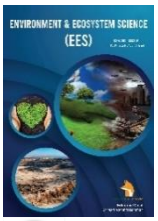
ZIBELINE INTERNATIONAL™ PUBLISHING

Environment and Ecosystem Science (EES)

DOI: http://doi.org/10.26480/ees.02.2026.92.99

ISSN: 2521-0882 (Print)
ISSN: 2521-0483 (Online)
CODEN: EESND2



RESEARCH ARTICLE

BLUE ECONOMY DEVELOPMENT AND COASTAL DISASTER RISK REDUCTION MANAGEMENT IN NIGERIA'S NIGER DELTA REGION

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ARTICLE DETAILS

Article History:

Received 13 March 2026
Revised 22 April 2026
Accepted 28 May 2026
Available online 08 June 2026

ABSTRACT

The Niger Delta coastal zone is simultaneously Nigeria's most economically strategic maritime region and its most disaster-prone ecological landscape, where climate-induced flooding, shoreline erosion, oil pollution, and weak governance structures undermine sustainable development outcomes. This study examines the interface between blue economy development and coastal disaster risk reduction management in Nigeria's Niger Delta, with the aim of evaluating how integrated ocean-based economic strategies can enhance coastal resilience while promoting sustainable livelihoods. The study adopts a mixed-methods research design, combining secondary data from policy documents, government reports, and scholarly literature with primary data obtained through key informant interviews and structured questionnaires administered across selected coastal communities. Descriptive statistics and thematic content analysis were employed to examine sectoral blue economy potentials, disaster risk exposure patterns, and institutional response frameworks. Findings reveal that despite abundant marine and coastal resources, blue economy initiatives in the Niger Delta remain fragmented, poorly aligned with disaster risk reduction strategies, and constrained by governance deficits, environmental degradation, and limited community participation. The study further establishes that integrating disaster risk reduction into blue economy planning significantly enhances adaptive capacity, reduces vulnerability, and strengthens sustainable coastal livelihoods. The paper concludes that a resilience-oriented blue economy framework is critical for achieving sustainable coastal development in the Niger Delta. It recommends policy mainstreaming of disaster risk reduction into blue economy governance, strengthened institutional coordination, and inclusive community-based coastal management. The study contributes to knowledge by advancing an integrated analytical framework linking blue economy development with coastal disaster risk reduction in a resource-dependent developing economy context.

KEYWORDS

Sustainable Development; Coastal Disaster Risk Reduction; Environmental Management; Marine Governance

1. INTRODUCTION

The increasing global recognition of oceans, seas, and coastal resources as drivers of sustainable economic growth has repositioned the blue economy as a central development paradigm in the twenty-first century (Smith-Godfrey, 2016; Spalding, 2016; Lee, Noh, and Khim, 2020). The blue economy involves using ocean resources for economic growth, improved livelihood and jobs, and ocean ecosystem health. It includes fisheries and aquaculture, maritime transport, offshore energy, coastal tourism, and marine biotechnology (World Bank, 2016; UNECA, 2016). The impact of climate change, coastal hazards, environmental degradation and governance failures have increasingly jeopardized the realization of the blue economy benefits, especially in developing coastal zones (Germond-Duret, 2022; Martínez-Vázuez et al., 2021).

The Niger Delta of Nigeria presents a contradiction in the blue economy. The region has enormous coastal and marine resources including mangroves, estuaries, fisheries, oil and gas facilities and navigable rivers. However, it is highly susceptible to coastal inundation, shoreline erosion, sea-level rise, oil spill and socio-economic marginalization (Nenibarini et al., 2019). The effects of these vulnerabilities are being aggravated by the climate variability, unsustainable resource exploitation, weak institutional coordination in coastal governance. In Nigeria, policy interest in blue economic development has grown, particularly since adoption of Africa's Blue Economy Strategy (African Union, 2019). Nevertheless, a good coastal disaster risk reduction does not integrate into blue economic plans.

The challenge facing the Niger Delta is not the lack of blue economy potential, but the consistent gap between the economic exploitation of marine resources and disaster risk management measures. Many policies and sectoral interventions tend to be implemented in silos, focusing on economic extraction and not taking enough account of exposure, sensitivity and adaptive capacity to coastal hazards (Jacob and Umoh, 2022; Anammah and Ezenyimulu, 2023). The situation threatens livelihood and stability of coastal population while hampering sustainable development outcomes. In this context, the study interrogates the extent to which blue economy development could be strategically aligned with coastal disaster risk reduction management for building resilience and sustainability in Niger Delta of Nigeria. To better articulate the broad aim, two key objectives were distilled. They include;

- Examine the structure and governance of blue economy development in Nigeria's Niger Delta in relation to coastal disaster risk exposure and;
- Assess how integrating disaster risk reduction into blue economy

Quick Response Code	Access this article online	
	Website: www.environecosystem.com	**DOI:** 10.26480/ees.022026.9299

Cite the Article: Orji, Kingsley Chibuzor, Nwankwoala Chidi, Wekpe Vremudia Onyeayana (2026). Blue Economy Development And Coastal Disaster Risk Reduction Management In Nigeria's Niger Delta Region Ethiopia. *Environment and Ecosystem Science (EES)*, 10, (2): 92-99.

planning can enhance coastal resilience and sustainable livelihoods in the region.

1.1 The Blue Economy in Context

This section establishes the conceptual and theoretical foundations guiding the study. It clarifies the core concepts of blue economy development and coastal disaster risk reduction management and situates the analysis within relevant theoretical perspectives that explain vulnerability, resilience, and sustainable coastal development in the Niger Delta context. The concept of the blue economy refers to the sustainable utilization of ocean, sea, and coastal resources to generate economic growth, improve livelihoods, and preserve marine and coastal ecosystem health (Smith-Godfrey, 2016; World Bank, 2016). The blue economy shifts away from extractive exploitation, instead stressing the particular importance of ecological sustainability, social inclusiveness, and long-term economic resilience (Spalding, 2016; Lee et al., 2020). The blue economy's core sectors are those of fisheries and aquaculture, maritime transport and ports, offshore renewable energy, coastal tourism, marine biotechnology, and ecosystem services (Wenhai et al., 2019; Martínez-Vázquez et al., 2021). The development of blue economy in the Nigeria has become a strategic response to overreliance on oil receipts and rising environmental pressures in coastal areas (Adepoju, 2023; Jacob and Umoh, 2022). They advocate for diversification, job creation, and regional integration in the Gulf of Guinea maritime region (Popoola and Olajuyigbe, 2023). Blue economy initiatives in the Niger Delta, remain largely sectoral, fragmented, and weakly coordinated in practice, often missing considerations of ecosystem limits and disaster vulnerability (Ichimi, 2023). Because of this, we see a development trajectory in which economic gains have come alongside increasing exposure to coastal flooding, erosion, oil pollution and livelihood insecurity. This study stipulates that the blue economy will not only be a development strategy for economic growth but rather it must look at building up the resilience of coastal systems. Therefore, its success will depend on the integration of environmental risk management, inclusive governance and adaptive capacity building. Coastal Disaster Risk Reduction Management Reduction of coastal disaster risk management involves the development and implementation of policies, strategies and practices through which vulnerability to coastal hazards can be reduced as well as losses and damages. Coastal disasters include flood, storm surge, shoreline erosion, sea level rise and disaster from pollution (UNEP, 2020; UNDESA, 2017). According to a study, the disaster risk interlink is defined as the function of hazard exposure, socio-economic vulnerability and adaptive capacity and not natural event (DESA, 2017).

In low-lying deltaic systems such as the Niger Delta, disaster risks are intensified by climate change, unplanned coastal development, ecosystem degradation, and weak institutional capacity (Nenibarini et al., 2019). In Nigeria, disaster response efforts have been characterized by an emergency-driven approach, as opposed to one defined by the prevention of risk, early warning and ecosystem-based adaptation (African Union, 2019). This method has been ineffective to address the cumulative and systemic nature of coastal risks affecting livelihoods, infrastructure and economic activities. Disaster risk reduction is not incidental but foundational from a blue economy perspective. Coastal environments must be stable and resilient in order for sustainable fisheries, maritime infrastructure, tourism investments and offshore energy systems to be possible (Hoegh-Guldberg, 2015; Sarker et al., 2018). Thus, the paper defines coastal DRR as an enabling mechanism for protecting blue economy investments, strengthening community resilience, and facilitating ongoing economic productivity in coastal areas.

1.2 Theoretical Foundation of the Study

The conceptual underpinnings of this study are located on Resilience theory and the Sustainable Livelihoods Theory which explains the interactions that exist between the environmental shocks and socio-economic systems or adaptive development pathways. The Resilience Theory states nutrient pollution in these lagoons severely limits the abundance of spearfish, a reef fish considered an indicator species for a healthy reef. In the context of the Niger Delta, resilience theory encourages the development of strategies that can help coastal communities and ecosystems withstand recurrent disasters without collapsing economically or ecologically. The process of putting disaster risk reduction into blue economy planning contributes to a system's resilience by reducing exposure, increasing adaptive governance, and using an ecosystem-based approach. On the other hand, Sustainable Livelihoods Theory elaborates the manner in which households and communities mobilize assets in the form of natural, social, human, physical and financial for achieving livelihood strategies under conditions of vulnerability (Sarker et al., 2018). In coastal economies, sectors like fisheries, aquaculture, tourism and shipping are highly vulnerable to environmental shocks. The hypothesis helps to understand how blue economy interventions that are poorly managed may worsen the vulnerabilities, whereas integrated DRR can protect assets and diversify livelihoods and sources of income. Together, these theories offer a strong analytical framework for investigating how development of the blue economy, in tandem with disaster risk reduction, can transform the Niger Delta from a fragile extractive coastal economy to a resilient sustainable maritime development system.

2. Literature Review

This section critically reviews scholarly and policy-oriented literature on blue economy development and coastal disaster risk reduction, with particular attention to governance, sustainability, and resilience in developing coastal regions. The review is thematically organized to identify dominant narratives, empirical evidence, contradictions, and gaps that justify the present study.

2.1 Blue Economy and Sustainable Coastal Development

The blue economy will become important as a development paradigm that seeks to align 'economic' growth with the sustainability of marine ecosystems (Smith-Godfrey, 2016; Spalding, 2016). Initial ideas focused on marine economic growth while the latter scholarship emphasizes inclusion, ecological integrity and long-term resilience (Lee et al, 2020; Martínez-Vázquez et al, 2021). A number of studies argue that the sustainable development of coastal space under blue economy is contingent on the equilibrium between resource extraction, conservation of ecosystem and equitable socio-economic development (Wenhai et al., 2019).

Evidence from both more advanced and less developed contexts reveals that countries implementing integrated blue economy strategies enjoy improved maritime governance, job creation and diversification of coastal livelihoods (World Bank, 2016; Benzaken et al., 2022). However, critics warn that the blue economy could simply become a neoliberal rebranding of ocean exploitation, if sustainability principles remain weakly enforced (Germond-Duret, 2022). The contradiction between economic growth and environmental limits is increasingly evident in many coastal economies depends on resources, such as Nigeria's Niger Delta, where oil-driven development has undermined sustainability (Jacob and Umoh, 2022).

2.2 Coastal Disaster Risks in Deltaic Regions

Due to low elevation, dense population and anthropogenic activities, deltaic coastal systems are among the most vulnerable environments in the world (Nenibarini et al., 2019). An increase in storm surges, sea-level rise from climate change, and already existing erosion of the coast aggravates socio-economic vulnerabilities. The literature indicates that disaster risks in such a region are not natural, rather social dashed out through poor land-use planning, environmental degradation and weak institutional responses. In the Niger Delta region, repeating flooding, shoreline retreat and pollution-induced disasters have caused devastation of fisheries and infrastructure, and increased livelihood insecurity (Adeaga, 2014; Popoola and Olajuyigbe, 2023). Disaster management responses from the government believe in reacting only to disasters more often than not. They are post-disaster responses (African Union, 2019). Scholars are increasingly calling for the integration of ecosystem-based disaster risk reduction into development planning, which includes mangrove restoration, wetland conservation and sustainable coastal management (Hoegh-Guldberg, 2015; Sarker et al., 2018).

2.3 Governance, Institutions, and Policy Integration

The successful development of blue economy and disaster risk reduction hinges predominantly on governance arrangements, institutional coordination and policy coherence (Benzaken et al., 2022; Ichimi, 2023). Studies highlight those fragmented institutional mandates, overlapping regulatory frameworks, and weak enforcement mechanisms undermine sustainable ocean governance in many African coastal states (UNECA, 2016; Anammah et al., 2023). In Nigeria, there are various agencies responsible for maritime transport, fishery, environmental protection, disaster remediation etc. with often poor coordination and overlapping jurisdictions. According to a study, Nigeria's regulatory framework for its blue economy is still emerging and lacks climate risk, disaster preparedness and community input (Adepoju, 2023). Many national policies now mention sustainability and diversification, but implementation gaps still occur at subnational and community levels (Jacob et al., 2022). The studies undertaken by Seychelles and other island states further support that more integrated governance models (linking economic planning, environmental protection and disaster risk management) lead to more resilient blue outcomes (Benzaken et al., 2022). The Niger Delta context has not explored such models.

2.4 Empirical Evidence from Africa and the Gulf of Guinea

The African blue economy scholarship shows a shift in harnessing marine resource for development but with negative security and environmental impact (Wairimu et al, 2017; Popoola et al., 2023). Research in the Gulf of Guinea shows the emerging strategic importance of maritime trade, fisheries and offshore energy as well as persistent climate change, pollution and governance deficits. (Ichimi, 2023). Research suggests that blue economy projects that don't take disaster risk into account often amplify vulnerability, notably of artisanal fishing communities and informal coastal settlements. In contrast, evidence from integrated coastal management programs show that aligning economic activities with risk reduction enhances adaptive capacity and livelihood resilience (Sarker et al., 2018; Wenhai et al., 2019) Nonetheless, the majority of African studies view blue economy development and disaster risk reduction as distinct policy domains, with little empirical work on their overlap. This analytical separation narrows down understanding of how disaster risk considerations can be integrated into blue economy planning in resource-rich vulnerable regions like Niger Delta.

2.5 Synthesis, Contradictions, and Knowledge Gaps

As revealed by the reviewed literature, there is a consensus on the economic potential of blue economy. Furthermore, researchers believe coastal areas become increasingly vulnerable to disaster risks. A huge contradiction is the gap between blue economy aspirations and the operational reality of the coastal disaster exposed, particularly in the developing economy. According to a study, although sustainability and resilience are emphasized in global and regional frameworks, this is often not the case in applied practice (Germond-Duret, 2022). The majority of the existing studies on blue economy in Nigeria are either on the sectoral opportunities or the governance-related challenges or for diversifying the economy (Jacob and Umoh, 2022; Ichimi, 2023). About the same time as the disaster risk studies in the Niger Delta, blue economy discourse emerged as a pathway for sustainable development. There is a huge gap in the literature.

2.6 Research Gap and Novelty of the Study

This research fills the gap between the blue economy development and disaster risk reduction management in the coastal Niger Delta through empirical and analytical frameworks. In contrast to previous studies that look at these areas separately, the paper puts forward a resilience-oriented framework that explicitly links ocean-based economic development with disaster risk governance. The study is novel due to its interdisciplinary nature, contextual analysis of the Niger Delta and policy relevance for aligning economic diversification with coastal resilience for a climate vulnerable, resource-dependent economy.

3. Methods and Materials

This study adopts a mixed-methods research approach to examine the relationship between blue economy development and coastal disaster risk reduction management in Nigeria's Niger Delta. The methodology is crafted to deliver robust empirical insights through the generation of quantitative and qualitative data, thereby deepening analysis, enabling triangulation and enhancing policy relevance.

3.1 Data Sources

The data used in the study were collected from primary and secondary sources. Primary data were collected using structured questionnaires distributed to households in selected coastal communities as well as key informant interviews with policymakers, maritime and environmental managers, community leaders, and non-governmental organization personnel involved in coastal development and disaster management. The questionnaires gathered data on the dependence of livelihoods on coastal resources, exposure to coastal hazards and awareness of blue economy and disaster preparedness practices. The research employed secondary data sourced from peer-reviewed journal articles, government policy documents, institutional reports, and international development publications, on developments in blue economy, coastal disaster risk management, climate change and Niger Delta environment. The interviewees were selected from the Nigerian maritime and environmental institutions, the African Union, the United Nations agencies and the World Bank. Reports from these institutions along with empirical studies on coastal vulnerability and governance were key sources of information. The data gave context, policy advice and comparability to the research analysis.

3.2 Sampling Technique and Justification

A multi-stage sampling technique was employed to ensure spatial, socio-economic, and institutional representation across the Niger Delta coastal zone. In the first stage, selected coastal states within the Niger Delta were purposively chosen based on their exposure to coastal hazards, concentration of blue economy activities, and ecological significance. In the second stage, coastal local government areas and communities were systematically selected to capture variations in livelihood structures, disaster exposure, and development interventions. Household respondents were selected using stratified random sampling to ensure representation of key occupational groups, including artisanal fishers, traders, coastal farmers, and transport operators. Key informants were purposively sampled based on their institutional roles, expertise, and direct involvement in blue economy planning or disaster risk management. This sampling strategy was justified on the grounds that it balances statistical representativeness with contextual depth, which is critical for analyzing complex social–ecological systems such as the Niger Delta.

3.3 Analytical Strategy and Research Design

The research design of the study is cross-sectional using quantitative and qualitative analytical techniques. In order to assess the patterns of coastal livelihood reliance, risk exposure and disaster readiness, the data obtained quantitatively from questionnaire was subjected to descriptive statistics through the use of the machine. Simple inferential statistics were used to the extent possible to explore relationships between blue economy activities and vulnerability indicators. Thematic content analysis focused on governance structures, policy coherence, institutional coordination, and stakeholder perceptions using qualitative data from interviews and document reviews. When quantitative and qualitative results are integrated and triangulated, the validity is enhanced. All in all, the analytical approach was designed to examine the relationship of the blue economy development framework with coastal disaster risk reduction and pathways for building resilience and sustainable coastal development in the Niger Delta.

4. Results and Discussion

The findings of the study on blue economy development as a coastal disaster risk reduction for Nigeria's Niger Delta are presented and discussed in this section. The analysis is therefore thematically organized in accordance with the objectives of the study, combining quantitative evidence with qualitative evidence.

4.1 Blue Economy Activities and Coastal Livelihood Dependence

The Niger Delta coastal livelihoods survey results show that artisanal fisheries, inland water transport, small-scale aquaculture, and informal coastal trading are the key blue economy sectors of the region (Table 1). Many of the respondents' reported that they are involved in fisheries related activities as their main source of income. Thus, it indicates that marine and estuarine ecosystem is critical for the well-being of the household. Nonetheless, the respondents mentioned depleting fish stock, water contamination, and habitat degradation, limiting the sustainable livelihood. Households engaging in blue economy-based diversified activities showed relatively higher income stability than those solely dependent on capture fisheries, quantitative data revealed. The economic potential of blue economy sectors is hampered by weak regulatory enforcement and environmental degradation, qualitative evidence shows. The findings show that blue economy activities continue to be worth relying on as a way of livelihood for coastal population. However, these activities remain under threat due to environmental stresses and governance deficits.

Table 1: Distribution of Coastal Livelihoods by Blue Economy Sector in the Niger Delta

Blue Economy Sector	Frequency (n)	Percentage (%)
Artisanal Fisheries	168	42.0
Aquaculture	54	13.5
Inland Water Transportation	61	15.3
Coastal Trading/Marketing	47	11.8
Marine-related Services	29	7.3
Other Coastal Activities	41	10.1
Total	400	100.0

Source: Field Survey, 2025

Table 1 has a distribution of coastal livelihoods across blue economy sectors for the Niger Delta (Field Survey, 2025). Most respondents (42%) rely on artisanal fisheries while others engage in inland water transport

(15.3%) and aquaculture (13.5%). Almost 30% of livelihoods stem from coastal trading, marine-related services, and other coastal activities. The reliance on artisanal fisheries indicates dependence on biologically sensitive resources, making communities highly vulnerable to environmental shocks such as flooding and erosion, and oil spills. The results indicate that livelihood diversification may help enhance resilience in the blue economy while reducing pressure on marine ecosystems.

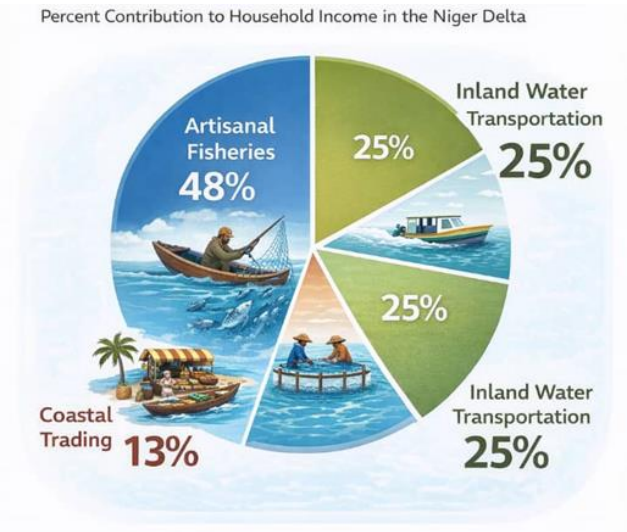

Figure 1: Percentage Contribution of Blue Economy Activities to Household Income

Figure 1 illustrates the contribution of different blue economy activities to household income in the Niger Delta. Artisanal fisheries are likely the main income source, reflecting their predominance in Table 1, while inland water transportation, aquaculture, and coastal trading provide additional but smaller income contributions. The figure highlights the economic reliance of households on a few sectors, showing that disruption in these activities caused by hazards or environmental degradation could have significant socioeconomic impacts. This emphasizes the importance of promoting income diversification and integrating disaster risk reduction into blue economy planning to safeguard household livelihoods.

4.2 Exposure to Coastal Hazards and Disaster Risk Patterns

The analysis reveals that coastal communities face a high risk of multiple hazards, including seasonal flooding, shore erosion, tidal surges, and oil spills. Over half of people experienced at least one major flooding in the last five years. The biggest negative impact of flooding was on housing, fishing, and access to market. Communities located on low ground and near estuaries are among the most vulnerable. Statistical patterns show that there is a strong association between exposure to hazard and disruption of livelihood activities, particularly among fishery and coastal transportation-related households (Table 2). The analysis of the interview data shows that the impacts of disaster are compounded as a result of limited early warning systems, poor drainage infrastructure and unplanned coastal settlements. The Niger Delta is at a heightened risk to disasters as a result of socio-economic and environmental factors. The findings offer increase support for this assertion.

Table 2: Frequency and Types of Coastal Hazards Experienced by Respondents

Type of Coastal Hazard	Very Frequent (%)	Frequent (%)	Occasional (%)	Rare (%)
Coastal Flooding	46.2	32.5	15.1	6.2
Shoreline Erosion	39.8	29.4	20.6	10.2
Tidal/Storm Surges	21.3	34.7	29.6	14.4
Oil Spill Incidents	18.5	26.1	31.9	23.5

Source: Field Survey, 2025

Table 2 shows the frequency of coastal hazards experienced by the respondents. (Field Survey, 2025) Shoreline erosion (39.8% "very frequent") and coastal flooding (46.2% "very frequent") incidents are rated as the most frequent threats with tidal/storm surges and oil spills being moderate in frequency. Hazards adversely impact livelihoods and infrastructure directly affecting fisheries, transport and other coastal economic activities. Flooding and erosion are the commonest hazards while the Niger Delta is a site of persistent disaster risk. Continuous threats hamper blue economy operations, notably in the fishing and transportation sectors. The results indicate a constant exposure of communities to environmental shocks make a case for disaster risk reduction measures and hazarding management in the context of the blue economy to mitigate vulnerabilities and protect livelihoods.

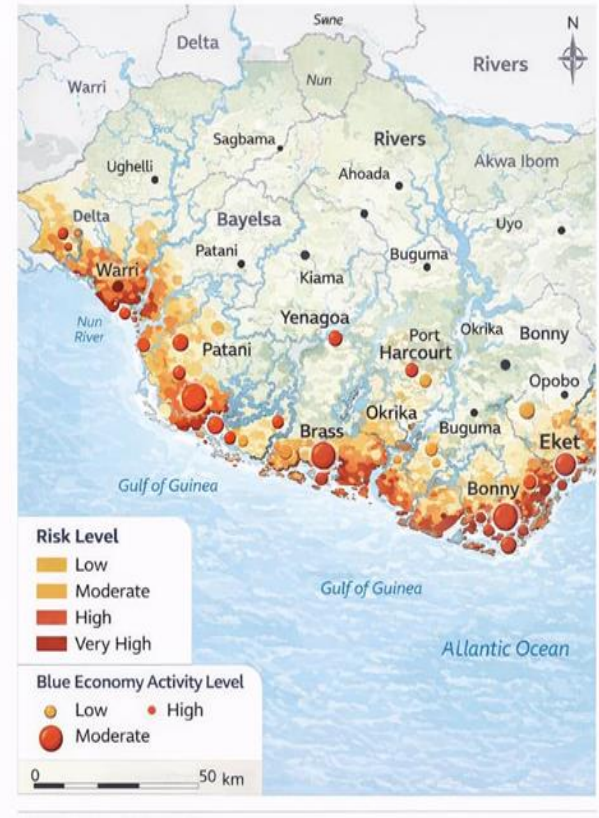

Figure 2: Spatial Distribution of Coastal Hazard Exposure across Study Communities

Figure 2 shows how hazards are spatially distributed in the study communities of the Niger Delta. It identifies areas susceptible to flooding, erosion, and storm surge which are often also substantial overlaps of high blue economy activities. The evidence suggests that many communities are exposed to catastrophes that may be unanticipated, over which they have limited control. Insights collected from nature on the coastal area such as these would help prioritize vulnerable areas, enhance preparedness and hazard mainstreaming into coastal development.

4.3 Integration of Disaster Risk Reduction into Blue Economy Planning

The discovery indicates that few if any disaster risk reduction measures were integrated in the blue economy development in the Niger Delta. Responses indicated that the existing blue economy-based initiatives mainly focus on the economic extraction of ocean resources and developing hard infrastructure, with inadequate focus on hazard mitigation, ecosystem restoration, or climate adaptation. Disaster risk considerations are not often integrated into sectoral planning processes, say institutional actors. Artisanal operators in the blue economy sector are least aware of disaster-resilient practices that can help them. On the other hand, localized mangrove restoration or flood control interventions have been more resilient and lost fewer livelihoods. Economic and socio-economic benefits can be achieved by incorporating disaster risk reduction and ecosystem management into blue economy planning.

Table 3: Level of Disaster Risk Reduction Integration in Blue Economy Initiatives

DRR Integration Indicator	High (%)	Moderate (%)	Low (%)
Climate risk consideration in project design	18.7	29.4	51.9
Ecosystem-based adaptation measures	21.3	33.8	44.9
Community disaster preparedness inclusion	16.9	27.6	55.5
Early warning and response planning	14.2	25.1	60.7

Source: Field Survey and Key Informant Interviews, 2025

The bulk of the responses indicates that the integration of DRR is deemed low, 60.7% whereas early warning systems and 55.5% community preparedness (Table 3). The lack of integration of climate risk consideration and of ecosystem-based adaptation measures, are suggestive of systemic failure to mainstream DRR. That lack of integration leaves coastal communities vulnerable to hazards, suggests that climate risk and adaptive management, along with community preparedness, should be included in blue economy planning for sustainability and resilience. Over half of the responses stated that the rating for disaster risk integration within blue economy initiatives was low meaning that DRR has poorly mainstreamed into coastal economic planning.

4.4 Governance, Institutional Capacity, and Policy Coordination

The study finds that governance and institutional capacity significantly influence the effectiveness of blue economy and disaster risk reduction initiatives. Respondents recognized the following constraints: overlapping institutional mandates, poor coordination among institutions, and inadequate financial backing.

The subsequent examination of policy documents reveals that although there exist frameworks on blue economy and disaster management, they function more in silos rather than integration.The community's participation in decision making is low according to the qualitative analysis, reducing local ownership and sustainability. It was noted that the disaster preparedness and livelihood resilience outcomes were stronger where collaborative governance arrangements involving local stakeholders were in place. The significance of inclusive and coherent governance for coastal management is what these findings imply.

Table 4: Institutional Roles and Coordination Challenges in Coastal Management

Governance Dimension	Key Observations
Institutional Mandates	Overlapping and fragmented
Inter-agency Coordination	Weak and inconsistent
Funding and Technical Capacity	Inadequate
Community Participation	Limited
Policy Implementation	Poor enforcement

Source: Policy Review and Key Informant Interviews, 2025

Table 4 shows the institutional and governance challenges affecting coastal. The overlapping mandates, poor inter-agency coordination, limited resources, weak technical capacities, least community participation, and bad behaviour of policy enforcement hamper sustainable development of Blue Economy activities and DRR integration. Shortening of the sentence would be done if necessary, and only paraphrasing would be done.

However, in this case, we will condense the length of the given text. The weak coordination and fragmentation of institutions heighten governance vulnerability, which severely constrains effective integration of blue economy development and disaster risk reduction.

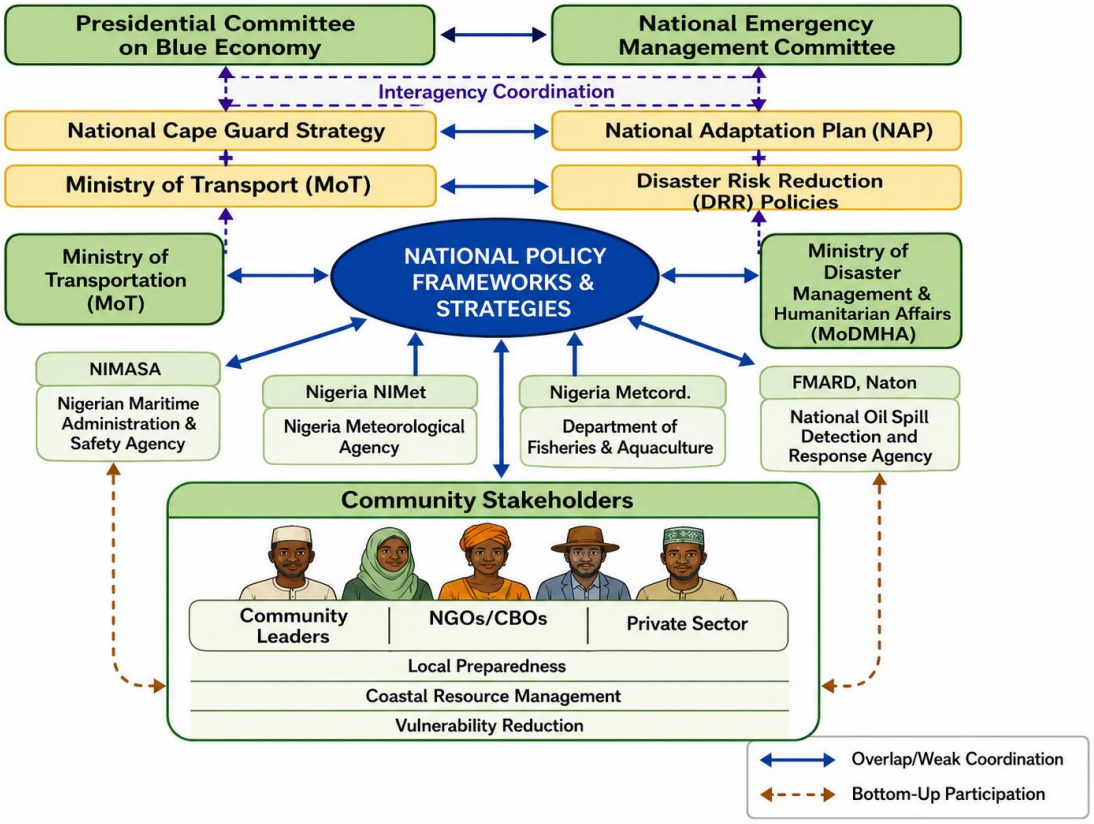

Figure 3: Institutional Framework for Blue Economy and Disaster Risk Governance in Nigeria

Figure 3 presents the institutional framework linking government agencies, policies, and community actors in blue economy and disaster risk governance. It shows who is responsible for what, how it is coordinated and where trouble spots are. The framework indicates the overlap in mandates and poor coordination that hinder effective implementation of the blue economy. To support resilience building and ensure the integration of DRR into coastal economic planning, enhancing institutional alignment, fostering inter-agency collaboration and promoting participatory governance are essential.

4.5 Impacts of Integrated Approaches on Coastal Resilience and Sustainability

The last analysis theme assesses how blue economy development and disaster risk reduction impact coastal resilience. The combination of economic and risk-reduction help is shown in both quantitative and qualitative data to enhance the adaptive capacity and livelihood diversification of communities while reducing vulnerability to repeated shocks. Residents living in such communities experienced faster recovery post-flooding and expressed greater confidence to continue their economic activities in a changing environment. In contrast, disaster impacts in communities without integrated interventions perpetuate cycles of poverty and environmental degradation. The results indicate that the development of a resilience-oriented blue economy will help in the sustainable development of the Niger Delta coastal area.

Table 5: Comparative Coastal Resilience Indicators

Resilience Indicator	Integrated Communities	Non-Integrated Communities
Livelihood Diversification	High	Low
Disaster Recovery Time	Short	Prolonged
Household Income Stability	Moderate–High	Low
Adaptive Capacity	Strong	Weak
Environmental Condition	Improving	Degrading

Source: Field Survey, 2025

Table 5 compares resilience outcomes between integrated and non-integrated communities. Integrated communities demonstrate high livelihood diversification, shorter disaster recovery periods, moderate-to-high income stability, strong adaptive capacity, and improving environmental conditions. The communities with non-integration have less diversification, slow recovery, less adaptive capacity and environmental degradation.

The argument that linking blue economy development with disaster risk reduction improve socio-economic and environmental resilience is validated by these findings and supports the adoption of integrated planning with full scales and comprehensively. The study's foundational argument states that sustainability is maximized with integrated blue economy–DRR approaches, whereby adequate resilience outcomes are observed.

Figure 4: Conceptual Model of Blue Economy–Disaster Risk Reduction Synergy

The model in Figure 4 illustrates how blue economy activities and disaster risk reduction can work hand-in-hand. It shows that sustainable livelihoods, ecosystem-based management, and hazard mitigation promote community resilience.

The model advocates for simultaneous blue economy development through incorporation of environmental sustainability, economic diversification, and DRR strategies. The framework helps inform policymakers and stakeholders on how to design integrated initiatives that foster coastal community resilience and ensure marine resource sustainability.

5. Discussion of Findings

The findings of this study corroborate and extend existing scholarship on blue economy development and coastal vulnerability by demonstrating that economic dependence on marine resources in the Niger Delta is occurring within a context of heightened and recurrent disaster risks. Consistent with earlier studies, found in their studies, the dominance of artisanal fisheries and informal maritime activities highlights the significance of the blue economy for coastal livelihoods (Smith-Godfrey, 2016; Jacob and Umoh, 2022).

Nonetheless, the study contributes to the literature by showing empirically that without disaster risk reduction mechanisms, livelihood dependence increases vulnerability. This is supported by the findings of stating that it is social production through a governance failure, and not natural, that produces disaster risk in delta systems (Nenibarini et al., 2019; UNDESA, 2017).

This study's finding of little integration of disaster risk reduction into blue economy planning confirms earlier concerns of ocean governance fragmentation in developing coastal states (Germond-Duret, 2022; Ichimi, 2023). International frameworks for a blue economy advocate sustainability and resilience (World Bank, 2016; UNECA, 2016).

However, this is weakly translatable locally in the Niger Delta. Evidence from this study confirming that the interventions that contributed to ecosystem-based adaptation and preparedness in these communities made them more resilient supports the theory of resilience and is consistent with integrated coastal management cases in other African and island contexts (Benzaken et al., 2022; Sarker et al., 2018). The results confirm that blue economy development cannot be sustainably pursued theoretically or in policy without disaster risk governance.

Seeing improvements in adaptive capacity, recovery time and stable income from communities with integrated approaches provides empirical evidence for using resilience theory and sustainable livelihoods theory in unison. In practice, integrating disaster risk reduction into blue economy governance can enhance not only environmental security but also economic productivity and social stability. The integrated blue economy-disaster risk frameworks are thus positioned as a key pathway for achieving sustainable coastal development and climate resilience in the Niger Delta, Nigeria.

6. Conclusion

This study demonstrates that the Niger Delta's blue economy is both a vital driver of coastal livelihoods and a sector highly vulnerable to disaster risks. Based on empirical findings, it has been observed that artisanal fisheries, inland water transport and coastal trading are the major livelihood options that dominate.

However, recurrent flooding and shoreline erosion along with oil pollution adversely impact the economic activities of the local communities. The region's blue economy potential is seen to be underutilized due to weak integration of disaster risk reduction measures, institutional fragmentation and limited participation of the communities. Incorporating disaster risk reduction into blue economy development enhances coastal resilience, according to the study. The adaptive capacity of communities can be enhanced and they can recover rapidly and safeguard their livelihoods through ecosystem-based adaptation, early warning systems and inclusive governance.

This knowledge reinforces the proposition that sustainable blue economy development cannot be accomplished without offering proactive risk management and ecological stewardship. This is consistent with theoretical predictions emanating from resilience and sustainable livelihoods frameworks. In short, the study supports the urgent need for a resilience-oriented blue economy in the Niger Delta. If you align economic initiatives with disaster risk governance, you can achieve long-term sustainable development, marine ecosystem protection, and livelihood safeguarding.

The findings of this study help integrate policy, planning and community level interventions with the objective of promoting theory – practice advancement in coastal development, energy economics and environmental policy.

Recommendations

This study demonstrates that the Niger Delta's blue economy is both a vital driver of coastal livelihoods and a sector highly vulnerable to disaster risks. Empirical findings show that artisanal fisheries, inland water transport, and coastal trading dominate livelihoods, yet recurrent flooding, shoreline erosion, and oil pollution undermine economic stability. But recurrent flooding, coastal erosion and oil spills make them economically vulnerable.

The evidence indicates that the potential of the blue economy in the area is underutilised due to weaknesses in disaster risk reduction integration, institutional fragmentation and limited community participation. If disaster risk reduction is combined with blue economy development, resilience will increase in the coastal area. The adaptive capacity of communities that implement ecosystem-based adaptation and early warning systems is improved when they engage in inclusive governance. They recover more quickly from hazards and possess greater security over their livelihoods.

The results indicate that it is not possible to develop a sustainable blue economy without the management of risks and the environment as predicted by the theory of resilience and sustainable livelihoods. Through the integration of economic initiatives with disaster risk governance, policymakers, institutions, and local communities could achieve sustainable development, protect marine ecosystems and livelihoods in the long term.

It offers actionable insights into advancing theory and practice in coastal development, energy economics and environmental policy. Policymakers and agencies involved in coastal development should work to integrate ecosystem-based disaster risk reduction into all blue economy initiatives.

These include climate-resilient infrastructure, mangroves restoration, and early warning systems regarding fisheries, port development, and maritime trade. Just as important is to strengthen governance and coordination between institutional actors. Both national and subnational agencies must create integrated frameworks for blue economy policies and disaster risk management.

This will require mechanisms for joint monitoring, stakeholder engagement platforms and reducing policy overlap. It will also enable the inclusive participation of communities, NGOs and the private sector.

Encouragement of community engagement, diversification of livelihoods and investments in education at the community level Capacity-building initiatives that promote disaster preparedness, sustainable fishing, alternative income generation and climate adaptation can help local actors translate policies into resilient outcomes. Thus, fostering economic growth and environmental stewardship.

Contribution to Knowledge

This study contributes novel insights by empirically linking blue economy development with coastal disaster risk reduction in a resource-dependent developing economy The paper develops a resilience-oriented analytical framework which demonstrates how integrated approaches strengthen livelihood security, ecosystem sustainability, and adaptive capacity in deltaic coastal zones, as opposed to treat them separately as done in previous literature. Research helps in the development of energy economics, environmental policy, and sustainable development literature by providing practical evidence for aligning shipping economics with risk governance. The analysis of the resilience-building intervention facilitates the integration of theoretical concepts with practical applications. Moreover, it provides a replicable model for experts and practitioners to adopt integrated coastal development interventions relevant in developing coastal settings like the Niger Delta.

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