

# Decolonising the Politics of Climate Disasters in the Senegal Estuary: Adaptive Practices Between the “Vanishing Past” and the “Near Future”

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The governance of coastal zones has been on the agenda of major international organisations since the end of the twentieth century (Billé et al., 2006, 2007), and, with the rise of the climate change issue, has become an object of study of the highest order (Rockstrom et al., 2009; IPCC, 2014; Steffen et al., 2015). Coastal areas are highly populated areas characterised by a marked increase in socio-economic inequalities (Gupta & Bavinck, 2017). They constitute a set of vulnerable socio-ecosystems threatened by a number of risks: rising sea levels, changes in currents, winds and waves, acculturation dynamics and possible “maladaptation” policies (Grinsted et al., 2009; Magnan et al., 2016) developed in the name of securing potentially affected territories.<sup>1</sup>

In the north of Senegal, the Senegal River estuary has become one of the areas where hydrological risks accumulate and is under particular scrutiny due to the anthropisation dynamics at work (Sy et al., 2015; Ballouche et al., 2019), besides the impacts of climate change (Vedeld & Coly 2015; Ba, 2019). The analysis of the governance of these consequences, which involves a complex interplay of different dimensions due to the deployment of various development policies within and between the states sharing the Senegal River waters since independence, directly challenges social sciences: what collective action models should be deployed in order to make the estuarine zone development trajectory sustainable? More specifically, as the decisions taken in response to the disastrous consequences

<sup>1</sup> The latter result in management practices that are hardly relevant and the sometimes questionable construction of protective infrastructure.

of the opening of a breach in the Langue de Barbarie in 2003 have not been taking into account the fact that it did not constitute a “disruptive” episode (Parsons et al., 2019) likely to reorient the management of the estuarine system (or even worsen the situation), it is proposed that the nature of the changes to be made to the estuarine zone governance in order to make it more “resilient” be questioned (Pelling & Blackburn, 2013).

Such a problem approach requires the development of a multi-scalar, spatial and temporal analysis, while taking the city of Saint-Louis as the central level and deploying infra-urban (Ndiaye governance) and supra-urban (Senegal estuary governance) analyses around it. Beyond this methodological challenge, it is a matter of mobilizing the approach based on the “politics of disaster” (Dill & Pelling, 2010) in order to shed light on the inertial logics at work and identify the means of resolving them. This approach seems essential to us insofar as it seeks to understand environmental disasters as socio-political constructs: I) whose occurrence can be understood with regard to the historical development trajectory of the socio-ecosystem under consideration, and II) which adaptive policies attempt to manage by constructing, in the face of the emergence of possible claims by the impacted populations, the socio-technical conditions for a secure future (in the short, medium and long term<sup>2</sup>).

Based on a longitudinal study of the development dynamics of the estuary around Saint-Louis (see methodological box), we propose to extend the results produced by this approach by developing an analysis based on the temporalities conflict that affects protagonists in the region studied. Faced with the local and regional authorities’ temporal framing, which is envisioned according to a logic that articulates the “extended past” and the “distant future”<sup>3</sup>, we will attempt to inform and shed analytical light on the ordinary practices that aim to link the “vanishing past” and the “near future” in an inclusive manner (Guyer, 2008).

The objective of this research is therefore to examine the strategies and modalities of action that make it possible to contain the wrongs associated with imported development logics (i.e. impregnated with expert rationality). In particular, it will be a matter of seeing to what extent and under what conditions it is possible to promote the emergence of “indigenous” logics (Makondo & Thomas, 2018) aimed at “healing the en-common” (common good) (Seck, 2017). Far from aiming to integrate this knowledge, which is deemed largely irreducible, it is more a case of thinking about the conditions for “relationships-based” collaborative action and potentially contributing to the emergence of viable and acceptable solutions (Lloyd et al., 2012; Sarr, 2017<sup>4</sup>). Such an analysis requires a thorough territorial understanding, positioned between the “vanishing past” and the “near future” (Guyer, 2008) and a precise analysis of the tensions generated<sup>5</sup> by the play of spatiotemporal scales.

In order to answer this question, we propose to unfold the Saint-Louis region’s “urban scene” (Decrop et al., 1997<sup>6</sup>) in a multi-scale perspective by proceeding with a geophysical and political-institutional characterisation of the territorial space concerned, and then by inserting the analysis of the urban between the infra (neighborhood) and supra (estuarine zone) levels. Postulating that transitional dynamics cannot do without a critical analysis of

2 The work developed within this approach has thus established links between the production of vulnerabilities within populations impacted by environmental disasters and the reconfiguration of power relations within the field of adaptation (Octavianti & Charles, 2018), the inclusion of environmental justice issues on political decision-makers’ agenda (Arifen & Ercksen, 2020), or the recognition – or not – of the role of indigenous knowledge in the co-production of adaptive solutions (Parsons et al., 2019).

3 The same expert logics are reproduced in the name of a distant future now conditioned by “sustainable development”.

4 However, the issue of valuing “indigenous” knowledge alongside “modern” knowledge (Kelman et al., 2009; Mignolo, 2015; Diagne & Amselle, 2018; Escobar, 2018) needs addressing with precision. A good critical description does not so much presuppose a social world that is “already made” as a social world that is “in the process of being made”, as it confronts its stakeholders with challenges.

5 As such, it can give rise to comparative analytical work that can highlight the value of focusing on these ‘oceanic and liquid Africas’ (Vergès, 2017) for observers from outside the continent.

6 For these authors, the risk scenes» are «instances in which actors of various statuses and functions take up and discuss one or more risks. These forums may be based on institutional procedures or, on the contrary, be more informal, open more or less widely to new actors; they may be ephemeral or benefit from a degree of durability, they may concern different types of territories or various levels of the same territory, they may focus on a more or less narrow aspect of risk, or deal with this risk only as an element of a wider problem, etc. [They are] diffuse social processes that are not always easy to understand. [They are] diffuse, relatively opaque, often loosely organised social processes concerning the collective apprehension of risks. [...] The notion of a scene thus has a measure of relevance, in that it points to the idea that, within the social body, spaces for negotiation emerge, of which risk is the focus or one of the focuses.» (p. 42).

temporalities (Kolinjivadi et al., 2020), we will redeploy the arrow of time (Howitt, 2020) in order to identify strategies for decolonizing the Anthropocene and indigenising the near future (Whyte, 2017).

## Methodological box

The empirical data used in this article are derived from field surveys conducted during a period of “observatory residence” in the Senegal River estuary. The approach used is qualitative<sup>7</sup>. Qualitative methods do not aim to produce representative data, i.e. data that can be generalized to a social group. Qualitative research is particularly appropriate when the social phenomena observed are difficult to measure (Sawadago, 2020). This article is part of this perspective: it aims to decipher the alternative knowledge held by local communities living in the Senegal River estuary. From this perspective, it is difficult to measure informants’ perceptions, imaginaries, myths, dreams, and cosmogonies. What matters most is to try to understand and grasp their meaning and symbolism. Thus, semi-structured interviews were used to inform our interview matrix (Table 1).

Informant's metadata	Gender, age domicile, occupation	Men/Women, age: 25–65 years Communauté rurale de Gandiol Fishing/ farmers/ technicians
Hydraulic skills, knowledge and know-how	Missions and roles Perceptions Hydrological knowledge	What are your skills in the hydrological governance of the Senegal River estuary? What are your perceptions of hydroclimatic hazards? Your knowledge of risks?
Actors/Stakeholders, network and relationships	Interactions and participation Legitimacy and power Collaborative instruments and dialogues	What are your relations with institutional and community actors and civil society? What are the obstacles? Existing frameworks for dialogue and sharing
Imaginations and collaborative perspectives	Dialogical spaces Hydraulic knowledge to be updated Scientific/ vernacular knowledge	What ideas do you have for improving existing dialogue/participation frameworks? What hydraulic knowledge would you like to update and put at the service of communities? The links between scientific and vernacular knowledge?

Table 1. The interview matrix sample (Ba, 2020).

To enhance this material, we conducted focus groups. Focus groups are open discussions that take place along a series of powerful questions addressed to respondents. The aim is to stimulate interaction between participants (Kitzinger, 1994). Unlike semi-structured interviews, it helps enhance the expression of ideas within a community. Communication between the informants who take part in the focus group is the heart of social representations. “We think with our mouths” said Moscovici (1984). The manufacture of ideas, beliefs and opinions lies in communication. In order to organise focus groups, we were inspired by Moscovici’s analysis grid and we adapted it to the cultural and traditional realities of our study area. We thus seized an opportune moment in the rural environment to bring citizens together (a baptism within a village community surveyed, for example).

<sup>7</sup> It can be defined as ‘a sociological analysis that makes it possible to understand the opinion mechanisms, to understand why people think such-and-such a thing, why they allow themselves or not to carry out a given practice, and how they understand their environment’ (Wahlich, 2006).

Semi-structured interviews and focus groups targeted mainly public services, village communities, local authorities and an NGO. Eventually, we interviewed 53 individuals (semi-structured interviews and focus groups) on two field missions in the Saint-Louis region during eight months of residence between 2015 and 2017.

Finally, we opted to transcribe all interviews. To protect informants, we made interviewees anonymous by creating fictitious first names (men and women). On the other hand, the structures identified, as well as the informants' profiles, are not made anonymous. The data collected in the field are cross-referenced with stylized hydroclimatic, socio-economic, historical and political facts that continue to shape the landscape of the Senegal River estuary.

## Setting the scene: Saint-Louis in its socio-ecosystem

The city of Saint-Louis—as a former political capital, a remarkable site listed as a World Heritage Site (since 2000) and the region's main settlement centre—proves to be particularly exposed to a number of hazards. These are partly inherited from a singular geophysical position, but also produced by a development trajectory that is not quite sustainable. We propose to revisit this process of “accumulation of hydraulic risks” by deploying a multi-scale analysis (from the estuarine region to Gandiol) in order to put into perspective the diversity of issues that question its development.

### The Senegal River estuary: Geophysical characteristics

The Senegal River is one of the major socio-ecosystems on West Africa's Atlantic coast. It descends from the Fouta Djalon sandstone massifs and then crosses the Mandingo plateau. It is the result of the confluence of two mother branches (the Bafing and the Bakoye) at Bafoulabé. From Bafoulabé, the Senegal River flows northeast through Kayes. Over 1,700 km long, it drains a 290,000-km<sup>2</sup> watershed in the territories of Senegal (21,000 km<sup>2</sup>), Mali (155,000 km<sup>2</sup>), Guinea (31,000 km<sup>2</sup>) and Mauritania (75,000 km<sup>2</sup>) (Figure 1).



Figure 1. The geographical space of the Senegal River

The Senegal River estuary is confined to a small area between the Diama dam and the Langue de Barbarie sandbar. Before the Diama dam was impounded (1986), the saline rise was noticeable, during low-water periods, as far as Podor, about 300 km from the mouth.

The Senegal estuary is limited today, upstream, by the Diama anti-salt dam, provided its gates remain closed; and downstream, by its mouth, an outlet through which marine waters flow back into the river. The Senegal River estuary belongs to the category of microtidal lagoon estuaries closed by a sandy spit. The Langue de Barbarie is oriented north-south and stretches for nearly 40 km over a width varying from 200 to 400 m. The swell plays a fundamental role in the coastline's morphology. The Senegalese-Mauritanian coastline, as far as the Cape Verde peninsula, is classified as a high-energy swell coast. North-western swells provide a significant sand transport that contributes to the propagation of the Langue de Barbarie (Figure 3).

Natural breaks in the barrier beach have marked the evolution of the Langue de Barbarie (LB) from 1850 until recently, with 24 breaks between 1850 and 1980 (Sall, 2006). At that time, it seems to go along a cycle evaluated at between 11 and 14 years. The most important breaches since 1900 (1906, 1923, 1936, 1948, 1959 and 1973) have always occurred south of the city of Saint-Louis (Diop, 2004). They have kept the river mouth very distinctly south of the city for more than half a century and had an important role in the risk of flooding. For a time, they could mitigate the impact of floods on the city by encouraging a more rapid evacuation of the river water towards the ocean until the breach was closed (by the combined contributions of the littoral drift and the river) and the southward progression resumed. No natural rupture has occurred since 1973. This can be explained by a combination of two factors: i) an absence of major floods between the 1950s and 1990s, associated with a "climatic downturn"; ii) a reduction in the "flushing effect" of floods since the construction of the Diama dam in 1986, which allows for some regulation of flows (Kane, 2002; Sy et al., 2013; Ba, 2013). The artificial opening of the Langue de Barbarie in 2003 in response to a critical hydraulic situation (repeated flooding) is a singular event that needs to be understood in all its complexity in order to grasp its possible "disruptive" potential.

### The opening of the Saint-Louis breach in 2003

Saint-Louis is located on the northern coast of Senegal (the Grande-Côte), 400 km north of Dakar. Its activities are based on fishing and tourism. The attractiveness of its beaches and its rich colonial past make it one of the country's main tourist centres. However, its site has strong constraints. Saint-Louis has developed in an environment deeply marked by water: built on an island that barely emerges above the water level in the middle of the river, it appears particularly vulnerable. The return of the floods at the end of the twentieth century was to be a cruel reminder of this.

After the great October 1999 flood, the winter of 2003 was marked by another major flood, linked to high rainfall in the Senegal basin (Mietton & Dumas, 2006; Durand et al., 2010). This heavy rainfall led to a first wave of flooding at the beginning of August, but this was capped by the Diama dam (which temporarily protected Saint-Louis from flooding). However, as the heavy rainfall persisted throughout the catchment area, the water remained at a high level for the following days. The flooding threshold at Saint-Louis (1.2 m) was exceeded from September 8 onwards and the water gradually rose over the following days, reaching 1.35 m on September 28 and remaining at 1.33 m until October 4. The result was very heavy flooding, both in the modern city and on the eastern bank of the river as well as in the colonial city. In the latter, the water is spreading from the lowest areas in the north and east of the island. Even more worrying: the rise in the water level could lead to the natural opening of a breach at the root of the Langue de Barbarie (Sy, 2006), 5 km north of the city, which would threaten all the neighbourhoods located immediately to the south.

In a context of increasing pressure from the population, exasperated by the repetition of floods in previous years and by the continuance of high-water levels for more than a month, local authorities decided to act as quickly as possible (Diop, 2004).

On 1 October 2003, the Saint-Louis municipality warned the national authorities and the Direction de l'Aménagement Hydraulique managers of the extent of the present and future flooding in the city. It asked for an emergency measure to be taken to lower the water level. After a brief field survey, an artificial 4 m wide and 1.5 m deep breach was created on October 3 in the Langue de Barbarie, 7 km south of the Faidherbe Bridge, where the spit was thinnest, reaching a width of about 100 metres (Kane, 2002; Ba, 2013; Sy, 2015).



Figure 2. Gandiol: a hazard-prone territory

The various works carried out in this sector have shown that the breach very quickly played the role assigned to it. In the space of 48 hours, the river's level dropped by nearly 0.50 m, falling back below the 1 m level, and it then gradually decreased by a further 0.40 m within about ten days. At the same time, the breach widened. Its width increased from 4 m on October 3 to 80 m by the 5th and 330 m, less than three weeks later. In the months that followed, stronger swells during the dry season increased the erosion on the southern shore. Eight months after its opening, the width of the breach finally reached almost 800 m. It is now more than 5 km wide (Ndour et al., 2018).

The contingency political decision thus taken has profoundly modified the hydrological sensitivity of urbanised areas to flooding has been established. The sedimentary input in the estuaries is generally not sufficient to compensate for the rise in sea level, except in areas where sediments can be deposited freely (unmanaged coastal mudflats) (Paskoff, 2006). Moreover, since its opening, the breach has still not stabilised, with a dynamic combining widening and overall southward movement towards Gandiol, where the village of Doun Baba Dièye had already been erased in 2010. Other localities further south are therefore exposed. The various issues facing the indigenous populations concerned are presented here.

### Indigenous populations at risk: The case of Gandiol

Gandiol is located in the extreme north of the Niayes, about ten kilometres from Saint-Louis. Occupying the dead arm banks, it benefits from the last few kilometres of the Senegal River. The name Gandiol comes from the Wolof vocabulary “Gaayi Ndiol”, which literally means “the Ndiol guys” in French. The origin of the word confirms that the first residents were Wolofs. The Wolofs are the majority, with 65% of the population, followed by the Peulhs, with about 25% and finally the Moors, with 10%. There are also other ethnic groups working seasonally in the area. These are the “Sourgas” who come mainly from neighbouring countries: Gambia, Mali, Guinea Bissau, etc. This settlement was facilitated by favourable environmental conditions. According to the administrative census carried out by the former rural council, the Ndiébène Gandiol commune has a total of about 20,000 inhabitants, or a density of 106 inhabitants per square kilometre. Today, most of the population is concentrated in the west.

Hydrologically, the Gandiol is a straight channel, bordered on the right bank by the Barbarie dune belt and on the left bank by a rather diffuse lagoons network, which constitute ancient fossilised mangrove landscapes. From a pedological point of view, a quaternary sandy material covers most of the Senegalese territory (a succession of dunes of different ages, textures and colours). Climatically, rainfall is brought by the monsoon flow from the south, which comes from the St Helena anticyclone. It is not very abundant and rarely exceeds 350 mm/year. The evolution of the population and the area is explained by the proximity of the depressions, which allow for agricultural practices (market gardening), but also by its openness to the river and the Atlantic Ocean, favouring the development of fishing activities.

The Gandiol region therefore appears to be a strategic economic and environmental zone: the market gardening, fishing and tourism sectors are increasingly dependent on climatic and geophysical conditions and need to be rethought in order to foster sustainable transitions (Sall, 2006). This region's development potential was impacted by the opening of the Langue de Barbarie breach in 2003. While the northern bank of the breach, which is currently undergoing natural reconstruction, appears to be the main equilibrium pole in the Langue de Barbarie, the situation is more problematic in the south. In the southern part, the breach continues its migration towards its pre-2003 position, naturally in the direction of the littoral drift. This migration is superimposed on a widening of the mouth caused by faster erosion (south) against slower sedimentation (north). This southern movement is accompanied by collateral damage (erosion, salinisation, etc.) and is dooming some of the houses in certain localities such as Pilote Barre and Tassinière to disappear. These potential threats justify fine-tuning measures to calibrate adaptive policies in order to secure the potentially impacted populations (Sy, 2015). Before considering what forms these policies might take, let us return to the institutional environment that frames public authorities' action and is likely to inform us about the resilience capacities and/or the blocking points (locks) of the governance stakeholders of the various systems affected.

### Framing the scene: Public action through the prism of a failing institutional environment

The socio-political dynamics that have accompanied the development of Senegal's institutional framework since the country's independence in 1960 have been widely documented (Piveteau, 2005; Diop, 2006; Touré, 2012). Renewing our multi-scale analysis, we return to the socio-political and economic characteristics of the Senegalese state's development trajectory, before outlining the stylised contemporary facts specific to Saint-Louis region and city. The institutional dynamics thereby outlined make it possible to understand why the opening of the breach in 2003 did not constitute a "disruptive event" (Dill & Pelling, 2010) capable of changing the estuary's governance and overcoming the rampant inertia. In the light of a more generic history of Senegalese institutions, we introduce a few factual elements by organising them by scalar issue (from national to local) before proposing a heuristic synthesis borrowing from the relational risk structuring approach (Brown et al., 2018)<sup>8</sup>.

### Slow socio-political dynamics

A brief description of the political and economic regulatory modes deployed after decolonisation highlights the consolidation of a bureaucracy based on a logic of social and political pacification to the detriment of economic performance (Diop, 2006). Emphasis is thus placed on the management of Léopold Sédar Senghor's legacy by his successors and on the importance of structural adjustment programmes in the administration of central public institutions (Piveteau, 2005). By reinforcing the regime's dependence on the outside world, these programmes exacerbated social tensions. In particular, they deteriorated the lowest and middle classes' incomes. As a result, political and trade union struggles intensified during the 1990s and, at the same time, the regime faced increasing difficulties in gaining the support of the confreres. Despite the implementation of sophisticated

<sup>8</sup> In order to understand the notional and conceptual foundations of the proposed approach, it is useful to refer directly to the article concerned: here we have an "instrumental" use aimed at illustrating the data and information collected in a synthetic manner.

political procedures and experienced personnel, the central power gradually lost control of the political and economic situation (electoral defeat in March 2000). The episode of 2003 therefore occurred within a new era.

The question asked after the changeover was whether the new leaders gathered around Abdoulaye Wade would—or would not—break with the mode of government that had characterised Senegal from Senghor to Abdou Diouf. The answer proposed by some observers suggests a continuity in the approach of the three Senegalese presidents marked by the following features: a predominant presidential power thanks to political and administrative centralisation, a clientelist logic, the co-option of political personalities likely to reinforce the presidential leadership, and a constant concern to promote the President's image on the international scene because of the regime's strong dependence on external resources (Diop, 2006). On the economic front, the central government inherited a relatively healthier macroeconomic framework than in the early 1990s. With the increase in state tax revenues, the Bretton Woods institutions no longer have any reason to maintain one of the measures of the structural adjustment programmes under Abdou Diouf: strict control of the wage bill. The ruling class thus proceeded to significant recruitments and granted salary increases and significant benefits. However, this redistribution has remained selective.

These general characteristics, which can be found in particular in regulation and environmental governance mechanisms (see Table 2, Boxes A and B), make it possible to understand why the institutional context and the configuration of powers in the early 2000s did not prepare for “adaptive” development at the macroeconomic level: protagonists were not able to specify relevant climate disaster policies despite the importance and imminence of the risks at stake. Let us then move down one level and see to what extent the Senegalese state has engaged in a process of decentralisation and what effects the reforms undertaken in regional and local governance have produced.

### Public action and local development: Persistent institutional fragmentation

In Senegal, the decentralisation policy inaugurated in 1960 has been severely tested by the state's inhibiting logic, despite the rich pre-colonial experience that has been gained. Indeed, as Ibrahima Touré has noted, “the decentralisation policy is not new; it has an endogenous history that is very often omitted by researchers in the social, legal and political sciences when they approach the analysis of the political and administrative system of the Senegalese State” (Touré, 2012)<sup>9</sup>. The decentralisation policy reached rural areas in 1972 and promoted setting up rural communities through administrative, territorial and local reforms. The creation of the regions occurred in 1996, with the adoption of the Code of Local Authorities and the transfer of powers to local councils.

However, the effects of these reforms have proved to be limited: the helpless administrative capacity of local institutions and their conflicting relations with the state are evidence of the state's constant control over territorial public management (Piveteau, 2005).

As Touré has revealed, for example:

In many local authorities, the State influences the deliberations of local councils and exercises a number of powers, even when they have been transferred. It is true that the Senegalese State has implemented many projects and programmes of national scope but, however large the allocations, the evaluation shows that the progress made in terms of transferring resources has been scant overall. (Touré, 2011, p. 810)

A realistic analysis of the situation of local finances also suggests that Senegalese local authorities' budgets are woefully poor. The environmental protection and natural hazards sector is a perfect example of this (see Table 2, Box D).

<sup>9</sup> “In its autonomy and delegation principles, it was already being experimented with in Senegambian socio-political institutions (Baol, Saloum, Waalo, Djoloff, Cayor) which, for geographical, technological and political reasons, had to resort to such a policy (Gastelu, 1976; Barry, 1988; Diaouné, 2007). In their development, these decentralising practices were enriched during the colonial period by a new experience with the introduction of communalisation in four of the country's coastal towns (Johnson, 1971)”, recalls Touré (2012, p. 810).



However, the pitfalls mentioned above do not mean that states' many internal efforts to democratise and build development at local level should be underestimated. Little doubt can be cast on the idea that the inaugurated decentralised governments have been important steps towards the emergence of public spaces in Africa. Some gains in participatory democracy are undeniable (Piveteau, 2005). Notwithstanding this, the implementation of a renewed delegation democracy—particularly in the area of environmental protection and natural hazards—has not materialised (Table 2, Boxes C and D). For robust decentralisation and local governance to emerge, it is deemed essential to “overcome the many contradictions that the State still continues to cover up” (Touré, 2012). Thus, even though it was continued in 2016 with an “Act III” aimed at correcting previous dysfunctions (Sene, 2019), the decentralisation exercise in Senegal has not succeeded in generating greater promotion of local freedoms and a context of interaction between protagonists that is favourable to the “productive” confrontation of distinct knowledge and visions (Diop, 2006; Touré, 2012; Sene, 2019). Let us see how this issue is being played out at the local level in Saint-Louis.

### Reproducing unequal dynamics in contemporary urban governance

In local action contexts largely determined by the decentralisation logic, the development of resources has largely been carried out by the “NGO conveyor belt”.

The latter, present since the dawn of decolonisation, originally carried out alternative projects driven by the desire to make colonial domination—which largely denied the colonised their dignity—bearable. After independence, they were inspired by a Third World ideology shared throughout the world (Hours, 2003).

The context of independence thereby favoured their proliferation and the promotion of local development (Fall, 2011).

In terms of environmental protection, they have gradually established collaborations with different regulation levels (see Table 2, Box C).

Today, in the context of local development, Saint-Louis has a more or less dense presence of NGOs. The latter mainly work with the population of small-scale operators (Coly et al., 2018) and aim to improve their financial, managerial and entrepreneurial conditions in a spirit of partnership. However, regardless of their origins and the sectors invested in, the spirit of partnership put forward in NGOs' discourse is slow to materialise in their interventions. Through the financing and capacity-building operations through which they intend to achieve their objectives (Sene, 2019), they are liable to discredit economic actors (organised artisans) and, in so doing, “they subject city actors' efforts to Western-inspired global standards” (Fall, 2011).

Encouraged by Act III of decentralisation to be closer to local actors, NGOs do not necessarily contribute to a better approach to the socio-economic realities that need to be transformed.<sup>10</sup> For some observers, “they continue to envision the socio-economic space in a way that accompanies the reproduction of the patterns that gave rise to the current situations” (Fall, 2011). This author goes on to highlight:

The valorisation of local resources [which] remains guided by a unique way of understanding and making society. Local development is still development, and development, whatever its name, persists in disseminating the norms and practices that account for its perpetual and, so far, futile questioning (Fall, 2011).

The pluralism of norms therefore remains unequal. In the end, with regard to the development policies that shape it (top-down and bottom-up):

[The Saint-Louis region] is not seen as the product of a history requiring [social-ecological] ruptures in the way it is transformed, but remains perceived as having to prolong a history which, until now, has only invalidated and restructured the identities (social, political, economic) of the social groups living there (Fall, 2011).

<sup>10</sup> Fall (2011) explains that “by examining the objective conditions that have installed them, the way they define themselves, apprehend the context to be transformed and deploy themselves, it becomes obvious they are struggling not to keep exile or expatriate perspectives”.

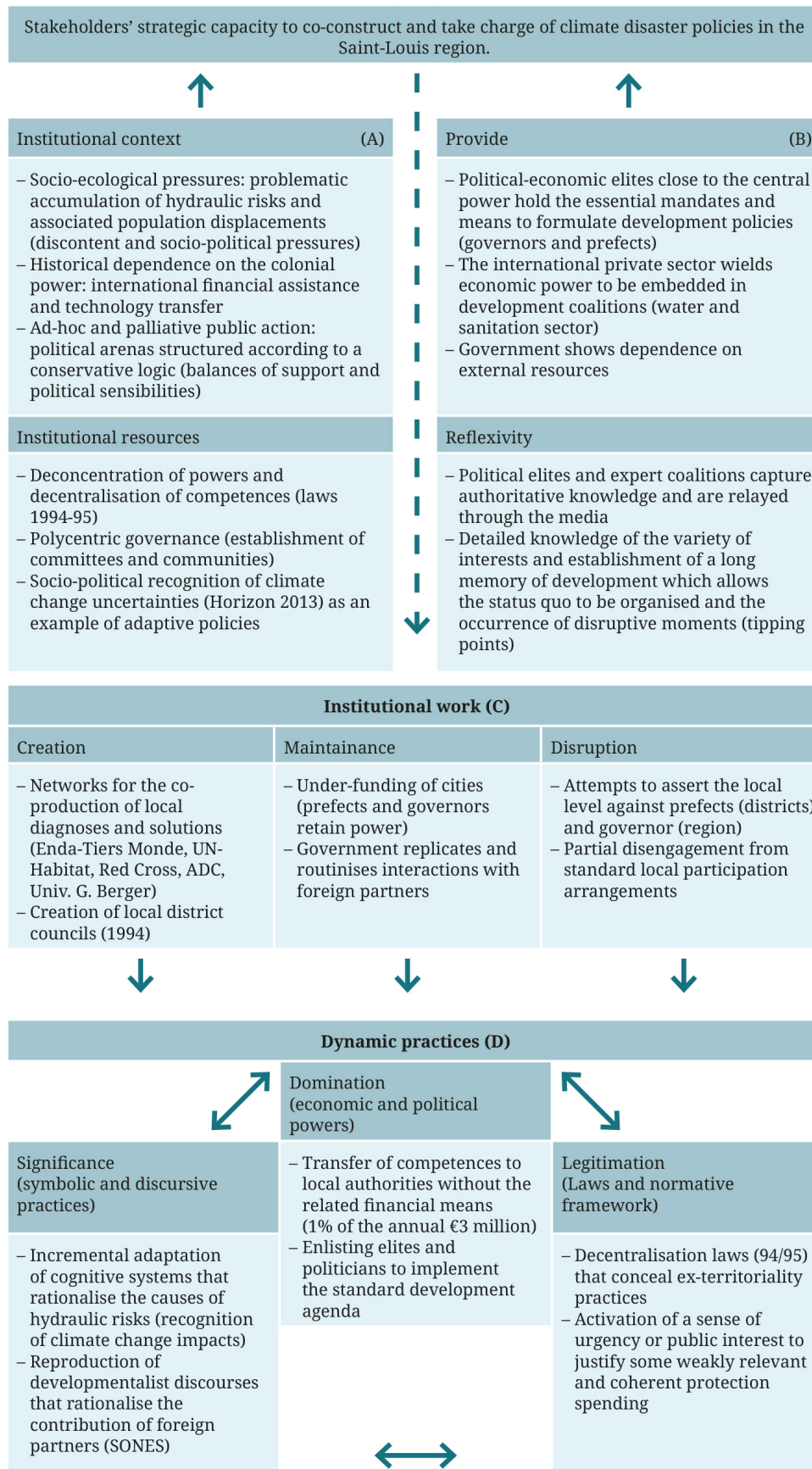


Table 2. Socio-institutional bottlenecks to adaptive policies in the St. Louis region: a synthesis (based on the analytical framework proposed by Brown et al. 2018). (See below, end of article)

By way of synthesis, mobilising an approach in terms of relational structuring, inspired by comparable work carried out by R. Brown et al. (2018) on the Asian continent, may prove useful. It shows that the co-construction of a strategic capacity to specify relevant and coherent climate disaster policies in the Saint-Louis region comes up against conservative dynamic practices: the latter contribute to reducing the transformative power of the “institutional work” (R. Brown et al., 2018) undertaken at the local level and to reinforcing the institutional structuring and power configuration in place at higher scales (see Table 1, boxes C and D). The relationship with “expert” knowledge and power, particularly in the specification of adaptive planning in the face of climate change, thus remains paramount and becomes problematic insofar as it participates in the reproduction of a decision-making system characterised by glaring “maladjustment” (Magnan et al., 2016).

Working towards a political ecology of knowledge that would participate in unlocking this system and open the way to alternatives based on the recognition/valorisation of indigenous practical knowledge therefore has to be an essential step. This would make it possible to inform sustainable transitions capable of altering the Saint-Louis region’s historical development trajectory. In our view, such a socio-political dynamic requires the re-emergence of a “near” (Guyer, 2007) and “indigenised” (White, 2017) future through the productive confrontation of local protagonists’ plurality of knowledge.

## Rebuilding the scene: Political ecology of knowledge, pluriversalism and the sustainable near future

Occurring during a socio-political sequence that prolonged the untransformative practices of a political class traditionally cut off from the local, the “crisis” caused by the opening of an artificial breach did not constitute a “tipping point” in the way of conducting sustainable “disaster politics” in the Saint-Louis urban territory (Dill & Pelling, 2010). Thus, despite the disastrous effects produced by the 2003 public intervention, institutional responses do not seek to re-found a still highly hierarchical “pluralism of norms”. Informed by a political ecology of knowledge that revives the emancipatory force of the “near future” (Guyer, 2007), we return to the implications of a revaluation of “minoritized” (indigenous) knowledge before proceeding to a critical evaluation—i.e. based on the “pluriversalist” logic (Escobar, 2018; Kothari et al., 2019)—of current adaptation policies.

### Setting sail! Reinventing resilience through the valorisation of indigenous knowledge

West Africa in general, and Senegal in particular, have been affected by reform philosophies (decentralisation and governance) since the 1970s and 1980s. As African communities emerged from “chaos” (not “nothingness”), organisational principles ought to have emerged from within the society (not from outside) (Le Roy, 1999). The reforms resulting from these policies have in fact disrupted traditional societies’ functioning instead of consolidating them. The latter have lost their legitimacy in the face of the emerging bureaucratic structures produced by territorial reforms imported from another culture. Highly influenced by the West, development institutions have become the “providential” force organising the original vacuum (Le Roy, September 28). They have thus obstructed the maintenance and development of traditional or vernacular knowledge in African societies (an “overflow” that development policies imported from the West could not recognize).

“Reinventing the future was therefore not self-evident, and such an undertaking required boldness. It was a matter of inventing anew, since the future already seemed a foregone conclusion. Its places and spaces were mapped out, the paths leading to them and the meadows where they could graze were precisely signposted. The ideal image of the future was supposed to be available in Western Europe and North America” (Sarr, 2016).

Today, faced with ecological and climatic challenges, besides the relative failure of adaptation policies (Renou et al., 2020), it is necessary to reinvent collective action strategies in the Senegal River estuary. However, this commitment must avoid the

systematic teleological appropriation of borrowed trajectories that are unsuited to the social, economic and cultural realities of the territory to be reinvented.

To re-direct that unsustainable trajectory of hydrological risk governance in the Senegal River estuary, it is essential to “give birth to forms of its own contemporaneity” (Sarr, 2016). Limiting oneself to the slavish imitation of models developed according to imperatives that deny local realities would risk producing extraversion, i.e. alienation. On the contrary, a political innovation understood and supported by a balanced endogenous dynamic (i.e. mobilising vernacular and modern knowledge jointly) according to a logic of “collective mission” that generates creativity (Bello-Bravo, 2020) will be able to accommodate the universal requirements of freedom and human dignity (Ndoye, 2015).

Such a perspective requires clarity on the notions of “indigenous” and “modern” knowledge. In the 1950s, work in ethnoscience, combined with the findings of Claude Lévi-Strauss (1962), demonstrated that vernacular knowledges is an intellectual construct and cannot be reduced solely to a praxis derived from empirical experience. Indeed, they are developed through the joint mobilisation of very different types of information units derived from experience, abstract reasoning from geometry, physics, biology, etc., philosophical reflections, individual and collective spirituality, beliefs, dreams and emotions. Together, they shape this knowledge (Agrawal, 1995; Collignon, 2005). They are subjective, contextualised as well as plural and refer to the expression of singular cultures. What differentiates them from scientific knowledge is that they are not based on an analytical approach. Even if experimenting is necessary, it will not be a case of looking for the veracity of the elements that make up its experience. Verification is not systemic. Its validity is assessed on the basis of its coherence and effectiveness, not on the accuracy of the units of information that are brought to bear. As they incorporate emotions or dreams in their approaches, it is difficult to theorise about them. Their antonym, scholarly knowledge, is discursive and formalised through theoretical approaches. They aim at objectification, communicability and aspire to universality (Collignon, 2005).

“Setting sails, taking the high road” by revalorising indigenous knowledge is therefore not an easy task: such a process will require, initially, negotiating socio-institutional transitions that respect the non-commensurability of the knowledge at work (indigenous and expert), but that do not exclude the emergence of sustainable solutions from their possible comparison. Bello-Bravo (2020) speaks in this respect of a “collective mission”<sup>11</sup>. Informed by this perspective and drawing conclusions from the failures of previous programmes and reforms in Africa, we propose to analyse how Senegalese experts envisage piloting socio-institutional transitions in the Senegal River estuary and, in particular, in the Gandiol region. The aim is to consider the place and scope of indigenous communities’ knowledge in such a process.

### (Still) alienated territorial strategies: the Gandiol prospective

Sy et al. (2015) proposed two scenarios for the governance of the Gandiol area—subject as it is to an accumulation of hydraulic risks—and they put them into perspective by mobilising different criteria<sup>12</sup>. The impact of the latter is so severe it gives rise to a quantification ranging from 4 (strong) to 1 (weak). It is accepted that the stabilisation scenario will have a strong overall effect on the Langue de Barbarie’s natural balance. The operations that could be implemented would have a low impact on the management of erosion if stabilisation is not accompanied by dredging and actions to protect villages. The cost of such an investment would therefore be quite high in terms of the technical and financial

11 That author (a woman) believes, “successes can be achieved even with quite active mutual misunderstanding. Again, we speak of a collective mission to capture this kind of situation. Under a collective mission, furthermore, we would highlight the co-managerial behavior of dissimilar actors. This behavior operates within the overlap of otherwise non-aligned worldviews and interpretive frameworks intersect and generate a variety of behaviors not otherwise possible. At the case site, this situation resulted in compromises or modifications to behavior by actors that often emerged not out of any shared understanding with respect to the use of the forest but became possible and practicable through the space of an edge.” (2020, p. 9).

12 I) natural balance: indicates the treatment capacity of the technology; II) erosion: indicates the capacity of the technology to reduce erosion; III) vulnerability: refers to those parts of the technology that are most prone to operational problems and where special attention is required by the operator; IV) environmental impacts: summarises each scenario’s expected direct positive as well as negative impacts; V) investment: considers the investment costs of the facilities; VI) recurrent costs: refers to the costs of maintaining and operating the facilities.

logistics required. It also implies recurrent costs related to the maintenance and operation of the recommended works. The natural evolution scenario would have a very low impact on the Langue de Barbarie's balance. However, this option would lead to rapid erosion in the vicinity of the Gandiol villages. It should therefore be accompanied with flexible protection measures (stone barriers on the sides of the beach) and population relocation. The investment linked to the application of such a scenario requires more financially sustainable means.

In view of the negative impacts on the Langue de Barbarie's natural balance and the substantial technical and financial resources required, the scenario of stabilising the breach seems inadvisable. Based on the analysis and evaluation of each scenario's expected effects, the study by Sy et al. (2015) recommends applying the natural evolution scenario: "let the breach evolve naturally" until the Langue de Barbarie regains its equilibrium (see Table 3).

Accompanying this process by designing flexible strategies to minimise the rate of retreat of the barrier beach cliffs is therefore of paramount importance. Recommendations for the application of the natural evolution scenario have been proposed in detail, including the resettlement of those people most at risk (around 200 households, according to initial estimates). This process needs to be "accompanied" by the mobilisation of a variety of stakeholders, including a priori the local communities. For the proper implementation of activities related to the follow-up of the study's recommendations and in order to anticipate the negative impacts of the beach's evolution, "institutional arrangements" are necessary. Thus, it is a matter of "creating an inter-institutional synergy to deal with issues related to technical assistance and the various accompanying measures" (Sy et al., 2015, p. 66). In the context of operational planning, the DEEC (including the Saint-Louis DREEC) is called upon to work in close partnership with the regional services involved in managing the breach.

	Rift/Breach stabilisation scenario	Natural evolution scenario
1.	Technical stabilisation of the northern and southern banks of the breach.	Relocation of the inhabitants to a safety margin.
2.	Technical reinforcement of weak areas on the south bank.	Lateral riprap in line with the villages of Gandiol and revegetation of the freed sites.
3.	Dredging of the river on the Doun Baba Dieye axis – old mouth.	Regular marking of the navigable channel to secure the passage of pirogues/dugouts.
4.	Technical regeneration of the beach by laying geotubes in front of the Gandiol villages.	Continuous monitoring of the hydrosedimentary dynamics in the Gandiol.

Table 3. A comparative analysis of the two scenarios studied (after Sy et al., 2015).

For the sake of "securing" them, nearly 200 particularly vulnerable households are thus expected to be "relocated" under the supervision of a variety of stakeholders, including "indigenous communities". This process, however, seems largely inherited from a planning mindset imbued with 'modern' knowledge (protecting tourism interests), marginalising indigenous knowledge and making of this knowledge holders targets to be 'sensitized', 'informed', 'monitored' etc. All this sounds far-removed from the spirit of the 'collective mission' (Bello-Bravo, 2020). that should generate a form of creativity supposed to confer value to indigenous knowledge alongside "modern" solutions. More generally, the approach outlined seems to be more imbued with a "regulatory pluralism" that considers reality as given and—in an unequal manner—assigns knowledge to the various actors that need to be governed, rather than a "confrontational pluralism" that

acknowledges the inseparability and irreducibility of “knowledge that needs to evolve by mobilizing it jointly in the production of a renewed reality” (Bello-Bravo, 2020). This is what pluriversalism calls for.

### Near future and pluriversalist everyday practices: the binding power of indigenous knowledge

The articulation of the multiplicity of diversified and incommensurable knowledge is mostly thought of in terms of pluralism. Our analysis invites a distancing of this notion—even when it is thought in the advanced form of a “regulatory pluralism” (Papazian & d’Aquino, 2017). Stimulatingly, this perspective, however, continues to be placed within a “pluralism of juxtaposition”<sup>13</sup> that misses inter- and cross-cultural dialogue (Lopez, 2017). To put it succinctly, we need to move from pluralism to pluriversalism<sup>14</sup> (Kothari et al., 2019).

It should be noted, however, that these transitional strategies can only emerge if they confront the power relations inherited from unequal development policies and engage in “ontological political struggles” (Howitt & Suchet-Preston, 2003; Escobar, 2018) relating to the boundaries and constituent entities of reality. This rebalancing of asymmetrical social relations is essential in order to fuel a possible “policy of divides” (“travail politique des écarts”, Jullien, 2018) or “opposites” that can create inseparation and bring about the emergence of new “commons” (Mbembe, 2017).

For such an analytical perspective to be rooted in reality, it is necessary to reflect on temporalities (Kolinjivadi et al., 2020): as many analysts have shown, the neoliberal turn in the late twentieth century was in fact accompanied by an eviction of the near future in favour of a polarisation on the hyper-present and the long-term (Guyer, 2007). In order to emerge from a “temporality of dates” (temporalité de dates) that reinforces regulatory logics based on the recognition of “multiple debts” (Guyer, 2007), it is necessary to reaffirm the unheard of (Jullien, 2018) or buried absences (Santos, 2011; Mbembe, 2017) and to bring about the emergence, through recognizing and consolidating ordinary practices, of a near-future that is likely to spur the deployment of a viable and supportive *en commun*. While we can clearly see the advantages of a potentiating approach that replaces a reifying vision of reality, we need to be more specific about the concrete methods that can be used to re-articulate the arrow of time from the fading past to the near future (Whyte, 2019; Howitt, 2020).

On the basis of the materials collected in our study, it is possible to identify an analytical sequence articulating the recognition of historical depth, the strengthening of systemic coherence and the consolidation of the operative relevance of vernacular knowledge/practices. Indeed, as we have seen, Gandiol is an ancient territory. Unfortunately, the knowledge held for a long time by its inhabitants seems to be only scantily heard. In 2017, an informant—a Gandiol local elected official and resident—recounted:

In 2003, no one asked us about anything. We wanted to get organized before the breach opened in 33 villages around the mouth of the Senegal River. We were thinking about the possibility of flooding some marigots (swamps) that had dried up because of the drought. But the central government, its experts, collaborators (e.g. OMVS) and deconcentrated services (e.g., Direction de l’environnement, Gouvernorat de Saint-Louis and others), at the local level, did not provide a framework for dialogue designed to share knowledge, visions and insights on hydroclimatic hazard management. They do not value our knowledge. Because it is not scientific or rational. We can’t give our opinion, unfortunately. And yet we

13 Thus, as d’Aquino et al (2017) concede at the end of their analysis of land governance in Senegal, such an approach amounts to valuing the notion of “assemblage” (2017, p. 249)

14 The latter put forward this: “A pluriversal world overcomes patriarchal attitudes, racism, casteism, and other forms of discrimination. Here, people re-learn what it means to be a humble part of “nature”, leaving behind narrow anthropocentric notions of progress based on economic growth. While many pluriversal articulations synergize with each other, unlike the universalizing ideology of sustainable development, they cannot be reduced to an overarching policy for administration either by the UN or some other global governance regime, or by regional or state regimes. We envision a world confluence of alternatives, provoking strategies for transition, including small everyday actions, towards a great transformation”. (Khotari et al., 2019, p. 28)

are the most exposed and vulnerable. Secondly, our knowledge is not necessarily scientific, but it certainly is operational. Because we live the situation on a day-to-day basis and we learn by experience.

As part of a doctoral project, we extended this analytical perspective by working with the former inhabitants of an old village in Gandiol. This is the Doun Baba Dièye village community, a village that was destroyed following the construction of the breach in 2003. The knowledge incorporated and transmitted in an intergenerational manner between the “sentinels” of the sea within this community has an operative character that has been increasingly recognized and put into practice. Thus, Baba Dièye Diagne<sup>15</sup> settled on the island that had become French<sup>16</sup>. He was obliged to continue the mission the French had entrusted to his parents: to sound the bar at the mouth and to control the entry of boats. With his knowledge of geomorphology and hydrology, he met the specific needs of this strategic and important mission for the colonial power. His knowledge of the Senegal estuary thus served the colonial authority and was passed on through successive generations. For example, during a field trip, an informant named Birane, a traditional chief in his fifties, said:

We are able to map the sites in the Senegal River estuary that are vulnerable to repeated flooding in Saint- Louis. Once these areas have been identified, we can work with the central government and all the decentralised services to better prepare and articulate the response mechanism against natural hazards, in a context of climate change.

He is one of the successor-heirs’ sons, noted for the robustness of his knowledge. He had informed the authorities that Gandiol people would be in serious danger should a breach in the barrier beach be opened in 2003. Thanks to the experience inherited from his ancestor Baba Dièye Diagne, he knew that the barrier beach served as a bulwark between the swell and the shore of his village, Doun Baba Dièye. He was threatened by the public authorities who would not heed anything he had to say and, when he died, he was replaced by his son, Ameth Sene Diagne. Both of them had accumulated ecological experiences that could (re) fertilize possible—generous and optimistic—imaginaries likely to heal communities’ damaged memories. Ameth Sene Diagne said that the communities, thanks to their practical knowledge, could consolidate the estuary’s barrier beach by accompanying the restoration of the filaos strips on the Langue de Barbarie. That way, the dunes would be fixed and able to protect the coastline against the risk of marine submersion. He also said it was possible to rely on lunar observations to specify the expected sea level and to use the Wolof calendar in order to have an enriched body of observations.

While immersed in the Langue de Barbarie National Park in Saint-Louis, we also talked over tea with eco- guards and a trainee from Dakar University. They said:

We are working on biodiversity protection and water conservation. It is quite possible to formulate adaptive strategies for the protection of living things in the face of the environmental crises that threaten us. Secondly, some animal species naturally organize their ecosystems to cope with climatic hazards and extremes. We are able to identify them and document their adaptation strategies with the authorities and technical partners.

He continued:

It is quite possible to identify and classify the various natural water spillways in the Senegal River estuary. These are necessary to evacuate the river’s overflow during the rainy season. Some of the spillways have even dried up and can be seen. With the support of the relevant local authorities and services, we can set up an atlas of possible Senegal River weirs.

During the colonial governance and after independence, indigenous knowledge—admittedly embedded in relationships of cultural domination—seems to have been recognized and maintained by the French authorities in order to consolidate the fixation

15 A well-known personality in the Gandiol village communities. He worked with the French settlers on the Senegal River estuary. Currently, his grandson is the chief of the village relocated following the opening of the breach in 2003.

16 This territory received the first French settlements, before the French settlers chose the island of Saint-Louis for its strategic position and the security that this city provided against the risks of marine submersion.

of the coastal strip that protected Saint-Louis. The post-colonial period, which has not been cleansed of coloniality in its relationship with the powers and knowledge that have shaped the new configuration of globalisation (the neo-liberal turn), has contributed to their gradual devaluation. “Doing them justice” therefore implies not only recognizing their historical depth and consolidating their systemic coherence, but also making them “cohabit” with other knowledge in order to consolidate the operative dimension of their implementation.<sup>17</sup> Ultimately, it is a case of rethinking new strategies for territorial coordination, oriented towards a shared near future and covering the diversity of hydrological risks accumulated upstream and downstream of the estuary zone (Ba 2019 and 2020). A cosmopolitan perspective (Mignolo 2015) can then be endorsed in order to draw on a diversity of practices and methods that are currently flourishing in a plurality of territories (Howitt and Suchet-Preston 2006; Chen et al. 2018; Whyte et al. 2019; Bello-Bravo 2020).

## Conclusion

In a region hit by an accumulation of hydrological risks (floods, droughts, marine submersions, erosive beach crises) in the face of which the “politics of disaster” (Dill & Pelling, 2010) have not succeeded in specifying adaptive actions capable of altering the inherited development trajectory, decolonizing the environmental imaginaries carried by the plurality of the protagonists involved is obviously necessary. In concrete terms, it is a matter of piloting the slow emergence of a “collaborative mission” capable of organizing the “cross-fertilization” of a plurality of knowledge (codified knowledge and wisdom, oral narratives, myths, popular wisdom...) and of welcoming new knowledge. Theoretically, this implies a shift from a “reifying” conception of reality based on objectifying knowledge and assigning positions towards a “potentializing” vision. The latter must make it possible to organize practically the confrontation of plural knowledge populating the actual as well as the negotiation of the respective positions of the stakeholders involved in the co-production of adaptive scenes. It is therefore a matter of working together on a “political work of the gaps” (*travail politique des écarts*) to secure a trajectory towards communalising the lived territories (Jullien, 2018; Renou, 2019).

In order to link the “ending past” and the “near future” and thus work towards a reappropriation of their future by a plurality of protagonists, we therefore argue in favour of a political ecology of knowledge that starts from the principle of the equal condition of different forms of knowledge and ways of acquiring knowledge. Acting on their incommensurability, it is a matter of framing them in an ecology in which they interact, confront, complement and, in fine, nourish each other (Sarr, 2017). Our study thus invites us to ecologise (green) “absences and emergences” (Santos, 2011) in order to change the practices of the dominant coalition (experts and political powers) and to work towards a rebalancing of the social relations and power struggles that constitute them.

Such a perspective calls for a critical and creative rethinking of the Saint-Louis region’s development trajectory (Sarr, 2017). More specifically, it seems to us that the advent of self-determination practices based on a political ecology of knowledge (Forsyth & Evans, 2013) is likely to make future socio-institutional transitions “governable” (Brown et al., 2018; Renou, 2019). Localized experiences already help understand how to progressively leave a dissipative system—in the sense that the external resources it needs to survive are not capitalized in the process of the territory’s local reproduction—to operationalize an inclusive territoriality based on a near and indigenized future (Bertoncin et al., 2009). While the horizon for action is thereby being outlined, the emerging paths are also paved with obstacles of various kinds (technical-economic, political-institutional, socio-cultural, etc.). It is therefore appropriate to re-emphasize the first step to be taken in order to “do justice to what is” (Chaniel, 2016): recognizing, caring for and maintaining, through practice, the vernacular knowledge “communalising” vital environments by and for sustainable communities (Seck, 2017; Gibson-Graham et al., 2016).

<sup>17</sup> The development of strategies to revitalise irrigated farming in the Senegal River Delta has historically required institutional support from the Société nationale d’aménagement et d’exploitation des terres du delta (SAED). Due to the collaboration difficulties between SAED and the small-scale producers with alternative knowledge and practices, the latter were obliged to find other solutions such as the formation of ASESCAW. This powerful farmers’ NGO has now become a key player in the Delta.



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