produce a flood season, which begins in July and

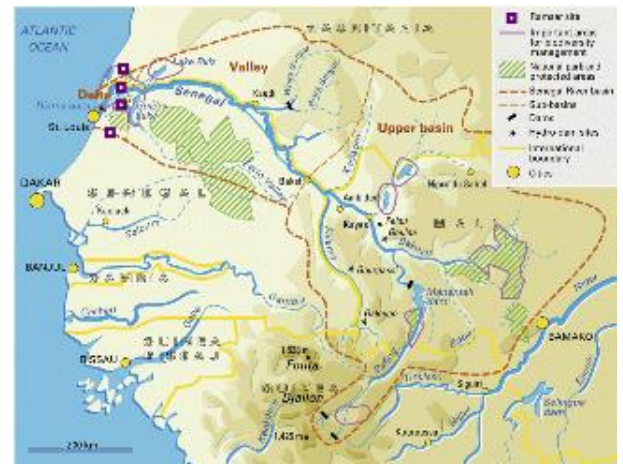


Figure 1: Senegal River Basin (source: OMVS, 2002)

¹ OMVS (2017). Analyse Diagnostique Environnementale Transfrontalière du Bassin du Fleuve Sénégal. Rapport final.195p.

ends in October. The longitudinal distribution of rainfall divides the Senegal River Basin into three bioclimatic zones: Sahelian, Sudanian and Guinean, with annual rainfall amounts varying from 50 mm to 2500 mm.

8. The **Sahelian zone** occupies **37%** of the basin and the average annual rainfall is less than 500 mm over the period 1951-2004. The Sahelian domain with very low rainfall. The rainy season lasts three months (July to September). This climatic domain extends north of Bakel and over the entire Senegal valley (with the exception of the coastal zone) and has been similar to the Saharan domain for the past 15 years. The proximity to the ocean leads to an attenuation of temperatures that influences the Sahelian zone.
9. In the **Sudanian zone**, which occupies **62%** of the area of the basin, the average annual rainfall varies between 500 and 1500 mm. The northern Sudanian domain with lower rainfall and a rainy season that lasts from 4 to 6 months (from May to October). It extends in the remaining part of the high basin to the Bakel station. The southern Sudanese area with an average rainfall and a rainy season of 6 to 8 months (April to November). This area includes the northern foothills of Fouta Djallon and the western part of the Mandingo plateaus.
10. The **Guinean zone**, representing **1%** of the basin, records the most abundant rainfall with an average greater than 1500 mm. The Guinean domain with an eight-month rainy season (April to November) with August as the rainiest month. The Guinean domain includes almost all of Fouta Djallon up to Daikka-Saidou. This is called the foutanian climate. The Fouta Djallon constitutes a barrier and prevents the progression of the monsoon.
11. The maximum daily temperature can reach 43°C in the Guinean zone, 48°C in the Sahelian zone and 49°C in the Sudanian zone over the period 1984-2017.
12. Rainfall in the Senegal Basin shows a distinct North-South gradient. The average annual rainfall in the Senegal River basin is 550 mm/year. At the source of the river in the Guinean highlands, rainfall in the Senegal basin exceeds 1400 mm per year. Where the Bafing and Bakoye rivers flow from Guinea and southern Mali, rainfall amounts remain above 850 mm per year. After they meet to form the Senegal River, north of the Manantali Reservoir, rainfall decreases to less than 500 mm per year. About half of the Senegal basin is located in Mauritania, where rainfall is even lower. In the region of the tributaries of the Gorgol, the Karakoro and the Kolimbine in Mauritania, the average annual rainfall is very limited (less than 140 mm per year).
13. From July to October, the Senegal River is characterized by high water levels. The low water season extends from December to June. Monsoon rains in the upper basin during the rainy season are the main factor causing significant fluctuations in water levels and flows. Another characteristic of rainfall is its high intra-seasonal and inter-annual variability. During the last thirty years, a very strong drop in rainfall has been noted. However, during the last ten years, a timid recovery has been recorded but this does not really affirm the end of the drought. A shortening of the rainy season is observed, associated with an increased variation in precipitation. In other words, during the few months of rain, the precipitation is higher than before.

The various topographic, hydrographic and climatological conditions divide the river basin into three large zones consisting of:

- The Upper Basin in the Fouta Djallon Massif region with altitudes ranging from 500 to 1500 m; The rainfall which is up to 1700 mm/year shapes the river's water level fluctuations;
- The Valley with rainfall of 400-600 mm/year; The river has a gentle slope ($\approx 0.002\%$) and thereby creates a vast alluvial plain with a floodplain of up to 500,000 ha; The floods can cover a large bed 10 to 20 km wide;
- The Delta, which is a very flat area, generally below sea level (Rosso and Saint-Louis are respectively at -0.23 and -0.53 meters), and is subject to the rise of sea water in the dry season with average rainfall of 200 to 300 mm/year. The surface waters also include the Guiers Lake in Senegal and the Rkiz Lake in Mauritania, which are fed by tributaries of the Senegal River.

1.1.3 *Ecological heritage and biodiversity*

14. The Senegal River flows through the dry wooded savannahs of Mali and the arid landscapes of the Sahel. The Basin has two World Heritage Sites: The Djoudj and the Island of Saint Louis. This status enlists the Djoudj National Park among the world's 830 natural and cultural heritage sites recognized as having universal value. It also has two Biosphere Reserves—the Boucle du Baoulé Transboundary Reserve of the Senegal River delta— included among the world's 480 reserves identified in the Man and Biosphere (MAB) Programme.
15. The SRB hosts **five Ramsar sites** in the river delta: Djoudj, Ndiael and Gueubeul on the left bank; and Diawling and Chat Tboul on the right bank.
16. In addition, other protected areas (national parks, wildlife reserves) include:
 - The Bafing Wildlife Reserve created to compensate for wildlife habitat loss from filling the Manantali reservoir. This latter is currently a refuge area in the northern most reaches for a few hundred chimpanzees;
 - The Lake Magui on the Kolimbine, an area with high concentrations of livestock, predominantly made up of herds from the Kayes region and transhumant herds from Mauritania; and the classified forest of Bakoun in the upper basin in Guinea.
 - The natural lakes (including the Lac de Guiers and the Lac R'Kiz) play leading economic and ecological roles, whereas those played by the human-made lakes (Manantali and Diama reservoirs).

17. In terms of flora, notable differences occur between the upper basin and the lower basin. In the upper basin, which generally corresponds to the Fouta Djallon highlands, the type of vegetation found there is a function of the type of ecosystem in place. Hence, the gallery forests of the dry forest ecosystems are marked by persistent deciduous species such as *Mitragina stipulosa*, *Alcornea cordifolia*, *Raphia gracilis*, *Uapaca somon* and *Cola cordifolia*. In forest islands, the most frequent woody species are: *Ceiba pentandra*, *Adansonia digitata*, *Cassia sieberiana*, *Cola cordifolia*, *Parkia biglobosa* and *Vitellaria paradoxa*. Today, the forest cover of the Fouta Djallon Massif extends over 13% of the region, or 800,000 ha of dry dense forest and 50,000 ha of patches of forests, remnants of the former dense cloud forest.
18. As for fauna, the same contrast between the upper basin and lower basin holds. In the upper basin, mammals such as large ungulates, rodents and primates live in the savannah ecosystems as well as small antelopes. The forest ecosystems are hosts to species such as the lion (*Panthera leo*), the Guinean baboon (*Papio papio*) and various colobi (*Colobus* sp.). In the gallery forests, most of the vertebrates are birds and reptiles. In terms of invertebrates, this ecosystem is also rich in frondicolus and xylophagous insects.
19. Regarding the fish fauna, the Guinean part of the upper basin numbers close to 30 species of fish divided between 15 families.
20. Many birds live in and exploit the Guinean groundcover and ligneous fruits. The most frequent species are pigeons and doves, green pigeons and parrots, various waterfowl and terrestrial birds.

1.2 Socio-demographic and economic characteristics of the Senegal River basin

21. The current population of the basin is approximately 8 million inhabitants, representing 14% of the total population of the (04) four riparian countries (57 million inhabitants). The population has doubled in 30 years (3.5 million inhabitants in 1990). Most of the population, nearly 85% (7 million people) lives relatively close to the river.
22. The average population density of the basin is around 23-25 inhabitants/km². The weight of the riparian countries in the demography of the basin is very variable. Half of the basin's population is Malian, and 15 to 20% for each of the other countries. The population growth rate is estimated at 2.7%².
23. The population of the basin is expected to reach nearly 10 million people by 2030.

Table 1: Distribution of the population of the catchment area between the riparian countries

Country	Total population in 2014	Total population in 2022 (estimation)	Growth rate (%)	Population in the SRB			
				2014	2022 (estimate)	2030 (projection)	% of SRB population
Guinea	12,000,000	15,295,952	3.08%	1,239,683	1,580,178	2,014,194	19%
Mali	15,800,000	197,06,160	2.80%	32,68,326	4,076,339	5,084,113	49%
Mauritania	4,000,000	4,862,212	2.47%	926,424	1,126,117	1,368,855	14%
Senegal	14,500,000	17,611,762	2.46%	1,192,255	1,448,118	1,758,890	18%
Total	46,300,000	57,476,087	2.70%	6,626,688	8,230,752	10,226,052	100%

(Source: OMVS, 2017. Transboundary Environmental Diagnostic Analysis-)

24. The population of the project area still lives below the poverty index. The Gross Domestic Product (GDP) per capita in 2021 indicates³: Guinea US\$ 1,174; Mali \$918; Mauritania US\$1,723 and Senegal US\$1,606.
25. The Senegal River Basin member countries are heavily dependent on agriculture, which contributes more than 30% of their average gross domestic product and employs almost 75% of the working population. This dependence on agriculture is even more pronounced for the populations living in the Senegal River Basin itself. For OMVS member countries, the fight against poverty requires the development of the agricultural sector.
26. In the Senegal River Basin, agriculture remains essentially a subsistence activity. The economy of the SRB is still dominated by agriculture, of which three main types can be distinguished: rain-fed agriculture (in the upper basin due to the good rainfall), flood-recession agriculture (concentrated in the valley and the delta) and irrigated agriculture, which has developed with better water control (Manantali and Diama dams) in order to reduce vulnerability to rainfall deficits.
27. Irrigated agriculture (rice cultivation, off-season crops, etc.) has benefited from major investments over the past decades, particularly in the Senegalese and Mauritanian parts of the basin. Irrigated agriculture benefits from 70 to 80% of water withdrawals from the Senegal River.
28. Recessional agriculture in the banks and lowlands of the river valley occupies variable areas depending on the annual water conditions of the SRB. After the construction of Manantali, recession agriculture lost its importance and its future remains uncertain even if it is now part of the development objectives of the OMVS. In practice, in recent years the future of annual flood and recession crops is rather linked to the level of runoff not controlled by the Manantali dam. Indeed, the dam has not carried out any support release since 2003.

² OMVS, 2017. Plan d'Action Stratégique de Gestion des Problèmes Environnementaux Prioritaires du Bassin du Fleuve Sénégal 2017-2037. Organisation pour la Mise en Valeur du fleuve Sénégal, 94 p

³ <https://www.macrotrends.net/countries/ranking/gdp-per-capita>

In Guinea

29. In the upstream part of the basin, slash-and-burn agriculture of cereals (rice, fonio, millet, sorghum) and the cultivation of groundnuts and tubers (cassava, sweet potato, yam) predominate along the banks of small rivers. Tapade and flood and recession crops (potatoes and rice) are also grown in the lowlands.
30. Agriculture is marked by the alternation of two seasons. Rain-fed crops are predominant in the area, with good rainfall being recorded. Irrigated agriculture is still in its early stages, despite the enormous potential identified, consisting of vast irrigable areas and year-round surface water resources. The Guinean authorities are aware of the importance of irrigated agriculture in the fight against poverty and malnutrition, hence the large number of sites identified in the area to house ponds, hill reservoirs and lowland development, the objective is to give the population the means to produce, with good water control.

In Mali

31. Agriculture in Mali is based on food crops (rice, maize, millet, sorghum, fonio, cowpea), market gardening (onions, okra, potato) and cash crops (cotton, peanuts, sugar cane). In Mali, around Kayes, the expansion of cotton cultivation is very important. It increased from zero ha in 1995 to more than 42,000 ha in 2006.
32. Agriculture is the main source of income for rural populations. Agriculture is by far the most widespread economic activity in the Senegal River Basin. Indeed, it occupies nearly 80% of the population. The main crops are millet and sorghum in the flooded areas and rice in the river valley.
33. The current irrigation needs of the perimeters downstream of Manantali are 11.147 million m³ per year for an area of 710 ha. As part of the implementation of OMVS activities, Mali created, in May 2010, the Senegal River Valley Rural Development Agency (ADRS). This agency's mission is to promote the implementation of hydro-agricultural developments and land use planning in its area of intervention. The movable and immovable assets of the Integrated Rural Development Project downstream of the Manantali Dam (PDIAM) and the Kita Integrated Rural Development Project (PDRIK) were transferred to ADRS. The intervention zone of the ADRS covers the circles of Bafoulabé, Kayes, Kéniéba, Kita and Yélimané.

In Mauritania

34. In Mauritania, the role of rain-fed agriculture is declining (especially in the northern part of the basin) due to increasing aridity and is becoming almost non-existent in the lower valley and the river delta. Rain-fed crops (millet and peanuts) are increasingly giving way to flood recession crops in the middle valley and to irrigated crops in the lower valley and the delta.
35. The main agricultural production systems in Mauritania in the Senegal River Basin are:
 - Intensive market gardening around dwellings for family consumption and barter;
 - Extensive cultivation outside residential areas for the production of cereals (rice, millet);
 - Cultivation at the bottom of the valley for products marketed in the dry season.

In Senegal

36. In the Senegalese parts of the basin, such as in Mauritania, the role of rain-fed agriculture is diminishing due to increasing aridity and becoming almost non-existent in the lower valley and the delta of the river. Rain fed crops (millet and peanuts) are increasingly giving way to flood recession crops in the middle valley and to irrigated crops in the lower valley and the delta.
37. The agriculture practiced in the Senegalese part of the basin has two components:
 - Rain-fed agriculture, mainly on land far from hydraulic axes (diéri land); it is subsistence agriculture (cereals) with good cash crop activity (peanuts and cotton). This activity is very dependent on the weather conditions;
 - Irrigated agriculture along major rivers: this agriculture is practiced with better water control, but with very low cropping intensity. The crops concerned are rice, sorghum and maize in the upper and middle valleys, to which are added market gardening and industrial crops near the delta.
38. In the delta zone, cropping intensity is higher, particularly in the upper valley, the annual rainfall ensures a good winter season and very often off-season crops are not favoured.
39. Senegal and Mauritania share more than 90% of agricultural developments in the basin, the irrigable potential of which is estimated at 420,000 ha (UNEP 2006). However, this irrigable potential and the facilities available remain under-exploited.

1.3 Project zone identification and description

40. The activities planned under the project will be developed as a priority in the areas selected by the executing entities as being the most vulnerable in each country, based on the following criteria: (i) the state of the environment, (ii) the state of water and soil resources, (iii) the degree of food insecurity, (iv) the degree of dependence on natural resources, (v) the degree of dependence on agriculture, and (vi) the threats posed by climate change to these areas (floods and drought). The consultative selection process identified 157 communes, including **20 in Guinea, 35 in Mali, 64 in Mauritania and 38 in Senegal**, as the potential project intervention area, as shown in the following table:

Table 2: Project intervention areas

Country	Regions	Number of Communes
Guinea	Faranah	3
	Kankan	8
	Labé	4
	Mamou	5
Total Guinea		20
Mali	Bafoulabé	5
	Kayes	6
	Kéniéba	4
	Kita	14
	Yélimané	6
Total Mali		35
Mauritania	Brakna	14
	Gorgol	24
	Guidimakha	11
	Trarza	15
Total Mauritania		64
Senegal	Matam	11
	Saint-Louis	18
	Tambacounda	9
Total Senegal		38
TOTAL		157

41. The locations of the selected project areas are shown on the following map (Figure 2). They are located within an area of approximately 60 km on both sides of the Senegal River and its tributaries where many socioeconomic activities are practiced, mainly agriculture, livestock and fishing, as well as income-generating activities mobilizing women and youth.

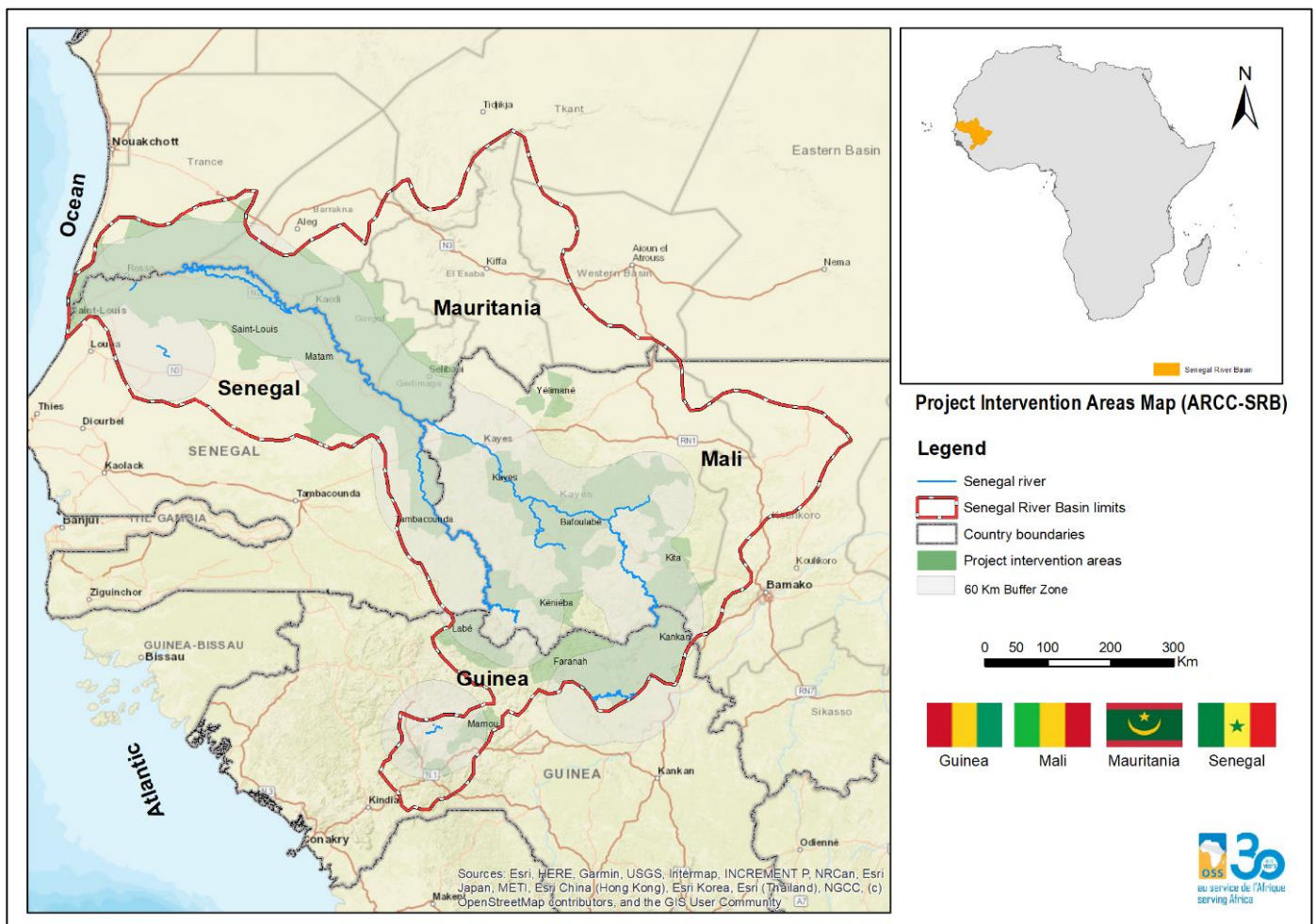


Figure 2: ARCC-SRB intervention areas map

42. Direct project beneficiaries will be selected during the development of the full proposal among vulnerable communities living in most critical areas exposed to climate risks, and highly dependent on natural resources.

1.4 Climate trends in the SRB

1.4.1 Past climate

43. **Temperature:** In the Senegal River Basin like in the West African and Sahelian regions, surface temperatures have increased over the past century in general and significantly over the 50 past years (Figure 3a). Data trends show statistically significant warming between 0.5 and 0.8°C between 1979 and 2020. Similar trends are observed for extreme temperature indices⁴. More specifically, the number of cold days and nights decreased and the number of warm days and nights increased between 1961 and 2000. Recent studies on the assessment of vulnerability to climate change in the Senegal River Basin⁵ confirm these trends. From 1960 to 2016, the temperature anomaly analysis shows an increase of +1°C, which could contribute to the amplification of drought effects in the basin.
44. **Rainfall:** Past trends (Figure 3b) show global decrease in rainfall, particularly in the headwaters of the Senegal River (Fouta Djallon) with more than 30% reduction in Senegal mean annual rainfall during the fifty past years⁶. Studies on vulnerability to climate change in the basin highlights a shift in the distribution of monthly rainfall with a trend towards shorter rainy periods, particularly in the middle and downstream parts of the basin. In addition, according to **M. L. Mbaye et al. research**⁷, the well-known droughts in the 1970s have led to a decline of water flows in many African river basins. For instance, the river's annual average flow at Bakel fell from 1374 m³/s over the period 1903-1950 to 840 m³/s in the period 1950-1972 and further decreased to only 419 m³/s in the period 1973-2002.

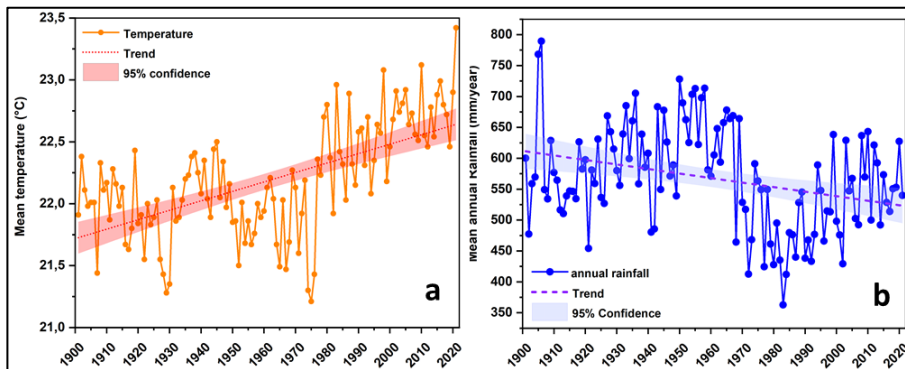


Figure 3: Past temperature (a) and rainfall (b) trend in the Senegal River Basin

Data source: World Bank Group⁸, 2022

1.4.2 Forecast

45. The climate projection data are modeled data from the global climate model compilations of the Coupled Model Intercomparing Projects (CMIPs), overseen by the World Climate Research Program. The climate projection shows that in the Senegal River basin, under the RCP 4.5 scenario, there will be an increase in extreme temperature of 1.5 to 2°C in the medium term (2020-2059) and 2 to 3°C in the long term (2060-2099); (Figure 4a and 5), compared to the reference period (1995-2014).

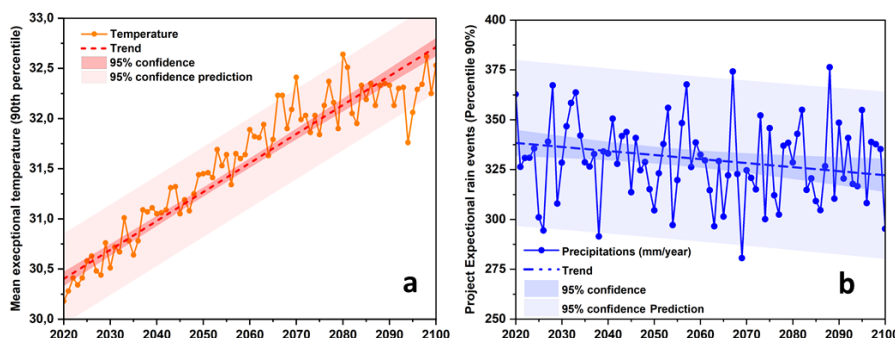


Figure 4: Projection of exceptional temperature (a) and rainfall (b)

Data source: World Bank Group, 2022

⁴ Collins, J.M., 2011. Temperature variability over Africa. *Journal of Climate* 24: 3649-3666.

⁵ OMVS, 2018. Vulnérabilité du Bassin du Fleuve Sénégal face aux Changement Climatiques. R2 - rapport de diagnostic d'évaluation de la vulnérabilité – Version finale. 450p

⁶ Henry David Venema , Eric J. Schiller & Kaz; Adamowski (1996) Evidence of Climate Change in the Senegal River Basin, *International Journal of Water Resources Development*, 12:4, 531-546

⁷ Mbaye, M.L., Hagemann, S., Haensler, A., Stacke, T., Gaye, A.T. and Afouda, A. (2015) Assessment of Climate Change Impact on Water Resources in the Upper Senegal Basin (West Africa). *American Journal of Climate Change*, 4, 77-93

⁸ <https://climateknowledgeportal.worldbank.org/download-data>

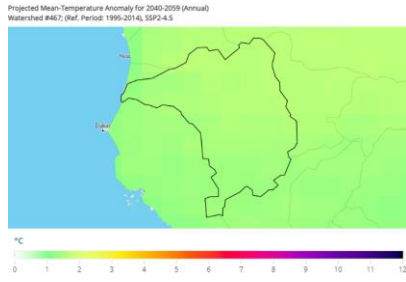


Figure 5: Projected mean temperature anomaly (2040-2059), RCP4.5/(1995-2014), World Bank Group, Climate Change Knowledge Portal

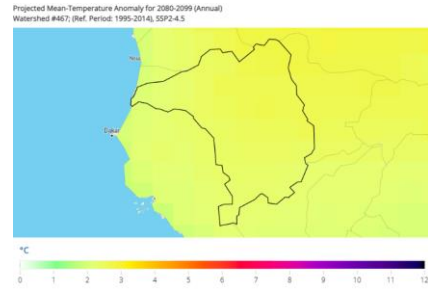


Figure 6: Projected mean temperature anomaly (2080-2099), RCP4.5/(1995-2014), World Bank Group, Climate Change Knowledge Portal

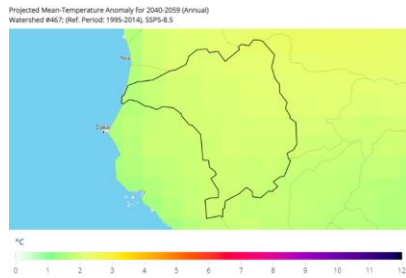


Figure 7: Projected mean temperature anomaly (2040-2059), RCP8.5/(1995-2014), World Bank Group, Climate Change Knowledge Portal

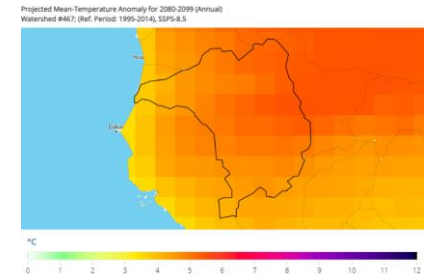


Figure 8: Projected mean temperature anomaly (2080-2099), RCP8.5/(1995-2014), World Bank Group, Climate Change Knowledge Portal

- 46. For the RCP8.5 scenario, this increase will range between 2 and 2.35°C in the medium term (2040-2059) and between 4.2 and 5.6°C in the long term (2080-2099), compared to the same reference period (1995-2014); (Figures 7 and 8).
- 47. Regarding precipitations forecasts for the Senegal River Basin region, there is no consensus for an average increase or decrease in rainfall for any term or scenario (figures 9, 10, 11 and 12) even the figure 4b shows slight decrease. However, there will be more variation between years, an intensification of rainfall events and changes in the timing and duration of the rainy period. In the Guinean highlands (upstream), rainfall will likely decrease. These highlands are the headwaters of the Senegal River and a decrease in rainfall in this region will likely affect the flow rates of the Senegal River.



Figure 9: Projected precipitation change, (2040-2059), RCP4.5/ (1995-2014), World Bank Group, Climate Change Knowledge Portal



Figure 10: Projected precipitation change, (2080-2099), RCP4.5/ (1995-2014), World Bank Group, Climate Change Knowledge Portal.



Figure 11: Projected precipitation change, (2040-2059), RCP8.5/

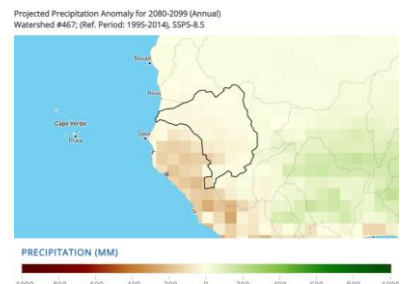


Figure 12: Projected precipitation change, (2080-2099), RCP8.5/ (1995-2014), World Bank Group, Climate Change Knowledge Portal.

- 48. Studies based on regional models suggest an increase in the number of extreme rainfall days over West Africa and the Sahel in May and July, as well as more intense and frequent recurrence of extreme rainfall over the Guinean highlands.

49. Many CMIP6 models indicate that the core of the rainy season is wetter, with a slight shift from early to late 21st century. A further complication is made with regional climate models that may alter the signal of change in rainfall patterns of incoming global models, particularly in regions with high and complex topography.
50. In conclusion, there is a low level of confidence in the robustness of changes in regional precipitation until a larger set of regional results is available. In the Senegal River basin, there is no consensus for an average increase or decrease in precipitation for any term or scenario.
51. The last IPCC Sixth Assessment Report made the following conclusions with respect to changes in West Africa (WAF), where SRB is located:
- An observed increase in riverine flooding;
 - An observed increase in agricultural and ecological dryness and droughts;
 - A projected increase in meteorological droughts, mainly on seasonal time scales;
 - A projected increase in average wind speed;
 - An increase in heavy precipitation and storm flooding.



Figure 13: IPCC Zoning of Africa

1.5 Impacts of climate change

52. In the current context of climate change, extreme weather events such as severe droughts, devastating floods and tornadoes are not only becoming more frequent but also more significant. Based on the results of the latest climate forecasts, there is a high probability that climate change in the Senegal River Basin will result in the occurrence of severe weather events, increased temperatures and decreased precipitation in the basin and river hydraulicity (long-term rainfall deficit), high wind activity, etc. All these events will have impacts on natural resources, ecosystems and all economic sectors.

1.5.1 Impacts on water resources

53. In the middle valley of the Senegal River, a decrease in rainfall in the spring areas and changes in the rainfall regime will most likely lead to a decrease in flows and flooding. The areas with modest rainfall, i.e. those located in the northern half of the basin, will be more sensitive to climate change than the areas located in the south. This is particularly the case in the southeastern regions of Mauritania (Gorgol, Guidimakha, Assaba and Hodh El Gharbi) and in the eastern part of the basin in northwestern Mali (Kaye region), where the temperature is expected to be the most severe. The Falémé source area, in particular, can be considered sensitive to landscape degradation and increased erosion as a result of an expected decrease in rainfall. Shallow lakes and wetlands that are connected to the Senegal River, such as Lake R'kiz in Mauritania and lake Guiers in Senegal, are also vulnerable to climate change. These systems will be even more dependent on high water levels for water supply from the river.

1.5.2 Impacts on agriculture and food security

54. As a reminder, the economy of the Senegal River Basin is still dominated by agriculture, which is subdivided into four main types: rain-fed agriculture (upper basin), flood recession agriculture (concentrated in the valley and delta), market gardening (everywhere) and irrigation, which has developed with better water control (Manantali and Diama dams). A decrease in flooding will lead to a lack of nutrients in the soil and consequently a reduction in the area available for cultivation and a decrease in crop yields. This decrease in crop yields will gradually lead to a decrease in the total production of certain crops that are traditionally important in the communities' staple diet (fonio in some BVs in Guinea and Mali; sorghum, maize and millet in the SRB). This decrease in production will lead to an increase in imports of cereals and food products, and thus an increased dependence on the outside world. Changes in the agricultural calendar will be observed due to the unequal distribution of rainfall in time and space. The decrease in the flow of water in front of the river will lead to the salinization of the soil and the eutrophication of the water. The vegetative cycle of crops can also be affected and thus cause a shift in the harvest and sowing periods. The appearance of invasive species at the level of certain hydraulic axes (SRB) and the proliferation of harmful insects are also consecutive to the tendency of the rainfall observed everywhere else. This decline in rainfall will have a negative impact on market gardening near waterways or by drilling wells, which is a dominant activity of women. The deterioration of these agro-climatic conditions is leading to migration, especially of young people to the cities or to foreign countries. All these phenomena are expected to continue in the future and even increase if appropriate responses are not implemented.

1.5.3 Impacts on livestock

55. The livestock sector is a significant source of household income and therefore plays an important role in the lives of people living in the Senegal River Basin. Extensive livestock production is generally practiced by the Peulhs with large herds of livestock, while intensive livestock production is developed in households as a strategy to meet certain basic needs. Unfortunately, this sector is being negatively affected by climate change. Late starts to the winter season and prolonged dry spells over the past ten years have made it extremely difficult for livestock keepers to operate. Livestock farming conditions in the various countries of the basin have thus become precarious because grazing areas have become very poor in most pastoral and agro-pastoral areas, particularly in the northern part of the basin, causing animal health problems and a drop-in livestock productivity. The exploitation of pastures dependent on boreholes may be more difficult when groundwater levels drop due to reduced flooding. This will certainly lead to increased pressure on the mid-valley pastures with increased competition with incoming pastoralists from other regions making sedentary

livestock farming in this area difficult as well. The consequences of such a situation would make access to meat and milk more difficult through higher purchase prices, thus increasing the risk of food insecurity.

1.5.4 Impacts on fishing

56. Fishing, particularly artisanal fishing, is an important activity in the Senegal River basin, but it is already facing constraints related to climate change, such as the reduction in fisheries productivity. In Mauritania, the NAP indicates that "the continental fisheries sub-sector (Senegal River) is facing certain climatic and other constraints: (i) decline in production, (ii) variation in physicochemical parameters, (iii) pollution problems (pesticides) in the Senegal River, (iv) anthropogenic effects (dams), (v) silting up of pools and water bodies, (vi) difficulties in accessing the resource due to invasive plants, (vii) irregularity of the river regime due to dams, (viii) conflicts between indigenous and /allochthonous populations. In some areas of Mali and Guinea where rivers have completely dried up or are silted up, fishing has disappeared.

1.5.5 Impacts on ecosystem services

57. The abusive cutting of wood for agricultural, energy, timber or housing purposes are factors that have contributed to a strong degradation of forest resources. This situation has been exacerbated by climate change through the conversion of certain segments of the population to forestry as a source of income, given the difficulties associated with the agricultural sector. This phenomenon is widespread in the basin where classified forests are threatened by illegal logging. With the various climate change scenarios, these resources will probably suffer quantitative as well as qualitative losses (loss of biological diversity), especially in the Kayes region in Mali, which is affected by at least three sub-basins and which occupies the first place in the annual authorized exploitation of wood for energy. Some endemic tree species that are harvested by the populations will tend to become rare or even disappear. This will have a negative impact on the income of households that use this activity as a secondary source of income.

1.5.6 Impacts on energy

58. Electricity production, one of the main priorities of the OMVS member states, requires a guaranteed minimum flow all year round and a certain height of water in the reservoir. The construction of two new reservoir dams in the Senegal River Basin is currently planned for 2025, one on the Bafing and one on the Falémé. The decrease in annual water volumes will impact the filling and/or productivity of these dams. In addition, the reservoirs will be impacted by the increase in temperature, which will lead to an increase in evaporation from the surface of the reservoirs and therefore greater water losses.

1.5.7 Impacts on navigation

59. The decrease in rainfall has strongly affected the waterways in the Senegal River Basin, making navigation difficult. In the past, inter-country transport was largely done by boat or pirogue. The gradual silting up of waterways and the drought are likely to handicap this activity.

1.5.8 Impacts on tourism

60. In the Senegal River Basin area, tourism is mainly for contemplation, discovery and, in some places, hunting. The tourism sector is a major consumer of water locally for the needs of clients staying in the accommodation facilities (some sources estimate water consumption per bed at 750 l/day). Due to the expected negative impacts of climate change on water resources and forest resources, and therefore the disappearance of certain species of fauna of hunting interest, it is reasonable to assume that tourism activities will be affected in terms of the number of visitors and that the risk of local and national job losses is high. The repercussions at the national level will be assessed in terms of loss of foreign currency, loss of employment and income, and a decline in the sector's share of GDP.

1.6 Vulnerability assessment and adaptation measures in the SRB

61. The four countries (Mali, Guinea, Mauritania, Senegal) sharing the Senegal River Basin are part of the Middle-Advanced Countries and therefore have already prepared for adaptation through their NAPA which targeted short-term actions. They are currently in the process of developing and implementing their NAP, which is the reference document that targets medium and long-term actions for adaptation to climate change. Thus, any climate change adaptation actions in the Senegal River Basin must be consistent with the NAPAs and NAPs as well as with orientations of other policy documents and sectoral strategies sensitive to climate change drawn up by the member countries.

1.6.1 Natural risk prevention measures

62. The drought risk in the Senegal River Basin is all the more complex since it is superimposed on the hydrological cycle, part of which already made up of the dry season. A better forecast of this phenomenon is key step in the prevention process.
63. Heat waves also have serious consequences on exposed populations, livestock and crops. A better meteorological forecast of the phenomenon contributes to its prevention. In addition, stopping deforestation, reforestation and tree planting contribute effectively to prevention.
64. Populations have tended to move closer to the river for easier access to water since the onset of droughts in the 1970s and 1990s and are therefore exposed to floods. Since the 1990s, marked by the return of a certain level of water, the risk of flooding has been proven with all the distress it entails for the affected populations. The implementation of

protection measures against the risk of flooding is necessary and even recommended in order to reduce the exposure of goods and populations. It is therefore necessary to carry out mapping of the hydrological hazard and mapping of the vulnerability of goods and people whose intersection makes it possible to highlight the risk zones linked to flooding. The final map must limit a red zone, subject to the risk of flooding, where it is forbidden to build, a blue zone, subject to the risk of flooding, where it is allowed to maintain pre-existing constructions under certain conditions, and a zone white, not subject to the risk of flooding, but nevertheless subject to the effects of runoff. A recent study⁹ carried out in August 2020 recommends the need to set up a basin-wide early warning system for flood management in the Senegal River basin, based mainly on the hydrometric and/or limnometric network, combined with a hydro meteorological approach using hydrological and forecasting models for least used areas. Such early warning system should be based on web and open-source solutions and designed in order to be easily upgradable (addition of new measurement stations, modifications of alert thresholds, alert distribution paths, etc.).

65. Support for the implementation of a satellite-based Multi-Hazard Early Warning System in the Senegal River basin is therefore relevant and has its foundation in the current context of drought and flood risk management.
66. The MH-EWS must therefore offer the possibility of "delivering, in a timely manner, to institutions previously identified, organized and trained, warning messages, information on the risk incurred or foreseeable, to ensure the safety of exposed populations and the protection of vulnerable assets". It will take the form of a web-based decision support platform. The operationalization of this early warning system will consider the existing achievements and will mobilize, among others, the hydrology, meteorology, agriculture, ecosystems, environment, energy services of local, national, regional and international actors.

1.6.2 *Priority adaptation measures in the context of the Senegal River Basin*

67. Measures that aim to reverse the unsustainable exploitation of resources while providing income to populations and strengthening their adaptive capacity, especially the most vulnerable, are particularly relevant. Many initiatives have been carried out in the basin with valuable achievements but need to be strengthened to achieve the sustainability required.
68. Scattered and varied actions of reactive adaptation have therefore been carried out in the basin to deal with variability and climate change. These include, among other, more economical water policies, agricultural choices more suited to the new climate, financial incentives to preserve natural resources, flood control policies. They have the advantage of creating know-how, of testing approaches. The current need is to move towards a proactive adaptation policy aimed at anticipating future impacts that threaten vulnerable areas of the basin. The OMVS needs a structural approach to adaptation and not temporary reactions because the future climate challenge for the region is strong. This adaptation approach must be developed in line with national adaptation strategies and participate in their implementation.
69. The OMVS has developed major structures (reservoir dams, hydroelectric dams, embankments) which contribute usefully to the control of water resources in the Senegal River Basin. The OMVS continues to develop major new works by ensuring, from the upstream stages of projects, that environmental and social impacts are controlled.
70. The development of irrigated perimeters coupled with the storage of water in reservoir dams makes it possible to increase considerably agricultural production, particularly rice to respond to the growing consumption of rice in the States of the Senegal River Basin. Currently, large part of rice is from importation. For instance, 80% of rice is imported from Indochina by Senegal, which is the biggest one in West Africa. The development of hydro-agricultural perimeters is therefore a priority, especially since the construction of new dams leads to a reduction in the possibilities of creating an artificial flood and therefore the areas of flood recession cultivation.
71. At the local scale, but likely to produce a knock-on effect on a global scale, OMVS micro-projects can and must also participate in this necessary change by allowing populations to mobilize around viable and sustainable projects. The impacts of the first works of the OMVS have been controlled (e.g. waterborne diseases) or still need to be (e.g. invasive aquatic plants). It is important to consider the experience feedback from these first structures for the subsequent development of the basin. It is also important to analyze the reasons for the successes and failures of micro-projects.
72. Income-generating activities are also of paramount importance for the most vulnerable communities in order to be able to cope with the adverse effects of climate change. Some even participate in the management of environmental problems. Typha development is considered a serious problem in the western part of the valley and it is expected that as temperatures increase in the future, these Typha related problems will become even more significant. A new industry to promote the use of Typha would be an additional means of controlling the spread of the species, while creating jobs for the local population¹⁰. In the Senegal River Basin, income-generating activities may also concern beekeeping, promotion of cook stoves and biogas, fish farming, promotion of market gardening, promotion of poultry farming, ecotourism, etc.
73. The ARCC-SRB project perfectly integrates the implementation, for the benefit of the most vulnerable communities, of adaptation measures aimed at improving their resilience to climate change in the targeted areas. While drawing inspiration from experiences and lessons learned from previous actions and aiming for sustainability, these adaptation measures will emphasize the integrated management of water resources at the quantitative and qualitative level. This integrated approach will consider other vulnerable sectors including agriculture, livestock, fisheries and ecosystem services.

⁹ Etude d'actualisation du plan d'alerte dans le Bassin du Fleuve Sénégal – Rapport Final. OMVS, August 2020 (444 pages).

¹⁰ Mietton et al., 2007. Water management in the Senegal River Delta: a continuing uncertainty -27 pages.

1.7 Increasing competition and growing potential conflicts

74. Competition between areas for irrigated agriculture, floodplain farming and grazing will intensify, potentially leading to more conflict. In addition to increased pressure on the river valley, pastoralists are now expected to move further south, where rainfall and grazing potential are greater. In general, the impacts of climate change have already increased the number of environmental refugees in the Sahel (Epule et al., 2015). The combination of climate change and poorly controlled human pressure can have disastrous consequences on the environment and an impact on the socio-economic balance of States (Artelia, 2018). Considering all this, the vulnerability of the ecosystem, population and biodiversity in the middle valley of Senegal is very high.

2. The project's objectives

75. The overall objective of the project is to improve the resilience to climate change of rural communities in the Senegal River Basin through the establishment of a multi-hazard early warning system and multi-sectoral adaptation actions that strengthen social and environmental systems and lead to resilient and sustainable livelihoods.
76. The specific objectives of the project are to:
- Develop and implement a multi-hazard early warning system to strengthen flood and drought risk management and food security in the basin;
 - Support the implementation of sustainable land and water management measures to strengthen the resilience of the Senegal River Basin to the impacts of climate change;
 - Strengthen the resilience of rural communities to climate change through income-generating activities;
 - Strengthen the capacities and management tools of the OMVS, as well as of the riparian countries, for a better adaptation to climate change.
77. The project will use a holistic approach and cover the entire basin. However, some actions will be region-specific: flood risk will be addressed downstream of the Manantali dam, drought risk in the northern half of the basin, and climate-resilient agriculture in the delta and valley.

3. Components and financing of the project

Project Components	Expected Outcomes	Expected Outputs	Countries	Amount (US\$)	%
C1: Strengthening the institutional and technical framework for resilient management of the Senegal River Basin to climate risks	1.1. An operational regional Multi-Hazard Early Warning System (MH-EWS) for effective disaster risk management in the Senegal River Basin is developed	1.1.1. The MH-EWS is designed and approved by the OMVS and its member states	Guinea, Mali Mauritania and Senegal	200,000	1.69%
		1.1.2. The production capacity of satellite and in situ data is strengthened		500,000	4.22%
		1.1.3. The MH-EWS is operational		1,200,000	10.13%
		1.1.4. Emergency for drought and flood prevention plans are developed		250,000	2.11%
	1.2. Development of management plans integrating cc risks are elaborated and updated	1.2.1: Integrated water management plans are developed and disseminated		150,000	1.27%
		1.2.2: Plans and tools for climate-resilient agriculture are developed		150,000	1.27%
Subtotal C1				2,450,000	20.99%
C2: Improving resilience to climate change and variability in targeted areas through community-based adaptation actions	2.1. Water, soil and land resources are protected and sustainably managed	2.1.1. The water quality and quantity monitoring network is strengthened	Guinea, Mali Mauritania and Senegal	200,000	1.69%
		2.1.2: River banks are stabilized and basin heads are restored		1,600,000	13.50%
		2.1.3: Soils are protected against erosion and desertification		1,600,000	13.50%
	2.2. Climate-vulnerable rural communities' livelihoods are strengthened and diversified	2.2.1. Infrastructure for the management and use of water related to agriculture, fisheries and livestock are strengthened.		1,250,000	10.55%
		2.2.2. Climate-resilient agri-silvi-pastoral practices are promoted		1,250,000	10.55%
		2.2.3. Sustainable fishing practices and value chain are promoted		1,250,000	10.55%
		2.2.4. Gender-specific income-generating activities for the benefit of rural communities are developed and supported with specialized funds and tools		1,250,000	10.55%
	Subtotal C2				8,400,000
C3: Capacity building,	3.1. The capacities of the OMVS and the population in terms of adaptation and	3.1.1. The capacities of the OMVS and national services in terms of adaptation to climate change and satellite tools are strengthened	Guinea, Mali Mauritania and Senegal	400,000	3.38%

awareness raising and knowledge sharing	appropriation of climate change are strengthened and knowledge is shared	3.1.2. Communities in targeted areas are sensitized on climate change adaptation and disaster risk reduction	300,000	2.53%
		3.1.3. Lessons learned are disseminated	300,000	2.53%
Subtotal C3			1,000,000	8.40%
Activities budget (A)			11,850,000	100%
Project Execution cost (B)			1,085,750	9.16% of (A)
Total Project Cost (C)=A+B			12,935,750	
Project Cycle Management Fee charged by the Implementing Entity			1,064,250	8.23% of (C)
Amount of Financing Requested			14,000,000	

4. Project calendar

Milestones	Planned dates
Start of project/programme implementation	September 2023
Mid-term review (if scheduled)	August 2025
Project/programme closure	August 2027
Terminal evaluation	February 2028

PART II PROJECT JUSTIFICATION

A. Description of the Project components

78. The ARCC-SRB project aims to strengthen the resilience of ecosystems and communities living in the Senegal River Basin to climate change through the establishment of a Multi-Hazard Early Warning System (MH-EWS) and the implementation of concrete adaptation measures. The project will also strengthen the capacities and management tools of the OMVS, as well as the riparian countries, for a more effective adaptation to climate change. The ARCC-SRB initiative will use a holistic approach and cover the entire basin. However, some actions will be region-specific: flood risk will be addressed downstream of Manantali Dam, drought risk in the upstream of the basin and climate-resilient agriculture in the delta and the valley. Critical sites for concrete adaptation activities will be identified using specific criteria and consultative process will be deployed during the development of the full proposal.
79. The project is structured around **three components**. The planned activities as well as the expected outcomes and outputs for each of the components to achieve the project objectives are in line with the Adaptation Fund's strategic outcomes as presented in the table of the Annex 3. The section below presents the details on the project's components, outcomes, outputs and activities.

Component 1: Strengthening the institutional and technical framework for resilient management of the Senegal River Basin to climate risks. (US\$ 2,450,000).

80. Actions under this component will make it possible to establish an operational and efficient regional basin wide Multi-Hazard Early Warning System and the integration of climate change dimension into development plans and water resources management tools. The implementation of the MH-EWS will help to promote collaboration, data and information exchange and develop an emergency regional response plan. Furthermore, the project will be the opportunity to review and improve existing flood and other climate risk management and response plans/tools of the OMVS (basin level) as well as in each member country. The implementation plan will involve in addition to OMVS, various actors; national focal points, national agencies in charge of water and related sectors (hydrology/water, meteorology, energy, agriculture, forest, environment...).

Outcome 1.1 An operational regional Multi-Hazard Early Warning System (MH-EWS) for effective disaster risk management in the Senegal River Basin is developed

81. The Senegal River Basin is a large transboundary ecosystem shared between four countries where climate change is amplifying extreme weather events such as floods and droughts affecting many communities' livelihoods and lives. The ARCC-SRB project is aiming at developing, updating and deploying a Multi-Hazard satellite-based Early Warning System (MH-EWS) which will be a regional innovative tool providing information for the SRB's different users, including farmers, fishermen, among other beneficiaries. It will be adapted to the local context and the socio-ecological specificities of the SRB for a better preparedness to manage natural disasters and extreme climate events. The proposed outputs and activities in this outcome are as follow.

Output 1.1.1 The MH-EWS is designed and approved by the OMVS and its member states

82. Droughts, heat waves and floods are the main climatic risks that hits the Senegal River Basin. In 2006, a flood early warning system was initiated with the aim of providing at any time and as soon as possible the foreseeable values of the expected flows and recommending the implementation of the appropriate measures. The satellite-based multi-risk early warning system envisaged within the framework of this project will reinforce the existing monitoring network with an innovative approach and enhance the MH-EWS. It will make it possible to consider the risks of floods, drought and other associated risks and will combine both the on-site produced data and information and those provided by the

satellites. It will be an information tool for the various users of the basin, in particular farmers, breeders and fishermen, and will be adapted to the regional, national and local context and to the socio-economic specificities of the basin.

83. The first step will consist in carrying out investigations to assess the current state of the existing early warning systems in the basin and in the various countries in order to be able to develop an appropriate MH-EWS at both the technical and institutional levels. Based on the results of this first activity, a model or prototype of a multi-risk satellite early warning system will be designed, equipment will be provided and made operational with the support of all stakeholders while linking with the national relevant institutions. This output will be implemented through the following activities:
- Activity 1.1.1.1: Carry out an inventory of the Early Warning Systems (EWS) and national/regional warning plans for hydro-climatic hazards and establish a detailed technical (data, models, etc.) and institutional (governance, etc.) diagnostic;
 - Activity 1.1.1.2: Develop a regional MH-EWS prototype (OMVS) linked to national and local schemes and define the investments to be undertaken (data production, equipment, etc.) as well as the operation and maintenance plan (measurement network, training, etc.) by integrating a sustainability mechanism;
 - Activity 1.1.1.3: Organize regional workshops to validate the studies and the MH-EWS prototype.

Output 1.1.2 The production capacity of satellite based and in situ data is strengthened

84. The relevance of an alert is linked to the type, reliability and quality of the data produced and transmitted to the system. The types of data (quantity and quality) are therefore of paramount importance for the multi-risk early warning system to be established within the framework of this project. The data to be collected must be based on the different risks that occur in the basin, namely environmental and hydro climatic data. Potential sources must therefore be identified and reinforced in order to guarantee the desired quantity and quality to run properly the model of the multi-hazard early warning system. The storage, processing and use mechanisms deserve to be reviewed in a more appropriate and harmonized framework. Satellite technologies will be used for the production of information in addition to information from the field network. The various actors who deal with the management of these types of data must be put together in a specific platform for ease of exchanges and updates.
85. The activities to be undertaken under this output will include:
- Activity 1.1.2.1: Define a strategy for operational and harmonized use of multi-source environmental and hydro-climatic data to support MH-EWS model inputs (quantitative precipitation estimates/predictions in catchments, etc.);
 - Activity 1.1.2.2: Strengthen data storing, processing and valorization as well as interoperability between the information systems of the various data suppliers (harmonization of formats, etc.) and the information exchange protocols necessary for the EWS, in particular through a common repository (determination of formats for producing information on hydrological extremes, etc.);
 - Activity 1.1.2.3: Using satellite technologies to enhance knowledge of the basin's water resources (hydrology, soil moisture, wetlands, etc.) and withdrawals in the intervention zones (filling reservoirs, irrigated areas, sowings, etc.) for information production for the MH-EWS in addition to the in-situ network.
 - Activity 1.1.2.4: Develop a platform to manage water withdrawals and implement climate resilient agriculture, using satellite imagery (geo-spatialization/modelling of sowing and irrigated areas, etc.).

Output 1.1.3 The MH-EWS is operational

86. The operationalization of the MH-EWS to be established will depend on the materials and equipment to be used. In the Senegal River Basin, the material and equipment needed for the MH-EWS must be well specified, defined and validated with all stakeholders at the various levels to ensure good data collection, analysis and processing. This network will feed the system with real time data for an efficient forecast and broadcast of the alert. During the first steps of the project implementation phase an additional detailed assessment of the equipment, the measurement sites, relevant partners involved in the risks management will be carried out. In addition, and to ensure ownership and sustainability of the monitoring system capacity building sessions for the identified actors will be necessary both at regional and national level.
87. Specific activities under this output will include:
- Activity 1.1.3.1: Establish an operational MH-EWS with supporting tools (modelling, flood/drought forecasting, etc.), services (bulletins, warning messages, etc.), a web platform and standard operating procedures including a chain of information dissemination to potential users;
 - Activity 1.1.3.2: Supply to upgrade and/or establish monitoring stations (hydrometric, meteorological, water level gauges, piezometers, real-time remote transmission system, etc.), computer equipment (servers, processing units, software, GPS, etc.) and tools to broadcast warning messages to the population (sirens, telephones, etc.);
 - Activity 1.1.3.3: Organize training and mentoring sessions at national and regional levels.

Output 1.1.4 Emergency for drought and flood prevention plans are developed

88. The early warning system, once in place, should reduce the negative impacts of disasters on the local population through the risk forecasting system and alert dissemination. This therefore requires the development of an emergency plan, which consists in an operational manual/tool to prevent, protect and manage the impacts of these disasters at the level of the Senegal Basin. Its development must consider all existing emergency plans and with the participation

of all stakeholders. The emergency plan will be dealing with both regional and national dimensions and will include a detailed procedure for managing disasters and emergencies related to different aspect such as crops, animals and humans in order to limit damage. The MH-EWS will also include a community-based component that will require a number of sensitization and training sessions to ensure ownership of the emergency plan actions for an adapted and suitable behavior.

89. The emergency plan development will be organized through the following activities:
- Activity 1.1.4.1: Develop and/or update warning and resilience plans for communities facing climate risks;
 - Activity 1.1.4.2: Ensure operational monitoring of the MH-EWS, the feedback mechanism and the prevention/response plans at regional and national levels;
 - Activity 1.1.4.3: Organize training sessions on the use of prevention/intervention plans for the benefit of various stakeholders at national and regional levels;
 - Activity 1.1.4.4: Establish a sustainability mechanism for the MH-EWS (long-term funding, long-term project targeting, etc.).

Outcome 1.2: Development of management plans integrating climate change risks are elaborated and updated.

90. Sectoral development plans are effective management documents defining the most suitable actions to be undertaken to ensure a sustainable development based on a natural resource exploitation. A vital and sensitive sector; such as water sector which is a key resource to agriculture, fishing, animal breeding in addition to household needs and potable water, requires a development plan that considers the impacts of climate change. One of the main expected results of this project is the development and/or the update of management plans focusing on water resources and agriculture and considering climate change. This outcome is based on the following outputs and activities:

Output 1.2.1: Integrated water management plans are updated/developed and disseminated

91. Integrated water resource management aims to implement a well-concerted and coordinated water and its related resources to ensure economic and social well-being in an equitable manner without compromising the sustainability of vital ecosystems. It is within this framework that this project envisages the updating/development of integrated water management plans and ensuring their dissemination. This will require the integration of issues related to climate change and the multi-hazard early warning system in the management of the Senegal River Basin after the revision of existing guidelines. The existing national plans and strategies will be updated/ developed using a consultative approach.
92. The following activities will be undertaken:
- Activity 1.2.1.1: Design/update water management plans (WMP) to include climate change dimension, MH-EWS and risk/vulnerability related to water uses;
 - Activity 1.2.1.2: Organize high-level regional validation meetings to endorse WMP at national level;
 - Activity 1.2.1.3: Dissemination at regional and national levels and alignment of WMP to the national plans/strategies.

Output 1.2.2 Plans and tools for climate-resilient agriculture, are developed

93. The economy of the Senegal River Basin remains dominated by agriculture, which is strongly impacted by climate change by, for example, the modification in the agricultural calendar and the reduction of yields. The project is aiming to promote resilient agriculture through the development of appropriate plans and tools that will consider the gaps and shortcomings of the existing ones. These plans will identify the most suitable agriculture practices to be promoted in the basin according to the various levels of vulnerability.
94. Specific activities will include:
- Activity 1.2.2.1 Assess the status of agriculture risks in the basin and identify gaps;
 - Activity 1.2.2.2 Establish an action plan for the development of climate resilient agriculture in the basin and support the implementation of the plan's urgent actions;
 - Activity 1.2.2.3 Document and support the implementation of endogenous agricultural best practices for climate change adaptation.

Component 2: Improving resilience to climate change and variability in targeted areas through community-based adaptation actions. (US\$ 8,400,000).

95. This second component aims at a more rational and sustainable use of natural resources at regional and national levels in the SRB. The shared resources require a common and a harmonized use and management for which several activities and actions related to water withdrawals and uses, soil protection, ecosystem preservation and land management are planned under this project. Given the vulnerability of the project targeted countries and areas to floods and droughts as extreme weather events exacerbated by CC, the ARCC-SRB is benefiting to the smallholder farmers, fishermen and pastoralists who will be informed in due time of the hazard and will have the opportunity to adapt thanks to the adaptation actions to be implemented under this component. The two outputs seek to understand the status of water security by focusing on surface and groundwater resources, soil and water conservation, crop and livestock production, fishing infrastructure and sources of incomes. The competitive small grants scheme will focus on encouraging and rewarding the efforts of the most vulnerable among smallholder farmers and pastoralists with a special attention to women, and youth. The livelihoods improvement will also be based on the development and

promotion of IGAs (ecotourism, beekeeping, sisal, and crafts production, energy saving stoves, briquettes and promotion of interlocking bricks for construction).

Outcome 2.1. Water, soil and land resources are protected and sustainably managed

96. Water, soil and land resources are defining factors for human production systems. In the Senegal River Basin, the main activities are based on natural resources such as subsistence farming, pastoralism, and fishing. Their protection and sustainable management in a context of climate change is necessary towards, water quality and quantity monitoring which will be ensured through the establishment of a regional network. The stabilization of riverbanks and restoration of basin heads coupled with soil protection against erosion and desertification will ensure a better management of flood and drought impacts.

Output 2.1.1 The water quality and quantity monitoring network is reinforced

97. Knowledge of the quantity and quality of water resources in the Senegal River basin is necessary to ensure that they meet the various uses and needs in place. The SRB is very diverse area where several groups of beneficiaries are evolving such as farmers, breeders, fishermen who have different water needs, in addition to the households water needs. As part of this project, studies will be carried out to assess the quantity and quality of water resources in the basin. Based on these studies and assessments, plans will be developed for the mobilization and management of water resources, targeting the most vulnerable areas. With regard to water quality, it will also be necessary to strengthen the monitoring systems based on the standards in force for the measurement of physio-chemical and bacteriological parameters. The water quality and quantity monitoring system will be set up through the following activities will include:

- Activity 2.1.1.1: Strengthen water quality monitoring systems (standardization of physio-chemical and bacteriological parameters, etc.);
- Activity 2.1.1.2: Establish a quantitative and qualitative assessment of the water resources (need-availability) and develop water mobilization/management plans in critical locations.

Output 2.1.2 River banks are stabilized and basin heads are restored

98. The degradation of the ecosystems of the Senegal River Basin through the excessive cutting of trees for different uses such as, wood for agricultural purposes, energy and timber or housing, has been amplified by the changes in the social behavior due to settlement of some communities as well as climate change. Due to these different practices of deforestation, clearing, and land use change the watershed is being degraded and impacted by an intense erosion of the riverbanks and its tributaries. The impact of this degradation is also affecting the downstream area of the catchment and is therefore causing damages to the communities' activities. The degraded riverbanks are also an additional factor that amplifies flood impacts. The project will therefore implement activities to stabilize the banks and restore the heads of the basin through the implementation of a restoration plan and concrete adaptation actions to reinforce the communities and the ecosystem resilience. To this end the following activities are to be implemented:

- Activity 2.1.2.1: Identify and prioritize the critical areas of degraded river banks with communities
- Activity 2.1.2.2: Develop/upgrade a restoration plan for critical areas for the river banks
- Activity 2.1.2.3: Stabilize riverbanks (gabion walls, washhouses, footbridges, access ramps, descent stairs, riprap, etc.) (HILO works) ;
- Activity 2.1.2.4: Restore degraded heads of water basins (reforestation, etc.)

Output 2.1.3 Soils are protected against erosion and desertification

99. The phenomena of erosion and desertification resulting from the degradation of the ecosystems of the Senegal River basin are also a concern to which the project aims to provide solutions. The approach will consist of identifying the areas with the most degraded soils, proposing a restoration plan and implementing concrete restoration actions. To ensure large scale SLWM that could be accounted for as an LDN action for the region, this output will be combined with output 2.1.2. Particular attention will be paid to structures and infrastructure for mobilizing rainwater with the objective of contributing to groundwater recharge.

100. Specific activities will include:

- Activity 2.1.3.1: Identify and prioritize the critical areas of degraded lands, and potential ground-water recharge sites, with communities
- Activity 2.1.3.2: Develop/upgrade a restoration plan for critical areas for degraded lands
- Activity 2.1.3.3: Protect soils against erosion, silting and desertification (stone barriers, terraces, Zai, sand dune fixation, etc.) (HILO works);
- Activity 2.1.3.4: Construct rainwater retention structures for groundwater recharge.

Outcome 2.2. Climate-vulnerable rural communities' livelihoods are strengthened and diversified

101. Communities in the Senegal River Basin continue to derive their livelihoods from resources and ecosystems in an unsustainable manner due to a lack of knowledge and access to information. Inputs for sustainable management practices of water resources, agriculture, fisheries, livestock, wetlands and riverbanks are required to enhance their resilience to the impacts of climate change. The ARCC-SRB project targets to strengthen and develop infrastructure for the management and use of water related to agriculture, fisheries and livestock including the promotion of climate-

resilient agro-silvo-pastoral practices and value chains. Income-generating activities for the benefit of rural communities are an integral part of the ARCC-SRB project, which is geared towards inclusion of gender.

Output 2.2.1 Infrastructure for the management and use of water related to agriculture, fisheries and livestock are strengthened

102. Following the occurrence of extreme weather events such as flooding and drought in the basin, water resources are affected by the changes in the rainfall patterns. Reducing the impacts of these flooding and drought phenomena requires the establishment and/or rehabilitation of water resources management infrastructures as well as improvement of their use by the potential beneficiaries who are farmers, fishermen and breeders. Training sessions will be organized for all stakeholders to ensure an efficient O&M for a sustainable management of these infrastructures. In addition, technical capacity building sessions on the efficient use of water will be organized. Socio-professional associations will be established or existing committees will be strengthened to enable them to be operational and take the responsibility of the water points after the project closure. Specific activities will include:

- Activity 2.2.1.1: Restore hydro-agricultural infrastructure, mainly hydraulic axes and irrigation channels for irrigation perimeters (mowing, cleaning, etc.) as well as catchment/storage structures;
- Activity 2.2.1.2: Setup at catchment level and local level, hydro-agricultural infrastructure management committees and conduct campaigns for safe water use and water demand management;
- Activity 2.2.1.3: Strengthen irrigated perimeters (irrigation techniques, instruments, etc.)
- Activity 2.2.1.4: Promote rainwater collection and storage techniques (hillside reservoirs, water tanks, etc.) for human consumption and subsistence farming;
- Activity 2.2.1.5: Develop water harvesting using solar powered pumps and set up storage infrastructure.

Output 2.2.2 Climate-resilient agro-silvo-pastoral practices are promoted

103. Strengthening the resilience of communities in the basin can also be ensured through promoting agro-silvo-pastoral practices in the most vulnerable areas. The approach will consist of identifying and prioritizing these areas, the potential beneficiaries and their needs and providing them with the necessary support to improve their living conditions. Specific support will be provided to improve the pastoralists and breeders' conditions as this is one of the main transboundary activity that made the ARCC-SRB project a regional one. Transhumance will also be the subject of concern with a view to its proper management in order to reduce or even eliminate the conflicts that it often generates. Activities related to promotion of climate resilient agriculture among others are also planned to achieve this output. Finally, facilitating the access to market and marketing of the local products will be an activity that ARCC-SRB will support. This output that is mainly dedicated to improve communities' livelihoods will include the following activities:

- Activity 2.2.2.1: Scaling up climate resilient horticulture and rice production practices;
- Activity 2.2.2.2: Provide climate resilient seeds and nurseries for short cycle crops;
- Activity 2.2.2.3: Provide fodder for introduced short cycle livestock;
- Activity 2.2.2.4: Improve/upscale pasture and grazing management techniques;
- Activity 2.2.2.5: Access to market and marketing;
- Activity 2.2.2.6: Develop transhumance territories and fodder crops.

Output 2.2.3. Sustainable fishing practices and value chain are promoted

104. Fishing is also a sector affected by climate change in the same way as agriculture and livestock. This is why the project has considered carrying out actions to strengthen the resilience of fishermen. The latter will benefit from appropriate training on the various fishing techniques most suited to dealing with the new natural conditions that has been modified because of climate change. Fisheries and aquaculture infrastructure will be rehabilitated and/or put in place as well as the provision of fishing equipment and tools.

105. Specific activities will include:

- Activity 2.2.3.1: Assessing the most viable infrastructures and techniques to promote fishing & aquaculture
- Activity 2.2.3.2: Improve fishing infrastructures and promote aquaculture (development and rehabilitation of fishponds, construction of fish markets and docks, fish processing area, recovery/rehabilitation of areas infested by aquatic plants, etc.).
- Activity 2.2.3.3: Conduct studies and train fishers' communities on fish value chain
- Activity 2.2.3.4: Equip fishers' communities with fishing equipment and tools

Output 2.2.4 Gender-specific income-generating activities for the benefit of rural communities are developed and supported with specialized funds and tools

106. The promotion of income-generating activities is also of great importance to improve the adaptive capacity of the most vulnerable communities to the adverse effects of climate change in the Senegal River basin. Improving their livelihoods is one of the main conditions to achieving the project's objectives. To this end, it is proposed to strengthen the resilience of the local population through the establishment of a micro-financing mechanism to help and accelerate the diversification of income-generating activities for the communities. Priority will be given to the most vulnerable communities and individuals. Given the importance of this output and to ensure the project results sustainability, special attention will be made to any other similar initiative already carried out or in progress and its lessons learnt will

be taken into account as good practices or practices to avoid. Specific partnerships will be established to implement the small funding and to build the capacities of the targeted and beneficiary communities and groups. This last output under component 2 will be ensured by 7 activities that will complement each other:

- Activity 2.2.4.1: Establish a complete inventory of microcredit facilities and develop mechanisms and procedures for accessing revolving funds for the diversification of income generating activities;
- Activity 2.2.4.2: Organize information and training workshops on revolving funds and income diversification;
- Activity 2.2.4.3: Develop an operational manual for the implementation of IGAs;
- Activity 2.2.4.4: Support women and youth groups for IGAs (fishing, agriculture and agroforestry, development of small market gardens for women, etc.);
- Activity 2.2.4.5: Provide small competitive grants targeting associations or groups of small farmers and pastoralists to develop innovative IGAs or climate change adaptation actions (micro-projects) (e.g. promote small-scale irrigation management, etc.);
- Activity 2.2.4.6: Develop lowlands and small community plains;
- Activity 2.2.4.7: Provide institutional and technical support to local authorities to increase the resilience of territories to climate change.

Component 3: Capacity building, raising awareness and knowledge sharing (US\$ 1,000,000).

107. The project third component aims at addressing the gaps in capacities regarding CC adaptation at various levels in the SRB area. The communities are considered having insufficient or inadequate knowledge on CC and their capacity to cope with CC impacts is limited. In response, the proposed project will raise and institutionalize awareness at community-level and build capacities of sub-national, national and regional structures. The ARCC-SRB project will develop innovative knowledge management mechanisms for information sharing, experiential training and learning, data creation and analysis, dissemination, and uptake of lessons and best practices. This component will include the elaboration of communication materials for the target groups including vulnerable communities, women, youth, smallholder farmers, pastoralists, artisans, local government or subnational and national as well as regional leaders including technical and non-technical staff in the four concerned countries. The technical and institutional capacities of OMVS and countries will thus be strengthened, including regarding the capitalization of knowledge in the basin, the use of management and decision support tools, and skills for processing and valorization of satellite data. Local communities will also benefit from these activities through awareness campaigns on the impacts of climate change (land degradation, desertification, etc.) and adaptation solutions.

Outcome 3.1. The capacities of the OMVS and the population in terms of adaptation and appropriation of climate change are strengthened and knowledge is shared

108. Vulnerability studies carried out in the Senegal River Basin identified impacts of climate change are the main factors affecting communities' livelihoods. It is therefore necessary to build the capacities of all the actors, including the technical services and the rural populations to ensure the sustainability of the various investments. Under the ARCC-SRB project, the capacities of OMVS and national services in terms of adaptation to climate change and satellite tools will be strengthened. The lessons learnt will be disseminated and the communities in targeted areas will benefit from sensitization on climate change adaptation and disaster risk reduction.

Output 3.1.1 The capacities of the OMVS and national services in terms of adaptation to climate change and satellite tools are strengthened

109. The OMVS is a concerted management organization that was set up to manage the shared resources of the Senegal River Basin. As part of this project, it is necessary that the OMVS through its technical services at the regional and national levels benefit from capacity building support in adaptation to climate change, and in satellite data and tools developed for the establishment of the Early Warning System, which will be implemented under component 1. Aspects related to the regulatory, legal and institutional frameworks on water resources management and adaptation will be addressed for a better project results anchorage. Specific activities will include:

- Activity 3.1.1.1: Strengthen and operationalize the OMVS High Commission's Environmental Observatory (HC-OMVS);
- Activity 3.1.1.2: Training-action on OMVS decision support and data production/management tools (GIS and other information systems, remote sensing, cartography, etc.);
- Activity 3.1.1.3: Enhancing the OMVS System's capacities on regulatory, legal and institutional aspects related to water resource management and adaptation to climate change.

Output 3.1.2 Communities in targeted areas are sensitized to climate change adaptation and disaster risk reduction

110. This output aims to raise awareness and build the capacities of the various actors (political decision-makers, practitioners, technicians) in terms of adaptation to climate change. Awareness-raising and technical capacity-building activities will contribute to the creation of a solid information framework that integrates adaptation to climate change. Thus, a part of the project resources will be used to assess the needs of the target group in terms of capacity building in order to develop a training plan adapted to the identified needs. The main activities under this output are the following

- Activity 3.1.2.1: Raising awareness of local communities on the impacts of climate change (land degradation, desertification, etc.) and adaptation solutions;

- Activity 3.1.2.2: Develop a communication strategy and action plan.

Output 3.1.3 Lessons learned are disseminated

111. The lessons learned and best practices that will come from the implementation of this project will be an essential aspect and deserve to be documented and disseminated. They will be of importance for the replication and upscaling of some of the interventions with better and higher adaptive effects to the impacts of climate change. At the same time, documentation will improve replication to other areas. Communication materials will be developed with informative material, for example in the form of posters, leaflets and brochures intended to facilitate knowledge transfer as well as to support project interventions. Exchange visits and study trips will be organized for experience sharing and practical learning.
112. Specific activities will include:
- Activity 3.1.3.1: Dissemination of information on lessons learned and achievements of the project (capitalization)
 - Activity 3.1.3.2: Document and disseminate good practices to other stakeholders
 - Activity 3.1.3.3: Organize study tours and exchanges for stakeholders, including local communities.

B. Promotion of new and innovative solutions to climate change adaptation

113. The ARCC-SRB project will implement a new management technology in the Senegal River Basin for the control of risks associated with direct and indirect impacts of CC. Indeed, under the first component of the project, a regional multi-hazard warning system will be developed. The particularity of this tool is its capacity to respond to the needs of the different actors intervening in the basin, i.e., decision-makers, administrations, farmers, etc.
114. This MH-EWS will be fed by a multitude of data from different sources and scales. In addition, the products that will be generated from this system will provide timely data/information on the status of the basin's resources, namely water and land degradation, agricultural production, among others. As described in output 1.1.2, the MH-EWS to be developed will use satellite imagery to better understand and access large areas at any given time, especially those that are physically inaccessible. In addition, a wide array of communication and sharing tools will be developed to ensure access and free flow of information to all relevant stakeholders.
115. Another innovative component will be provided by ARCC-SRB through the implementation of a participatory community approach that combines awareness, learning, planning and action. Indeed, under outcome 2.1 of the project, several field interventions will be undertaken using the HILO method.
116. The project will introduce new gender-specific income-generating activities to diversify both food production and improve communities' livelihoods. Innovation will be experienced through the introduction of identified activities, which will provide improved health and income sources. Besides these, the project will also enhance the integration of smallholders into value chains, and provide the funds and tools for the project activities for the benefit of the communities, thereby creating new employment opportunities.
117. The innovations in adaptation and resilience-building will be shared and promoted through the knowledge-sharing activities included in the project and through the network of stakeholders that will be involved in the project. Lessons learned will be disseminated at the local, national and regional levels and ultimately globally for further adoption.
118. The project will build on the existing capacities of OMVS and its national units to strengthen their institutional and human capacities accordingly. It will also build the capacities of the national decision-makers and leadership towards the project's execution. It will promote national networks and rely on local communities for field activities especially programmed under component 2.

C. Economic, social and environmental benefits

119. The implementation of the ARCC-SRB project, which aims at strengthening the basin's vulnerable communities' adaptive capacities to climate change, will undoubtedly generate environmental, economic and social benefits.

Outcomes	Economic	Social	Environmental
1.1. An operational regional Multi-Hazard Early Warning System (MH-EWS) for effective disaster risk management in the Senegal River Basin is developed	<ul style="list-style-type: none"> • Sustainable agro-pastoral practices with the creation of fodder fields and livestock corridors 	<ul style="list-style-type: none"> • Direct impacts on 7,000,000 people (51% women) living in the basin 	<ul style="list-style-type: none"> • Acquisition of hydro-climatic data in real time and at lower cost than in-situ processes • Restore wetlands in the basin • Low GHG emissions
1.2. Development of management plans integrating climate change risks are elaborated and updated.	<ul style="list-style-type: none"> • Payment for ecosystem services within the river basin 	<ul style="list-style-type: none"> • Consideration of the specific needs of different social groups considering the differentiated effects of climate change on their livelihoods 	<ul style="list-style-type: none"> • Development of planning and sustainable management tools for water resources and associated ecosystems
2.1. Water, soil and land resources are protected and sustainably managed	<ul style="list-style-type: none"> • Increase agricultural yields and consequently the economic livelihoods and well- 	<ul style="list-style-type: none"> • 20,000 direct beneficiaries 	<ul style="list-style-type: none"> • Sustainable exploitation of the basin's natural resources • Soil protection and preservation against erosion and desertification

	being of the basin's communities		<ul style="list-style-type: none"> Protect and reduce degradation of lands used for agriculture
2.2. Climate-vulnerable rural communities' livelihoods are strengthened and diversified	<ul style="list-style-type: none"> Increase climate resilient livestock breeds and numbers 	<ul style="list-style-type: none"> Sustainable increases in productivity and improvements in food security 	<ul style="list-style-type: none"> Reforestation/afforestation
3.1. The capacities of the OMVS and the population in terms of adaptation and appropriation of climate change are strengthened and knowledge is shared	<ul style="list-style-type: none"> Implementation of measures to protect assets and services Satellite based and in situ data will help to increase knowledge on water resources 	<ul style="list-style-type: none"> 10,000 direct beneficiaries 	<ul style="list-style-type: none"> Water quality monitoring, protection and restoration of spring sources and river banks

The main benefits from the project are described as follow:

Environmental benefits

120. The use of satellite images will allow the acquisition of hydro-climatic data in real time and at lower cost than in-situ processes. These data will provide useful information to support the development of planning and sustainable management tools for water resources and associated ecosystems in the basin. The deployment of these tools is essential and will contribute significantly to ecosystem, economic, and social benefits. In addition, the multi-hazard early warning system that will be established will generate useful information that will enable effective implementation actions to protect and reduce degradation of lands used for agriculture and restore wetlands in the basin.
121. The project intends to promote climate-smart agriculture, which has important environmental benefits¹¹. This will allow for low emissions (greenhouse gas emission) and climate resilience development for sustainable increases in productivity and improvements in food security.
122. Actions to preserve ecosystems through water quality monitoring, protection and restoration of spring sources and riverbanks, soil protection and preservation against erosion and desertification, reforestation/afforestation, development of livestock corridors, etc. have strong environmental impacts. The immediate and long-term positive effects and impacts of the implementation of these actions are the regeneration of the ecosystems and biodiversity in the basin. This will increase the provision of ecosystem services in the basin and by extension, the economic and social development of communities.
123. In addition, all the data and information produced, particularly under component 1, will promote a better understanding of the interactions between the environment and human factors, as well as the impacts of climate on these components, in order to define the most appropriate approaches and means for sustainable exploitation of the basin's natural resources.
124. The lessons learned from the ARCC-SRB project and the best practices to be adopted could be replicated in other national basins of the beneficiary countries as well as transboundary basins. This will be promoted by involving the population and stakeholders at different levels (national (local and central) and regional). The planned awareness-raising and communication activities will ensure the mobilization and participation of decision-makers and the local population and their commitment to the sustainable management of the basin's ecosystems. Awareness raising is also important for the sustainability of the project's achievements in preserving the basin's natural resources, ecosystems and biodiversity.

Economic benefits

125. Alerts from the operational MH-EWS and the development of contingency plans will facilitate timely and effective decision-making and the implementation of measures to protect assets and services that may be exposed to extreme events such as floods and droughts. Positive impacts include limiting economic losses and social impacts related to these events.
126. The development of climate-resilient agriculture will not only contribute to water and soil conservation, but will also increase agricultural yields and consequently the economic livelihoods and well-being of the basin's communities.
127. The use of satellite tools will allow the acquisition of real-time hydro-climatic data at a lower cost than the process of monitoring in situ. This will provide useful information and support the development of tools and instruments for planning and sustainable management of water resources and ecosystems in the basin. The effective deployment of such tools will increase the economic benefits of resource exploitation to complement the environmental and social benefits. This will also support payment for ecosystem services within the river basin from the beneficiary communities and stakeholders.
128. The promotion of sustainable agro-pastoral practices with the creation of fodder fields and livestock corridors will not only increase climate resilient livestock breeds and numbers for economic strength which will also have environmental benefits for the preservation of ecosystems and but will also limit the recurrent conflicts between herders and farmers in the region towards social benefits.

¹¹ Gustavo Sain et al. (2017). Costs and benefits of climate-smart agriculture: The case of the Dry Corridor in Guatemala. *Agricultural Systems*, Volume 151, pp163-173.

129. The support provided by the project through the implementation of income-generating activities for women and vulnerable groups and the promotion of other actions such as agroforestry and pastoralism will favor the improvement of livelihoods, as well as the financial autonomy and social well-being of the communities, particularly the most vulnerable groups.

Social benefits

130. The implementation of this project will have direct impacts on all the 7,000,000 people (of which nearly 51% are women) living in the basin and particularly the 6 million people living along the river (about 85% of the total population of the basin). Indirect impacts will affect the entire population of the four countries, estimated at nearly 46 million inhabitants¹².
131. The functional of the MHEW system will contribute to the preservation and protection of social infrastructure (houses, roads, schools, health centers, etc.) as well as people and other goods and services exposed to extreme climate risks, through the provision of warnings and the deployment of contingency plans.
132. The support of vulnerable groups, especially women, through the implementation of income-generating activities aims to increase the economic income of the beneficiaries and their financial autonomy. In addition, the empowerment of gender (women led initiatives) and youth aspects will be at the heart of the project's actions at all stages, from planning to implementation of the project. They will be actively involved in decision-making.
133. One of the long-term impacts of this project is the improved management of water resources and dependent ecosystems in the basin. As such, the project is designed to provide benefits to the riparian populations and particularly to women and other vulnerable groups who depend highly on these resources for their livelihood and well-being. As such, gender concerns will be integrated into capacity building programmes and community level interventions.
134. To better mitigate the reverse effects resulting from the project implementation, relevant risks related to the planned actions in compliance with the Adaptation Fund's Environmental and Social Policy (ESP) and OSS will be employed. This will be applied at all levels, as well as with national environmental legislation in each of the four beneficiary countries. Moreover, an Environmental and Social Impact Assessment (ESIA), an Environmental and Social Risk Management Plan (ESRMP) and Gender Assessment will be undertaken for the proposed project with inputs from the national authorities and the respective executing entities, hand in hand with the Sahara and Sahel Observatory as the project's implementing entity. OSS will also apply the FPIC process to complement the compliance with the ESP at all levels and at all scales of the project.

D. Cost-effectiveness of the proposed project

135. According to the UN Environment Programme (UNEP), the economic impacts of climate change in Africa are likely to be significantly higher than in many other world regions and they could be significant in the short-term, with estimates that the costs could be equivalent to 1.5-3% of GDP/year by 2030. Impacts (and benefits) will be unevenly distributed across countries and between sectors. Though adaptation is key to reduce these costs, it cannot remove them completely, particularly under a business-as-usual scenario¹³. Due to climate change events in West Africa (mainly in the Sahel region), yields of irrigated rice (which is the main crop in the Senegal River Basin) could decrease by - 45% in the dry season and rain-fed rice production might soon become too risky¹⁴.
136. To complement the above, the latest IPCC report Climate Change 2022, in the context of Africa, identifies that the current finance allocated to adaptation is less than even the lowest adaptation cost estimates assessed and reported¹⁵.
137. Indeed, the current project is designed to be cost effective as it aims at implementing actions to reduce the negative impacts of climate change on ecosystems and populations and to strengthen their resilience through the implementation of concrete adaptation actions on the ground. The main issues to be addressed are flood and drought risk management, sustainable and integrated land and water resources management. At the end of the project, it is expected that new innovative solutions will be identified and implemented to respond effectively and sustainably to the challenges related to these issues at the basin level. If no action is taken, the threats and negative impacts related to the above-mentioned climate risks will continue and intensify in the basin and consequently increase the vulnerability of the populations and ecosystems in the basin. For example, recurrent flooding and frequent pockets of drought will seriously affect agricultural production (the main source of income) in the basin, leading to significant degradation of communities' livelihoods. As a result, failure to implement the project will inevitably increase the adaptation costs of vulnerable communities exposed to climate hazards considerably.
138. The proposed project will also strengthen the capacity of the OMVS to fulfil effectively its mandate as a basin resource manager. The planned regional (basin-wide) approach is recognized as more coherent, efficient and cost-effective for the identification and implementation of adaptation measures and sustainable development¹⁶. This approach will facilitate consultations between the four riparian countries of the basin; efficiency will be gained as knowledge and previous funding as well as ongoing projects will be considered in order to limit overlaps and duplications and the transfer of methodologies from one area to another will be easier to implement. Similarly, the adaptation tools and

¹² Information source: Senegal River Basin TDA/SAP report

¹³ Watkiss, P., Downing, T., Dyszynski, J.: (2010). AdaptCost Project: Analysis of the Economic Costs of Climate Change Adaptation in Africa. UNEP, Nairobi

¹⁴ OMVS (2019). Impacts du changement climatique dans le bassin du fleuve Sénégal : une évaluation spatiale de la vulnérabilité. 121p

¹⁵ https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf

¹⁶ Both ENDS (2010). River Basin Management: A Negotiated Approach.

(https://www.bothends.org/uploaded_files/document/12006_River_Basin_Management_complete_publication.pdf)

methodologies developed can be tested on a larger scale in the basin, and easily adopted in other similar environments, thus creating a community of users considering the prospects of climate change.

139. Overall, the adaptation measures mainstreamed by the project (supporting income-generating activities of vulnerable communities, promoting sustainable agro-pastoral practices, implementing water and soil protection measures) are confirmed to be cost-effective solutions for developing long-term resilience. Early Warning Systems are also cost-effective solutions to reduce disaster risk. The participative approach, including in the design of monitoring and management tools (living lab methodology), and the use of free satellite data (Copernicus) also contribute to making the project cost-effective.

140. The table below gives an overview of the concrete benefits resulting from the implementation of the project's actions.

Table 3: Concrete benefits resulting from the implementation of the project's actions

Project Components	Project Cost (USD)	Concrete adaptation benefits	Avoided losses	Trade-offs (compromise)	Number of Beneficiaries
Component 1: Strengthening the institutional and technical framework for resilient management of the Senegal River Basin to climate risks.	2,450,000	<ul style="list-style-type: none"> - The deployment of a Multi-Hazard Early Warning System (MH-EWS), mainly for floods and droughts management will allow the beneficiaries to gain knowledge and tools to increase preparedness for climate extreme events; - The designing and implementation of tools for climate-resilient agriculture: Supporting climate-smart agriculture in the basin will enable producers to increase their yields; - The production capacity of satellite based and in situ data will help to increase knowledge on water resources and their dependence as well as better planning by decision-makers. 	<ul style="list-style-type: none"> - Socio-economic losses due to recurrent floods; - Destruction of socio-community development infrastructure (roads, schools, hospital, water points, etc.) of settlements; - Crops losses due to seasonal climate variability; - Food insecurity. 	<ul style="list-style-type: none"> - Significant spending (financial investments) by governments and funding partners to address crisis response to recurrent climate-related disasters; - Increased vulnerability to climate change in the basin 	The 7 million people living along the river (about 85% of the total population of the basin).
Component 2: Improving resilience to climate change and variability in targeted areas through community-based adaptation actions.	8,400,00	<ul style="list-style-type: none"> - Improved river protection and aquatic ecosystem function as well as water quality and quantity; - Increased soils protection and fertility; - Enhanced resilience to climate change impact through improvement of water uses (agriculture, fishing and livestock) and Sustainable agro-pastoral practices activities, - Improved household income and the benefit of rural communities through gender responsive income-generating activities. 	<ul style="list-style-type: none"> - Degradation of the Senegal River water resources; - Spread of invasive aquatic plants (Typha and others); - Loss of aquatic resources; - Soil erosion and desertification; - Decrease in crops productivity, mainly rice in the basin; - Loss of the population' purchasing power, especially the most vulnerable ones; - Food insecurity 	<ul style="list-style-type: none"> - Decline in agricultural productivity in the basin due to land degradation and loss of soil fertility; - Loss of terrestrial and aquatic biodiversity; - High adaptation costs - countries should be investing more in the provision of basic necessities and other basic social services for vulnerable communities in the basin 	About 25,000 direct beneficiaries; The 7 million people living along the river will be indirectly target)
Component 3: Capacity building, raising awareness and knowledge sharing	1,000,000	<ul style="list-style-type: none"> - Increased institutional and technical capacities of various stakeholders at national (country) and regional (OMVS) levels regarding the designing and implementation of climate change adaptation and 	Uncoordinated actions:	<ul style="list-style-type: none"> - Governance system specific to each of the four riparian countries in order to manage climate events and 	About 10,000 directly and several millions indirectly

		satellite-based tools; - Increased regional cooperation for better regional coordination of climate action at the SRB level; - Enhanced regional capacities to communicate projects achievement and best lessons learnt		disasters without assuming additional roles and responsibilities at transboundary level;	
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E. Consistency with development strategies

141. This project is consistent with key national sustainable development policies, strategies and plans implemented in each beneficiary country (Guinea, Mali, Mauritania and Senegal) as well as with the OMVS' regulation tools regarding the regional level, as described in table 4.

Table 4: Development strategy and project consistency for the 4 ARCC-SRB countries

Country/level	Policy/Strategy/Plan	Purpose
Regional	Senegal River Water Charter	This Charter aims, among others, at determining the rules related to environmental safeguards and protection, particularly with regard to fauna, flora, floodplain ecosystems and the wetlands, as well as to define the framework and modalities for the participation of water users in decision-making of the Senegal River water resources management.
	Master Plan for Water Development and Management (SDAGE) ¹⁷ of the Senegal River	The SDAGE aims at advancing water resources development, while mitigating the negative impacts of socio-economic development.
	Strategic Action Plan (SAP) of the OMVS	The project will contribute to the implementation of the Strategic Action Plan (SAP) and especially to the achievement of some of the SAP Long Term Environmental Quality Objectives (LTEQOs), essentially: (i) LTEQO1, which aims at taking urgent measures to combat desertification and its impacts in the SRB; (ii) LTEQO2, which targets water availability and sustainable management of for all; (iii) LTEQO6 which will help protect human lives and reduce the exposure and vulnerability of ecosystems and services to climate-related extreme events; and (iv) LTOEQ7 which is to strengthen resilience and adaptive capacity to climate change of communities and ecosystem.
Guinea	Vision 2040 for an emerging and prosperous Guinea	The objective of the document is to build an emerging and prosperous country, master of its destiny, ensuring a high level of well-being for its people and guaranteeing the future of the next generations. The Objective 5.3 of the vision focuses on combating climate change and the preserving the environment.
	National Economic and Social Development Plan – PNDES II (2021-2025)	PNDES is the operational plan of the Guinea's Vision 2040 and the unique reference framework for planning. It aims at giving priority to: i) national capacity building on combating climate change; ii) promotion of clean energy and energy efficient technologies; iii) mitigation of greenhouse gases in the transport and agriculture sectors; iv) promotion of the use of household appliances with clean technology; and v) increase the capacity of carbon sequestration through agroforestry development.
	National Strategy on Climate Change of Guinea Passed in 2019	This document sets out Guinea's vision and objectives for action on climate. It is centered around 9 strategic axes: <ul style="list-style-type: none"> - Promotion of measures to reinforce climate resilience; - Promotion of sectoral measures to limit greenhouse gas emissions; - Capacity building; - Promotion of technology transfer and adoption; - Integrating climate change into policies and strategies; - Education and communication; - reinforcing Guinea's meteorological services; - Risk reduction and management, including immigration; - Promotion of access to climate finance.
	Second National Communication (2018)	The second communication sets out the country's determination to work towards (i) improving water resources knowledge; (ii) promoting the dissemination of harmonized legislative texts in all the country's

¹⁷ SDAGE: French acronym of « Master Plan » and stands for « Schéma Directeur d'Aménagement et de Gestion des Eaux »

		development sectors (iii) setting up an institutional framework capable of promoting the implementation of concrete actions on adaptation to the impacts of climate change; (iv) the establishment of a national water policy in line with integrated water resources management; (v) with the other States of the sub-region, the definition of an integration policy around transboundary river basins.
	National Environmental Policy Passed in 2011	This policy aims essentially at ensuring sustainable management of natural resources: (i) combating soil degradation, (ii) managing water resources, (iii) improving the contribution of natural resources to the national economy, (iv) improving knowledge of natural resources, and (vi) adapting to the effects of climate change and mitigating.
	National Agricultural Development Policy (PNDA) (2016-2025)	The general objective of this policy is to increase the contribution of the agricultural sector to food security, nutrition and poverty reduction for the Guinean populations.
	National Determined Contribution (NDC, 2015 revised 2021)	The NDC outlines some priority actions that deal with the local consequences of climate change : (1) preserve water resources quality and quantity for the benefit of Guinea people; (2) Set up measures for protection, conservation and management of ecosystems, revive economic activities and boost the resilience of communities in the coastal zone; and (3) support the adaptation efforts of rural communities to develop agri-silvi-pastoral technics enabling them both to continue their activities and preserve they livelihoods.
	National Agriculture Investment and Food Security Plan (PNIASA)	This plan is aimed at developing a modern, sustainable, productive and competitive agriculture on the intra-community and international markets
	Accelerated Program, Food and Nutritional Security and Sustainable Agricultural Development (PASANDAD)	PASANDAD's overall objective is to accelerate the fight against poverty and its implications in terms of availability and access to healthy food, including by the most vulnerable communities.
	National Sustainable Development Strategy (NSDS) Passed in 2019	This strategy intends to (iii) develop a sustainable and modern agriculture, preserving environment (iv) manage rationally natural resources and strengthen biodiversity conservation.
	National Adaptation Plan of Action (NAPA, 2007)	The purpose of the NAPA is to define priority activities to be implemented to meet the immediate needs and urgent concerns of socio-economic groups to ensure their adaptation to the harmful effects of climate change. Within the framework productive and sustainable agriculture.
Mali	Mali's vision for 2025	The vision has established sustainable environmental management as a long-term strategic objective. It aims at basing the country's development and poverty reduction on successful adaptation to climate change effects.
	Strategic Framework for Economic Recovery and Sustainable Development - CREDD (2019-2023)	CREDD supports, among others, the orientations of the "Strategic Framework for Growth and Poverty Reduction" (CSCR, 2012-2017) and constitutes the single reference framework for all the country's development policies.
	Third Communication (2017)	Mali's Third National Communication (TCN) aims at contributing to the international community's efforts to combat climate change in a context of sustainable development.
	National Agricultural Sector Investment Programme (PNISA, 2015-2025)	PNISA focuses on agricultural production and value chain management. It aims to reach the agricultural growth of 8.1% (which is the required rate to halve poverty by 2020)
	Strategic Framework for Building a Resilient and Green Mali Passed in 2011	The Strategic Framework for Building a Resilient and Green Mali identifies the key strategic orientations of the country's framework which includes specific directions for each sector, such as soil management and land security for farming, promoting bio-fuel and electric energy for transportation, environmental and social development plans for the mining sector, capacity building for risk and disaster management, etc. The

		Strategy also constitutes the Mali Climate Fund as part of the investment plan for a resilient and green economy.
	The agricultural development policy (PDA) Passed in 2013	PDA aims at promoting sustainable, modern and competitive agriculture, based on Family Farming and Agricultural Professional Organizations.
	Nationally Determined Contribution (NDC, 2021 - 2030)	The NDC identifies climate change as a cause of increasing flooding and recommends the use of meteorological products and information and capacity building as adaptation tools.
	National Policy on Climate Change (Passed in 2011)	The National Policy on Climate Change serves as a reference framework for the various interventions in the areas of climate change in Mali. The vision of the National Policy on Climate Change in Mali is to define by 2025 a framework for sustainable socio-economic development that integrates the challenges of climate change in all sectors of its development in order to improve the well-being of the populations.
	National Adaptation Program of Action - NAPA (2007)	The general objective of NAPA is to contribute to the mitigation of the harmful effects of climate variability and change on the most vulnerable populations with a view to sustainable development. To achieve this objective, the program envisages among other things the extension of improved varieties adapted to the climatic conditions of the main food crop
	National Environmental Protection Policy Passed in 2009	Its objective is to ensure safe environment and sustainable development by considering the environmental aspects in all decisions affecting the design, planning and implementation of development policies, programmes and activities through the empowerment and commitment of all stakeholders.
	National Water Policy (NWP)	National Water Policy (NWP). Its main objective is to meet the water needs, in quantity and quality, of a growing population, as well as those of the various economic sectors, while ensuring consideration for aquatic ecosystems and preserving future generation's Needs.
Mauritania	Nationally Determined Contribution (NDC, 2015 revised in 2021)	The revised NDC aims at promoting climate-resilient development and the creation of sustainable green jobs.
	President's Expanded Priority Program (PROPEP 2020-2023)	The program notably allocates funds towards reforestation and sustainable forest management efforts, and the creation of green jobs. It aims to restore and ensure sustainable management of forest areas and degraded lands with a view to improving the livelihoods of local populations. It also contributes to better pollution management and the promotion of waste recovery channels capable of creating sustainable jobs, especially for young people.
	Strategy for Accelerated Growth and Shared Prosperity - SAGSP (2016-2030)	The SAGSP promotes strong, inclusive and sustainable growth through the fight against environmental threats and the effects of climate change, and the inclusive management of natural resources.
	National Food Security Strategy (NFSS) and its action plan (PNIA/SA)	The objective is to ensure a more balanced distribution of rural activities among the country's agro-ecological zones. The climate change dimension is included in its programme 1, which aims to combat the effects of climate change through the restoration/maintenance of soil fertility.
	National Strategy for Sustainable Access to Water and Sanitation (SNADEA, 2016) for 2030	The Strategy is developed to ensure (i) knowledge, monitoring and protection of water resources; (ii) access to drinking water for as many people as possible; (iii) improved access to water for agriculture and livestock; (iv) improved access to liquid sanitation and hygiene and (v) improved governance of the sector.
	Rural Sector Development Strategy for 2025	The strategy aims at promoting sustainable agriculture that contributes to the economic and social development of the rural sector; the protection and rehabilitation of agricultural land; local development with the involvement of the population, particularly young people and women; the control of water resources and pastures; and the prevention of climate change and its consequences, particularly on the use of water resources, especially the Senegal River basin.
	National Strategy for Sustainable Development (NSSD):	NSSD builds on a common vision of a long-term sustainable development in the country through a strategic approach that integrates social, economic and environmental considerations. Its five priority pillars are: (i) strengthening institutional and political capabilities as well as effective management of environment and natural resources, (ii) provision of sustainable access to basic services as a strategic means to fight against

		poverty, (iii) support an integrated and participatory management for efficient use of natural resources, (iv) management of local and global environment in line with international conventions obligations (v) development and implementation of funding mechanism for its National Environmental and Sustainable Development Action Plan.
	Fourth National Communication (2019)	The project is directly linked to the country's climate change adaptation strategy to prevent and reduce the impacts of climate change on the country's economic and social growth and development. More specifically, the project responds to the objectives of the 4th Communication, which aim to (i) protect populations from the consequences of climate change, in particular vulnerable groups, (ii) develop the resilience of actors to climate risks and (iii) promote rational sustainable management of natural resources.
	Nationally Determined Contribution – NDC (2021 - 2030)	Mauritania aims to improve its adaptation to climate change through the protection and conservation of ecosystems, including wetlands, sustainable pasture management, biodiversity conservation, fisheries and aquaculture, housing and urban planning, agriculture and food security, including genetic improvement, health, water, coastal management, prevention of extreme weather events, and the development of a sustainable energy system. health, water, coastal management, prevention of extreme climate events, infrastructure and education.
	National Action Plan for Adaptation (NAPA, 2004)	The NAPA identifies, among other things, the establishment of an early warning system, flood management, sustainable and equitable management of natural resources and the improvement of cultural techniques as priority adaptation actions.
	National Environmental Action Plan – NEAP (2004)	Its main objectives are the sustainable and equitable management of continental and fisheries resources, the monitoring of environmental problems such as pollution and combating the effects of climate change
	National Agricultural Development Plan (NADP)	The NADP aims at promoting modern, competitive and sustainable agriculture through the development of plant sectors with high growth potential. The climate change dimension is included in programme 1, with the aim of intensifying and diversifying agricultural production; The programme 2 focuses on natural resources sustainable management.
Senegal	Flood Prevention and Management Policy (FPMP)	This policy provides with the priority measures for Senegal adaptation to climate change-related floods: early warning system, sustainable land management, promotion of integrated agriculture-livestock-agroforestry production systems, strengthening resilience through diversification of production systems, water management, promotion and use of climate information and services, climate-related risk and disaster management, etc.
	National Environmental Action Plan - NEAP	It focuses on the rational management of natural resources, with a view to sustainable development.
	Nationally Determined Contribution – NDC (2020-2030)	Through its NDC, Senegal envision to set up adaptation measures aimed at increasing the resilience of ecosystems and populations to climate variability and change impacts.
	National Agricultural Investment Program for Food Security and Nutrition (PNIASAN, 2018-2022)	PNIASAN aims at contributing sustainably to Senegal's economic development, poverty reduction, and improvement of food security and nutrition of the Senegalese populations.
	National Adaptation Plan - NAP	NAP, which is under preparation, focuses on trans-sectoral management approach (habitat and health, fisheries, agriculture, soils and agricultural land, biodiversity and ecosystems, and water supply). It aims at (i) reducing vulnerability to climate change impacts by building adaptive capacity and resilience and (ii) facilitating the coherent integration of climate change adaptation into development planning policies, programmes and strategies in all relevant sectors.
	Integrated Water Resources Management Plan (PAGIRE, 2017-2025)	The main objective is to contribute to the implementation of an integrated management of water resources, adapted to the national context, in accordance with the orientations defined by the Senegalese Government for the reduction of poverty, the achievement of the SDGs and in

		compliance with international principles regarding sustainable water resources management.
	National Food Security and Resilience Support Programme (NFSRSP, 2016-2035)	PNASAR aims to contribute to the sustainable improvement of food and nutrition security, especially the most vulnerable, and to strengthening of their resilience.
	Senegalese Agriculture Cadence Acceleration Programme (PRACAS)	The Programme aims to achieve food and nutrition security and the development of agricultural exports within very short deadlines while building competitive, diversified and sustainable agriculture.
	Emerging Senegal Plan (ESP) -2035	The sustainable development objectives of the ESP are to reduce people's vulnerability to climate change effects and to preserve the resource base needed to sustain high growth over the long term.
	National Strategy for Sustainable Development (SNDD)	The SNDD aims at developing a framework for integrated, coherent and consistent efforts of all development policies and programmes and to address the integration of political, economic, social and environmental development agendas.

F. Alignment with national technical standards

142. The project is consistent with the Adaptation Fund's environmental, social and gender policy, and is in line with national environmental and social regulations in the four countries. Minor negative impacts of the project could result from the activities of Component 2, which mainly concern riverbank stabilization and the strengthening of water use infrastructure for agriculture and livestock. The activities planned within the framework of the project have been proposed in close cooperation with the national and regional stakeholders and executing entities, ensuring that they comply with the relevant technical standards in each country as well as those of OMVS. The project also includes actions for land protection and restoration, sustainable land and water management, and the promotion of sustainable agriculture. To this end, technical standards applicable to infrastructure works, land tenure, production and use of organic fertilizers have been considered and will be the subject of modules for stakeholders and beneficiaries capacity building.
143. In addition, the project promotes the practice of sustainable agriculture with the use of organic fertilizers and the reduction and/or cessation of chemical fertilizer use. It will be implemented in sites throughout the Senegal River Basin. Despite this wide geographical coverage, the site selection criteria applied by the countries considered, among other things: the fragility of the ecosystem and the vulnerability of the environment and people. The protection of the environment (especially land and water) is a key challenge for the project, and the training modules will help to raise awareness on this subject. The table below shows the relevant national laws and regulations of the countries concerned regarding agriculture, land, water and soil resources, as well as environmental and social standards that will be respected during the implementation of the project.

Table 5: Alignment with national technical standards

Country	Relevant national technical standards
Guinea	<ul style="list-style-type: none"> • Water Code, Law N°L/94/ 005/CTRN of 15 February 1994 • Order No. 045\PRG\87 modified by Order NO. 022/RG/89 on the Code for the protection and enhancement of the environment; • Decree No. 199/PRG/SGG/89 codifying environmental impact studies; • Order A/2013/474/MEEF/CAB/SGG of March 11, 2013, adopting the general. guide for environmental assessment • Law n°L/95/51/CTRN of 29 August 1995 on the pastoral code • Law L-99-013 / AN establishing the Land and State Code in the Republic of Guinea • Law L/2019/034/AN of July 04, 2019, on the Environmental Code • Ordinary law L/2017/060/AN (Forest Code) • Wildlife and hunting code (Law L/99/038/AN Adopting and Enacting the Code of Wildlife Protection and Hunting Regulation)
Mali	<ul style="list-style-type: none"> • Water Code of June 2002 • Decree No. 09-318-P-RM of June 26, 2009 relating to the Environmental and Social Impact Study • Decree No. 2018-0992 / P-RM of December 31, 2018 setting the rules and procedures for the strategic environmental assessment • Decree No. 2018-0991/P-RM of December 31, 2018 relating to the study and the environmental and social impact statement Niger • Law No. 2017- 001/ of 11 April 2017 on agricultural land • Law No. 06-045 on the Agricultural Orientation Law of 2006 • Law of 03 June 2002 instituting phytosanitary control in the Republic of Mali • Law of 03 June 2002 relating to the approval and control of pesticides in the Republic of Mali • Law of August 11, 2008 relating to the installations classified by the protection of the environment • Law of December 1, 2008 on biotechnology safety in the Republic of Mali • Decree of June 26, 2008 relating to the environmental and social impact study, modified by the decree of

	<p>June 26 June 2009</p> <ul style="list-style-type: none"> • Ordinance No. 00-27/P-RM of March 22, 2000 on the Code of Land Tenure • Law No. 0-004 of 27 February 2001 on the Pastoral Charter • Law No. 01-020 of May 30, 2001 on pollution and nuisances
Mauritania	<ul style="list-style-type: none"> • Water Code (Law 2005-030) of 2005 • Law No. 2000-45 of July 2000, Framework Law on the Environment • Law 2007-055 of 18 September 2007, Forestry Code • Agropastoral Orientation Law (LOAP) of 2012 • Law No. 97-006 of January 20, 1997, on the Hunting and Nature Protection Code • Law No. 2000-042 of July 26, 2000 on plant protection • Orientation Law No. 2010-001 of January 7, 2010 on land use planning • Law No. 2000-044 of July 26, 2000 on the Pastoral Code • Law No. 2004-024 of July 13, 2004 on the Livestock Code • Law No. 2010-042 of July 21, 2010 on the Hygiene Code • Law No. 2000-025 of January 24, 2000 on the Fisheries Code • Ordinance No. 2007-037 of April 17, 2007 on the coastline • Ordinance No. 83.127 of June 5, 1983 on land and property reorganization.
Senegal	<ul style="list-style-type: none"> • Law No. 2001-01 on the Environment Code • Law No. 81-13 on the Water Code • Decree No. 2001-282 implementing the Environmental Code • Law No. 2004-16 on the agri-silvi-pastoral orientation law • Law n ° 2011-07 of March 30, 2011 on the land ownership regime • Law No. 63-40 of June 10, 1963, on the Code of Inland Fisheries • Law No. 65-23 of February 9, 1965 on the Forestry Code • Law No. 93-03 of February 4, 1993 revising the Forestry Code; • Law No. 83-71 of July 5, 1983 bearing the hygiene code • Law No. 86-04 of January 24, 1986 bearing the hunting and wildlife protection code • Article 8 of the Constitution of January 22, 2001, enshrining the right of peoples to a healthy environment • Circular n° 009 PM/SGG/SP of July 30, 2001 reminding the different structures of the necessity to respect the provisions of the Environment Code in its legislative and regulatory parts

G. Project duplication

144. The present project has an integrated scope with activities addressing several water-related sectors, namely environment, land, biodiversity, agriculture, etc. The project will thus involve in its implementation, stakeholders from these different sectors. Therefore, the project will clearly have impacts and complementarities with ongoing projects/programmes and initiatives in the basin. Accordingly, during its design at the full proposal stage, consideration will be given to ongoing and planned activities in the (0) four OMVS countries, as well as those implemented by agencies and other donors active in the region. Moreover, a strong participatory approach and consultations with all stakeholders working on water resources and climate change issues in the basin will help to emphasize synergies and complementarities and to avoid overlaps and duplication of projects or sources of funding.
145. The table below lists potential projects (past and ongoing) in the Senegal River Basin, their purpose and possible synergies with the ARCC-SRB project.

Table 6: Related projects/programmes in the Senegal River Basin and synergies

Project/program	Extend ¹⁸	Objectives	Possible synergies with the proposed ARCC-SRB project
Senegal-HYCOS	Regional	<ul style="list-style-type: none"> - To establish a regional hydrological and climatological information system; - To strengthen national and regional technical capacities (Hydrological services and basin institutions) focusing on water resources assessment, monitoring and management for sustainable development, environmental protection and biodiversity; - To formulate and disseminate relevant water resources information products to contribute to decision-making for rational water resources management in the Senegal River Basin, both at national and regional levels 	No duplication. The project's interventions will reinforce the actions of the HYCOS project, particularly with regard to the production of data and information by remote sensing and the deployment of a MH-EWS for the basin
Promoting Innovative Finance and Community Based Adaptation in Communes Surrounding Community Natural Reserves (Ferlo, Niokolo Koba, Senegal River Bas Delta & Saloum Delta), Senegal	Regional	<ul style="list-style-type: none"> - Promote sustainable financing mechanisms and community-based adaptation in communes surrounding community natural reserves (Ferlo, Niokolo Koba, Bas Delta Senegal, Delta du Saloum), Senegal 	No duplication. The promotion of income-generating activities and the implementation of micro-credits for the benefit of vulnerable populations identified in the framework of the ARCC-SRB project will provide excellent support for the project's actions
Regional Action Plan for the Improvement of Irrigated Crops in the Senegal River Basin: Fostering Irrigated Agriculture.	Regional	<ul style="list-style-type: none"> - Improving irrigated agriculture in the Senegal River basin and strengthening economic integration in the OMVS basin by maximizing the benefits from the dams 	No duplication. It is intended to promote climate-resilient agriculture in the basin. The results of this project will then consolidate the achievements of previous projects in terms of strengthening adaptation in the agricultural sector.
Integrated Water Resources Management and Multiple Use Development Project in the Senegal River Basin (PGIRE)	Regional	<ul style="list-style-type: none"> - Strengthen the OMVS's capacity to take into account climate change in the development and concerted management of water resources in the Senegal River Basin 	No duplication. The current project will build on the achievements and fill in the gaps by integrating elements that have not been included in previous initiatives or programmes.
Hydropower projects ¹⁹	Regional	<ul style="list-style-type: none"> - To fulfil the energy needs of the Member States and to ensure a competitive position in the future sub-regional energy market. 	No duplication. Through its actions on the collection of data and information, especially by satellite, the current project will contribute in a substantial way to support the implementation of hydroelectric projects. Indeed, reliable data and information are crucial for the design and construction of the infrastructures but also very useful for their management.
A number of projects and/or initiatives to tackle the issue of aquatic invasive species, particularly the Typha ²⁰	Regional	<ul style="list-style-type: none"> - Economic valuation of Typha as a means of combating the invasive plant, which is a threat to the ecology of the basin and a major constraint to economic activities such as agriculture and fishing 	No duplication. The present project plans to carry out an updated mapping of the surface conditions with a particular focus on the areas affected by invasive species. By doing so, the ARCC-SRB project contributes to facilitating the actions foreseen in the different initiatives to manage these invasive species

¹⁸ « Regional » extends to projects implemented throughout the Senegal River Basin and « National » for projects implemented only at national level in the member countries.

¹⁹ OMVS is implementing the Koukoutamba (in Guinea) and Goubassi (on the Falémé) dam projects with installed capacities of nearly 300 MW for Koukoutamba and 18 MW for Goubassi. On completion of these dam projects, the OMVS energy system should reach an installed capacity of about 2000 MW.

²⁰ Main projects are:

- Projet TYPHA (Project for the production of Typha-based thermal isolation materials);
- PERACOD (Promotion of Rural Electrification and Sustainable Fuel Supply)
- Project for the promotion of Typha charcoal as an alternative to charcoal in Mauritania
- Experimentation with the production of cattle feed from Typha (Mauritania)

The Senegal River Basin Climate Change Resilience Development Project (2014-2019) funded by the World Bank	Regional	- 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.	No duplication. Some outcomes of the ARCC-SRB project incorporate transboundary IWRM principles (including environment and groundwater) and policy/legal/institutional reforms into national/local plans while some of the project interventions focused on communities' adaptation and resilience
WEFE Senegal Project « Support for water resources management and the Water-Energy-Agriculture-Ecosystems Nexus in the Senegal River Basin »	Regional	- To better understand the interactions between the management of natural water resources linked to the water, energy and food needs of the population in a context of climate change and the evolution of agricultural activities in a rural economy	No Duplication. The ARCC-SRB project will build on the achievements of the WEFE project, mainly in the following areas (i) technical and scientific knowledge on water resources and adaptation to climate change, (ii) strengthening of pilot actions for adaptation and resilience of local communities on the ground and (iii) technical and institutional capacity building for cooperative management of water resources and ecosystems in the basin
Community-based Land Management Project	National (Guinea)	- To reduce land degradation through the integration of SLM practices into the overall development planning process of communities and local governments in selected pilot sub-watersheds	No duplication. Lessons learnt from the previous interventions on the selected pilot sub-watershed will be useful for the designing and implementation of the ARCC-SRB project planned actions, as well as scaling up of those actions.
Enhancing Adaptive Capacity and Resilience to Climate Change in the Agriculture Sector Project	National (Mali)	- To strengthen capacities for adaptation to climate change in the agricultural (including livestock farming) sector, in the context of rural livelihood opportunities,	No duplication. The project is designed to promote climate-resilient agriculture in the basin. The results of the current project will then consolidate the achievements of previous projects in terms of strengthening adaptation in the agricultural sector.
Enhancing Resilience of Communities to the Adverse Effects of Climate Change on Food Security Project.	National (Mauritania)	- To enhance the resilience of vulnerable communities to the effects of climate change on food security	No duplication. The project will consolidate some of the achievements of the previous intervention regarding the strengthening of livelihoods and adaptation to climate change
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 adaptive activities for pastoral and forest resources in the southern Wilayas of Mauritania	No duplication. There will be a strong complementarity between the actions of the two projects, regarding mainly the development of integrates adaptation measures and considerations, Land and water management techniques
Strengthening Land & Ecosystem Management Under Conditions of Climate Change in the Niayes and Casamance regions- Republic of Senegal	National (Senegal)	- To strengthen the enabling environment for the implementation of appropriate adaptation measures based on ecosystem management in Niayes and Casamance Regions.	No duplication. The lessons learnt from the realizations of the previous GEF project, especially with regard to the strengthening of data collection and production of hydro-climatic information, will be useful to inform the planning of the activities of component 1 (operationalization of the MH-EWS) of the ARCC-SRB project.
Project for the Restoration and Strengthening the Resilience of the Lake de Guiers Wetland Ecosystems (PRRELAG)		- Strengthen the conservation of the natural habitats and the effectiveness of the management of the Reserve Spéciale d'Avifaune du Ndiael (RSAN)	No duplication. However, there are synergies and complementarities. The results of the PRRELAG project related to the conservation of ecosystems and biodiversity as well as the improvement of the quality and quantity of freshwater in the Ndiael aquatic ecosystem will be reinforced through the interventions of the ARCC-SRB project.

H. Learning and knowledge management

146. Key activities are planned under the project's component 3 (output 3.1.1 and 3.1.3) for documentation and dissemination of knowledge generated by this project with all beneficiaries and various stakeholders. Dissemination of knowledge and good practice will make it possible to improve learning achievements and potentially facilitate the replication of successes stories by government bodies and communities facing similar issues within the basin as well as in other basins or countries. Various means will be used to ensure good coordination and to broaden the dissemination of the project's achievements to a larger range of institutions and communities in the four-member countries of the Senegal River Basin. At the project start-up, a knowledge management strategy aiming to capitalize on existing climate-related information, facilitate information sharing between stakeholders, and disseminate project

results will be built. The knowledge shared should be relevant, linked with strategic objectives, practical, replicable, and accessible.

147. Existing tools as the OMVS Archives and Documentation Centre and the African Water Information System (SADIEau) will be used and the dissemination of lessons learned will include the diffusion of web-based information and communications in national and regional forums. Other channels of wider dissemination may include social Medias (Facebook, LinkedIn, Twitter), mass media channel (radio and TV services using local languages as well as non-technical languages), and videos for good practices diffusion.
148. Knowledge materials will be developed and disseminated and made available, responding to demand and need of different stakeholder groups; a web-based platform will be functional; advocacy briefs will be developed and publicly available; data and information generated by the project will be systematically shared on this web platform as well as on the project main implementing partners websites, particularly OMVS, OSS, and OIEau; and interaction and best practices exchanging between the countries will be facilitated.
149. Regional and global events (Conference symposia, various workshops and meetings) may be used to further the dissemination of the projects results and lessons learnt.
150. At community-level, the 28 Coordination Local Committees in the basin, which ensure the mobilization of local stakeholders and facilitate the implementation of OMVS programs will be central hubs for information gathering and sharing.
151. At the end of the project, a post-project evaluation will be carried out with the different categories of beneficiaries and stakeholders (government bodies, civil society, and local communities) to assess the lessons learned, the effects and impacts of the project as well as its sustainability. This report will be prepared in close cooperation with the key stakeholders listed above.
152. An appropriate budget will be allocated to ensure the proper implementation of the knowledge management and lessons dissemination activities.

I. Consultative process

153. The ARCC-SRB project promotes transboundary management of natural resources in the Senegal River Basin as well as flood and drought adaptation measures at both national and regional levels. This project will benefit the communities within the river basin who are prone to extreme weather conditions of drought and flooding that often occur consecutively. In this respect, the entire project cycle (from its preparation to its implementation) was and will be conducted according to a participatory approach involving all levels of potential stakeholders, including the local population, and thereby contribute to the collective effort of engagement. The preparation and incubation process of the project was also carried out engaging several partners in the Senegal River Basin. These mainly included OMVS, national agencies, infrastructures' managers, communities, users' associations, the Office International de l'Eau (OiEau) and the Sahara and Sahel Observatory - OSS (as Adaptation Fund regional accredited entity). The consultations are anchored within the framework of the implementation of the "100 Water & Climate Projects for Africa" Initiative led by the International Network of Basin Organizations (INBO) acting as the Secretariat of the World Water and Climate Alliances (WWCA). Therefore, the proposal intends to identify responses to major challenges of ecosystems and communities' adaptation as well as resilience building in the Senegal River Basin.
154. The Initial consultations, which commenced towards the end of 2019, identified the need to address drought and the transboundary-shared resource that led to the preparation of the Pre-concept note, which was approved in March 2021 by the Adaptation Fund Secretariat.
155. During this current stage of project preparation, i.e. the development of the Concept Note, the process of consultations and involvement of different stakeholders has continued and further deepened. Thus, in the field, data and information collection for the preparation of various thematic studies was carried out in collaboration with the OMVS technical staff and its National Focal Points, which ensured the continuous participation of the representatives within the sectoral technical departments (water, environment, agriculture, etc.) in the four beneficiary countries. These actors also actively participated in the identification of the different intervention areas and priority actions to be carried out within the framework of the project. Several virtual meetings were held with the participation of the representatives of OSS, OMVS, OiEau and the National Focal Points of the four OMVS countries in order to collect the contributions of the countries and to improve the concept note. To note that the consultative process was limited and required an adaptive approach due to the COVID-19 pandemic which hindered in person interactions and meetings.
156. During the CN development phase, the water partners involved in this project attended a sideline meeting at the World Water Forum, in Dakar in March, 2022. With this in mind and considering the pandemic previous restrictions OSS took advantage to bring together participants from OMVS, OiEau, Water Agencies, OMVS National Units and SOGED to present the project. Organized on the sidelines of the World Water Forum, this meeting was an opportunity to disseminate the proposal development process and to agree on a roadmap for the collection of the outstanding data, the updating of the institutional arrangements and the finalization of the CN. OiEau and the water agencies reaffirmed their commitment to support technically the project development process and to ensure its complementarity with ongoing or planned initiatives.
157. B2B meetings were also organized within the framework of the World Water Forum, with the OMVS national focal points of Senegal, Mauritania and Mali, present at the event. This was an opportunity to clarify technicalities related

to data collection for the selection of project intervention areas and beneficiaries as well as the identification of potential executing partners to be considered in the institutional arrangements.

158. The table below gives an overview of the different categories of stakeholders consulted and a description of their main roles during the project preparation.

Table 7: Main actors and their main roles during the project preparation

Key categories of actors	Description of key roles
OMVS	<ul style="list-style-type: none"> - Lead regional organization that will coordinate the project activities execution. During the project preparation, OMVS will facilitate and provide all required data and information. - During the project execution, OMVS will facilitate community mobilization as well as the monitoring the project progress.
SOGED	<ul style="list-style-type: none"> - Support the OMVS in data collection, community mobilization.
OiEau	<ul style="list-style-type: none"> - Provide support to the preparation and execution of the project in the use of satellite data for natural resources and ecosystems monitoring.
National governmental bodies: <i>Technical departments of the sectors in charge of water, and others in charge of related sectors (agriculture, environment, etc.) in the 4 countries</i>	<ul style="list-style-type: none"> - Provide inputs during project preparation and execution. - Participate in both Project management at national level - Member of the Steering Committee to provide technical guidance
Local actors: <i>Decentralized bodies, Local Coordination Committees of the SRB</i>	<ul style="list-style-type: none"> - Provide guidance and technical assistance for the project preparation on key activities - Support in project execution.
Research institutions (universities, research centers, etc.)	<ul style="list-style-type: none"> - Provide technical and scientific expertise/advice - Provide scientific data and information - Support in project execution. - Member of the Regional Steering Committee.
Civil Organization actors (NGOs)	<ul style="list-style-type: none"> - Support to the project management team. - Support in training, community awareness on climate change issues, water resources management and development and advocacy.
Users Socio-professional organizations (farmers, fishermen, etc.); Women and/or youth organizations	<ul style="list-style-type: none"> - They are among the key project beneficiaries on the ground that will be mobilized through their local institutions to participate in trainings and awareness raising sessions as well as pilot actions implementation at local level. - Provide feedback and lesson learned from project activities since their interventions are directly on the ground.

159. Moreover, the development of the project full proposal stage will also follow a very long and wide consultative and participatory process at various levels (regional and national in the four-member countries). This will assist in the assessment and confirmation of respective roles and responsibilities of the various stakeholders as well as the acceptance and commitment of the grassroots communities mainly women and youth.

J. Justification of funding request

160. The populations of the four beneficiary countries under this proposal are still living below the poverty index. They are also ranked as Heavily Indebted Poor Country (HIPC)²¹, thus, requiring them to seek International Monetary Fund (IMF) authorizations before acquiring new debt. Similarly, the decline in development aid flows coupled with rising interest expenditure is putting pressure on national budgets and balance of payments positions.

161. As for the majority of African countries, the water and agriculture sectors are crucial for their economic development. It is noted that, the agricultural sector employs more than 60% of the continent's working population and contributes an average of 16.2% to the countries' national Gross Domestic Product (GDP). The GDP per capita in 2019 indicates²²: 967 dollars US for the Guinea, 887 dollars US for Mali, 1 678 dollars US for Mauritania and 1 452 dollars US for Senegal compared to other LDCs is lower than expected.

162. In the Senegal River basin, the main activity of the communities is agriculture, with rain-fed agriculture being dominant, although irrigated agriculture is strongly promoted. However, the water and agriculture sectors are very vulnerable and exposed to various climate risks. The public sector of the four countries are insufficiently funded hence they have indicated in their NDCs and NAPA their willingness to implement adaptation actions for the mentioned sectors. While facing these financial difficulties in meeting public investments, the countries are seeking support from climate financing institutions such as the Adaptation Fund (AF) to as well as support the capacity building requirements to strengthen better their cause towards climate change adaptation.

²¹ <https://donnees.banquemondiale.org/indicateur/NY.GDP.MKTP.KD.ZG?locations=XE>

²² <https://unstats.un.org/unsd/snaama/Index>

163. The interventions of the ARCC-SRB Project are in line with the vision, objectives and orientations of the AF, which will be able to provide support through a grant, for the implementation in a coordinated and regional approach, of concrete long-term adaptation measures for the management of the various climate risks in the Senegal River Basin (floods, droughts, etc.).
164. The following provides an in-depth analysis of the scenarios without the interventions in this project and a justification of the full cost of adaptation as seen in the table below.

Table 8: Analysis of the scenarios without the interventions in this project and justification for the need of this request

Project Components	Baseline: Without any support from the Adaptation Fund	Impacts of the proposed project: with the Adaptation Fund support
<p>Component 1: Strengthening the institutional and technical framework for resilient management of the Senegal River Basin to climate risks. (US\$ 2,450,000)</p>	<p>Lack of reliable data and information for long-term monitoring and planning for proper water resources management and adaptation to climate change in the Senegal River Basin. This is due to insufficient or declining hydrological and environmental monitoring tools. Indeed, private and community infrastructures and natural resources will be continuously exposed to climate variability and risks, resulting in damage and degradation of adaptive capacities. Moreover, existing preparedness and response measures for climate risks in the basin (mainly floods and drought) are still not sufficiently effective to be operational, due to the lack of technical capacity of OMVS in this regard. Under current conditions and without the support of the Adaptation Fund, it is not clear that the situation will improve significantly and may even deteriorate, exposing vulnerable communities in the basin to climate disasters.</p>	<p>The AF support will help to review and improve existing flood and other climate risk management and response plans in each beneficiary country. It will especially allow the OMVS to manage better flood and drought risk reduction through the implementation of Multi-Hazard Early Warning System (MH-EWS) using geospatial technologies to the catchment as well as the promotion of collaboration, data/information exchange and development of a regional emergency response plan. These actions will increase the stakeholders' capacity to make decisions and prepare to reduce impacts and to implement alternative practices if need be.</p>
<p>Component 2: Improving resilience to climate change and variability in targeted areas through community-based adaptation actions. (US\$ 8,400,000).</p>	<p>The Senegal River Basin is particularly vulnerable to climate change due to its high exposure and low adaptive capacity. These effects of climate change strongly impact the availability of water in the basin and exacerbate already significant anthropogenic pressures with serious consequences on the environment (massive deforestation, destabilization of rivers, poor water quality, etc.) and the socio-economic balance of the countries. The ecosystem services provided by the river are also under threat: inadequate water retention and groundwater recharge; reduced fish stocks and degraded flooded forests areas; and loss of biodiversity. From this perspective, the vulnerability of local communities, especially rural ones, is very high due to livelihoods directly dependent on natural resources (rain-fed agriculture, pastoralism, etc.) combined with limited adaptive capacity and recurrent food crisis and water shortages²³. The catchment's populations are also highly exposed to drought and flooding hazards, which are set to increase with the climate changes experienced in the area²⁴.</p>	<p>With the Adaptation Fund support, the following impacts could be achieved:</p> <ul style="list-style-type: none"> - Improved adapting practices that must involve reducing the vulnerability of human and natural systems, and fall within the continuum between climatic and anthropogenic factors (related to development and essential services); - Strengthening the climate vulnerable communities and hydro-systems resilience through the implementation of various concrete adaptation actions (water, soil and land resources protection, livelihoods strengthening and diversification for vulnerable rural communities); - Livelihoods improvement of the most vulnerable among smallholder farmers and pastoralists such as women, and youth;
<p>Component 3: Capacity building, raising awareness and knowledge sharing (US\$ 1,000,000)</p>	<p>Various stakeholders in the basin (OMVS, local actors, etc.) and flood prone communities lack knowledge and tools for mainstreaming Gender and developing natural and nature-based solutions for flood management, though they have useful traditional solutions and adhoc experiences, which need to be captured and improved in new flood and drought management strategies.</p>	<p>The following improvements are possible through the implementation of the current project:</p> <ul style="list-style-type: none"> - Innovative knowledge management mechanisms developed for information exchange; experiential training and learning; data creation and analysis; dissemination; and uptake of lessons and best practices. - Elaboration of communication materials for the target groups including vulnerable communities, women, youth, smallholder farmers, pastoralists, artisans, - Institutional capacities of OMVS and countries strengthened, including regarding the capitalization of knowledge in the basin, the use of management and decision support tools, and skills for processing and valorization of satellite data. - Local communities are aware on the impacts of climate change (land degradation, desertification, etc.) and adaptation solutions and will be able to facilitate the implementation of adaptation actions with a possibility to scale up the interventions in other sites found in the basin

²³ OMVS, 2018a. R2 – Rapport de diagnostic d'évaluation de la vulnérabilité.

²⁴ OMVS, 2018a. R3 – Rapport du plan d'adaptation et de renforcement de la résilience du bassin.

K. Project sustainability

165. There is a strong need and justification for considering the "sustainability" aspect of project results in order to ensure the long-term viability of its achievements. To make it effective, sustainability issue has to be fully integrated into the whole project life cycle: from conception to implementation. To this end, the project sustainability will target financial, institutional, environmental, technical, and social capacities consolidation. In addition to the above, the project will also pay particular emphasis on the sustainability of the investments and infrastructure provided/built, as well as their long-term operation and maintenance. This will require the tight involvement and commitment of the various stakeholders at different levels (OMVS at the regional level as well as the national and local actors).
166. **Financial and social sustainability:** The project will help to improve water availability for all needed (safe drinking water, agriculture productivity boosting, energy, tourism, etc.). This will help to improve communities' income mainly the most vulnerable ones (women and youth in particular). Given the benefits generated by the facilities and equipment provided by the project, the beneficiaries will be able to finance the maintenance and renewal of their equipment after the end of the project. In addition, the design and deployment of the Multi Hazard Early Warning System will help to limit the negative impacts of disasters caused by extreme climatic events (floods, droughts) in the basin. The restoration of the damage caused by these impacts generally has very important financial costs, which weigh heavily on the economies of the countries. Thus, the project will allow limiting durably and saving such post climate disasters investments. These aspects will then strengthen the sustainability of the project concerning its financial and social areas.
167. **Institutional and technical sustainability:** During the project life cycle (preparation and implementation), national stakeholders from the four countries (national public technical structures, local communities, civil society, beneficiaries,) as well as the OMVS officials will be consulted and associated firmly. Since they have significant decision-making responsibilities during all the project life. Indeed, they will be able to assimilate the technologies developed and thus ensure their monitoring, maintenance, and replication even after the project. Besides, emphasis will be given to competence transfer aspects during the implementation of the project in order to ensure its institutional and technical sustainability. An additional important way to strengthen the project's sustainability is to encourage national institutions (institutions and sectoral ministries concerned) in the four-member countries and regional ones (OMVS, SOGED, Regional Economic Communities such as ECOWAS, etc.) to provide additional resources to ensure the continuation of some of activities in line with their mandate. Details of this issue and its implementation will be further refined during the full proposal development phase.
168. **Environmental sustainability:** The project will invest in the development of actions aimed at reducing floods, developing climate-resilient agriculture, protecting soils and riverbanks and restoring basin heads as well as promoting sustainable agro-pastoral practices. It is meant to run all the equipment provided for the clean energy project. These actions result in the protection of people and properties, the preservation of land, soil, and environment, and the improvement of people's living conditions through the provision of many indirect services (health, schooling, increased income, etc.). These actions contribute to strengthening the environmental sustainability of the project.
169. For the long-term operation/implementation of the EWS, maintenance of the investments and infrastructure as well as stakeholders' commitments at the post-project phase, various actions could be undertaken. For instance, for the MEWS, its economic benefits can be used to convince governments to commit to funding these operations. Indeed, about 0.5-1.0% of the annual flood damage costs that will be avoided after MEWS deployment could be enough to keep the equipment operating. Similarly, the OMVS, which will be the regional management structure of the MEWS, will have to include in its annual budget and in the budget lines of its various projects related to the EWS, financial resources to cover the operating and maintenance costs of the EWS equipment and infrastructure. In addition to ensuring sustainable financing, the technical capacities of all actors involved must be strengthened and serviced. To this end, the relevant technical services in charge of meteorology, hydrology, civil security/disaster management in both countries, the OMVS, the technical services of the basin municipalities, etc., will have to be involved in all the stages of setting up the process and trained technically to this end. For concrete adaptation actions on the ground planned under component 2, since the implementation of most of the activities will generate economic benefits, a maintenance fund could be created and fed by a part of the annual benefits (2 to 3%) generated. Part of this resource will be used to ensure the maintenance and replacement of equipment. In addition, the OMVS MBA would be able to initiate new projects for additional funding for the scaling up of the different actions in other parts of the basin

L. Environmental and social impacts and risks

170. This project was developed in accordance with the 15 environmental and social (E&S) principles of the Adaptation Fund's Environmental and Social Policy. A preliminary E&S assessment was conducted for the project concept note. The results are presented in the table below. A detailed environmental and social impact assessment, including mitigation measures and the environmental and social management framework, will be carried out during proposal development.

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
Compliance with the Law	<p>As described in the Section D, Part II, the ARCC-SRB project complies with both national and regional laws, policies strategies and plans related to water resources, ecosystem management, land conservation, biodiversity, etc.</p> <p>At full proposal stage, further assessments will be carried out on the Environmental and social impact framework (ESMF)</p>	<ul style="list-style-type: none"> - Risk: Even the risk of non-compliance with all domestic and international laws and regulations could occurs during the implementation of the project, the OSS as the project's regional implementing entity with the support of the OMVS as executing entity will ensure the strict application of this principle. - Potential Impact: Low <p>As described in the Section D, Part II, the ARCC-SRB project complies with both national and regional laws, policies strategies and plans related to water resources, ecosystem management, land conservation, biodiversity, etc. Furthermore, almost all of the proposed project activities are outside the first category of projects requiring a full EIA.</p> <p>At full proposal stage, further assessments will be carried out on the Environmental and social impact framework (ESMF)</p>
Access and Equity		<ul style="list-style-type: none"> - Risk: Certain categories (Disabled; elderly, displaced people, refugees, affected by HIV/AIDS or Corona Virus, etc.) may be excluded because of their status. Particular awareness-raising action will be the undertaken in concerned communities - Potential Impact: Low <p>The project will ensure fair and equitable access benefits to all targeted beneficiaries, mainly the most vulnerable one through elaboration and using of robust criteria during the full proposal phase. All key stakeholders will be involved in this process.</p>
Marginalized and Vulnerable Groups		<ul style="list-style-type: none"> - Risk: Some of the member countries of the Senegal River Basin, mainly Guinea and Mali are experiencing security issues (terrorist attacks) and political instability provoking the displacement of people inside or outside the country. These issues could increase the amount of marginalized and vulnerable groups in the project's intervention zones. - Potential Impact: to medium <p>Best approach will be defined to reach the marginalized and vulnerable groups and to avoid discrimination. For instance, some of the project activities, mainly those of the Outcome 2.2 (Climate-vulnerable rural communities' livelihoods are strengthened and diversified) will target preferably Women and Youth who are considered the most vulnerable in the basin</p>
Human Rights	<p>There will be no discrimination in the project's implementation, regardless of ethnicity, age, gender or even education level. The project design is based on a consultative approach involving different stakeholders. All activities will be implemented in accordance with the existing governments' dispositions as well as strict observance of established international human rights standards</p>	<ul style="list-style-type: none"> - Risk: Low - Potential Impact: Low <p>However, further assessment will be conducted during the full proposal stage to identify any impacts and risks regarding this principle</p>
Gender Equality and Women's Empowerment	<p>the project puts special emphasis on women and youth groups, including capacity building, leadership to ensure that they will fully participate and benefit from the project. Under components 2 and 3, specific activities targeting women and youth have been planned for livelihoods strengthening and diversification (IAGs, sustainable agri-pastoral practices, training, etc.). A detailed gender analysis will be conducted at the full proposal development stage to ensure that all aspects of women's equity, empowerment and representation are fully integrated into the project.</p>	<ul style="list-style-type: none"> - Risk: Low - Potential Impact: Low <p>Further assessment will be conducted during the full proposal stage to identify any impacts and risks regarding this principle</p>
Core Labor Rights	-	<ul style="list-style-type: none"> - Risk: Even though there are no legal rules regarding the matter in the region, there are risks of gender remuneration inequality and child labor that could

		<p>occur and therefore impact on the project's successful implementation,</p> <ul style="list-style-type: none"> - Potential Impact: Low <p>During the Environment and Social assessment as well as the implementation of the project, care will be taken to ensure that labor rights are strictly applied to all workers involved in order to avoid the risks of existing inequalities. Indeed, in the region, there is some inequality in remuneration between men and women as well as child labor and have impact the proper execution of the project.</p>
Indigenous Peoples	No indigenous people or tribes were noted in the Senegal River Basin and will be affected by the project activities)	<ul style="list-style-type: none"> - Risk: Low - Potential Impact: Low <p>There are no indigenous people or tribes were noted in the Senegal River Basin and will be affected by the project activities)</p>
Involuntary Resettlement	Given the nature of the project interventions, no displacement to new locations or resettlement will be required	<ul style="list-style-type: none"> - Risk: Low - Potential Impact: Low <p>However, this risk will be further assessed during the full proposal stage to identify any impacts and risks regarding this principle</p>
Protection of Natural Habitats	-	<ul style="list-style-type: none"> - Risk: There may be possible influences on the environmental and ecological balance, particularly in sensitive areas such as the RAMSAR sites in the river delta (Djoudj, Ndiael, Gueubeul, Diawling and Chat Tbou) as well the Transboundary Biosphere Reserve (Boucle du Baoulé) - Potential Impact: Low <p>The various endangered species populations will deserve particular attention to avoid being affected during the implementation of the project activities. An Environmental and Social Management Plan (ESMP) will be developed and implemented for specific activities in such area.</p>
Conservation of Biological Diversity	-	<ul style="list-style-type: none"> - Risk: The project is not expected to have negative impacts on biological diversity and should contribute rather to preserving biological diversity - Potential Impact: Low <p>The project is not expected to have significant impacts on biological diversity and should contribute rather to preserving biological diversity. However, during the development phase of the full proposal and Environmental and Social Impact Framework (ESMF), an in-depth analysis of the compliance of the planned actions with the relevant legal provisions will be carried out.</p>
Climate Change	The project aims to reduce the vulnerability and to strengthen the resilience of communities through the prevention of climatic risks (floods, drought). It also aims to restore and preserve ecosystems and strengthen people's livelihoods	<ul style="list-style-type: none"> - Risk: Low - Potential Impact: Low <p>Climate change risks will be further assessed during the full proposal stage to identify any impacts and risks regarding this principle</p>
Pollution Prevention and Resource Efficiency	The project aims to strengthen adaptation and resilience to climate change as well as sustainable natural resources management in the basin. Its interventions will not generate pollution or loss of resources. They will contribute to the preservation of the quantity and quality of the basin's resources and to their efficient and sustainable use This may reduce the pressure on land.	<ul style="list-style-type: none"> - Risk: Low - Potential Impact: Low <p>In-depth assessment will be carried out during the full proposal stage to identify any impacts and risks regarding this risk</p>
Public Health	No negative impacts on public health will be generate by the project. The project aims to reduce the vulnerability and to strengthen the resilience of communities through the prevention of climatic risks (floods, drought). It also aims to restore and preserve ecosystems and strengthen people's livelihoods. Therefore, the project will help to prevent waterborne diseases and other epidemics.	<ul style="list-style-type: none"> - Risk: Low - Potential Impact: Low <p>This will be further assessed during the full proposal stage to identify any impacts and risks regarding this principle</p>
Physical and Cultural Heritage	-	<ul style="list-style-type: none"> - Risk: There a notable cultural heritage in the basin which includes several sacred woods with historically. significant cultural and spiritual characteristics. Such heritage could be impacted if some activities have to be

		undertaken in such zones - Potential Impact: Low The local communities who are the initiators and custodians of these practices will be consulted and involved, if needed, in any interventions in the relevant areas.
Lands and Soil Conservation	The project will have no negative impact on this environmental component. Instead, the project will reinforce Lands and Soil Conservation as well as their productivity through actions like Integrated water management, soils protection against erosion and desertification, climate resilient agri-sylvi-pastoral practices	- Risk: Low - Potential Impact: Low

PART III IMPLEMENTATION ARRANGEMENTS

A. Project implementation and management arrangements

171. The institutional arrangement for the project management will be as follows:

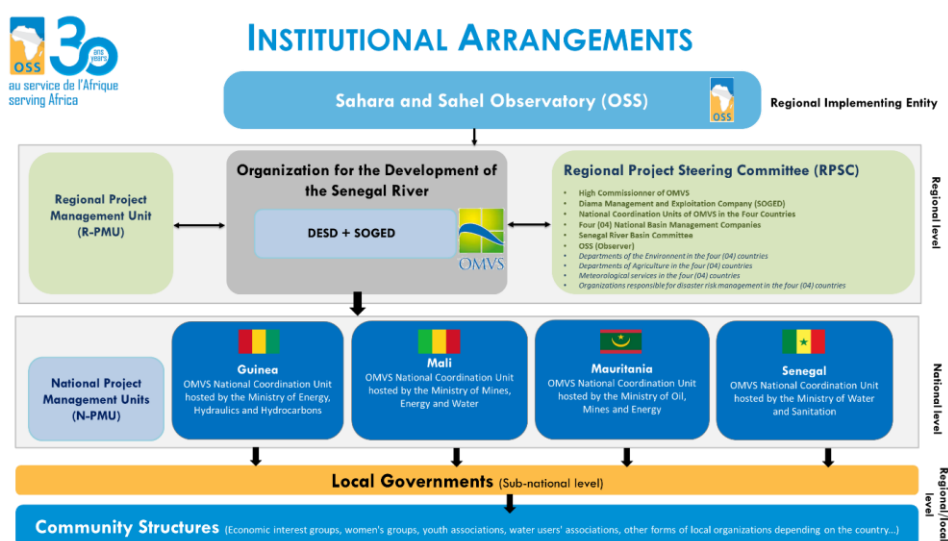


Figure 14: Project institutional arrangements

172. **Regional Implementing Entity (RIE):** The project will be implemented by the Sahara and Sahel Observatory (OSS), which will serve as the Regional Implementing Entity (RIE) and will be responsible for all financial, monitoring and reporting aspects to the Adaptation Fund. The OSS will also provide administrative and management support to the regional executing entity as well as technical guidance. As the four targeted countries (Guinea, Mali, Mauritania and Senegal) are members and partners of the OSS, this will facilitate the exchange with the key national partners and enable the sharing of data and information among the executing entities.

173. **Executing Entities:** Project execution will involve stakeholders at the regional, national and local levels, as follows:

- **Regional level: Regional Executing Entity (REE)** the executing entity at the regional level will be the OMVS²⁵, which will lead the project through the Directorate of Environment and Sustainable Development (DESD) and the Management and Exploitation Company of the Diama dam (SOGED) where a Regional Project Management Unit (RPMU) will be established. The RPMU will coordinate and implement the project at the regional level and will ensure the coordination of the project activities in the four participating countries in close collaboration with the four National Executing Entities (NEEs). The High Commission of OMVS will coordinate the system through its autonomous structures, which are the SOGED, the SOGEM, the SOGENAV and the SOGEOH, according to their specific expertise and will mobilize for this purpose, their operational means to support the project execution.
- **National level: The National Executing Entities (NEE):** at the national level, the National Project Management Units (NPMUs) are hosted by the OMVS' national coordination Units, respectively in the Ministry of Energy, Hydraulics and Hydrocarbons in Guinea, the Ministry of Oil, Mines and Energy in Mauritania, the Ministry of Mines, Energy and Water in Mali and the Ministry of Water and Sanitation in Senegal. The NPMUs will be supported, at country level, by a National Coordination Committee (NCC), which plays the role of National Steering Committee gathering all project stakeholders, representing the various concerned sectors (water, environment, agriculture, etc.). The NPMUs, under the supervision of OMVS and in close consultation with the relevant national structures, will manage the execution of activities at the local level through various NGOs and beneficiary groups (economic

²⁵ <https://www.omvs.org/>

interest groups, women's groups, youth associations, water users' associations, other forms of local organizations depending on the country...).

174. **Regional Project Steering Committee (RPSC):** The RPSC will provide guidance for the effective management of the project and will periodically assess the extent to which project results are in line with expectations. Its core membership will consist of representatives of the following structures and institutions:

Table 9: Members of the RPSC

Institution	Number of representatives
OMVS High Commission	2
Société de Gestion et d'Exploitation de Diama (SOGED)	1
OMVS National Coordination Units in the four countries	4
Four (04) National Basin Management Companies	4
Senegal River Basin Committee	1
OSS (observer)	2
Total	14
Other Institutions to be invited depending on topics to be discussed	
Departments of Environment	1
Departments of Agriculture	1
Meteorological Services	1
Structures in charge of disaster risk management	1
Others	1

175. Depending on the thematic and topics discussed, the RPSC may invite representatives of other relevant institutions or resource persons who will bring their expertise and guidance to the project.
176. The members of the RPSC must be represented at a level that allows them to take decisions independently.

PART IV Endorsement by governments and certification by the IE

A. Record of endorsement on behalf of the government

Guinea	Mrs. Oumou DOUMBOUYA, Adaptation Fund National Designated Authority, Ministère de l'Environnement, des Eaux et Forêts	Date: May 10, 2022
Mali	Madame Niamele Aminata DIARRA, Adaptation Fund National Designated Authority, Conseiller Technique, Ministère de l'Environnement, de l'Assainissement et du Développement Durable	Date: May 9, 2022
Mauritania	Mr. Sidi Mohamed OULD EL WAVI, Adaptation Fund National Designated Authority, Directeur du Climat et de l'Economie Verte Ministère de l'Environnement et du Développement durable	Date: May 6, 2022
Senegal	Madame Mame Faty NIANG SEYDI, Autorité Nationale Désignée pour le Fonds d'Adaptation, Ministère de l'Environnement et du Développement Durable	Date: June 16, 2022

B. Implementing Entity certification

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans (ECOWAS, CAADP, NAP, NAPA, NDC,..) and subject to the approval by the Adaptation Fund Board, commit to implementing the project in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this regional project.

Mr. Nabil BEN KHATRA – *Executive Secretary of the Sahara and Sahel Observatory (OSS) as the Implementing Entity Coordinator*



Date: **August 8th, 2022**

Tel.: **(+216) 71 206 633**

Email: nabil.benkhatra@oss.org.tn; boc@oss.org.tn

Project Contact Person: **Mrs. Khaoula JAOUI**

Tel. and Email: **(+216) 71 206 633** – khaoula.jaoui@oss.org.tn

Annexes

Annex 1: Endorsement Letters



REPUBLIQUE DE GUINEE
Travail-Justice- Solidarité

**MINISTRE DE L'ENVIRONNEMENT
ET DU DEVELOPPEMENT DURABLE**



ADAPTATION FUND

**DIRECTION NATIONALE
DES POLLUTIONS NUISANCES ET
CHANGEMENTS CLIMATIQUES**

Conakry, le 10/05/2022

**CONVENTION-CADRE DES NATIONS UNIES SUR LE
CHANGEMENT CLIMATIQUE**

FOND D'ADAPTATION

N°003/MEDD/DNPNC/CCNUCC/FA/2022

Le Point Focal National

Letter of Endorsement by Government

To: The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat
Email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5

Subject: Endorsement for the "Strengthening the resilience of climate-vulnerable communities in the Senegal River Basin using a multi-hazard early warning system and building adaptive capacity (ARCC-SRB)" project.

In my capacity as designated authority for the Adaptation Fund in Guinea, I confirm that the above regional project proposal is in accordance with the government's national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in Guinea.

Accordingly, I am pleased to endorse the above project proposal with support from the Adaptation Fund. If approved, the project will be implemented by the Sahara and Sahel Observatory (OSS) and executed by OMVS (Organisation pour la Mise en Valeur du Fleuve Sénégal).

Sincerely,



Madame Oumou DOUMBOUYA
DNAPNCC/Focal Point Adaptation Fund

MINISTRE DE L'ENVIRONNEMENT, DE L'ASSAINISSEMENT
ET DU DEVELOPPEMENT DURABLE

REPUBLIQUE DU MALI
UN PEUPLE – UN BUT – UNE FOI

SECRETARIAT GENERAL



Letter of Endorsement by Government

Bamako le 09 mai 2022

To: The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat
Email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5

Subject: Endorsement for the "Strengthening the resilience of climate-vulnerable communities in the Senegal River Basin using a multi-hazard early warning system and building adaptive capacity (ARCC-SRB)" project.

In my capacity as designated authority for the Adaptation Fund in **Mali**, I confirm that the above national grant proposal is in accordance with the government's national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the **Mali**.

Accordingly, I am pleased to endorse the above project proposal with support from the Adaptation Fund. If approved, the project will be implemented by the Sahara and Sahel Observatory (OSS) and executed by OMVS (Organisation pour la Mise en Valeur du Fleuve Sénégal).

Sincerely,

Mrs. Niamebe Aminata Diarra
Conseiller Technique

Ministère de l'Environnement, de l'Assainissement et du Développement Durable

الجمهورية الإسلامية الموريتانية
 شرف - إخاء - عدل

RÉPUBLIQUE ISLAMIQUE DE MAURITANIE
 Honneur - Fraternité - Justice

وزارة البيئة والتنمية المستدامة
**Ministère de l'Environnement
 et du Développement Durable**
 مديرية المناخ والاقتصاد الأخضر
 Direction climat et Economie Verte

06 MAI 2022
 Nouakchott, le : _____ في
 N° : 2024/21 رقم

Le Directeur المدير

To: The Adaptation Fund Board
 c/o Adaptation Fund Board Secretariat
 Email: Secretariat@Adaptation-Fund.org
 Fax: 202 522 3240/5

Subject: Endorsement for the "Strengthening the resilience and adaptive capacity of climate-vulnerable communities in the Senegal River basin" project.

In my capacity as designated authority for the Adaptation Fund in Mauritania, I confirm that the above regional project proposal is in accordance with the government's regional priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the Senegal River basin.

Accordingly, I am pleased to endorse the above project proposal with support from the Adaptation Fund. If approved, the project will be implemented by the Sahel and Sahara Observatory and executed by the OMVS.

Sincerely,

Mr. Sidi Mohamed Ould El Wavi
 NDA/AFB Mauritania




Copy : MEDD

République du Sénégal
 Un Peuple - Un But - Une Foi
 MINISTÈRE DE L'ENVIRONNEMENT
 ET DU DÉVELOPPEMENT DURABLE
 DIRECTION DE L'ENVIRONNEMENT
 ET DES ÉTABLISSEMENTS CLASÉS



Letter of Endorsement by Government

Dakar, le ... 16 JUIN 2022

To : The Adaptation Fund Board
 c/o Adaptation Fund Board Secretariat
 Email: Secretariat@Adaptation-Fund.org
 Fax: 202 522 324075

Subject : Endorsement for the "Strengthening the resilience of climate-vulnerable communities in the Senegal River Basin using a multi-hazard early warning system and building adaptive capacity " project

In my capacity as designated authority for the Adaptation Fund in Senegal, I confirm that the above regional project proposal is in accordance with the government's regional priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the Senegal River basin.

Accordingly, I am pleased to endorse the above project proposal with support from Adaptation Fund. If approved, the project will be implemented by the Sahel and Sahara Observatory an executed by the OMVS.

Sincerely,



Ms. Moussa Fily NIANG
 DNA/AF Senegal

Direction of the Environment and Classified Establishments
 Ministry of the Environment and Sustainable Development

Direction de l'Environnement et des Établissements Classés (DEEC)
 Parc Forestier de Hann, route des Pères Maristes BP : 6557 Dakar Tél : +(221) 33 859 17 58
 106, rue Carnot - Tél : +(221) 33 821 63 49 Web : www.dems.gouv.sn e-mail : cel@decom.deec@gmail.com

Annex 2: Consultation process

CONCEPT NOTE DEVELOPMENT

ARCC-SRB Project - Strengthening the resilience of climate-vulnerable communities in the Senegal River Basin using a multi-hazard early warning system and building adaptive capacity

Stakeholder consultation process report

Introduction

The Senegal River Basin (SRB) is shared by four countries: Guinea, Mali, Mauritania and Senegal. The Organization for the Development of the Senegal River (OMVS) is the regional organization in charge of the basin management.

The ARCC-SRB regional project is being developed by the four (04) countries with the technical support of OMVS and the Sahara and Sahel Observatory - OSS (Regional Implementing Entity of the Adaptation Fund) and will be submitted to the Adaptation Fund (AF) for funding. Its overall objective is to improve the resilience to climate change of rural communities in the Senegal River Basin (SRB) through the implementation of a multi-hazard early warning system and concrete climate change adaptation actions on the ground. The project will thus address the challenges of transboundary water management exacerbated by climate change in the basin.

Being a regional project, the preparation of the project follows the three-step approach of the AF. The first step was the development of the Pre-concept Note and its approval by the Board in April 2021 (Decision B.36/17), thereby enabling the current (2nd) preparation phase related to the development of the Concept Note.

The current stage (Concept Note) requires gathering more detailed information while taking into account the comments of the review sheet and the questions raised and annexed to the decision of the AF Board on the pre-concept note. This step also has as key requirement the broad consultation of various project stakeholders. This note provides a summary of the consultation process carried out during the preparation of the ARCC-SRB project concept note. It first provides a brief overview of the importance of stakeholder consultation and then outlines the consultation process and its outcomes.

The stakeholder consultation process and its importance in the preparation of the Adaptation Fund projects

Background

Stakeholder consultation is essential to ensure that the needs of the different categories of beneficiaries (public and private actors, civil society organizations, socio-professional organizations, vulnerable and marginalized groups, etc.) are taken into account. This process also has the advantage of guaranteeing the ownership of the project by the beneficiaries as well as the sustainability of the adaptation measures developed. It consists of collecting their expectations and agreeing on the priority aspects to be integrated into the concept note while taking into account the requirements of the AF. The process also has the benefit of ensuring that issues of social equity, vulnerability and inclusion are well integrated into the development of the concept note and raising awareness as well as the promotion of ecosystem integrity. To ensure inclusive and meaningful consultation, particular emphasis on the participation of key stakeholders, namely the most vulnerable communities and gender-based groups located in the project areas is employed.

Mapping of key stakeholders and consulted in the frame of the ARC-SRB Project Concept Note preparation

The table below provides an overview of the key stakeholder categories involved in the consultation process both at national and regional levels during the preparation of the ARC-SRB project concept note.

Table 1: Key stakeholders in Senegal River Basin identified in the consultation process

Key categories of actors	Description of key roles
OMVS	<ul style="list-style-type: none"> • Lead regional organization that will coordinate the project activities execution. • During the project preparation, OMVS will facilitate and provide all required data and information. • During the project execution, OMVS will facilitate community mobilization as well as the monitoring the project progress.
SOGED	<ul style="list-style-type: none"> • Support the OMVS in data collection, community mobilization.
OiEau	<ul style="list-style-type: none"> • Provide support to the preparation and execution of the project in the use of satellite data for natural resources and ecosystems monitoring.
National governmental bodies: Technical departments of the sectors in charge of water, and others in charge of related sectors (agriculture, environment, etc.) in the 4 countries	<ul style="list-style-type: none"> • Provide inputs during project preparation and execution. • Participate in both Project management at national level • Member of the Steering Committee to provide technical guidance
Local actors: Decentralized bodies, Local Coordination Committees of the SRB, local government	<ul style="list-style-type: none"> • Provide guidance and technical assistance for the project preparation on key activities • Support in project execution.
Research institutions (universities, research centers, etc.)	<ul style="list-style-type: none"> • Provide technical and scientific expertise/advice • Provide scientific data and information • Support in project execution. • Member of the Regional Steering Committee.
Civil Organization actors (NGOs)	<ul style="list-style-type: none"> • Support to the project management team. • Support in training, community awareness on climate change issues, water resources management and development and advocacy.
Users Socio-professional organizations (farmers, fishermen, etc.); Women and/or youth organizations	<ul style="list-style-type: none"> • They are among the key project beneficiaries on the ground that will be mobilized through their local institutions to participate in trainings and awareness raising sessions as well as pilot actions implementation at local level. • Provide feedback and lesson learned from project activities since their interventions are directly on the ground.

Approach and mechanism implemented for the consultation of the identified stakeholders and the outcomes of the consultations

Setting meeting between project management actors for the definition of the consultation methodology

The consultation process started with sessions between the main project preparation actors, namely OSS, OMVS, the OMVS National Focal Points in the countries and OiEau. Several working sessions (virtual meetings) were held to define and validate the approach and methodology to carry out the preparation of the project concept note and especially the consultation process with stakeholders and beneficiaries. As such, for the consultation process, it was agreed to adopt a "bottom-up" approach with engaging the OMVS National Focal Points in their respective countries. They will then report the information collected at the regional level for aggregation by OMVS High Commission and submitted to OSS for synthesize the integration of identified needs. The information gathered was then validated at the regional level with the involvement of the various categories of actors (national and regional).

National level stakeholder consultation: Collection of data, information, and identification of national priorities

The OMVS National Focal Points in each country conducted the consultation process at the national level. It consisted of organizing working sessions with the relevant stakeholders concerned by the project. The targeted stakeholders included the most vulnerable communities in the basin and form a part stakeholders' list in table 1. The main goal is to identify needs and priorities in order to consider them in the design and eventual execution of the project. To this end, interview guidelines and data collection templates were developed by OSS and made available for use in compiling national data and information and identifying priority areas for intervention in each country. The information collected in the countries was then made available to OMVS and OSS for regional aggregation.

Regional consultations: Exchange and validation of aggregated data and information

Consultation sessions were organized to validate the proposed activities, project areas and target beneficiaries. Some of these sessions included face-to-face meetings in Dakar during the World Water Forum, from 21 to 26 March 2022. To this end, several meetings between the implementing entity (OSS) and several other project actors were held. To finalize the process, a regional remote technical meeting involving the national and regional stakeholders was held for validation and contributions were recorded for the improvement of the priority activities as well as the entire concept note.

Table 2: People met during B2B meetings

Country	Name	Organization/Position	Contacts
Mali	Abraham SOGOBA	OMVS National Unit Focal point	abrasogoba@yahoo.fr
	Moussa BERTHE	OMVS National Unit	moussa.brt@gmail.com
Mauritania	Mohamed El Mokhtar	OMVS National Unit Coordinator	memmactar@yahoo.fr
	Ousmane HANE	SOGED, Director	ousmhane@gmail.com
Senegal	Amadou Lamine NDIAYE	OMVS, Director of Environment and Sustainable Development	amadoulamine.ndiaye@omvs.org
	Alpha Oumar BALDE	OMVS, Head of the Planning, Forecasting and Basic Development Division	Alphaoumar.balde@omvs.org
	Ibrahima TRAORE	OMVS, Regional Coordinator of the Technical Unit of the Environmental and Social Management Programme	ibrahima.traore@omvs.org
	Kandas CONDE	OMVS, Head of Water Resources Management and Risk Prevention Division	condekandas74@gmail.com
FranceOiEau	Blaise DHONT	OiEau, Project managerOiEau	b.dhont@oieau.fr



Figure 1: Meeting OSS delegation with the DEDD/OMVS



Figure 2: Meeting OSS delegation with the National Focal Point of Mali



Figure 3: Meeting OSS delegation with the National FP of Mauritania

Regional stakeholders' technical consultation meeting

The OSS took the opportunity of the holding of the 9th edition of the World Water Forum in Dakar to organize on March, 25th 2022, a technical consultation meeting with the key project' stakeholders present at the event, namely: OMVS, OSS, OiEau, Adour-Garonne Water Agency (France), Société de gestion des Coteaux de Gascogne (France), OMVS National Units, OMVS National Focal Points and SOGED.

The meeting made it possible to:

- Discuss the progress of the concept note preparation as well as the bottlenecks;
- Discuss the data and information collected and the priority sites identified and their validation;
- Finalize the institutional arrangement for project implementation; and
- Update the roadmap for the finalization of the CN.

During this meeting, all the barriers and challenges related to the development of the Concept Note were also presented and solutions were suggested with an action plan developed. All the actors present also reiterated their commitment and support for the preparation of the project and its implementation



Figure 4: Representative of OSS presenting the CN at the Regional Technical concertation meeting at WWF9 Dakar, 2022



Figure 5: Partial view of the participants at the Regional Technical concertation meeting at the WWF9 Dakar, 2022

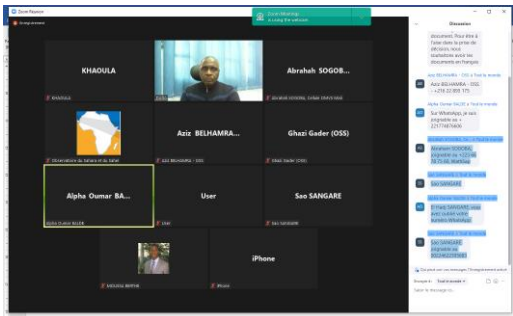
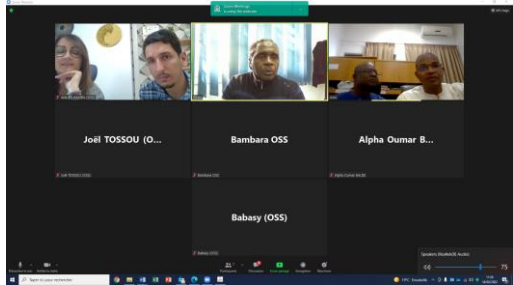
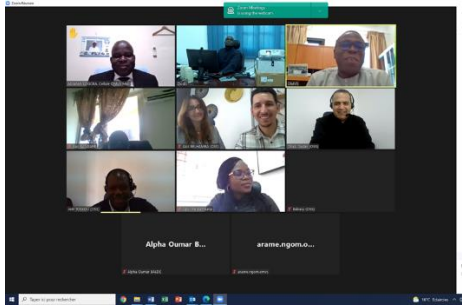
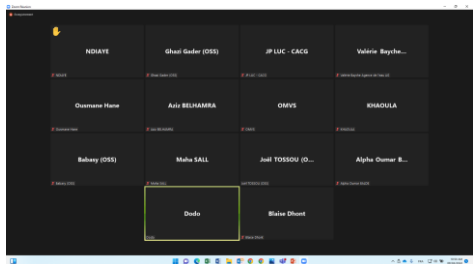
Table 3: List of organizations and people met for national consultations

Name	Organization	Address
Guinea		
Sao SANGARE	OMVS National Unit	moussa_sang@yahoo.fr
Mariama Dalanda	National Water Partnership/vice President	dalandiallo2002@yahoo.fr
Alpha Oumar BAH	Ministry of Environment	Bahalphaoumar2@gmail.com
Abdourahmane BANGOURA	Water and Forests National Directorate	akolia83@gmail.com
Mali		
Abraham SOGOBA	OMVS National Focal Point	abrasogoba@yahoo.fr
Moussa	OMVS National Unit	moussa.brt@gmail.com
Bourama	National Water Partnership	bourama75@gmail.com
Nouradine Zakaria	Natural Resources Users Association/President	nouradhine@gmail.com
Amadou Tidiane KEITA	NGO IEC General Director	amkeita@mail.com
Moustapha SISSOKO	Directorate of Agriculture	moustaphasisssoko2002@yahoo.fr
Abel COULIBALY	Consultant NGO IEC	Abel_coulibaly@yahoo.fr
Amidou GOÏTA	GEF Point Focal AEDD/MEADD	amidougoita@gmail.com
Moussa Ben Issak DIALLO	General Director ADRS	dialloben@yahoo.fr
Assékou GUINDO	Assistant General Director ADRS	assekouguindo@yahoo.fr
Issaka KEITA	IWRM 2 Project Manager /ADRS	issaka_keita@yahoo.fr
Chiaka SOGOBA	General Director NGO ID Sahel Africa	chiacsogo@yahoo.fr
Mauritania		
Mohamed El Mokhtar	OMVS National Unit/ Coordinator	memmoctar@yahoo.fr
Ahmed EL WAVI	OMVS National Unit	aswafi73@yahoo.fr
Mohamed TOURAD	NGO Tenmya/Director	mohamed_tourad@yahoo.fr
Sarah Souleymane CHEIKH SIDIA	Ministry of Water and Sanitation	sarahmscs@yahoo.fr
Saadou Ebih MONANE	Ministry of Water and Sanitation	saadouebih@yahoo.fr
MOHAMED Yahya OULD LAFDAL	Ministry of Environment	my.lafdal@gmail.com
Senegal		
Amadou Lamine NDIAYE	OMVS	amadoulamine.ndiaye@omvs.org
Ousmane HANE	SOGED	ousmhane@gmail.com
Alpha Oumar BALDE	OMVS	Alphaoumar.balde@omvs.org
Ibrahima TRAORE	OMVS	ibrahima.traore@omvs.org
Kandas CONDE	OMVS	condekandas74@gmail.com
Basile DIOUF	National Water Partnership/ES	pnes.secretex@gmail.com
Niokhor NDOUR	Ministry of Environment	cheikh.fofana@environnement.gouv.sn
Fofana CHEIKH	Ministry of Water and Sanitation (MEA)	niokhorndour@gmail.com

Table 4: Attendance list of participants at the project stakeholders' regional technical consultation meeting (Dakar, 25 march 2022)

Name and Surname	Institution and position	Country	Contact mail
Kondas CONDE	HC/OMVS	Sénégal	Kandas.conde@omvs.org
Abraham SOCOBA	CN-OMVS	Mali	niaratoure@gmail.com
Ousmane HANE	SOGED/OMVS	Mauritania	ousmhane@gmail.com
Amadou Lamine NDIAYE	HC/OMVS	Sénégal	Amadoulamine.ndiaye@omvs.org
Valérie BAYCHE	Water Agency Adou – garounue	France	Valerie.bayche@eau-adou-garonue.fr
Nicolas DAURENSAN	CACG	France	n.dourensay@cacg.fr
Agathe LEROUX	CACG	France	a.leroux@cacg.fr
Alain BERNARD	OiEau	France	ab@oieau.fr
Eric TARJIEU	OiEau / DG	France	et@oieau.fr
Abdelkader DODO	OSS	Tunisia	abdelkader.dodo@oss.org.tn
Mouhamedou BABASY	OSS / Expert Eau	Tunisia	lamine.babasy@oss.org.tn
Ghazi GADER	OSS/ Project Manager	Tunisia	ghazi.gader@oss.org.tn
Joël TOSSOU	OSS/ Water Expert	Tunisia	joel.tossou@oss.org.tn

Table 5: Key meetings during the consultation process and stakeholders involved

Date	Subject	Participants
November 1, 2021	Scoping meeting	National Focal Points OMVS: Sao SANGARE (Guinea), Abraham SOGOBA (Mali), Ahmed EL WAWI (Mauritania), Moussa BERTHE (Senegal) / OMVS / OSS
November 11, 2022	Follow-up meeting	
11 February 2022	Exchanges on the process; Contacts with the OMVS FPs of the countries for the collection of national data and information;	
18 February 2022	Follow-up meeting: Exchanges on the data collection process and national information;	
March 02, 2022	Working session with representatives of OMVS countries collection of national data	
March 25, 2022	Technical consultation meeting on the development process of the ARCC-SRB project concept note	See list of participants (table above)
April 08, 2022	Validation of the project's institutional arrangements and prioritization of intervention sites and main project beneficiaries	
April 15, 2022	Validation meeting of the institutional arrangement of the project, Elaboration of the concept note	National Focal Points OMVS: Sao SANGARE (Guinea), Abraham SOGOBA (Mali), Ahmed EL WAWI (Mauritania), Moussa BERTHE (Senegal) / OMVS / OSS

Annex 3: Project Alignment of Project Objectives/Outcomes with Adaptation Fund Results Framework

Project Objective(s) ²⁶	Project Objective Indicator	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
Improve the resilience to climate change of rural communities in the Senegal River Basin through the establishment of a multi-hazard early warning system and multi-sectoral adaptation actions that strengthen social and environmental systems and lead to resilient and sustainable livelihoods	Number of communities covered by improved multi hazard early warning system and weather information	<u>Outcome 1:</u> Reduced exposure to climate-related hazards and threats	1. Relevant threat and hazard information generated and disseminated to stakeholders on a timely basis	
		<u>Outcome 2:</u> Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic & environmental losses	2.2 No. of people with reduced risk to extreme weather events	
	Number of communities sensitized and aware of predicted adverse impacts of climate change	<u>Outcome 3:</u> Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.1 Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses	
	Improved Infrastructure to strengthen the adaptive capacity of the community	<u>Outcome 4:</u> Increased adaptive capacity within relevant development sector services and infrastructure assets	4.2. Physical infrastructure improved to withstand climate change and variability-induced stress	
	Improved ecosystem services for the benefit of the communities	<u>Outcome 5:</u> Increased ecosystem resilience in response to climate change and variability-induced stress	5. Ecosystem services and natural resource assets maintained or improved under climate change and variability-induced stress	
Component 1: Strengthening the institutional and technical framework for resilient management of the Senegal River Basin to climate risks				
Outcome 1.1: An operational regional Multi-Hazard Early Warning System (MH-EWS) for effective disaster risk management in the Senegal River Basin is developed	Number of communities covered by the multi hazard early warning system developed and functioning	Output 1.1: Risk and vulnerability assessments conducted and updated	1.2 No. of early warning systems (by scale) and no. of beneficiaries covered	2,450,000
		Output 1.2: Targeted population groups covered by adequate risk reduction systems	1.2.1. Percentage of target population covered by adequate risk-reduction systems	
		Output 2.1: Strengthened capacity of national and sub-national centres and networks to respond rapidly to extreme weather events	2.1.1. No. of staff trained to respond to, and mitigate impacts of, climate-related events (by gender)	
2.1.2 No. of targeted institutions with increased capacity to minimize exposure to climate variability risks (by type, sector and scale)				
Component 2: Improving resilience to climate change and variability in targeted areas through community-based adaptation actions				
Outcome 2.1: Water, soil and land resources are protected and sustainably managed	Improved water availability and access to quality water for the community	Output 4: Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability	4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by sector and scale)	3,400,000
Outcome 2.2 Climate-vulnerable rural communities' livelihoods are strengthened and diversified	Number of SRB ecosystems preserved through the implemented adaptation measures against the effects of climate change	Output 5: Vulnerable ecosystem services and natural resource assets strengthened in response to climate change impacts, including variability	5.1. No. of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type and scale)	5,000,000
	Number of households/populations benefiting of the implemented adaptation measures	Output 4: Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability	4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by sector and scale)	
Component 3: Capacity building, awareness raising and knowledge sharing				
Outcome 3.1: The capacities of the OMVS and the population in terms of adaptation and appropriation of climate change are strengthened and knowledge is shared	Number of stakeholders mobilized and sensitized through communication and capacity building activities	Output 3.1: Targeted population groups participating in adaptation and risk reduction awareness activities	3.1 No. of news outlets in the local press and media that have covered the topic	1,000,000
		Output 3.2: Strengthened capacity of national and subnational stakeholders and entities to capture and disseminate knowledge and learning	3.2.1 No. of technical committees/associations formed to ensure transfer of knowledge	
			3.2.2 No. of tools and guidelines developed (thematic, sectoral, institutional) and shared with relevant stakeholders	

²⁶ The AF utilized OECD/DAC terminology for its results framework. Project proponents may use different terminology but the overall principle should still apply



ADAPTATION FUND

Project Formulation Grant (PFG)

Submission Date: August 8, 2022

Adaptation Fund Project ID:

Countries: **Guinea, Mali, Mauritania and Senegal**

Title of Project: **Strengthening the resilience of climate-vulnerable communities in the Senegal River Basin using a multi-hazard early warning system and building adaptive capacity _ ARCC-SRB**

Type of IE: **RIE**

Implementing Entity: **Sahara and Sahel Observatory (OSS)**

Executing Entity: **Senegal River Basin Development Authority (OMVS)**

A. Project Preparation Timeframe

Start date of PFG	Upon Concept Note approval date
Completion date of PFG	10 months after Concept Note approval date

B. Proposed Project Preparation Activities (\$)


Description of the PFG activities and justifications:

List of Proposed Project Preparation Activities	Output of the PFG Activities	USD Amount
Cost-effectiveness	<ul style="list-style-type: none">Assess the economic and financial contribution for the project zones' beneficiariesAnalyze the profitability of project activities taking into account the cost-effectiveness of the proposed, water management infrastructure, climate-resilient farming practices, IGAs as well as the project added-value at the environmental, social and economic levels	5 000

Gender analysis	<ul style="list-style-type: none"> • Assess extent of gender mainstreaming into regional and national disaster risk management related policies with regards to governance, management, and emergency action plans • Analyze the existing gender strategies on addressing gender in water, agriculture and fishing related policies. • Monitoring and Evaluation interventions to measure progress and/ or impact of gender mainstreaming • Propose a gender specific action plan for ARCC-SRB project 	5 000
Environment Impact Studies/Reviews	<ul style="list-style-type: none"> • Assessment of the project areas intervention and preliminary baseline establishment with additional stakeholder mapping • Environmental Impact assessment according to the AF 15 safeguards and OSS E&S policy • Review of project interventions identified to cause disharmony to the environment and socio-economic setup of the communities. T • Development of an ESMP detailing the mitigation actions and its M&E system. 	6 000
Workshops	National and regional concertation workshops with stakeholders and local communities' representatives	40 000
Design of the full project proposal	A complete funding proposal document including all the technical outcome from the preparatory studies and consultation workshops will be developed and validated before submission to the AF	10 000
Travel/participation	Travel costs and technical support	10 000
Other costs	Management fees	4 000
Total Project Formulation Grant		80 000

C. Implementing Entity

This request has been prepared in accordance with the Adaptation Fund Board's procedures and meets the Adaptation Fund's criteria for project identification and formulation

Implementing Entity Coordinator, IE Name	Signature	Date (Month, day, year)
Mr. Nabil BEN KHATRA, OSS' Executive Secretary (RIE)		08/08/2022

Project Contact Person	Telephone	Email Address
Mrs. Khaoula JAOUI, Climate Department Coordinator	(+216) 71 206 633	boc@oss.org.tn

