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Tides of Change: Fisheries in Casamance Amid Global Forces Institutional Change in Artisanal Fishery Commons and Its Implications for Food Security in Basse Casamance, Senegal

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Abstract

This article examines the artisanal fisheries of the Basse Casamance region in southern Senegal and investigates how changing governance arrangements shape their capacity to sustain local food security under conditions of socio-ecological change. These fisheries face mounting pressures from climate change, global market integration, shifting governance regimes, and emigration, while also undergoing profound institutional and socio-ecological transformations. Based on three months of ethnographic fieldwork, including participant observation and semi-structured interviews, the study traces the historical evolution of fisheries governance from precolonial common-property arrangements through colonial and postcolonial interventions to contemporary challenges such as industrial overfishing and environmental degradation. The analysis combines theoretical perspectives from New Institutionalism, Political Ecology, and Common-Property Theory to illuminate how local fisheries governance operates within a context of institutional pluralism and external pressures. The findings demonstrate that inland fisheries remain embedded in communal responsibility, local rulemaking, and ecological stewardship, but are increasingly strained by state regulation, market integration, and demographic shifts. Nevertheless, local actors sustain resilience by negotiating institutions and diversifying livelihoods. These adaptive strategies not only mitigate external pressures but also reinforce the role of fisheries as a cornerstone of local food security. By highlighting the resilience of artisanal fisheries as locally grounded governance systems, this study contributes to broader debates on sustainability, food security, and institutional change in West African fisheries. It underscores the need to recognize the enduring importance of community-based governance in managing common-pool resources under conditions of globalization and environmental uncertainty.

Keywords: fisheries; Casamance; Senegal; food security; commons; anthropology; New Institutionalism; Political Ecology; coping strategies; resilience



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1. Introduction

Fisheries in the Basse Casamance region of southern Senegal have long been central to local livelihoods and food security, yet they have undergone fundamental transformations over time. This study examines these changes, situating them in a context marked by complex ecological, social, and political dynamics. Tracing developments from the precolonial period to the present, the research explores how fishing practices and systems of resource governance have evolved in response to both external pressures and internal shifts. Throughout history, Casamance's fisheries have been shaped by changing access

regimes, shifting authority structures, and the involvement of diverse actors. In earlier times, the management of aquatic resources was primarily organized through local customary institutions and common-property arrangements. These were embedded in animistic ontologies that recognized the more-than-human world, spiritual beings, and ancestors as part of the commons, establishing norms governing who could fish where and how specific resources were utilized. The colonial period brought disruption and new forms of regulation, introducing state-driven governance and integrating the region into wider economic and political structures as ownership of fisheries was transferred from common property to state property. In recent decades, the fishery governance has grown more complex, involving a multiplicity of stakeholders, including national government entities, NGOs, local authorities, and transnational fishing enterprises. The interplay of these actors has resulted in a hybrid and often contested system of governance in an institutional pluralism setting, combining precolonial rules, formal state policies, and international influences. Another crucial factor in the transformation of local fisheries is the depletion of aquatic resources. Overfishing by foreign industrial fleets in the Atlantic has significantly reduced fish stocks, a situation exacerbated by the effects of climate change. These external pressures are compounded by internal developments such as the increasing emigration of young men, which reconfigures community structures and labor availability within fisheries. The sector is further divided along ecological and institutional lines: while coastal and marine fisheries tend to be governed and commercially exploited at the national or international level, the inland fisheries of the Casamance region are more firmly embedded in local livelihoods and systems. Here, precolonial fishing practices not only support food provision but are closely linked to rice cultivation, reflecting how fishing is socially and ecologically embedded in broader livelihoods and land-use systems. Institutional change is a central theme, as the governance of fisheries has shifted from systems of common property toward state regulation and in some instances de facto open access systems. These processes do not occur uniformly, instead resulting in hybrid governance forms that reflect ongoing negotiations between state authorities, local norms and institutions, and external interventions. In the face of decreasing resource availability and shifting institutional settings, local communities have developed various strategies to adapt and maintain food security. Issues such as environmental conservation, sustainable resource management, and resilience are critically assessed, highlighting the continued importance of artisanal fisheries for food security. This paper contributes to the literature by demonstrating that institutional change unfolds differently in inland and marine fisheries. While marine fisheries are increasingly shaped by national and transnational actors, leaving local fishers with limited influence over governance, inland fisheries remain characterized by locally negotiated institutions in which communities retain greater bargaining power and capacity to shape resource management. This comparison highlights how actors' adaptive strategies and agency vary according to their position within changing power relations.

The specific research context of Basse Casamance (see Figure 1), located in southwestern Senegal, is geographically defined by the Casamance River estuary and a network of tidal water channels known as *bolongs*, lined with extensive mangrove forests crucial for local ecosystems and livelihoods [1]. Casamance receives the most rainfall in Senegal, with lush, tropical landscapes and abundant water resources that underpin both rice cultivation and artisanal fisheries [2]. The Diola (also written Jola or Joola) are the largest ethnic group in Basse Casamance, particularly around Ziguinchor and the coastal areas [1]. Other groups include the Mandinka in inland areas and the Peul (Fulani), who are primarily pastoralists [3]. Unlike northern Senegal, where the Wolof are the majority, the Wolof population in Casamance is relatively small. Accordingly, Diola is the predominant language, although Wolof and French are also widely spoken [3]. Religiously, the region differs from most of

Senegal in that Christianity is more widespread, especially among the Diola, alongside long-standing animist practices [4]. The category “Diola” should be understood as a fluid and internally diverse identity rather than a homogeneous cultural group. Anthropological research emphasizes that ethnic boundaries are historically contingent and continuously shaped by social and political processes. Likewise, notions of “traditional” or “precolonial” practices often reflect contemporary interpretations influenced by colonial legacies. Politically, Casamance has been shaped by a long-running separatist conflict led by the Movement of Democratic Forces of Casamance (MFDC), rooted in grievances over regional marginalization and affecting governance and everyday life since the early 1980s [5]. Economically, Basse Casamance remains oriented towards the primary sector. Wet rice agriculture in tidal wetlands and artisanal fishing continue to form the backbone of subsistence, supplemented by the cultivation of diverse crops [1,6]. The lack of industrialization and limited commercial processing reinforce strong dependencies on natural resources.



Figure 1. Map of Research Area.

The field research for this study mainly included participant observation, informal conversations, and semi-structured interviews in several coastal and inland villages. This ethnographic approach enabled a nuanced engagement with local actors and practices, revealing both the everyday realities and the broader institutional transformations shaping fisheries and food security. Conducted within the framework of the interdisciplinary SNSF Sinergia project “Foodways in West Africa”, this paper draws on concepts from institutional theory, political ecology, and resilience studies. It thereby aims to illuminate how the transformation of fisheries in Basse Casamance not only shapes local food systems but also reflects deeper socio-ecological and political-economic processes, offering new perspectives on local adaptive responses and the sustainability of rural livelihoods in West Africa. It contributes to discussions on food security and resilience in a region affected by processes of commons grabbing in fisheries, which undermine local food security and livelihood resilience, while highlighting the strategies through which local communities adapt and sustain resilience.

2. Theoretical Framework

The study views fisheries in Casamance not only as an economic sector but as integral to local identities and social structures. It highlights the overlooked role of precolonial commons and examines the interplay between communities, institutions, and resource use. Drawing on Commons Theory, New Institutionalism, Political Ecology, and concepts of resilience and food security—integrated in the NIPE approach—this study analyses power relations, ecological change, and coping strategies, contributing to debates on sustainable fisheries management in West Africa.

2.1. Common-Pool Resources

The concept of common-pool resources (CPRs) is central in economic and ecological anthropology for understanding the sustainable management of collectively used natural resources. Defined by high subtractability and difficulties of exclusion [7,8], CPRs require distinguishing between resource systems (e.g., fish stocks) and resource units (e.g., fish), as overharvesting the latter can deplete the former [8]. While CPRs share ecological features, they can be governed under diverse property regimes: private, state, communal, or open access [9]. Fisheries exemplify CPRs, where one fisher's catch reduces availability for others and exclusion is difficult.

In his influential essay "The Tragedy of the Commons" [10], Hardin argued that unregulated use leads inevitably to overexploitation. However, his model conflated CPRs with open-access systems, ignoring the possibility of self-organization. This perspective informed policies emphasizing privatization or centralized regulation [8]. Subsequent empirical studies demonstrated that communities often develop effective governance systems, distinguishing between CPRs as resource types and common property as a property rights regime [7]. Ostrom (1990, 2002) showed that robust CPR institutions share design principles such as clear boundaries, context-specific rules, participatory rulemaking, monitoring, sanctions, conflict resolution, and recognition by external authorities [8,11–13]. Factors such as communication, cooperation, group size, and social capital shape outcomes [13], while state interventions and market forces may either support or undermine local regimes [14]. Precolonial African communal systems played vital roles in resilience and subsistence, embedding institutions in cultural practices and social cohesion [15]. Similar dynamics persist globally, where customary ownership supports resilience and adaptive strategies [16].

Processes of commons grabbing, driven by colonial legacies, state appropriation, privatization, and neoliberal policies, have displaced communal institutions and redirected resources toward market-oriented production [17,18]. These shifts also contribute to processes of resilience grabbing, as dispossession undermines communities' ability to cope with crises, eroding social capital and disproportionately affecting women and minorities [17,18]. The concept of "constitutionality" emphasizes bottom-up rulemaking in which local actors create legitimate institutions that incorporate marginalized voices, contrasting with top-down "environmentality" [19,20]. In Casamance, artisanal fisheries are shaped by institutional pluralism: state ownership and licensing coexist with customary systems rooted in ritual and cosmology [21]. Here, the notion of "care for the commons" [22] highlights the cultural and relational dimensions of fisheries management, raising key questions about how local communities adapt, maintain resilience, and resist external pressures.

2.2. New Institutionalism

New Institutional Economics (NIE) provides an analytical framework for understanding institutional arrangements and their impact on fisheries in Casamance. Unlike neoclassical economics, which largely ignored institutions, NIE highlights their central role in shaping economic behavior and outcomes, drawing on economics, law, anthropology, sociology, and political science [23,24]. At its core are key concepts such as transaction costs—the costs of initiating, conducting, and enforcing exchanges [23]—and property rights, which influence incentives for sustainable resource use [25]. Institutions, defined as formal and informal rules and enforcement mechanisms, reduce uncertainty and structure human interaction, but outcomes are also shaped by bargaining power, meaning that dominant actors often design institutions in their favor [25]. NIE relies on methodological individualism, assuming that self-interested, rational actors—albeit bounded by limited information and capacities—drive institutional dynamics [26]. Institutional change results from aggregated individual decisions within given constraints, influenced by shifts in

relative prices, political and economic contexts, or technological developments that alter transaction costs [23,24]. Old institutions may persist in modified forms, with actors strategically drawing on multiple frameworks such as state laws or customary norms depending on context [26]. Ensminger's (1992) model integrates economic and anthropological perspectives, showing how exogenous factors (environment, population, technology) reshape relative prices, which in turn affect bargaining power, organization, ideology, and institutions in mutually reinforcing ways [27]. Power and ideology are particularly important for explaining who benefits from institutional change and how distributional effects shape behavior [27].

Applied to Casamance, NIE highlights the institutional pluralism created by the coexistence of precolonial customary institutions and formal state regulation. Historically, fisheries were managed through locally embedded rules adapted to ecological and social contexts. Today, commercialization, climate change, state licensing, and global market forces have introduced new pressures, altering property rights regimes and transaction costs. The interplay between competing frameworks raises questions about power relations, equity, and sustainability in fisheries governance.

NIE thus complements Common Property Theory in examining resource management. From this perspective, three approaches to commons governance can be distinguished: (1) decentralization of governance and property rights combined with participatory management, (2) internalization of state and global environmental practices ("environmentality"), and (3) bottom-up institution building ("constitutionality") [19]. Analyzing fisheries through NIE allows for a deeper understanding of how local practices interact with broader political and economic forces, and how bargaining power and institutional change shape sustainability outcomes in Casamance.

2.3. Political Ecology

Political Ecology (PE) is an interdisciplinary approach that integrates natural and social sciences to analyze environmental problems such as overfishing, deforestation, or biodiversity loss, situating them within broader social and political contexts [21]. It focuses on the motivations and organization of actors, their relationships, and the unequal distribution of power and resources that drive environmental change. Neo-Marxist perspectives highlight capitalist exploitation, commodification, and class-based inequalities, while poststructuralist approaches, influenced by Foucault and Escobar, analyze how discourses, ideologies, and institutions regulate people through governmentality [21]. PE conceptualizes power in three interrelated dimensions: structural power, rooted in economic inequalities of capitalist systems; discursive power, which examines how knowledge and narratives legitimize governance forms; and ontological power, which emphasizes alternative worldviews and cosmologies, challenging dominant Western understandings of nature [21]. This triadic framework opens space for plural models of sustainability. Central to PE is the concept of marginality, both ecological and socio-economic, as marginalized groups are often displaced into fragile environments due to colonial and capitalist expansion [28]. PE thus foregrounds ecological distributional conflicts over access to and control of resources, frequently involving struggles between local communities and transnational actors [29]. Development discourses often depoliticize resource struggles, framing them as technical challenges ("Anti-Politics Machine") [28,30]. In fisheries management, this can obscure power asymmetries and delegitimize local ecological knowledge.

Applied to Casamance, PE highlights the interplay of historical legacies, peripheral economic development, and capitalist expansion in shaping fisheries. It allows for analysis across scales, from households and villages to global institutions [28], while foregrounding conflicts between artisanal fishers, industrial fleets, state authorities, and conservation

agendas. By integrating local knowledge with analysis of power, discourse, and structural inequalities, PE provides critical tools to trace the root causes of resource degradation and to understand how different actors shape access, control, and sustainability outcomes in Casamance's fisheries.

2.4. NIPE

New Institutional Political Ecology (NIPE) combines the strengths of Political Ecology (PE) and New Institutionalism (NI) to analyze socio-ecological systems such as Casamance's fisheries. While PE focuses on power relations and actor interests in resource governance, NI examines how institutions emerge, adapt, and are strategically used in response to internal and external dynamics [21]. Together, they provide a multi-layered framework for exploring institutional change, actor strategies, and shifting power configurations. NIPE emphasizes that institutions are not fixed but contested because actors engage in institution shopping, selectively adopting or modifying formal and informal rules to advance their interests within a landscape of institutional pluralism [21]. Power plays a central role in this process: building on Ensminger's (1992) model [27], external drivers such as environmental change, market shifts, or demographic pressures alter relative prices, reshaping actors' bargaining power. This, in turn, affects organizational forms, institutional selection, and ideological legitimation [21]. Unlike earlier strands of institutionalism, NIPE explicitly foregrounds power, both as bargaining capacity and as constructed through ideologies, narratives, and discourses in the Foucauldian sense [21].

Applied to Casamance, NIPE highlights several key dimensions: (1) power relations between local fishers, customary authorities, the state, and international actors; (2) the coexistence of formal and informal institutions regulating fisheries; (3) institution shopping, e.g., invoking precolonial rights or state laws to legitimize claims; (4) ideological legitimation through narratives of "tradition", "economic development", or "sustainability"; and (5) external drivers such as global fish markets or climate change, which reshape local governance [21]. Through this lens, Casamance fisheries appear as a dynamic system where institutions and power are continuously renegotiated. By integrating PE's critical focus on power with NI's analysis of institutional change, NIPE reveals how external shocks, actor strategies, and competing discourses shape access to, control over, and distribution of fisheries resources, ultimately influencing both sustainability and social equity.

2.5. State of Research

Research on fisheries in Casamance has largely been shaped by geographical and ecological perspectives, emphasizing wetland dynamics, mangrove ecosystems, and environmental change. Historical studies highlight the integration of artisanal fishing with rice cultivation among the Diola, as well as the seasonal and gendered division of labor in local fisheries [31–34]. More recent work points to significant transformations since the 1970s, when declining rice cultivation, soil salinization, and prolonged droughts contributed to a growing reliance on fisheries as a primary livelihood [35,36]. These changes were accompanied by new technologies, the motorization of pirogues, and intensified pressures from industrial and foreign fishing fleets [1].

Despite these insights, existing research remains fragmented and often outdated. Anthropological perspectives on institutional arrangements, common-property systems, and coping strategies in fisheries governance are scarce. Little is known about how pre-colonial tenure systems, local ecological knowledge, and community-based institutions shape resilience and food security today. Similarly, the role of migration, both seasonal and permanent, in reshaping fishing practices and community structures has not been sufficiently examined. Moreover, while the impacts of globalization, state interventions,

and foreign competition are acknowledged, their interaction with local governance systems remains underexplored.

This study seeks to fill these gaps by combining historical aspects with an anthropological investigation of contemporary fisheries governance in Casamance. It highlights the relevance of precolonial common-property systems and examines how local actors develop coping strategies in response to environmental degradation, economic pressures, and institutional change. By applying a multidimensional theoretical framework—Commons Theory, New Institutionalism in anthropology, Political Ecology, and NIPE—the study contributes to current debates on resilience, sustainability, and food security. In doing so, it not only enriches scholarship on Casamance but also advances broader discussions on the role of local governance systems in small-scale fisheries management across West Africa.

3. Methodology

This study employed a qualitative ethnographic mixed-methods approach, combining participant observation and interviews as its central methods. The ethnographic dimension, based on three months of participant observation, facilitated access to tacit knowledge and social dynamics such as labor division, cooperation, and conflict, while also fostering trust with participants and providing a comprehensive framework for exploring the embedded social meanings of fisheries. Within the framework of the interdisciplinary SNSF Sinergia project “Foodways in West Africa”, previous fieldwork had identified artisanal fisheries as a key but underexplored component of local food systems. Building on these findings, participant observation focused on everyday fishing practices, resource use, interactions among fishers, and local governance processes, while remaining sufficiently open to capture unexpected themes and emerging dynamics during fieldwork. Data on industrial fishing, climate variability, demographic trends, and migration patterns were drawn from secondary sources to contextualize and complement the qualitative findings, thereby situating local practices within broader socio-economic and ecological processes. Semi-structured interviews were supplemented by key informant, expert, and biographical interviews. Interviewees included for example artisanal fishers, fish processors, or representatives of local fisheries committees. Participants were selected through purposive and snowball sampling to capture a diversity of perspectives and local knowledge. Semi-structured interviews balanced thematic guidance with flexibility, ensuring core topics were covered while allowing unexpected themes to emerge [37]. Key informant interviews targeted individuals with extensive contextual knowledge, while expert interviews provided insights into the technical and institutional dimensions of fisheries [37,38]. Biographical interviews added historical depth by tracing individual life histories and the evolution of local fishing practices over time. The interview guide was informed by both the literature and insights gained through participant observation and informal conversations, allowing it to be refined throughout the fieldwork [39]. Finally, the research engaged with debates on decolonizing methodology. Conducting research as a Swiss scholar in Senegal necessitated reflection on epistemological inequalities and power asymmetries in global knowledge production [40]. The study sought to foreground the agency and resilience of Senegalese fishers, resisting deficit-oriented narratives that have historically characterized research on Africa [41].

4. Results

4.1. Local Fisheries in the Precolonial Period

In precolonial times fisheries in the Casamance region were deeply embedded in the ecological, social, political, and spiritual life of local communities, functioning as more than merely an economic activity. Fishing practices followed seasonal rhythms and the rice

cultivation calendar, were shaped by local environmental conditions, and operated within collectively managed systems typical of common-pool resources. Fishing primarily served subsistence needs and access to resources was regulated through customary institutions, communal governance arrangements, and long-standing social norms. A wide range of fishing techniques existed, reflecting a high degree of ecological adaptation and local knowledge, although many early methods have become rare today due to environmental change and evolving socio-economic structures. Early fishing techniques varied by landscape type and water depth. Among the oldest methods were bows, arrows, and spears used in shallow waters to target larger fish. Another historically significant practice involved constructing simple fish traps along the mangrove-lined *bolongs*, where rice residues and larvae served as bait during rising tides, constituting what can be called a cultural landscape aqua-system. These methods were time-consuming and, from a capitalist perspective, less efficient, and have therefore largely disappeared. Women played a distinct, though more limited, role in fishing at this time. There were gender-specific techniques. For example, women engaged in mussel collection or catching small fish in shallow waters using small nets tied to curved poles. These activities were seasonal and served primarily household subsistence.

A particularly sophisticated and enduring precolonial technique is the use of fish traps (reuses, in French “nasses”) at dams (“barrages/digues”), a practice that remains in use in some villages today. These dams separate rain-fed freshwater reservoirs from the slightly saline waters of the *bolongs*. During the rainy season, fish naturally migrate through a tunnel in the dam into the freshwater basin. When water levels begin to recede, the fish attempt to return and are captured in a strategically placed reuse trap. This method demonstrates a finely tuned understanding of the region’s hydrology, tides, and salinity gradients. Access to the dam is strictly governed: only the men of the family that owns the dam or their appointed delegates may fish there, and only at specific times of the year. The catch cannot be sold and must be shared with the village, reinforcing the dam’s role as a communal food resource. Maintenance responsibilities lie with the owning family, though repairs are carried out collectively by the entire village. At the end of the fishing season, when water levels are low and before the reservoir dries up, the remaining fish are harvested exclusively by the women of the village. This event is formally announced the day before by the owning family and constitutes a socially meaningful, gendered collective practice. Women use baskets and small round nets to catch the residual fish, spending an entire day at the site. The method, the timing, and the social participation highlight the embeddedness of ecological practices within broader community life. Seasonal dam use closely mirrors rainfall patterns, salinity cycles, hydrological change, gendered labor, and customary obligations. In some villages such as Kabrousse, this system continues, partly reinforced by state-built dams originally intended to prevent salinization of rice fields but now also used for fishing. Elsewhere, however, dam fishing has declined because maintaining the structures is labor-intensive, and many young people, especially men, have migrated. Communities such as Oussouye, Djivente, and Bandial report that dwindling labor availability and changing aspirations among younger generations have contributed to the abandonment of these practices, which in turn accelerates salinization and reduces agricultural productivity. Differences between villages—such as the use of cast nets by men instead of women’s techniques at the end of the season in Bandial—illustrate the diversity of local adaptations.

A local example from the village of Kabrousse (Table 1) shows how dam-based fishing is carefully structured throughout the year, in coordination with rainfall, water salinity, and ecological rhythms.

Table 1. Seasonal structure of dam fishing.

Season	Activity
Dry season (January–June)	No fishing, the freshwater reservoir is dry.
Rainy season (July–August)	Fish migrate from the <i>bolong</i> into the freshwater reservoir via the open tunnel through the dam. Fishing is prohibited.
Late August	The tunnel is closed for fish. Water circulation (for oxygen and temperature) continues.
September–December	Men from the owning family (or their delegation) fish at the dam using reuses as the fish attempt to return to the <i>bolong</i> .
End of December	Women (and their children) fish using their techniques on a designated day when water levels are low.

In the precolonial period, access to fishing grounds and the regulation of techniques were governed by customary rules in the form of common property institutions upheld by village elders and spiritual authorities. These systems were not codified in written form but were widely known, socially embedded, and broadly legitimized. Elders—referred to as “the wise” (“les sages”)—and spiritual leaders such as the “roi féticheur” exercised authority based on environmental knowledge, ritual responsibility, and ancestral legitimacy. They determined seasonal regulations, sanctioned inappropriate practices, and ensured that ecological and social harmony was maintained. Some areas, particularly those associated with sacred sites or totems, were designated as no-fishing zones. Such restrictions served both spiritual and ecological purposes by protecting spawning grounds, ensuring species reproduction, and coordinating collective resource use. Violations were believed to provoke supernatural consequences, reinforcing compliance through a combination of moral obligation, fear, and social scrutiny. Taken together, these practices constitute a functioning commons governance system that aligns closely with several of Ostrom’s design principles for sustainable management of shared resources. Access rights were clearly defined, rules matched local ecological conditions, monitoring occurred through community observation, sanctions were socially and spiritually enforced, and conflicts were resolved through customary authority structures. Despite their informality, these norms effectively regulated resource use countering the dynamics of overexploitation predicted by Hardin’s “Tragedy of the Commons” [10]. The precolonial fisheries of Casamance were not open-access systems but rather governed by collective institutions shaped by social membership, family-based rights, and ritual obligations.

The fish species most commonly caught historically and still today include tilapia, mullet, capitaine, barracuda, monkfish, various carp species, catfish, as well as crabs, shellfish, and shrimp. Biodiversity peaks during the rainy season but has been declining due to environmental degradation and overfishing. Larger, offshore species are usually sold to restaurants or hotels, while smaller fish from the *bolongs* are consumed within households. Fishing practices are strongly gendered: men typically fish at sea using boats, rods or specialized nets, for example for shrimp fishing, whereas women are primarily responsible for shellfish collection in intertidal zones. These harvests contribute both to subsistence and to local market economies, with seasonal variations depending on salinity levels and ecological conditions. Consumption and distribution practices were historically oriented toward household needs. Fishers prioritized feeding their families and sold only the surplus to obtain small amounts of cash for personal expenses. Sales were often announced through characteristic cries within the village, and if fish remained unsold,

they were carried to larger markets by women, although declining catches have led to a situation in which consumers increasingly approach fishers directly at their homes. A persistent structural challenge in Casamance is the lack of preservation and processing infrastructure. Without cold storage or processing facilities, fish must be consumed fresh or preserved through traditional drying and salting methods, mostly performed by women. The absence of such infrastructure limits economic opportunities and contributes to youth out-migration. Similar issues affect other regional products, such as mangoes, which often spoil due to the absence of agro-industrial transformation facilities.

Overall, the organization of precolonial fisheries in Casamance illustrates a robust, adaptive, and socially embedded commons governance system. It demonstrates that communal resource management anchored in customary rights, spiritual authority, local ecological knowledge, and strong social cohesion can regulate fishing sustainably and equitably. These practices challenge simplistic narratives of “traditional” inefficiency and instead highlight the resilience and sophistication of locally grounded institutions that remain influential in shaping contemporary fisheries governance.

4.2. Commons Grabbing as a Process of Institutional Transformation

Fishing practices in Casamance have changed profoundly from the precolonial period to today. The transition from common-property fisheries governance to state ownership has profoundly transformed fishing practices, institutions, and the use of fisheries resources:

Fishery practices: Since the late 19th century, external forces like colonial rule, tourism, environmental decline, and expanding market pressures have reshaped how people fish. Large and efficient nets are now widely used in both *bolongs* and the open sea, alongside methods introduced during the French colonial era, such as the controversial “ramasse” or “senne de plage”, which is criticized for catching juvenile fish and is increasingly restricted. Additional techniques like longlines, cast nets, and shrimp nets have also become common. In the last few decades, modern equipment has further influenced local practices: fishing rods introduced by European tourists and the recent rise of commercial fish farming signal a shift toward profit-driven, year-round production. The tilapia aquaculture project in Djivente exemplifies growing economic diversification. Access to boats has also changed. While motorized pirogues are now common, few local fishers own them, as permits are costly and many boat owners come from outside Casamance. Those without boats often rely on simple wooden boards to set and check nets. As fish stocks decline and industrial overfishing expands, many ancient and ecologically embedded practices have become untenable. This has pushed fishers toward more mobile and active methods and has contributed to the marginalization of local artisanal fishers from participation in marine fisheries, which are increasingly dominated by better-equipped outsiders. At the same time, some older communal techniques such as dam-based fishing grounded in collective management survive in certain inland areas. Overall, these transformations reveal a deeper restructuring of social organization, ecological knowledge, and environmental governance in Casamance, where cultural continuity, sustainability, and economic pressures now intersect and often conflict.

Institutional changes: Over time, fisheries institutions and related governance in Casamance have undergone a far-reaching transformation, shifting from a precolonial system rooted in customary norms and spiritual authority to a complex, multilayered institutional landscape involving local communities, the Senegalese state, NGOs, and various external actors. Historically, access to fishing grounds was regulated informally: village elders and sacred authorities decided when, where, and how to fish, drawing on ecological knowledge and communal values. Sacred zones and seasonal bans helped maintain ecological balance, and territorial rights over rice fields or *bolongs* were largely tied to families

or villages. While the sea was open to all, inland waters were embedded in clear local governance systems.

Today, fisheries resources are legally under state ownership, but governance is fragmented. Marine fisheries fall under strict national rules encoded in the Code de la Pêche, including licensing for industrial and pirogue-based fishing. These regulations are perceived locally as rigid and top-down, reflecting the economic stakes tied to maritime resources. Inland fisheries, by contrast, remain governed mostly through local norms. Although state laws apply in principle, the Senegalese government largely relies on communities to regulate fishing in *bolongs* and near rice fields. This creates a governance dichotomy: while marine fisheries are centralized and commercialized, inland fisheries remain spaces of local autonomy and subsistence-oriented practices. Their limited economic visibility likely contributes to the state's relaxed involvement. A key institutional innovation reshaping this landscape is the creation of local councils for artisanal fisheries (Conseil Local de la Pêche Artisanal—CLPA). Established through collaboration between the Senegalese government and NGOs, CLPAs combine state-appointed leadership with broad local participation, including fishers, village elders, and chiefs. Their functions include awareness campaigns, conflict mediation, and the elaboration of conventions locales—locally drafted, state-approved rules adapted to ecological and cultural contexts. These conventions blend precolonial norms, such as sacred-site protection or seasonal rhythms, with contemporary conservation measures like mesh-size restrictions, bans on destructive techniques such as “la ramasse”, prohibitions on toxic bait, and species protection. Once validated by the “préfet”, these conventions carry the same legal weight as national legislation. CLPAs thus function as bridges between state authority and community knowledge, though their effectiveness varies, and they operate within clear limitations.

Local-state relations are marked by both cooperation and contradiction. Community members emphasize that many management decisions originate from local initiative rather than state imposition, reflecting strong local agency and the belief that the state lacks fine-grained knowledge of ecological conditions in the area. Ideally, ancient local norms and state regulations complement each other, with communities adapting ancestral practices to changing ecological realities. However, state policies often undermine local conservation efforts, most notably through the issuance of licenses to foreign industrial fleets, which accelerates overfishing and fuels mistrust. CLPAs themselves struggle with limited resources, bureaucratic delays, and unequal power relations with state institutions, particularly in a region historically marked by political marginalization. Regulation surrounding fishing permits further reflects institutional ambiguity. While some fishers claim no permit is required for small-scale artisanal fishing, others insist that all fishers must pay an annual fee. In practice, enforcement is lax for subsistence fishing but stricter when catches enter the market. Pirogue ownership requires a separate permit, often applied more consistently. Similar confusion surrounds the licensing of fish traders, with many—especially women—operating informally. These discrepancies blur the line between subsistence and commercial activity, complicating monitoring and compliance.

Enforcement of rules relies on both cultural and formal mechanisms. Spiritual beliefs still contribute to compliance, while CLPA surveillance committees monitor activities but must rely on state authorities for actual sanctions. Enforcement is uneven, particularly against industrial or semi-industrial actors who often act with impunity. This power imbalance is visible in accounts of foreign fleets damaging local nets or ignoring local norms. Conflicts also arise with fishers from northern Senegal, who migrate south due to depleted northern fisheries. These fishers often use motorized pirogues and apply more industrialized methods, catching large volumes and sometimes violating local rules such as discarding juvenile fish. They frequently recognize only state authority and ignore local

conventions, thereby engaging in a form of “institution shopping” by invoking whichever regulatory framework benefits them most. Local communities may appeal to the “sous-préfet”, sometimes resulting in sanctions, but enforcement remains difficult due to the mobility and economic power of incoming migrant fishers.

Overall, fisheries governance in Casamance today is characterized by hybrid, layered institutions that combine customary authority, state laws, and NGO-driven initiatives. While formalization and coordination have increased, significant tensions persist, including power asymmetries, inconsistent enforcement, conflicting interpretations of rules, and external pressures from industrial fleets and mobile fishers. Authority over marine fisheries has shifted increasingly toward state and global actors, while inland fisheries remain more locally governed, though not without challenges. These patterns reflect broader processes of institutional change described by Ensminger (1992): shifts in relative prices, bargaining power, and evolving ideologies reshape governance structures over time [27]. In Casamance, precolonial systems persist but are continually renegotiated within a wider political-economic context marked by inequality, market expansion, and competing claims to authority.

Degradation of fisheries: This process of commons grabbing has had profound effects fisheries as a common-pool resource in the Casamance region. Not only have there been institutional transformations, but these have exacerbated ecological changes which directly affect local communities whose livelihoods increasingly suffer from resource depletion, external competition, and environmental disruption. Whereas fishing historically served primarily subsistence and household consumption, it has progressively become integrated into monetized and market-oriented economies. This shift is most visible in coastal areas, where commercial full-time fishers, many of whom originate from northern Senegal, operate with motorized pirogues, cold storage, and transport networks that link them to national markets such as Dakar. In contrast, many local Casamance fishers remain in inland *bolongs* and rice-growing areas, relying on small-scale trade and facing infrastructural disadvantages. Overall, artisanal fishing in Casamance remains highly heterogeneous, spanning a continuum from subsistence-based practices to profit-oriented strategies. Alongside commercialization, industrial fishing has drastically accelerated the depletion of local fish stocks. The Senegalese state grants fishing licenses to foreign fleets especially from China, South Korea, and Japan, whose large vessels employ non-selective trawling methods that generate immense ecological damage. High volumes of bycatch, including juvenile fish, are frequently discarded and wash up dead along the coast. Despite generating state revenue through licensing agreements, industrial catches contribute little to local food security and undermine the ecological foundations of artisanal fishing. Local fishers report a marked decline in fish availability, which not only jeopardizes incomes but also has significant social repercussions, including marginalization and increased outmigration. In northern Senegal in particular, the erosion of fishing livelihoods has pushed many young men toward perilous transatlantic migration attempts. Climate change further amplifies these pressures. Rising sea levels, saltwater intrusion, and coastal erosion are reshaping brackish and marine ecosystems, while reduced rainfall increases salinity and limits fish movement into freshwater zones that previously served as important habitats. These climatic processes intersect with socio-economic changes: labor shortages in rice cultivation leave fields uncultivated, heightening their vulnerability to salinization and altering land–water dynamics.

4.3. Analysis of the Transformation of Fishing Practices in Casamance from the Perspective of New Institutional Political Ecology (NIPE)

Viewed through a political ecology lens, these transformations reflect deeper power asymmetries and competing claims over natural resources. The commercialization of

fisheries illustrates the penetration of global capitalist markets into local economies, transforming access, incentives, and control. The state's licensing of foreign industrial fleets exemplifies how national political interests and international capital extract value from local ecosystems while disempowering artisanal fishers. Although local communities retain some agency in the domain of artisanal fisheries through customary norms, local knowledge, and participatory institutions such as CLPAs, these spaces of negotiation are increasingly constrained by ecological change, emigration, and shifting land-use practices. This shows how the transformation of fisheries resources in Casamance is not merely ecological. It is fundamentally political, shaped by contested resource regimes, shifting governance structures, and global–local interdependencies. These dynamics determine who benefits from the region's resources and who bears the costs of environmental change.

As discussed in previous sections, local fishery systems in Casamance are increasingly exposed to a variety of pressures, ranging from commercialization and institutional transformations to emigration, industrial overfishing, global capitalism, and climate change. This chapter applies the theoretical framework of New Institutional Political Ecology (NIPE) [21] to analyse the complex socio-ecological dynamics shaping fisheries in the Basse Casamance region of Senegal. As outlined in the theoretical framework, NIPE combines core insights from Political Ecology (PE) and New Institutionalism (NI) in social anthropology. Political Ecology contributes a critical perspective on power relations, environmental discourses, and narratives that influence how legitimacy is constructed and how certain actors gain or lose bargaining power in resource governance. New Institutionalism emphasizes the role of institutions (both formal and informal rules, norms, and organizational arrangements) in shaping economic and social behavior. By integrating these two perspectives, NIPE provides a comprehensive framework to explore how external and internal drivers, shifting power dynamics, and ideological legitimization strategies shape institutions, actor behavior, and distributional outcomes in the governance of fisheries resources in Casamance. This approach enables a deeper understanding of the local responses to challenges of institutional change, socio-economic shifts, and environmental transformations. Fisheries in Casamance provide a compelling case of how the NIPE framework can be applied. Their evolution is shaped by a complex interplay of external and internal forces, shifting power relations, and competing ideological visions:

- **External Factors and Relative Prices:** The rise of industrial fishing by foreign actors (e.g., Japanese, Chinese, South Korean companies) due to government-issued licenses, along with global market demand for fish, has increased the relative price of fish resources in Casamance. Climate change and new fishing technologies further affect the availability and value of these resources. Furthermore, the emigration of young people, predominantly young men, weakens the labor base for precolonial, labor-intensive fishing methods (e.g., construction of dams), thus altering their relative attractiveness.
- **Internal Factors and Bargaining Power:** Changing relative prices and the presence of new actors have affected the bargaining power of local fishing communities in relation to state actors and commercial fishing enterprises. Precolonial authorities and local fishing organizations such as the CLPAs attempt to represent their interests against more powerful external stakeholders. The historical development of land and fishing rights, including colonial interventions and the introduction of state ownership over fish stocks, has influenced the starting point for these negotiations.
- **Institutional Pluralism and Institution Shopping:** Casamance is marked by institutional pluralism, combining formal state laws and fishing regulations with informal, long-standing customary rules and norms. The CLPAs aim to bridge these institutional domains by establishing participatory local governance structures with state support. The various actors engage in institution shopping by selectively using, adapting, or

reshaping the rules and institutions that best serve their interests. This may involve invoking precolonial fishing rights to resist industrial fishing or using CLPA structures to enforce local conservation measures. Conflicts between local and external fishers often reflect deeper struggles over the legitimacy of competing institutional frameworks.

- **Ideology and Legitimacy:** Different actors in Casamance rely on various ideologies, discourses, and narratives to legitimize their claims to fisheries resources. State actors may emphasize the need for economic development through licensing industrial fishing companies, while local communities might invoke cultural identity and traditional ecological knowledge to advocate for the protection of their resources. Sacred sites and associated fishing taboos function as part of a local ideological order that regulates resource use. Discourses of sustainability and resource conservation are employed by both state and local actors, although the specific interpretations and strategies may differ significantly.
- **Distributional Effects and Behavior:** The prevailing institutional arrangements and power relations result in specific distributional outcomes concerning access to fisheries resources and their associated benefits. Industrial fishing generates revenue for the state but can threaten the livelihoods of local small-scale fishers. Local governance initiatives like the CLPAs aim to ensure more equitable distribution and sustainable management. The behavior of fishers, including rule compliance and participation in local governance, is strongly influenced by the perceived incentives and constraints within this institutional and political context.

Figure 2 illustrates the application of the NIPE framework to fisheries governance in Casamance. The grey-shaded boxes indicate the additional analytical dimensions introduced by NIPE, highlighting how the framework integrates and extends the perspectives of Commons Theory, New Institutionalism, and Political Ecology.

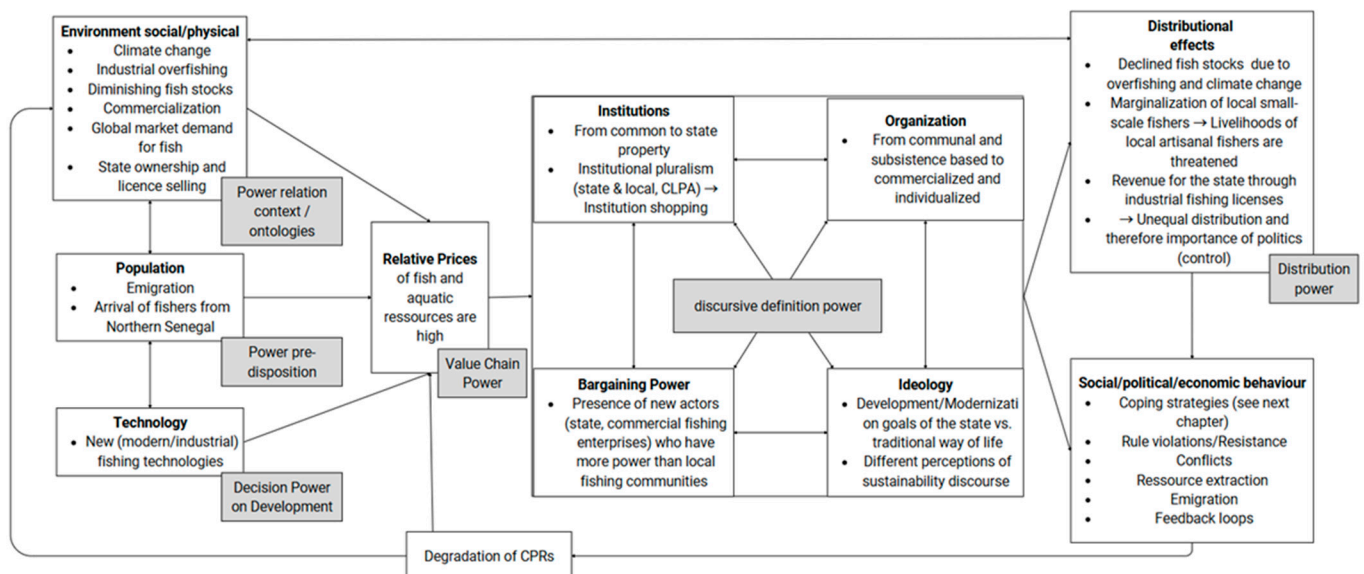


Figure 2. Application of the NIPE framework to fisheries in Casamance.

Applied to Casamance, NIPE highlights several key dimensions: (1) institutional change in fisheries governance, tracing how customary institutions adapt to commercialization, state regulation, and environmental change; (2) shifting power relations between artisanal fishers, customary authorities, the state, and international actors, particularly as industrial offshore fisheries strengthen the bargaining position of global actors while constraining local communities' access to resources; (3) institution shopping, whereby

actors strategically invoke customary rights or state law to legitimize competing claims; (4) ideological legitimation through narratives of “tradition”, “economic development”, and “sustainability”; and (5) the ontological dimension of fisheries, recognizing that for many local communities fisheries and aquatic landscapes represent cultural, spiritual, and social relationships that extend beyond their economic value, often contrasting with the naturalistic resource perspective underpinning state regulation and global markets. Through this lens, Casamance fisheries emerge as a dynamic socio-ecological system in which institutional change, power asymmetries, competing ontologies, and external drivers such as global markets and climate change continuously reshape access to, control over, and the distribution of fisheries resources. NIPE thus makes it possible to analyze not only how institutions change, but also why some actors are better able to influence these transformations than others and how local communities seek to maintain livelihoods, food security, and resilience under increasing external pressures.

4.4. Reframing the Fishery Commons? Constitutionality Options and Limitations in Casamance

At the same time, the emergence of initiatives like the CLPAs signals efforts by local actors to defend the commons, assert interests, and foster sustainable fisheries governance through bottom-up institution-building, which aligns with the concept of constitutionality. NIPE enables a deeper understanding of the interactions between external influences, internal power relations, institutional pluralism, and ideological struggles that shape the use and governance of fisheries resources. The findings show how local communities strategically navigate institutional pluralism to defend their practices and livelihoods in the face of modernization and globalization—which appears to be more successful in inland fisheries than in marine fisheries.

This study highlights the complex transformations shaping fisheries governance in Basse Casamance, where external pressures such as industrial fishing, climate change, and market integration increasingly influence livelihoods but do not entirely displace embedded local practices. Instead, the findings underscore the persistence of precolonial common property systems that continue to provide a foundation for sustainable resource use, food security, and socio-ecological resilience. A key insight is that precolonial fisheries were organized as common property resource systems, deeply embedded in ecological, social, political, and spiritual life. Rules governing practices such as dam fishing were enforced collectively and underpinned by moral economies of redistribution and mutual support. Spiritual taboos and exclusion zones further reinforced ecological stewardship. These institutions demonstrate how local governance systems ensured equity and sustainability, challenging Hardin’s (1968) “Tragedy of the Commons” thesis [10]. Instead, they align with Ostrom’s (1990) design principles, including clearly defined boundaries, locally adapted rules, collective decision-making, and community-led enforcement [8].

The study traces how these systems have evolved with the gradual introduction of new technologies, such as nets and aquaculture, and with the integration of external governance structures. Inland fisheries remain largely under community management, supported by hybrid institutions like the local artisanal fisheries councils (CLPAs), which attempt to bridge customary rules and state regulations. By contrast, marine fisheries are dominated by state licensing and international fleets, leaving artisanal fishers with little influence. This duality demonstrates both the resilience of inland common property systems and the disempowerment of coastal communities facing globalized industrial exploitation. The expansion of industrial fishing has had severe ecological and social consequences, including declining fish stocks and the erosion of artisanal livelihoods. Climate change compounds these pressures, with altered rainfall patterns and rising salinity reducing fish availability. From a socio-ecological systems perspective, these interacting forces reveal both vulnerabilities and

adaptive capacities [16], and rather than inevitably leading to the “tragedy of the grabbed commons”, they suggest a “drama of the grabbed commons”, which also foregrounds local responses and agency [42]. Communities’ continued investment in maintaining customary institutions reflects agency and resilience, even under adverse conditions. Consistent with Gerber and Haller (2021), the pluralistic governance landscape simultaneously introduces new opportunities and risks [42]. Hybrid arrangements, such as the CLPAs, have the potential to institutionalize local knowledge and foster co-management [7,20]. Yet their effectiveness is constrained by limited resources, inconsistent state support, and contested legitimacy. Institutional pluralism also creates risks of “institution shopping”, where actors strategically exploit overlapping rules, undermining coherence and equity. This highlights core concerns of New Institutional Economics about how formal and informal institutions interact, and whose interests prevail [25]. The findings also resonate strongly with Political Ecology, which emphasizes the inseparability of ecological change from power and political-economic structures. The Senegalese state’s granting of licenses to foreign industrial fleets, often motivated by short-term fiscal gains, directly undermines local sustainability efforts. These policies privilege global economic actors over artisanal communities, illustrating how unequal power relations drive ecological degradation and dispossession. At the same time, inland fisheries exemplify spaces of resistance and adaptation, where communities assert local sovereignty through customary rules and selective engagement with state structures. This perspective aligns with New Institutional Political Ecology (NIPE), which situates institutional performance within broader struggles over power, access, and legitimacy [21].

Importantly, governance in Casamance cannot be understood in isolation from its socio-political and ecological context. The region’s mangrove ecosystems, seasonal salinity fluctuations, and history of separatist conflict have shaped both ecological dynamics and governance arrangements. The conflict fostered greater local autonomy and skepticism toward state authority, reinforcing the legitimacy of customary institutions. These dynamics illustrate how ecological specificity and political history condition institutional resilience and legitimacy. Nevertheless, the study also acknowledges the limits of customary governance. Accelerating climate change, rising salinity, and habitat loss pose unprecedented challenges that may exceed the adaptive capacity of precolonial systems. Future strategies should therefore integrate local knowledge with scientific approaches to develop adaptive and context-specific management tools. This requires bridging formal and informal knowledge systems, rather than privileging one over the other.

Overall, the research contributes to debates on small-scale fisheries governance in West Africa by showing how historical continuity, institutional hybridity, and external pressures intersect. It demonstrates that local fisheries systems are not relics, but living institutions embedded in social identity and ecological knowledge. Practices such as dam fishing exemplify culturally rooted and ecologically sensitive management strategies that sustain livelihoods and foster resilience. At the same time, the study illustrates the harmful impacts of industrial fishing, enabled by state policy, which undermines local systems and exacerbates vulnerability. For policymakers and practitioners, the findings underscore the importance of strengthening co-management institutions like CLPAs, ensuring they are adequately resourced, participatory, and legitimate. Limiting industrial overexploitation and integrating local ecological knowledge into fisheries science and national policy are essential for building climate-resilient governance systems. Ultimately, sustainable fisheries governance requires not only technical and ecological measures but also equitable power relations and recognition of community agency.

5. Conclusions

This study examined the artisanal fisheries of Casamance, highlighting the interplay between local knowledge, ecological sustainability, and governance. It shows that fisheries as commons are managed not only through formal regulation but also through deeply embedded social norms that regulate access, distribution, and production, while reflecting values of reciprocity, solidarity, and collective responsibility. Inland fisheries in *bolongs* and rice-growing areas illustrate the cultural embeddedness of commons-based systems, where fishing practices, dam maintenance, and spiritual taboos are integral to communal life. These systems are dynamic and adaptive, shaped by environmental change, shifting power relations, and external pressures. Yet, they face mounting threats from climate change, salinization, ecological decline, institutional change, commercialization, and the encroachment of industrial offshore fishing, which often marginalizes local actors. The contrast between industrial marine fisheries and inland systems underscores broader dynamics of inequality and resilience. While export-oriented, state-aligned marine fisheries are marked by extraction and exclusion, inland systems persist through cooperation, shared labor, and cultural continuity by which the commons are adapted and made resilient. Inland fisheries thus remain sites of autonomy, where precolonial governance practices are preserved and reworked as strategies of resilience.

From a NIPE analytical perspective, this persistence can be understood through the lens of constitutionality. Inland fisheries are embedded in locally recognized institutions that define legitimate users, regulate access, and establish shared norms of responsibility toward the resource. These rules are continuously reproduced through everyday practices such as collective dam maintenance, ritual prohibitions, and communal decision-making. Such processes strengthen the constitutional dimension of the commons by aligning ecological use with locally legitimate governance structures. In contrast, marine fisheries are increasingly shaped by external political-economic forces, including industrial fleets, export-oriented policies, and centralized state regulation. These dynamics weaken local constitutional arrangements and displace community-based rule systems, thereby eroding the institutional foundations that sustain fisheries as commons. The NIPE perspective thus helps explain why inland fisheries remain comparatively resilient: their governance is grounded in socially embedded institutions that maintain legitimacy, participation, and adaptive capacity at the local level.

The case of Casamance suggests that commons-based systems can strengthen both food security and socio-ecological resilience under conditions of global disruption and political marginalization. Policy responses should therefore go beyond technical fixes and top-down regulation. Strengthening participatory governance, safeguarding access rights, and integrating local ecological knowledge into fisheries management are essential for sustaining fisheries as common-pool resources. Ultimately, this research shows that inland fisheries in Casamance are not mere subsistence strategies but spaces of hope, adaptation, and resistance. They remind us that sustainability is a place-based process rooted in care, collaboration, and shared responsibility, and that supporting such systems is critical for ecological sustainability, economic viability, and cultural integrity alike.

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