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WATER RESOURCES PROFILE SERIES

The Water Resources Profile Series synthesizes information on water resources, water quality, the water-related dimensions of climate change, and water governance and provides an overview of the most critical water resources challenges and stress factors within USAID Water for the World Act High Priority Countries. The profile includes: a summary of available surface and groundwater resources; analysis of surface and groundwater availability and quality challenges related to water and land use practices; discussion of climate change risks; and synthesis of governance issues affecting water resources management institutions and service providers.

Senegal Water Resources Profile Overview

Senegal has abundant freshwater resources but seasonal and regional variability in surface and groundwater availability is high. Total renewable freshwater resources per capita (3,459 m^3) exceed the Falkenmark Water Stress Index[i] threshold for water scarcity and abstraction rates (11.81 percent) are below the threshold for water stress[ii]. Senegal's dependency ratio is considered high relative to other countries in Sub-Saharan Africa as approximately 34 percent of its water resources originate outside the country.

Climate change is expected to exacerbate the duration and severity of droughts, which threaten agricultural livelihoods and food security. Coastal areas of the Sine Saloum, Casamance estuary and Senegal River are threatened by rising sea levels, coastal erosion, and urban flooding. Temperate increases in the arid regions of the north and east will likely threaten agriculture and fisheries.

Salinization, nitrate pollution, and eutrophication linked to irrigation, agricultural runoff, and untreated wastewater from urban centers threaten surface water quality. Increasing salinization is a growing problem in coastal areas of the Casamance and Sine Saloum deltas.

Groundwater salinity is increasing due to over abstraction, saltwater intrusion, and irrigation. Untreated wastewater and agricultural runoff, especially in coastal regions and arid central western Senegal, are contributing to high nitrate concentrations. Groundwater near Dakar is especially at risk of overexploitation and bacteriological contamination.

Aquatic plant invasions in large areas of the Senegal River and Lake Guiers limit biodiversity, fishing potential, and usage for irrigation and drinking.

Water sector restructuring, policy reforms, and emphasis on decentralization aim to strengthen water governance, quality, and availability. Low funding, limited data collection, and sector coordination challenges have impeded implementation of water management plans, while the lack of comprehensive data hinders understanding of the quality and availability of water resources. This has impeded enforcement of water quality regulations, withdrawal limits, and preparation for climate change impacts.

[i]The Falkenmark Water Stress Index measures water scarcity as the amount of renewable freshwater that is available for each person each year. A country is said to be experiencing water stress when water availability is below 1,700 m^3 per person per year; below 1,000 m^3 is considered water scarcity; and below 500 m^3 is absolute or severe water scarcity.

[ii]SDG 6.4.2 measures water stress as the percentage of freshwater withdrawals against total renewable freshwater resources. The water stress thresholds are: no stress <25%, low 25%-50%, medium 50%-75%, high 75%-100%, and critical >100%.

WINROCK INTERNATIONAL · TETRA TECH · IUCN · mWater · SEI Stockholm Environment Institute · World Resources Institute · The CEO Water Mandate

Water Resources Availability

KEY TAKEAWAYS

- Senegal has five main drainage basins. The Senegal River Basin, which flows into the Atlantic, is the largest followed by the Gambia River Basin. Northern Senegal is drier compared to the south.
- Senegal's rivers feed into extensive delta complexes and estuaries on the Atlantic coast, including the Senegal River Delta Complex, the Sine Saloum Delta, and the Casamance Estuary.
- Groundwater availability, productivity, and depth vary by region. The shallowest aquifers are located near Petite Côte, Casamance, and the central western regions of Fatick and Kaolack, while the deepest are found in the Thiès region.

This section summarizes key characteristics of surface and groundwater resources. Table 1 summarizes key water resources data and Figure 1 presents key surface water resources, wetlands, and dams.

Surface Water Resources

Most renewable water supply is derived from surface water (see Table 1) in five main drainage basins: the Senegal River, Gambia River, Casamance River, the Kayanga River, and the Sine Saloum. All of the basins flow into the Atlantic Ocean.[2] The Senegal River Basin reaches the northern border with Mauritania and Mali and is shared with Guinea. It is the largest and most water abundant basin, covering 37 percent of the country and contributes approximately 20,000 million cubic meters (MCM) annually, albeit with high annual variability.[2] The Senegal River delta extends up to 200 kilometers (km) upstream from the river mouth, passing through four Wetlands of International Importance (Ramsar Sites), and a series of floodplains extend for 600 km from the river mouth.[4] The Gambia River Basin features tropical savanna, covers 30 percent of the country in the center and south, and contributes approximately 2,700 MCM. The Casamance and Kayanga River Basins are in the south and contribute approximately 60 MCM. These basins receive more rainfall and are covered by dense woodlands, wetlands, and mangrove swamps.[2] The Sine Saloum Basin is located in the center and experiences intermittent river flow.[5] Surface water resources are also more saline at the end of the dry season due to high evaporation.[6]

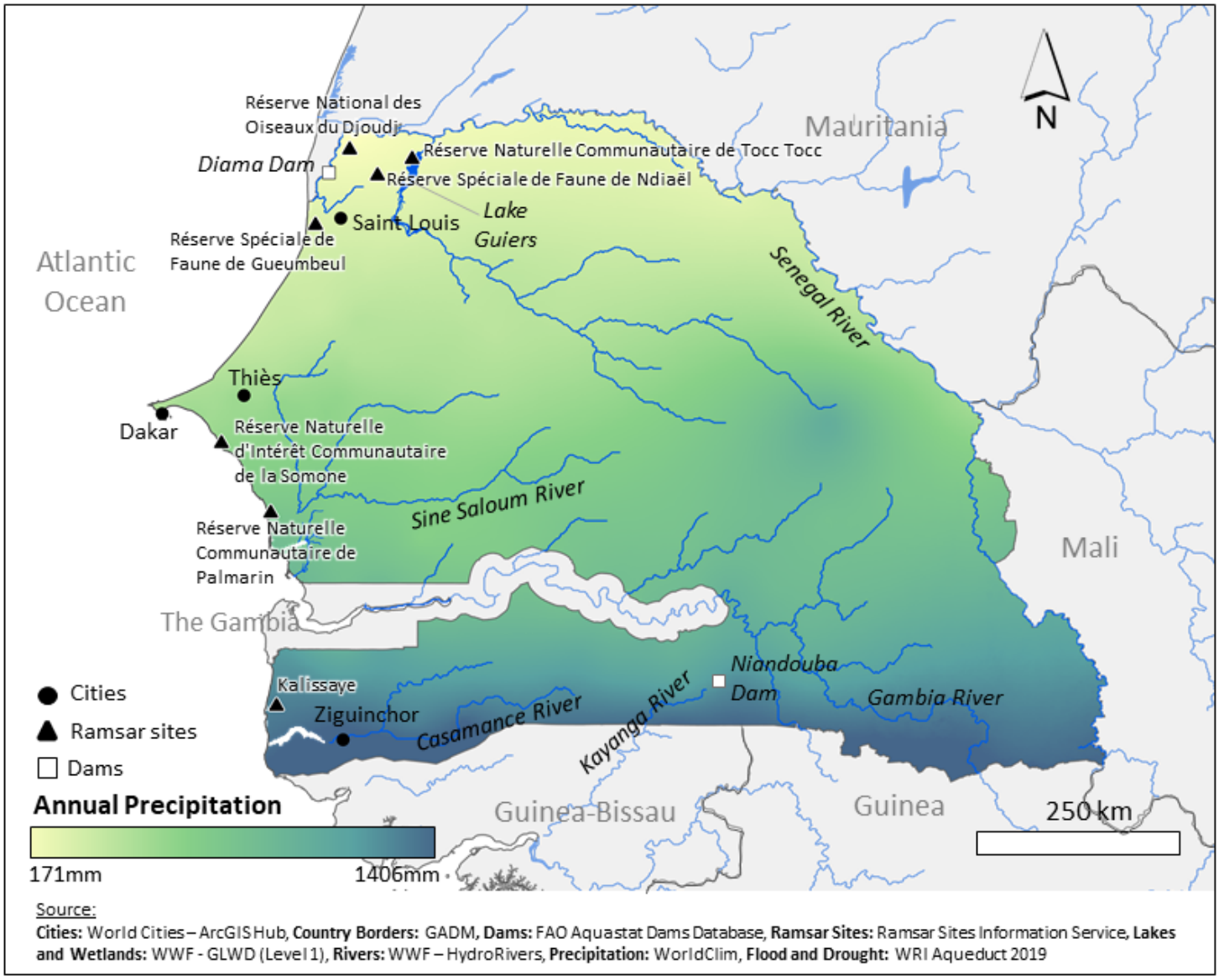
With the exception of the Kayanga, Senegal's rivers feed extensive delta complexes and estuaries on the Atlantic coast including the 200,000 hectare (ha) Senegal River Delta Complex, the 150,000 ha Sine Saloum Delta (a UNESCO World Heritage Site), and the 250,000 ha mangrove forest of the Casamance Estuary (Figure 1).[2,3,7,8] Lake Guiers is another substantial source of surface water and is fed by the Senegal River.[2] Wetlands and water bodies account for 3 percent of the country's

TABLE 1. WATER RESOURCES DATA

	Year	Senegal	Sub-Saharan Africa (median)
Long-term average precipitation (mm/year)	2017	686	1,032
Total renewable freshwater resources (TRWR) (MCM/year)	2017	38,970	38,385
Falkenmark Index - TRWR per capita (m^3/year)	2017	2,459	2,519
Total renewable surface water (MCM/year)	2017	36,970	36,970
Total renewable groundwater (MCM/year)	2017	3,500	7,470
Total freshwater withdrawal (TFWW) (MCM/year)	2002	2,221	658
Total dam capacity (MCM)	2015	250	7,085
Dependency ratio (%)	2017	33.8	23
Interannual variability	2013	1.8	1.55
Seasonal variability	2013	3.9	3.15
Environmental Flow Requirements (MCM/year)	2017	20,160	18,570
SDG 6.4.2 Water Stress (%)	2002	11.81	5.70

Source: FAO Aquastat

FIGURE 1: MAP OF WATER RESOURCES



Source:
Cities: World Cities – ArcGIS Hub, **Country Borders:** GADM, **Dams:** FAO Aquastat Dams Database, **Ramsar Sites:** Ramsar Sites Information Service, **Lakes and Wetlands:** WWF - GLWD (Level 1), **Rivers:** WWF – HydroRivers, **Precipitation:** WorldClim, **Flood and Drought:** WRI Aqueduct 2019

land area, including eight Ramsar sites with a combined surface area of approximately 160,000 ha.

Senegal has several man-made dams and reservoirs, which regulate surface water flows for irrigation, prevent inland saltwater intrusion, and generate hydropower. Approximately 8.6 percent of Senegal's energy is derived from hydropower.[9] The largest (250 MCM capacity) is the Diama Dam located in the north on the Senegal River.[10] It is primarily an anti-salt intrusion dam and is a major source of water for irrigation. The Niandouba (85 MCM) and Confluent (34 MCM) dams in the south on the Kayanga River are primarily used for irrigation.[11]

Groundwater Resources

Groundwater is the primary source for domestic consumption, livestock watering, mining and industry, and some irrigation.[12] Groundwater is unevenly distributed across four main aquifer systems: deep Maastrichtian, superficial, intermediate, and basement aquifers.[12] Aquifer characteristics, including abstraction rates, water quality and groundwater depth, are not well understood. The deep Maastrichtian aquifer, which is part of the Senegalo-Mauritanian aquifer, covers 80 percent of the country and accounts for 40 percent of groundwater flows.[7,13] The deep aquifer system has the highest productivity and greatest depths, reaching up to 400 meters (m), although variability can be significant depending on location.[7,13,14] The intermediate aquifer is the next deepest and is located along the northwestern border and in the east near Dakar.[14] The superficial aquifer is shallower and productivity is low.[13] The basement aquifer in the southeast has low productivity.[13]

Surface Water Outlook

KEY TAKEAWAYS

- Agriculture accounts for 93 percent of total water demand. Irrigation in the Senegal River Valley region accounts for 73 percent of agricultural water abstraction, predominantly for rice production.
- The Diama Dam provides an important source of water for irrigation, navigation, and hydropower, although it has impacted ecosystems and water quality.
- Salinization of river deltas through inverse estuaries is common in coastal Senegal and agricultural runoff and untreated human wastewater are leading to increased eutrophication in surface water bodies.

This section describes key sources of demand and uses of surface water, and associated challenges stemming from water availability and water quality challenges.

Demand for surface water is highest in the Senegal and Gambia Basins, primarily for agriculture.[16] Agriculture accounts for 93 percent of total water demand compared to domestic (4.4 percent) and industrial uses (2.6 percent).[2] Approximately 70 percent of the population is engaged in agriculture, primarily in valleys near the Senegal and Gambia Rivers[2,17] and around 30 percent of agriculture is irrigated, of which 73 percent is in the Senegal River Valley.[18,19] Only 104,000 ha out of a potential 350,000 ha are irrigated, primarily for rice, in the Niayes, Anambé, and Senegal River Valley regions and 80 percent of rice production uses flood irrigation.[17] The government has promoted investment in irrigation to increase rice production to meet self-sufficiency goals.[20,21] The sugar cane industry and other agriculture sectors continue to invest in irrigation as well.[17,22]

The Diama Dam has generated positive and negative economic and environmental benefits along the Senegal River. The Diama dam, built in 1986, has been important for agricultural and energy production.[23] The Diama dam increased irrigation coverage from 10,000 ha to more than 100,000 ha by regulating seasonal freshwater flooding and tidal inflows[8,17,23] and it generates 740 GWh annually, which meets 30 percent of Dakar's electricity demand.[23–25] The Diama Dam has also increased storage capacity (approximately 500 MCM) in Lake Guiers, which is an important source of drinking water.[26] The regulation of water flows, however, impacted local farmers who depended on the natural flooding cycles. The dam also reduced the velocity of the Senegal River, which has increased eutrophication[1,23] and contributed to the loss of 8,600 ha of forest and 122,000 ha of wetlands.[22,23]

Salinization is linked to naturally occurring inverse estuaries, higher rates of sea water evaporation in estuaries[24], saltwater near the river mouth, and tidal phenomena.[29] Seasonal variability in surface water flows in the Senegal River, Sine Saloum, and Casamance Deltas contribute to inflows of seawater and increased salinity.[6] Salinity has dramatically increased in the Sine Saloum River due to high evaporation and reduced rainfall, which have impacted fisheries.[30] Communities in the Casamance Basin have used anti-salt intrusion micro-dams to limit salinization of surface water, however, decreasing rainfall and reduced flow have worsened salinity.[2,31] The Diama dam successfully prevented the inverse flow of seawater upstream in the Senegal River.

Invasive aquatic plant growth has reduced the flow and oxygenation of surface waters and is impacting Lake Guiers, which is a key source of drinking water.[12,32] Aquatic plants have reduced water quality, slowed water velocity, and increased siltation, which have disrupted ecosystems and impacted agriculture, fishing and animal husbandry.[33] Agricultural runoff has caused eutrophication in the Senegal River Valley, the Cap-Vert peninsula near Dakar, and in Mbour and Fatick.[32] Approximately 30 percent of Lake Guiers is affected by eutrophication and plant growth caused by runoff from sugar plantations.[28,33] Lake Guiers, fed by the Senegal River, provides 50 percent of Dakar's drinking water and is a key resource for the city of Thiès.[27] In the lower valley of the Senegal River, excess nutrient loads and reduced streamflow have increased invasive aquatic plants in approximately 24 percent of the water body[14,23] and untreated wastewater has led to eutrophication in the Senegal River estuary downstream from the city of Saint Louis.[35]

Industrial effluents and human wastewater have contaminated surface water, particularly near urban areas. Only 15 percent of household wastewater is treated and just 21 percent of the population uses a safely managed sanitation service.[82] This has increased the incidence of water-borne diseases, especially in the Senegal River Valley[2,23,32] where more than 75 percent of the population is estimated to have been infected by schistosomiasis, a water-borne parasitic disease that proliferates when freshwater is contaminated with infected excreta.[23] In the southeastern Kédougou gold zone along the Gambia and Falémé rivers (a tributary

to the Senegal River), mercury and methylmercury from uncontrolled gold washing threaten water quality[36] although the extent is not well-understood.[22,33]

Erosion and siltation are prevalent near agriculture and in coastal river deltas. River bank erosion is widespread in the lower Casamance Valley and Senegal Basin near Lake Guiers and the Lower Ferlo Valley.[33] Approximately 65 percent of the coastline subject to erosion at an average rate of 1.6m per year,[39] which is exacerbated by a decline in mangroves in Casamance and Sine Saloum due to logging and root-cutting for mollusks.[40] In Casamance, 670 km2 of mangroves were lost between 1972 and 2010, impacting valuable biofiltering and erosion control ecosystem services as well as fisheries nurseries.[40]

Groundwater Outlook

KEY TAKEAWAYS

- Groundwater is the primary source of water for drinking and domestic use in rural and urban areas. Boreholes are highly concentrated in central western Senegal, which relies almost exclusively on groundwater. Over-abstraction of groundwater has been significant in some regions, including near Dakar.
- High evaporation rates, saltwater intrusion, naturally occurring rock-water mineralization processes, irrigation practices, and over-abstraction have led to salinization of aquifers, especially in central western and northwestern Senegal.

This section describes key sources of demand and uses of groundwater, and associated challenges stemming from water availability and water quality challenges.

Groundwater availability, quality, and accessibility varies widely, but it is most commonly used for domestic water supply and some irrigation and livestock watering.[41,42] Approximately 61 percent of all new abstraction permits in 2019 were for agriculture, 29 percent for industry, and 10 percent for drinking water, although this may not be a complete reflection of how groundwater is currently used.[43] The DGPRE has estimated there are over 8,000 wells and boreholes in the country,44 predominantly in the arid region of central western Senegal.[12,14,33] The Thiès region in central western Senegal, just east of Dakar, has the highest number of boreholes (666) and is a key source of Dakar's drinking water supply.[43,45]

Groundwater is threatened by overexploitation and low recharge rates.[1] Nationally, groundwater levels are decreasing by 0.30m–0.67m annually[43] due to over abstraction.[46] In central Senegal, overexploitation[47] and low recharge rates caused by worsening droughts have impacted groundwater availability since the 1970s.[48] In the northeast, groundwater use has nearly tripled since the 1950s to approximately 14 MCM per year, which has lowered the water table by 2-8m.[41] Overexploitation and insufficient recharge in the central western part of the country have continuously lowered water tables since the mid-1970s, and levels are expected to drop another 12m by 2050.[2,42] Pumping rates increased in the Maastrichtian Diass aquifer on the Thiès plateau from 16,000 m3/day in 1958 to over 174,000 m3/day in 2019 to meet increasing demand in Dakar[49,50] has led to groundwater levels declining by approximately 30m.[45]

Groundwater salinization is a growing challenge, especially in the Sine Saloum, Casamance Delta, and northwestern coastal regions.[47] Elevated groundwater salinity has been an issue in the northwestern coastal areas[22,25,51] and have exceeded World Health Organization (WHO) recommendations for drinking water in the lower Casamance River Basin.[47,52] High salinity is partially attributed to historically trapped seawater in aquifers[26] as well as rock-water interactions. Salinity is also linked to high evaporation rates in arid areas, seawater intrusion, and percolation from saline inverse estuaries.[53–55] Inadequate irrigation drainage, particularly in the Senegal River Basin, has also increased salinity in groundwater and in soils.

High concentrations of fluoride in central western and northwestern Senegal increase risks of dental and skeletal fluorosis.[26] High fluoride levels are largely driven by naturally occurring marine clay sediments in aquifers[26] and phosphate ores.[56] In 2015, approximately 18 percent of the rural population, namely in the central western areas, relied on groundwater with fluoride levels that exceeded WHO guidelines.[46] Dental and skeletal fluorosis caused by chronic exposure to fluoride can harm teeth enamel and lead to painful permanent bone and joint damage, including the ossification of ligaments. Approximately 84 percent of people surveyed in the rural areas of the Mbour and Fatick regions had dental fluorosis and 53 percent showed signs of skeletal fluorosis.[57] Naturally occurring iron in groundwater has also been found to exceed WHO guidelines in the superficial aquifer.[47]

Untreated wastewater and agricultural runoff has led to nitrate and bacteriological pollution, posing risks to urban groundwater supplies. High nitrate levels due to untreated waste have been detected in urban centers, including in Ziguinchor and the suburbs of Dakar (including Cap-Vert).[13,47] Groundwater studies in the Thiaroye aquifer, which is an important source of drinking

water for Dakar, detected elevated nitrates and half of the sources sampled also showed E. coli linked to fecal contamination.[59] In Dakar, nitrate concentrations were found to be approximately ten times higher than the WHO drinking water guideline.[51,60] Widespread use of pesticides and fertilizers also contribute to the degradation of groundwater,[33,47] although the extent is not well-understood.[25]

Water Resources and Climate

KEY TAKEAWAYS

- Droughts, floods, and coastal erosion are expected to increase in both extent and magnitude, with more intense but less frequent rain events and rising temperatures.
- Coastal flood risk and sea level rise is very high in the central and southern coastal regions, particularly in Casamance.

This section covers the climate variability and climate change, their impacts on water availability and water quality, and the risks they pose to local communities and their economies.

Between 1996 and 2019, 1.8 million people were affected by drought and 1.2 million were affected by flood events.[61] Average annual precipitation is 686 mm/year (Table 1), although regional precipitation ranges from 200 mm/year in the north to 1,500 mm/year in the south.[2] The rainy season in the south is from June-October, while the rainy season in the north is from July-September.[2] Average annual temperature has increased by 0.9° Celsius since 1975 and is projected to rise by 1.1 to 3.1° by 2060.[62,63] Recent rainfall levels are already 15 percent below the 1920-1969 average, reflecting only a partial recovery from the severe drought of the mid-1990s.[63] Prolonged drought between 1970 and 2000 contributed to rural-urban migration and today approximately three quarters of urban residents reside in unplanned settlements that are vulnerable to extreme flooding caused by heavy rainfall events.[64] Flooding in 2009 caused an estimated $102.7 million in damage and losses, mostly concentrated in the peri-urban areas of Dakar.[64] While it is uncertain whether total precipitation will increase or decrease with climate change, rainfall intensity is expected to increase,[62] although they will occur less frequently.[65]

Drought, erratic rain, and prolonged dry spells at critical points in the growing season are a significant risk to Senegal's climate-sensitive, rainfed agricultural economy.[61] Approximately 70 percent of agriculture is rainfed and vulnerable to changes in rainfall due to climate change. Increased temperature and changes in rainfall will reduce crop quality and yield, while changes in water levels, temperatures, and acidity will negatively impact fisheries, which employ 17 percent of the labor force.[62]

Coastal flood risks are considered high, particularly the central and southern coastal regions.[66] More than 10 million people live within 100 km of the coast[61] and urban areas along the coast are home to 67 percent of the population and 90 percent of industrial production.[62] Sea levels are projected to rise by one meter by 2100, creating extreme coastal flooding risks.[67] Approximately 74 percent of households in coastal areas are vulnerable to coastal erosion[67] as rising sea levels have caused one to two meters of coastal retreat annually.[65] In some parts of Casamance, shorelines are receding an average of six meters per year.[24]

FIGURE 2: DROUGHT RISK

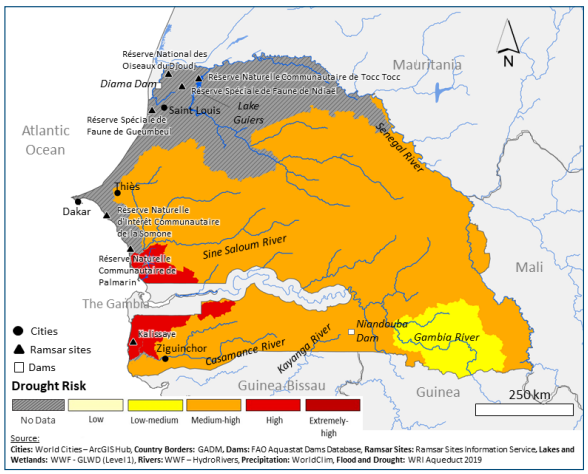
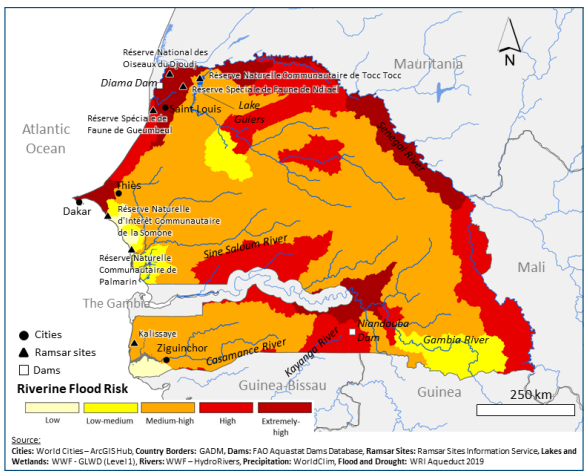


FIGURE 3. RIVERINE FLOOD RISK



Water Policy and Governance

KEY TAKEAWAYS

- Low government funding and human resources and institutional capacity constraints impede implementation of integrated water resources management and investments needed to protect water quality and availability.
- Several entities are responsible for surface and groundwater quality monitoring, but coordination is limited.
- Transboundary agreements regulating the Senegal and Gambia Rivers are key in promoting international collaboration and water management.

This section provides an overview of key policies, institutions, and management challenges. Key laws, policies, and plans are summarized in Table 2 and the roles and responsibilities of select transboundary, national, and sub-national water management entities are summarized in Table 3.

TABLE 2. KEY LAWS, POLICIES, AND PLANS

Name	Year	Purpose
Water Code	1981	Establishes water as a public good to be equitably distributed between different uses with prioritization for domestic consumption. It also contains provisions on water ownership, authorization and control required to exploit water resources, and water withdrawal fees.
Hygiene Code	1983	Regulates public water distribution and establishes rules for reservoirs, wells, springs, and private and public cisterns.
Action Plan for Integrated Water Resource Management (PAGIRE)	2007	Aims to improve national water resources management; preserve water quality; create a favorable environment to apply integrated water resources management (IWRM) through legal, organizational, and political means; and improve communication and awareness on water. The plan was updated in 2018.
Law on Public Service for Drinking Water and Sanitation	2008	Regulates drinking water supply and sanitation services in urban and rural areas and delegates some authority to local bodies.
Sanitation Code	2009	Regulates discharge of waste and management of pluvial waters, systematizes codes relevant to sanitation, and clarifies legal framework for stormwater treatment.

Water sector strategic plans emphasize integrated water resources management but implementation of the plans has been slow. In 2010, a Strategic Plan to Mobilize Water Resources (PSMRE) identified five UGPs and 28 SUGPs to manage water resources locally, and in 2014 they began to develop IWRM management plans.[70] However, only nine of the 28 SUGPs have prepared their plans and none of these have been fully implemented.[33,43] In 2019, institutional restructuring and a new PAGIRE (IWRM Action Plan 2018-2030) developed by the DGPRE emphasized participatory governance, mobilization of sustainable financing, and delegation to local institutions. The new PAGIRE focuses on five issues: i) water and sanitation services, ii) governance, iii) financing, iv) water quality, and v) gender and climate change.[33] The previous PAGIRE (2008-2015) focused on reforming institutional and legal frameworks to improve protection and technical, economic, and financial management of water resources.[68] Implementation of the plan was partially successful, however, it was affected by lack of clear consensus on institutional responsibilities and insufficient funding.[33]

Government funding is limited and there is strong reliance on international and private support to accomplish sector goals. Funding requirements for the PAGIRE are estimated at $219 million, with plans to source 30 percent from the national government, 20 percent from a new national fund for water, the FGE (Fonds pour la Gestion de l'Eau), and 50 percent from other technical and financial partners.[33] However, government allocations to the water sector have historically remained low. During the 2008-2015 PAGIRE, the government contributed only three percent while international organizations, foreign direct assistance, and development agencies including the World Bank, the European Union, and USAID covered 65 percent of the budget.[33,71] A 2014 public-private partnerships (PPPs)

law underlies collaboration around innovative funding opportunities for the water sector.[33]

Transboundary cooperation is vital to Senegal's water security, as 34 percent of the country's water originates outside the country.[12] Senegal has signed six multilateral agreements covering the Senegal River Basin alone, as well as other international agreements such as the Special Establishment Convention to implement the OMVG and the United Nations Economic Commission for Europe (UNECE) Water Convention.[72–74] International agreements governing the Senegal and Gambia Rivers provide a basis for countries to address water allocation, environmental preservation, and hydraulic and energy infrastructure.[72,75,76] The OMVG and OMVS have faced challenges in establishing provisions for groundwater management.[33]

Water Quality Monitoring

Several institutions are responsible for water quality monitoring. The DGPRE oversees national studies of ambient ground and surface water quality.[44] With a network of 500 piezometers, the DGPRE measures aquifer depth, pH, temperature, conductivity and total mineralization four times per year in littoral aquifers, once per month in aquifers near Dakar, and twice per year in the rest of the country.[44] DGPRE conducts water quality studies in individual basins on a sporadic basis. The DGPRE is also responsible for managing industrial, agricultural, or other discharge and abstraction permits.[77] Within the Senegal River Basin, the OMVS also carries out monitoring alongside the DGPRE, although greater basin-wide collaboration is needed.[34] Drinking water quality monitoring is shared between several institutions.[77] The National Hygiene Service (SNH) oversees national drinking water monitoring, the state asset holding company Senegalese National Society of Water Usage (SONES) and the private service provider, Sénégalaise des Eaux (SDE), conduct drinking water quality monitoring in urban areas, and the Office of Rural Drilling (OFOR) is responsible for data collection and coordination in rural areas.[77] OFOR does not have sufficient resources to comprehensively monitor rural drinking water supply.[78]

Throughout the country, there is a limited understanding of the quality and availability of water resources, vulnerability to climate change, water use, and risks of pollution.[77] Limited data collection[19] and management challenges with monitoring and data systems have introduced uncertainty into water quality and abstraction data.[12,33,79] Limited coordination between the water quality agencies[33,46,80] and low funding compound these challenges.[58]

TABLE 3. WATER RESOURCES MANAGEMENT ENTITIES

Mandate	Institution	Roles and Responsibilities
Transboundary	Organization for the Enhancement of the Senegal River (OMVS)	Housed within the MEA, it is responsible for management of transboundary basin development and protection initiatives. Oversees regional collaboration around hydropower and serves as a forum for conflict resolution.
	Organization for the Enhancement of the Gambia River (OMVG)	
National	Ministry of Water and Sanitation (MEA)	Responsible for water resource management, drinking water supply and sanitation, and agricultural water allocation and facilitating collaboration and communication within the water sector.
	Program Planning, Coordination, and Monitoring Unit (CPCSP)	Housed within the MEA, coordinates interventions such as the Potable Water and Sanitation Program for the Millennium (PEPAM) in rural and urban areas and water resources studies and planning.
	Directorate of Management and Planning of Water Resources (DGPRE)	Manages water abstraction and discharge permits, monitors water availability and quality, and oversees Senegal's IWRM plan.
	Office of Lakes and Waterways (OLAC)	Responsible for IWRM of all inland lakes and streams except those subject to international conventions.
	Ministry of Agriculture and Rural Equipment (MAER)	Manages retention basins and artificial lakes and development of the Senegal River Basin through the National Society of Senegal River Valley and Delta Development (SAED).
	Ministry of the Environment and Sustainable Development (MEDD)	Oversees the Directorate of Water, Forests, Hunting and Soil Conservation (DEFCCS), responsible for conservation of water, forests, hunting, and soil.

Mandate	Institution	Roles and Responsibilities
Sub-national	Management and Planning Units (UGP)	Five units managed by the DGPRE and responsible for the regional management plan (SDAGE).
	Management and Planning Sub-units (SUGP)	28 sub-units responsible for preparing localized IWRM water management plans.
	Local Water Committees (CLE)	Coordinate and manage local water resources across all actors, including the state, local authorities, and the private sector. Identify local water management problems and needs, assess local demand and environmental impacts, develop Community IWRM Plans (PCGIRE).

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ABOUT THIS PROFILE

This profile was produced by USAID's Sustainable Water Partnership activity.

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