

The Langue de Barbarie - exposed and vulnerable

This strip of land in the vicinity of Saint-Louis, wedged between the Atlantic Ocean and the Senegal River, has been exposed both to the pressures of economic development and the impacts of climate change. Inundation, erosion, and salinization of water have damaged its ecosystem. How do the inhabitants who have been affected perceive the resulting health and social hazards that have come about? How have they reacted?

MODOU NDIAYE, a Senegalese geographer, author of his thesis, “Urban planning put to the test of sustainable development in Senegal: stakeholders, challenges, and strategies in the new town project of Diamniadio”, is a researcher affiliated with REMIGRAF at the Fundamental Institute of Black Africa (IFAN) of the Cheikh Anta Diop University of Dakar (UCAD). His work focuses on regional planning, sustainable development, and health geography.

The context of humanitarian and social challenges

Coastlines comprise land-sea interface zones where coastal strips, estuaries, deltas, and continental platforms represent strategic areas for socio-economic development. Coastlines are exposed to human-induced pressures (urban, industrial, agricultural, fishing, and tourist-related), as well as to the impacts of climate change. They are subject to natural disasters that can cause profound transformations in social, economic, and environmental terms. In 2003, in the Langue de Barbarie, the site of our study, a relief channel was opened across the sandy coastal strip in order to prevent inundation. The opening of this breach has had multiple impacts on the development of this region and on the health of its residents: the capsizing of trawlers, salinization of wells and degraded water quality, shifting sandbanks and retreat of the shoreline, depletion of fish populations, population displacements, etc. The degradation of the environment combined with the effects of climatic hazards have aggravated health risks and strongly impacted communities whose survival depends on the ecosystem. Properly identifying the effects of climate change is therefore imperative, so that residents can take the necessary action for them to adapt. Otherwise, health measures may prove to be ineffective and work against the resolution of humanitarian and social issues.

Research objectives

The overall objective of this research is to contribute to a better understanding of the perception of populations to climate hazards, their level of sensitivity to the different impacts of climate change on their health, and the adaptive measures that can be used to reverse current trends. It also requires identifying the effects of climate change in the area studied. In addition, it contributes to the development of a location map of climate risks that impact human health.

Understanding people's perception of the impacts of climate change on health, the economy, and productivity in the coastal zones should help better respond to climate change. Likewise, research on the perception of coastlines as an ecosystem beneficial for society should provide perspectives on social involvement in resource management. In this sense, our work contributes to learning more about the vulnerability of climate-impacted victims and the means that allow them to adapt to hazards to their health.

Research Partners

This research was carried out with the support of the French Red Cross Foundation and of the *Agence française de développement* (AFD).



How do populations perceive the link between climate change, the degradation of their environment, and their health? What are the strategies that they can develop in order to adapt?

Most of the respondents we interviewed in our study area have a basic knowledge of climate change and are alarmed by its more frequently occurring destructive impacts. Among these they mention inundation (87%), coastal erosion (82.1%), violent winds (53%), salinization and unseasonal rains (14.3%), and accumulation of refuse (7.1%). They state that flooding is one the natural calamities that have historically struck the region since the mid-17th century. But ever since the Diama and Manantali dams have been constructed to regulate the flow of the Senegal river, the water level has gradually risen, particularly in winter. This has caused the river to overflow and inundate the entire estuary, and more particularly Saint-Louis.

The presence of two dynamic forces (marine and fluvial) accounts for the transformation of the Langue de Barbarie's coastline. This is evidenced by a pattern of erosion causing the destruction of homes, casuarina trees (that serve to fix the dunes), the retreat of the shoreline and sedimentation, which leads to the formation of sandbanks that, in turn, impede navigation. Alternating erosion and sedimentation are responsible for the rapid modifications of the Langue de Barbarie coastline and the shallower depths of its waters. These changes create real challenges in coastal zone management. These include setting the limits of the artisanal maritime fishing zone, regular dredging of silted river channels at considerable expense, surveying the retreat of the shoreline, etc.

The perception of fishermen

Fishermen, who make up bulk of the working population of this region, state that inundation, coastal erosion, and violent winds are the most serious consequences resulting from climate change. Fishing in Saint-Louis must struggle with the presence of the sandbar for nine months of the year, which is frequently the cause of accidents and fatalities estimated at approximately twenty per year. Rising sea levels also cause delays in the process of offloading sardinella. In addition, there are days when venturing out to sea is impossible. Some recall that *"in the past, we would spend less than 24 hours at sea, and we would bring back large catches of fish. Our fishing zone was easy to reach, which made it possible to sell fish at cheaper prices to consumers. Nowadays, to catch fish, you have to venture into high seas with all the risks that it entails. This necessarily requires more people and more money, but also more time at sea, at least five days, because sometimes we navigate as far as the waters of Mauritania. But despite all this effort, our total catches are not enough."* Ever since the opening

of the breach in the sandbar, the fishermen in the populous district of Guet-Ndar, have had less activity. It has also had a harmful human impact. Entire families have swept away by the flows in the breach, causing a shortage of able-bodied workers.

The perception of health personnel

Health personnel claim that climate change has had significantly greater repercussions on the health of populations in this region over the course of several decades. Numerous medical conditions have become recurrent and persistent: malaria, asthma, rheumatism, diarrheal diseases, and acute malnutrition resulting from insufficient rainfall. Certain illnesses, such as parasitoses, dermatoses, and allergies are due to a lack of sanitation and hygiene (e.g. in Guet-Ndar) brought about by fish products on dumped on the shores and poor 'water quality. It should be noted that certain neighbourhoods unconnected to the drinking water supply network and use well water.

According to the head medical officer of the Saint-Louis district, no study has been carried out on zoonoses or eye ailments that affect individuals working in the Tassinère salt flats or the fish processing plants. Exposure to heat in salt marshes cases eye ailments. In addition, cases of zoonoses have been identified in the locality of Guet-Ndar where the inhabitants are in close proximity to animals.

Which social groups have been most impacted the most?

According to the surveys, the social groups the most exposed to the health and social consequences of climate change are fishermen (96%), educators (50%), health personnel (39%), and farmers (32 %). Fishing plays a central role in Guet-Ndar. Discussing the breach that authorities opened up in the sandbar to keep the city from flooding is rubbing a knife in a wound, because hundreds of fishermen have perished since 2003 when it was opened. Our local official was adamant: *"Just take a close look at it. It's a death trap. It has swallowed up all our children, I will never venture through this breach."* Last January, thirty fishermen lost their lives after their trawler capsized and ran aground on a sandbank that wasn't visible". In 2018, there were 3,695 registered trawlers for more than 15,000 fishermen. In 2020, there were about 4,500 (according to the Fisheries Directorate, 2021). And between 2000 and 2018, 588 fishermen lost their lives at sea, including 157 dead or missing in 2013 alone.



Concerning safety, the means of surveillance and protection (life jackets and rescue equipment) are insufficient. The utilization of life jackets has been reported to be optional in certain cases. Despite a trawler and an ambulance for rescue operations, carts are also utilized, which has augmented the risks for patients in need of urgent medical attention.

The education sector is also very vulnerable to climate change. School buildings have collapsed, and thus children cannot complete their school year. Health professionals come in third position of those having been impacted as a result of the ensuing shortage of health facilities.

Other activities are experiencing these misfortunes, especially market gardening. Agricultural land has suffered from salinization; a process that has reached an alarming level of concern and whose impact has had severe consequences. The accumulation of salts (particularly sodium salts) reduces the absorption of nutrients, reduces water quality, affects plant development, and decreases soil fertility. The tourist industry has also been hit. Certain hotels threatened by water encroachment have been obliged to close or relocate south, as was the case for the Hotel La Saint-Louisienne and the Faro resort.

Resilience strategies of climate-displaced people

Climate-displaced villagers were sheltered in the camps of Bountou Ndour, Khar Yallah and Bouo built in 2003, 2016, and 2018, to let them escape from the climate hazards threatening to destroy their homes. These people, estimated at 1,000 families, experienced difficult living conditions in the camps. As a consequence, they have developed various resilience strategies. Thus, in Bountou Ndour, they connected basic services (water, electricity) themselves thanks to monthly allowances from their children who had emigrated elsewhere in Senegal or abroad. Due to the distance from the sea and the drying up of the natural river mouth which allowed them to go fishing at sea, they shifted to farming and formed economic interest groups. They nevertheless ask to be decently rehoused. At “Khar Yalla” – which means “waiting for God” – they say they rely on providence. And in Boudiouck, parents receive support from their children, most of whom have settled in other parts of Senegal or emigrated. Women have been retrained for employment in sewing, hairdressing, and other small business. While others, despite the distance, have continued to work in the Langue de Barbarie. The older men, for lack of any other professional skills, continue to fish at sea, even though fish are becoming scarcer. These resilience strategies are supplemented by support from the State and NGOs which provide financial aid, food, and medicine.

Methodology and data sources

Data were collected in the following three domains: climate, health, and socioeconomics. The collection of climate data was funded by the National Agency for Civil Aviation and Meteorology (ANACIM). These data were utilized to analyse climate variability going back over a fifty-year period. Health data was collected in the Saint-Louis medical region, which centralizes data covering the Langue de Barbarie with the use of a specific interview guide customized to measure disease prevalence within the population. Finally, regarding the collection of socio-economic data, we carried out several surveys in the Langue de Barbarie among residents through interviews and with focus groups.

Scientific lessons beyond the framework of this study

The work carried out thus far in the Langue de Barbarie has proven that the local population possesses a solid knowledge of the river’s dynamics, as well as of the importance of wetlands, lakes, and lagoons in the preservation of wildlife and tourism attraction. Our research offers an added dimension. It demonstrates the relationships between risk perception, vulnerability, and resilience among climate-displaced populations. It also sheds light on the strategies employed by local communities to adapt to climate change, resulting in new social, economic, and environmental capacities.

Limitations in the results

When considering the impacts of climate change on human activities in the Langue de Barbarie, modelling and simulations would have produced more accurate results than those obtained from the estimated data generated in this study. Furthermore, because the Saint-Louis health structures have difficulty archiving data, it was not possible to conduct a full series of observations.





Those who were forced to leave must give up any hope of returning-

Modou Ndiaye



Can traditional activities still be kept alive in the Langue de Barbarie or are most of them inevitably going to die out?

M. N.: The main activities of fishing, farming, and tourism can be revived to create jobs for the local population. Overhauling and stabilizing the breach would allow for the recovery of farmland, reforestation and the regeneration of ecosystems, and the opening of hotels, such as the La Saint-Louisienne. With the construction of dikes and plantations, traditional activities have somewhat recovered, especially fishing.

Do the climate-displaced people from the various camps still hope to return to their traditional activities in the Langue de Barbarie or do they realize that they will have to relinquish their hopes and reinvent a new life?

Most of the people who left their homes in the Langue de Barbarie have been obliged to give up any hope of coming back. In fact, their homes were completely destroyed. However, most of those who were displaced, mainly fishermen, say that they want to return to the Langue de Barbarie because fishing is all that they know, and they don't want to travel back and forth between the camp and the Langue de Barbarie. People who are fragile, like the elderly, those with chronic illnesses requiring long-term care, and pregnant women all desire to return too.

Are the camps intended to be permanent or temporary, and will they eventually disappear?

The camps are of different types. The Boudiouck camp is made up of makeshift tents, which explains why a site is being developed there to build houses. On the other hand, the Bamba Dieye and Bountou camps Ndour are made up of houses. However, the primary point of contention is the absence of property titles and the concern that an occupant can be eventually evicted.

Do climate-displaced people receive international aid?

In the Boudiouck camp, climate-displaced people have received aid from the World Bank, which finances tents and distributes food (one 50-kg-bag of rice, oil, and sugar. At the Bamba Dieye city camp – named after the former mayor of the city of Saint-Louis – a donor contributed 100,000 CFA francs to each family. There are also well-intended persons who help families by making donations in kind (clothing, impregnated mosquito nets, etc.). In the Bountou Ndour camp, aid is socially driven, in particular with the State granting land for rehousing.

What are the implications for humanitarian and social action?

This research encourages humanitarian and social aid providers to invite local communities to participate in developing the conditions for their adaptation to climate change. They can utilize this study to identify the health concerns associated with climate change, anticipate the needs of potential climate refugees, and improve their reception conditions. In terms of prevention, they can consult with the residents and rely on their knowledge of the Langue de Barbarie ecosystem to promote social resource management. They can also contribute to a better conservation of the Langue de Barbarie by helping to preserve the dunes, marshes, and casuarina trees, which act as natural barriers against climatic disasters along the coastline.

The “Pratiques & Humanités” series of the French Red Cross Foundation summarizes the research work of researchers supported by the Foundation. Its objective is to provide humanitarians with high-quality and concise scientific information.

The French Red Cross Foundation is a recognized public utility foundation dedicated to research in the fields of humanitarian and social action. It represents the desire of the French Red Cross to promote scientific knowledge, ethical reflection, and social innovation to advance action in the service of the most vulnerable

Fondation Croix-Rouge française
21 rue de la Vanne | CS 90070 | 92126 MONTRouGE CEDEX
+33 1 40 71 16 34 | www.fondation-croix-rouge.fr
contact@fondation-croix-rouge.fr