CASE STUDY

Senegal -

MBOUR AND SAINT-LOUIS

GEOGRAPHICAL CONTEXT

Mbour is situated on the Petite Côte, approximately 80 kilometers south of Dakar, in the Thiès region, and is bordered to the west by the Atlantic Ocean. Originally a fishing village, the city expanded through the combined influence of fishing and tourism. Its fishing port is now among the largest in Senegal. Since the 1980s, Mbour has experienced significant demographic growth, with a current population exceeding 250,000 inhabitants and more than 35,000 households.

Saint-Louis is located in the far north of Senegal, near the Mauritanian border, on an island at the mouth of the Senegal River. Formerly the first capital of French West Africa (AOF), the city is noted for its distinctive architecture and its historical role as a commercial and administrative center. Today, Saint-Louis has a population of over 250,000 inhabitants and more than 30,000 households. It lies at the southern end of the "Langue de Barbarie," a narrow 40-kilometer-long sandbar separating the Atlantic Ocean from the Senegal River. Within this area is the fishing village of Guet-Ndar, which has one of the highest recorded population densities in West Africa.[1]

1 ECOLOGICAL AND TERRITORIAL DISRUPTIONS FROM CLIMATE CHANGE AND HUMAN ACTIVITY

The fishing communities of Mbour and Saint-Louis have been increasingly affected by the impacts of climate change, with marked acceleration since 2010.

- SEA-LEVEL RISE AND COASTAL EROSION: Rising sea levels along the Senegalese coast have contributed to severe coastal erosion, with average retreat exceeding two meters per year. Higher sea levels allow waves to penetrate further inland with

1 Lucie Vialard et al., "Toward a Socio-Territorial Approach to Health: Health Equity in West Africa," *International Journal of Environmental Research and Public Health* 14, no. 1 (January 2017): 6, https://doi.org/10.3390/ijerph14010106

greater force, accelerating shoreline loss and driving salinization of coastal lands and water resources in both Mbour and Saint-Louis.

In Mbour, significant erosion began around 2000 and has intensified rapidly since 2010. In 1990, residential areas stood more than 100 meters from the high tide line, with a broad beach serving as a space for boat repair, fish processing, and recreation. Today, those beaches have largely disappeared: fish processing sites are submerged, landing areas have narrowed, and in neighborhoods such as Golf, the sea now approaches within ten meters of houses, many of which have collapsed. As one fisherman explained,"Every high tide brings its share of destruction."[2]

In Saint-Louis, the situation is equally severe. Large sections of Guet-Ndar have been destroyed by the sea, and essential infrastructure such as schools, cemeteries, mosques, health centers, and landing stages have been lost. More than 3,000 people have been forcibly displaced since 2010.[3] Erosion has been exacerbated by the artificial breach of a four-meter-wide canal in 2003, intended to prevent flooding. The opening has since expanded to nearly five kilometers due to sea level rise and coastal dynamics, permitting saltwater intrusion further inland. This has increased the salinization of the estuary and coastal aquifers, altered local hydrology, and disrupted coastal ecosystems. Vegetation die-off and changes in fish species composition have been direct consequences.

OCEAN WARMING AND CHANGING CURRENTS: Rising ocean temperatures and shifts in coastal currents, particularly observed in Mbour, are connected to broader changes in ocean circulation. These dynamics affect upwelling systems that normally bring nutrient-rich waters to the surface, with significant implications for marine ecosystems. Disruptions to upwelling have reduced nutrient availability, while warming waters have intensified ecological stress. A visible consequence has been the proliferation of toxic green algae, which spreads across fishing nets and beaches, undermining both fishing practices and coastal livelihoods.

EXTREME WEATHER EVENTS: Stronger and more frequent storms have accelerated coastal erosion and destroyed property along the Senegalese coast. In 2018, a single storm in Guet-Ndar destroyed 38 homes, leaving all affected families homeless.[4] Seagrass beds have also been severely degraded, a result of changes in hydrology, increased sedimentation from erosion, and rising salinity levels.

2 Fall, Souleymane. 2025. "From Flood Mitigation to Environmental and Socioeconomic Disruption: A Case Study of the Langue de Barbarie Sand Spit Breach." *Hydrology* 12 (97). https://www.mdpi.com/2306-5338/12/4/97

3 Testimony of local fishers. Field notes.

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INDUSTRIAL AND URBAN PRESSURES: In addition to climate-related drivers, human activity has intensified coastal vulnerability. In Mbour, fishers report that oil refineries, fish processing plants, and hotels discharge wastewater directly into the sea, threatening both livelihoods and marine ecosystems.[5] Sand extraction for construction in Dakar and Saly has further exacerbated erosion. At the same time, dense urbanization on the Langue de Barbarie, a naturally unstable sandbar, has compounded the risks of coastal degradation.[6]

THE IMPACTS OF CLIMATE CHANGE ON FISHER PEOPLES' HUMAN RIGHTS, LIVELIHOODS AND WAYS OF LIVING

RIGHT TO FOOD AND NUTRITION

As early as the 1990s, artisanal fishers began noticing shifts in marine ecosystems, particularly in the timing of fish arrivals. Species such as sardinella, grouper, and octopus were arriving later than expected, disrupting traditional fishing calendars passed down through generations. Since 2010, these changes have become more pronounced, with fishing seasons increasingly unpredictable and fish no longer following the cycles once well understood by local communities.

In Mbour, the migration patterns of round sardinella, the principal pelagic species on which artisanal fishers and women processors depend, have shifted significantly. These fish now migrate northward in search of colder waters. A similar phenomenon has been observed in Saint-Louis, where sardinella and other traditional target species have also moved northward in response to rising sea temperatures. As a result, fishers must travel much greater distances, extending fishing trips from an average of two days to seven or more. This increase in distance has led to a 60% rise in operating costs, particularly for fuel, provisions, and ice.

"In Mbour, everything is submerged," reports a local fisher. "We are struggling to find a place to dry and repair our canoes. The coastal infrastructure, once reliable, is now constantly threatened by rising waters and bad weather". The near-total disappearance of thiof (white grouper), a highly prized commercial species, only exacerbates these difficulties. Despite the increase in time and effort spent at sea, fishers are experiencing a substantial decline

5 The Guardian. 2023. "Hann Bay, Senegal: From Coastal Idyll to Industrial Dumping Ground – in Pictures." *The Guardian*, December 4, 2023. https://www.theguardian.com/artanddesign/gallery/2023/dec/04/hann-bay-senegal-from-coastal-idyll-to-industrial-dumping-ground-in-pictures

6 Sékou Diop et al., "Geoscience at the Confluence of Human–Environment Interaction in Dakar, Senegal," in *Geoscience and Society: Addressing Global Challenges*, Geological Society of America Special Paper 520 (Boulder, CO: Geological Society of America, 2016), 292. According to the study, sand has been mined since the 1960s from beaches and dunes near Dakar—up to 200 m³/day—exposing coastlines to tidal wave action.

in their incomes, earning less than half of what they previously earned from their catches. In the 1990s, fishers could catch approximately 15 to 20 thiof per day, some weighing up to 20 kg. These species were highly sought after and fetched a good price. Today, catching a single 15 kg thiof is considered a rare event.

To adapt, fishers have been forced to change their fishing gear and equipment to target other less valuable species (e.g., sea bream and crucian carp). “We now spend more time at sea,” explains one fisher, “and we often come back unable to cover our expenses.”

In 2000, a good day’s fishing could earn a fisher more than 50,000 CFA francs (USD 72). Today, even with longer and riskier trips, it is rare to earn more than 10,000 CFA francs (USD 175). Fuel prices have tripled, as have the quantities needed for long trips. Nets are becoming more expensive, and engines require more frequent repairs due to harsher sea conditions.

In Mbour, the decline in the purchasing power of fishing families has led to increasingly precarious living conditions, as artisanal fishing remains the main, and often the only source of income. Approximately 90% of fishers are in debt, whether to fishmongers who lend them money, petrol station attendants who extend fuel on credit, or banks that provide loans for the purchase and maintenance of fishing equipment. This situation entrenches households in a cycle of debt that is difficult to escape.

The decline in fish availability has contributed to a 60% increase in fish prices across the supply chain, affecting fishers, fishmongers, women processors, exporters, and local consumers. This rise is largely the result of smaller catches and increased operating costs, as fishers must travel farther to reach fishing grounds. While local supply has not recovered, fish imports have risen by 40% to compensate for the shortfall. These imports, mainly frozen fish from Morocco and Mauritania and farmed fish from Asia, differ considerably from the fresh, locally caught fish that coastal communities traditionally consume.

Catches have fallen by more than 50% compared to previous levels, making it nearly impossible for younger fishers to earn a sustainable livelihood. Many have consequently resorted to irregular migration, often attempting the dangerous journey by canoe to the Canary Islands.[7] According to the International Organization for Migration, at least 2,300 migrants departed Senegal for the Canary Islands during the first six months of 2023, double the number recorded during the same period the previous year.[8] Tragically, many have lost their lives along the way. Others, out of desperation, have turned to fishing illegally in Mauritanian waters, where they risk arrest by the coast guard and confiscation of their equipment.[9]

7 Associated Press, “Migration from Senegal to Canary Islands Surges,” *AP News*, 2023, https://apnews.com/article/migration-senegal-canary-islands-spain-1cd7bb79372214ff86838a8895a92338

8 Associated Press, “Migrants from Senegal to Spain Drown; Unmarked Beach Graves Found,” *AP News*, 2023, https://apnews.com/article/migrants-senegal-spain-drowning-unmarked-beach-graves-03de4c63bd8dabae4777550d52da5e96

9 Ibid.; and World Forum of Fisher Peoples (WFFP), “The Growing Tragedy of Illegal Emigration in Mbour, Senegal,” WFFP, 2023, https://wffp-web.org/the-growing-tragedy-of-illegal-emigration-in-mbour-senegal/

Another concerning trend is the increasing reliance on small, juvenile fish species that have little or no commercial value. Fishers are compelled to use fine-mesh nets to capture these fish, not by choice but by necessity. With larger species in decline and little public support, families are left with few alternatives to meet basic nutritional needs. However, harvesting juvenile fish undermines long-term sustainability by preventing stocks from reaching maturity and reproducing. These practices generate minimal income despite requiring the same level of labor and time, further entrenching hardship. This reflects a cycle of deepening vulnerability in which communities must sacrifice future sustainability in order to secure present survival.

RIGHT TO HOUSING

Erosion and severe storms have destroyed the homes of more than 300 families in the village of Guet Ndar in Saint-Louis. After initially being placed in temporary shelters, the municipality relocated them to undeveloped plots of land without access to water or electricity. In 2019, approximately 400 shelters were constructed in Diougop, a resettlement site located about 15 kilometers inland.

This displacement has significantly disrupted livelihoods, particularly for women who previously sold fish at the Guet-Ndar market. High transportation costs have made it difficult for them to continue their activities. Community support networks have also been fractured, with older women and poorer households most affected. Older women in particular face challenges due to reduced mobility and the physical strain of long travel distances.

RIGHT TO CULTURE

Environmental changes have had profound cultural and social consequences. In Saint-Louis, coastal erosion and flooding threaten cultural and religious sites, including cemeteries such as the one in Guet-Ndar. The loss of these places undermines collective memory and spiritual practices. At the same time, the transmission of knowledge related to fish reproduction cycles and traditional conservation methods is being disrupted, placing the intangible heritage of coastal communities at risk.

These upheavals have deeply affected cultural life, particularly among the traditional fishing community of Lebou who reside mainly in Mbour, where fishing ceremonies have been altered. The migration of young people is further destabilizing traditional social structures and challenging established roles within communities. Forced displacement has also contributed to the erosion of cultural identity, weakening intergenerational ties and impeding the transfer of knowledge across generations.

RIGHT TO HEALTH

Accidents at sea have become more frequent as fishers are forced to travel greater distances in search of catches.[10] Women fish processors who use straw to smoke fish often work in confined and poorly ventilated spaces, which increases their exposure to toxic fumes. Combined with inadequate living conditions, these factors contribute to a range of health problems.

RIGHT TO EDUCATION

Many children drop out of school because their parents can no longer afford school fees. Early school dropouts are common due to parental poverty, with an illiteracy rate of 80%. In almost all fishing families, at least one person works in Europe to support the household.

ROLES AND VULNERABILITIES OF WOMEN

Women, particularly in Mbour where they represent about 70% of those involved in fish processing and marketing, are especially vulnerable to these changes. Coastal erosion has significantly reduced their main processing site in Mballing, with the coastline now encroaching on areas that were once considered safe. A site that previously lay more than 200 meters from the shore is now flooded at high tide, severely restricting the available workspace. As a result, women processors have lost more than half of their working area. Overall, women employed in the processing sector are experiencing a 60% decline in income, driven by both the reduction in fish supply and the loss of secure and functional workspaces.

Even when fish is available, many women are unable to work due to insufficient space. Ovens are positioned too close together, which causes smoke to accumulate and contributes to respiratory and eye problems. As a consequence, many women now suffer from asthma and other serious health conditions.

Despite their crucial role, women remain underrepresented in decision-making bodies, accounting for only 15% of Local Artisanal Fisheries Councils (CLPAs).[11]

10 Testimony of fishing communities regarding offshore fishing risks and collisions. The disappearance of fishers and their boats – often resulting in the death of the entire crew – is frequently caused by offshore fishing, difficult weather conditions, and collisions with larger vessels, leaving many families in despair.

11 Coalition for Fair Fisheries Arrangements (CFFA), "CLPA Co-Management to Preserve Marine Ecosystem in Senegal," CFFA Cape News Blog, 2023, https://www.cffacape.org/news-blog/clpa-comanagement-preserve-marine-ecosystem-senegal. The CLPA's objective is to *„prevent, reduce and resolve conflicts at the local level in the first instance, and to participate in the monitoring, control and surveillance of fishing and related activities."*.

2 CLIMATE CHANGE AND ENVIRONMENTAL POLICIES, LAWS AND GOVERNMENT ACTIONS IN SENEGAL

POLICIES AND PROGRAMS AFFECTING ACCESS TO FISHING AREAS AND RESOURCES

Senegal's climate policy, as outlined in its Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs), emphasizes the importance of protecting coastal and marine ecosystems that are essential to artisanal fishers.[12] These policies encourage, for example, mangrove restoration, improved fisheries management, and the creation of marine protected areas (MPAs).[13] In Mbour and St. Louis, but also in other areas (e.g. Dakar, Kayar, Joal-Fadiouth, and Bamboung), the creation of Marine Protected Areas (MPAs) is already underway. MPAs often generate significant conflict, both between local communities and among fishers themselves, due to their placement in coastal zones traditionally used for fishing. These areas are typically rich in marine resources, and their designation restricts access to productive fishing grounds, forcing small-scale fishers to operate farther offshore, where fish stocks are less abundant. As a result, competition over limited resources intensifies, occasionally escalating into disputes that can lead to legal penalties, including substantial fines and, in some cases, imprisonment. However, climate change initiatives are leading to immediate restrictions for fishers, despite their potential long-term benefits for the conservation of fishery resources. In addition, offshore oil and gas exploitation along the Senegalese coast, part of Senegal's national and continental blue economy strategies, limits access to traditional fishing areas, exacerbates barriers to access to traditional fishing areas, and amplifies the precariousness of local fishing communities.[14]

Fishing agreements signed with the European Union, particularly for tuna and hake, tend to favor industrial fleets to the detriment of artisanal fishers.[15] Other coastal and maritime development projects, including initiatives linked to coastal tourism, are promoted as part of Senegal's blue economy strategy but often benefit large investors more than small-scale fishers. These projects frequently restrict local communities' physical access to the sea. For example, World Bank–funded Blue Economy projects in Saly have prioritized coastal protection for hotels and tourism infrastructure, while neglecting the needs of nearby fishing communities such as Mbour. As a result, traditional fishers face worsening coastal erosion, loss of workspace, and exclusion from decision-making, which underscores persistent inequalities in climate adaptation efforts.[16]

12 Republic of Senegal, Revised Nationally Determined Contribution (Dakar: Ministry of Environment and Sustainable Development, 2020).

13 UNFCCC, *National Adaptation Plan (NAP) of Senegal* (Bonn: United Nations Framework Convention on Climate Change, 2021), https://www4.unfccc.int/sites/NAPC/Pages/national-adaptation-plans.aspx

14 Laura Kossoff, "Offshore Extraction and Artisanal Fisheries in West Africa," *African Studies Quarterly* 22, no. 3 (2023): 45–68.; African Union Commission, *Blue Economy Strategy* (Addis Ababa: African Union Commission, 2020).; Energy Capital & Power, "Senegal: First Oil from Sangomar Field Begins," *Energy Capital & Power*, 2024, https://energycapitalpower.com/senegal-first-oil-sangomar

15 International Collective in Support of Fishworkers (ICSF), "Fishermen Condemn European Feeding Frenzy in Senegal," ICSF, 2023, https://icsf.net/newss/fishermen-condemn-european-feeding-frenzy-in-senegal/

16 Fiona Harvey, "World Bank Climate Funding Greens African Hotels While Fishermen Sink," *Climate Change News*, April 16, 2024, https://www.climatechangenews.com/2024/04/16/world-bank-climate-funding-greens-african-hotels-while-fishermen-sink/

Similarly, carbon offset initiatives, including mangrove reforestation and the establishment of strict conservation zones, impose new restrictions on natural resource use, often without local consultation. These measures, while framed as environmental protection, disrupt fish migration patterns and further undermine the stability of traditional artisanal fishing practices.[17]

INTEGRATING GENDER EQUALITY INTO CLIMATE AND MARINE RESOURCE MANAGEMENT POLICIES IN SENEGAL

Current policies and programs do not sufficiently address climate equity between men and women in fishing communities. Women's specific needs are rarely considered in adaptation policies; their access to financial and technical resources remains limited, and there are no specific measures to protect the fish processing sites they manage. Their economic role in the value chain is rarely officially recognized. However, some promising initiatives have emerged. The Women and Shellfish program in the Sine-Saloum Delta and the Resilient Women Processors initiative in Joal-Fadiouth have focused on improving processing techniques and constructing flood-resistant infrastructure. These programs also provide access to microcredit systems and tailored technical training, strengthening both the resilience and economic independence of women processors.

FISHERS' RESISTANCE AND SOLUTIONS TO CLIMATE CHANGE

In response to the growing challenges posed by climate change, Senegalese fishers, including those from Mbour and St. Louis, are organizing themselves into local collectives and associations to strengthen their resilience. Structures such as the National Collective of Artisanal Fishers of Senegal (CNPS), the Interprofessional Council of Artisanal Fisheries of Senegal (CONIPAS) and women's groups involved in fish processing play a key role in defending their rights and seeking sustainable solutions.

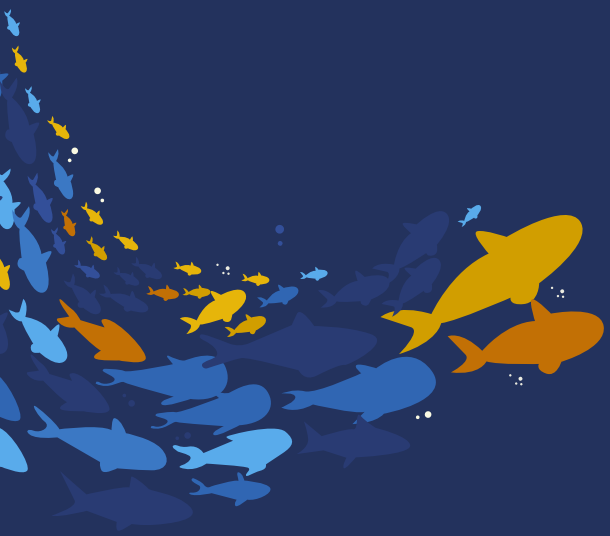
To address the depletion of fish stocks, they are introducing biological rest periods, such as a six-month ban on night fishing, and working to restore critical ecosystems such as mangroves, which are essential for fish reproduction. Some fishers are turning to beekeeping, sheep and poultry farming, oyster farming, or diversifying their activities through agroecology and community ecotourism.

17 REDD Monitor, "Colonial Conservation at Work: Mangrove," *Substack*, April 2024, https://reddmonitor.substack.com/p/colonial-conservation-at-work-mangrove

Women, who have been particularly affected by the crisis, are developing cooperatives focused on processing and marketing cereal products in order to secure their incomes.

Finally, fishers are engaging in advocacy with authorities and in national and regional forums to demand fairer climate policies and adequate financial support. For example, in 2022, fishers in Mbour organized a protest that led to violent clashes with authorities seeking to allocate the only remaining space for the construction of a new fishing pier to Japan International Cooperation Agency. The fishers strongly opposed this, arguing that another pier built by the EU already existed less than 40 meters away. Due to ongoing coastal erosion, the fishers no longer have enough space to repair their canoes. This increasingly limited space was one of the main reasons for the uprising.

Despite the difficulties, their mobilization demonstrates a strong capacity for innovation and resilience, aimed at preserving their livelihoods and communities.



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