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Climate change, migration and conflict in the Niger Delta: A qualitative study of the poly-crisis nexus

Emmanuel Rowlands *, Prince Eze

Qatar-South Africa Centre for Peace and Intercultural Understanding, Faculty of Humanities, University of Johannesburg, Johannesburg, South Africa

Abstract

Despite its vast natural wealth, Nigeria's Niger Delta is mired in a complex poly-crisis marked by environmental degradation, climate change, and human migration. This paper critically examines the nexus of these crises through qualitative secondary data and document analysis, applying a Vulnerability and Resilience framework to understand how climate-induced environmental changes shape migration and conflict patterns in the Delta. The analysis showed that climate change acts as a structural catalyst for both human mobility and conflict escalation. Deteriorating agricultural productivity, water scarcity, and coastal erosion have driven communities to migrate in search of livelihoods, often settling in ecologically fragile areas. This migratory pressure has, in turn, intensified environmental degradation in host areas already burdened by ecological fragility, thus reinforcing a vicious cycle of resource depletion and intercommunal tension. To address this, the study calls for a multi-level policy response that enhances local resilience particularly among smallholder farmers, through climate-smart agriculture and sustainable resource governance. It further advocates a shift from reactive responses to systems-based conflict transformation, recognising the interdependence of environmental and socio-political dynamics. Long-term solutions will require coordinated efforts by governments, civil society, and international partners to foster a more resilient and just future for the region.

Keywords: Poly-Crisis; Climate-Change; Migration; Farmers; Environment; Niger-Delta

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* Corresponding author. *E-mail address:* emmanuelr@uj.ac.za

1. Introduction

Across Nigeria and much of the African continent, the entangled crises of climate change, migration, and environmental degradation constitute a mounting threat to humanity and human survival. These interlinked dynamics have devastated livelihoods, particularly in agrarian communities undermining food security and fuelling cycles of displacement and intercommunal conflict (Dias et al., 2022; Kwanhi et al., 2024; Tuholske et al., 2024). For example, this poly-crisis has intensified vulnerability among rural populations, with climate projections indicating a significant decline in staple crop yields (e.g., cassava, maize, yam, and rice) by 2050 (Omoleye and Segun, 2018; Shin et al., 2024; Zagre et al., 2024) Climate-induced disruptions manifested through extreme weather events, flooding, and drought have further eroded agricultural productivity, fisheries, and livestock sectors, catalyzing the migration of farming and pastoralist populations into already resource-stressed zones (Mikailu, 2016; Omoleye and Segun, 2018; MacCarthy et al., 2025).

This migration has contributed to heightened tensions, particularly between farmers and pastoralist communities, (Ladan, 2014; Mikailu, 2016; Babatunde and Ibnouf, 2024), a pattern also in Central and West African countries observed in South Sudan, Mali, and the Democratic Republic of Congo (Tonah, 2006; Lyammouri, 2021; Abdou et al., 2022). In Nigeria, the farmer-herder conflict arising from the migration of herdsmen has become increasingly lethal in recent years - 2020, 2021, 2022, 2023, 2024, with significant loss of life and widespread human suffering, with little or no evidence of effective state response (Omotayo, 2010; Abbass, 2014; Godwin, 2018). Notably, these clashes are no longer solely resource-based but have acquired new socio-political dimensions, exacerbating regional instability (Omotayo, 2010; Godwin, 2018; Buhaug et al., 2023).

Despite growing concern, scholarly engagement with the interrelationship between climate change, migration, and conflict in Nigeria remains limited. Existing studies, while insightful, tend to isolate specific elements such as land tenure or resource scarcity without fully integrating climate and environmental variables. For example, Koubi (2019) examines transnational dimensions of the farmer-herder crisis across Chad and Nigeria, but neglects intra-regional specificities. Adisa and Adekunle (2010) identify livelihood pressures but fall short of linking it directly to climate change; and Abbass et al. (2022) foregrounds policy failures without exploring environmental degradation as a core driver farmers-herder conflict in Nigeria. This study addresses these gaps by critically analysing the climate-migration-conflict nexus in the Niger Delta of Nigeria.

This study seeks to examine how climate change contributes to migration and conflict in the Niger Delta, and how these interconnected issues shape the region's environmental and socio-political landscape. Drawing on secondary data and guided by the Vulnerability and Resilience Theory, the paper aims to provide a conceptual understanding of the poly-crisis dynamics affecting local communities and to identify policy-relevant insights for promoting resilience and stability.

1.1. Conceptualizing the poly-crisis and theoretical framework

Lawrence et al. (2022) define a global poly-crisis as the convergence of multiple systemic crises whose cumulative impact is magnified by the interdependence of the systems in which they arise. In this configuration, the resultant harm far exceeds the sum of the crises considered in isolation. Contemporary global society is increasingly characterized by such interlocking crises ranging from environmental degradation, mass

migration, and gender inequality to climate change, biodiversity collapse, and financial instability, all of which constitute a multidimensional threat to human flourishing (Homer-Dixon et al., 2023; Lawrence et al., 2024). As Wolf (2022) argues, the world now confronts an unprecedented configuration of complex, rapidly evolving challenges: looming ecological collapse, geopolitical volatility, the resurgence of nuclear threat, and faltering global economic systems. Central to this crisis configuration is global capitalism, which functions as a key structural driver of ecological destabilization and socio-political inequality (Stanturf, 2021; Lerch, 2023).

Nearly every nation is grappling with the cascading effects of this poly-crisis, investing significant resources in both research and mitigation efforts. Within international peace and security discourse, the language of "cascade crises" and "poly-crises" has become increasingly prominent (World Economic Forum, 2023). These concepts capture the interconnected nature of global risks geopolitical, environmental, economic, and highlight the erosion of systemic resilience. As the World Economic Forum (2023:9) notes, these crises are "interrelated environmental, geopolitical, and socioeconomic risks," whose mutual amplification "gives rise to the risk of poly-crises - where disparate crises interact such that the overall impact far exceeds the sum of each part."

Climate change, in particular, represents a critical accelerant within this constellation of risks, with profound implications for global development trajectories, geopolitical stability, and human security (Homer-Dixon et al., 2021; Simpson et al., 2023). Scholars increasingly highlight the violent repercussions of climate-induced ecological disruptions, which degrade biospheres, destabilize livelihoods, and heighten conflict risk in already fragile states (Welzer, 2017; Koubi, 2019; von Uexkull and Buhaug, 2021; Sommerville et al., 2014). UNICEF (2023) emphasizes the intensification of global hardship in recent years: the most severe energy crisis since the 1970s, a lingering pandemic, escalating military conflict among nuclear-armed states, record inflation, mounting food insecurity, and unsustainable sovereign debt. These intersecting shocks disproportionately affect women and children, manifesting in widespread malnutrition, educational disruption, forced migration, and humanitarian dependency, most notably in the context of Ukraine and across the Global South (Filho et al., 2023; Torero, 2023; Makinde et al., 2023).

UNICEF further asserts that the systemic nature of polycrises renders them uniquely intractable. Their interconnectedness resists linear solutions, and institutional inertia or failure to respond adequately exacerbates instability and contributes to the risk of systemic collapse. Beyond structural threats such as climate change and financial fragility, the current poly-crisis also encompasses more immediate geopolitical flashpoints: Russia's invasion of Ukraine, U.S. electoral polarization, the European debt crisis, protracted conflict in the Middle East, Africa's migration and environmental crises, among others (Omoleye and Segun, 2018; Koubi, 2019; Lawrence et al., 2024).

Technological advancements in Asia-including nuclear innovation, artificial intelligence, and bioengineering, introduce new thresholds of both opportunity and existential risk (Scheffran, 2025) Nonetheless, the most pressing environmental issues in the region remain climate-induced disasters such as rampant wildfires and the accelerated melting of Arctic sea ice (UN, 2023). Lawrence et al. (2023) identify key domains - economic, environmental, health, food, energy, transportation, communication, and international security as core vectors of the global poly-crisis.

This study turns a focused lens on the Niger Delta as a microcosm of these global dynamics. By deploying the theoretical framework of Vulnerability and Resilience, it explores the interactive effects of environmental, social, and economic stressors on human livelihoods and regional stability (Ribot, 2014; Thomas et al., 2018;

Biswas and Nautiyal, 2023). The Vulnerability and Resilience framework provides a dual epistemological lens: first, through the pioneering work of Piers Blaikie, who conceptualized vulnerability as a socially constructed condition rooted in political marginalization, resource inequality, and historical legacies such as resource exploitation, colonial extraction; and second, through C.S. Holling's 1973 ecological model of resilience, which defines resilience as the capacity of systems to absorb disturbance while maintaining core functions. Blaikie's work compels us to understand vulnerability as a dynamic and relational process, shaped by asymmetric power relations and institutional failures. Holling, conversely, offers a systems-theoretical orientation, emphasizing adaptability, learning, and the potential for transformative change in the face of exogenous shocks.

When applied to the Niger Delta, these theories reveal a deeply entrenched pattern of livelihood vulnerability, where communities' dependent on agriculture, fishing, and forest-based economies confront existential threats from oil pollution, deforestation, and climate-induced variability. Environmental degradation has not only devastated ecosystems but has also disrupted income flows, exacerbated food insecurity, and intensified poverty. These biophysical pressures are compounded by inadequate infrastructure, poor access to health and education services, and a history of political neglect - conditions that have entrenched the region's fragility.

Moreover, the failures of governance manifest in weak regulatory institutions, lack of environmental accountability, and the marginalization of local voices, serve to reproduce and deepen vulnerability. Conflict in the Niger Delta is thus not merely a function of environmental scarcity but a symptom of broader structural violence (Udoh et al, 2019; Babátúndé, 2020). Existing studies, while insightful, often treat climate change, migration, and conflict as discrete phenomena, overlooking their complex interactions within specific socio-ecological contexts (Balogun and Onokerhoraye, 2022; Luke et al., 2015). Moreover, a number of existing studies do not adequately integrate the role of governance failures, political economy dynamics, and historical injustices in shaping vulnerability and resilience in the region (Balogun and Onokerhoraye, 2022). By interrogating these complex interrelationships, this study seeks to generate context-specific insights into how poly-crisis manifests in vulnerable regions and what pathways might exist for cultivating resilience and transformative peace.

2. Methodology

This study adopts a qualitative approach based on the review and synthesis of secondary data. The research draws on existing academic literature, policy documents, institutional reports, and other credible sources to examine the complex relationship between climate change, migration, and conflict in the Niger Delta (Cheong et al., 2023; Daoust and Selby, 2024). Relevant materials were identified through manual searches of academic databases, policy websites, and institutional repositories (Browne et al., 2019). Sources were selected based on their focus on the Niger Delta or closely related contexts in West Africa, and their relevance to the core themes of the study: environmental degradation, climate change, migration, and regional conflict. Rather than following a formal coding process, the study involved a close reading of the selected texts to extract key arguments, case examples, and policy observations. These were then synthesized thematically to highlight recurring patterns, causal relationships, and points of tension within the literature (Nowell et al., 2017; Onwuegbuzie et al., 2016). This approach enables a conceptual understanding of the poly-crisis dynamics in the Niger Delta and helps identify gaps and opportunities for policy intervention.

3. Between climate change, migration and conflict in the Niger Delta

The intersecting crises of climate change, forced migration, and violent conflict in Nigeria's Niger Delta represent a paradigmatic manifestation of what scholars increasingly describe as a *poly-crisis* - a convergence of multiple, compounding systemic shocks that undermine institutional stability and societal cohesion. Nowhere is this more evident than in the ecological and socio-political landscape of the Niger Delta, where rising sea levels, flooding, intensified rainfall, and coastal erosion, hallmarks of anthropogenic climate change interact with entrenched inequality, environmental degradation, and insecurity, thereby compounding climate vulnerability and severely undermining adaptive capacity (Ezegwu, 2014; Omoleye and Segun, 2018; Martín, 2021; Ogele, 2021).

From a vulnerability-resilience theoretical standpoint, the Niger Delta can be seen as a region in which multiple axes of exposure (ecological, economic, political, and social) intersect with limited adaptive capacity, producing chronic vulnerability among communities already marginalized by extractive governance and historical neglect (Eze et al., 2021; Nduwe Kalagbor et al., 2022; Obiam and Amadi, 2022) The vulnerability framework posits that risk is not merely a function of environmental hazards but is deeply conditioned by the socio-political structures that determine who is exposed, who suffers, and who is protected (Wisney, et al. 2012; Ribot, 2014; Thomas et al., 2018; Biswas and Nautiyal, 2023). In the Niger Delta, those most affected subsistence farmers, fisherfolk, women, and youth are systematically excluded from the institutions and resources that might otherwise enable resilience.

The role of oil extraction over the past five decades cannot be overstated in shaping the region's risk landscape. The degradation of farmlands, loss of biodiversity, and extensive pollution of land and waterways primarily due to the operations of transnational oil corporations have contributed not only to ecological collapse but also to food insecurity, livelihood disruption, and socio-political unrest (Watts and Ibaba, 2011; Ogele, 2021; Josiah and Akpuh, 2022). This degradation has rendered many traditional livelihoods unviable, creating a feedback loop wherein climate-induced environmental stressors and corporate-induced destruction mutually reinforce local vulnerabilities (Ezegwu, 2014; Nguyễn et al., 2023)

Furthermore, in the Niger Delta area of Nigeria the governance vacuum created by the state's complicity in environmental exploitation has fostered a climate of impunity, resulting in weak regulation, poor enforcement, and a lack of accountability for environmental crimes (Cartwright & Atampugre, 2020; Okpaleke and Abraham-Dukuma, 2020; Akerele, 2024). This has eroded trust in formal institutions and fueled grievances, which have been readily mobilized along ethnic and political lines, leading to the proliferation of armed groups and the intensification of resource conflicts (Emuedo, 2015; Amaraegbu, 2011).

Under the resilience framework, resilience is not merely the capacity to "bounce back" from crisis but a dynamic process of transformation - rebuilding, reconfiguring, and reimagining social-ecological systems under stress.(Johnson et al., 2023; Lyytimäki et al., 2023) In this context, the resilience of the Niger Delta is severely compromised by the state's complicity in environmental neglect and its failure to provide public goods, such as health services, education, infrastructure, and security (Bousquet et al., 2016; Rashid, 2024). Furthermore, the degradation of the environment has led to youth restiveness, proliferation of arms and emergence of militant groups which poses great threat to Nigeria (Idemudia and Ite, 2006; Ejumudo, 2014; Eze-Michael, 2020). The region's already fragile ecological and social systems are further destabilized by the presence of multiple armed groups, including Juma'at Nasr al-Islam wal Muslimin (JNIM), Boko Haram, and

various factions of Fulani herdsmen (Koubi, 2019). In the Middle Belt, herder-farmer conflicts have escalated into systematic attacks on entire communities, often surpassing Boko Haram in their destructiveness (Lenshie and Jacob 2020). These conflicts have displaced millions, contributing to a humanitarian emergency that is inextricably linked to the poly-crisis nexus of climate change, forced migration, environmental degradation, and gendered vulnerability.

The empirical literature corroborates this complex reality. For instance, Koubi (2019) underscore how climate-induced stressors particularly drought, sea-level rise, and irregular rainfall are intensifying across West Africa, with projections indicating a 3–6°C rise in regional temperatures by the 2040s. Tarif (2022) projects that these dynamics are likely to intensify in the coming decades. In the Niger Delta, this warming trend is linked to heightened resource scarcity, reduced agricultural yields, and the collapse of local economies (Benson, 2020; Ogele, 2021) Crucially, these environmental pressures catalyze internal and cross-border migration, creating new sites of contestation and conflict.

The vulnerability of women and girls in this setting is particularly acute. Displacement magnifies gendered inequalities, exposing women to elevated risks of sexual and gender-based violence, while limiting their access to education, land, and legal protection. Tarif (2022) notes that livelihood insecurity, and degraded agricultural capacity in the Niger Delta exemplify how climate change is already restructuring the gendered landscape. These gendered vulnerabilities are not incidental but structurally embedded in the patriarchal logics that shape both the formal state and informal community institutions (Balogun and Onokerhoraye, 2022; Tarif, 2022; Moon, 2024) Thus, any resilience-building strategy must foreground gender justice as a core principle of environmental and peace policy.

The situation in the Niger Delta is further exacerbated by poor environmental governance and the predatory alliance between the Nigerian state and multinational oil corporations. As Graham (2020) argues, the region's political economy is characterized by a toxic symbiosis wherein extractive capitalism flourishes at the expense of ecological sustainability and human well-being. Despite contributing over 80% of Nigeria's national revenue, the Niger Delta remains the Delta remains impoverished, polluted, and politically marginalized - a quintessential case of environmental injustice (Bodo and Gimah, 2019; Obiam and Amadi, 2022). The people of the region face what Graham (2020) describes as a "complex crisis" that severely threatens their adaptive capacities and undermines any trajectory toward sustainable development.

Studies by Reginald-Ugwuadu et al. (2014) and Sobomate (2016) further underscore the depth of ecological harm. Reginald-Ugwuadu et al. (2014) observed that in oil-producing communities, land and water sources have been extensively contaminated, with dire consequences for agriculture, health, and the broader ecological balance. Surface water, sediment, vegetation, and even air quality have been compromised, creating cascading public health crises and ecological breakdowns. Sobomate (2016) provides further evidence of the magnitude of environmental harm, documenting over 2,976 oil spills in the Ogoni region alone, amounting to approximately 2.1 million barrels of oil and accounting for 40% of Shell BP's global oil spills. The cumulative impacts of these disasters exemplify the environmental dimensions of the poly-crisis narrative in Southern Nigeria. These environmental degradations are not isolated events but rather cumulative crises that, over time, erode the resilience of communities and ecosystems alike. What emerges is a complex crisis - what Graham (2020) rightly identifies as a "recursive catastrophe" - where each shock diminishes the capacity to withstand the next.

Regionally, the ripple effects of the Niger Delta's poly-crisis are mirrored across Nigeria. In the North-West and North-East, erratic rainfall and desertification have driven farmer-herder conflicts to unprecedented levels. In the South-West, coastal submergence endangers agriculture, while the South-East faces volatile rainfall patterns that threaten food security (Wakdok and Bleischwitz, 2021; Ukwe, 2025). These developments attest to a national poly-crisis in which environmental instability, livelihood collapse, forced migration, and armed conflict form a mutually reinforcing loop (Eze and Alabi, 2024).

From the dual perspective of vulnerability and resilience, it is clear that the current policy architecture is inadequate to meet the scale of the crisis. Interventions must move beyond reactive, short-term fixes toward transformative strategies that dismantle structural inequalities, invest in environmental regeneration, and centre the voices of those most affected. Building resilience in the Niger Delta demands inclusive governance, sustained climate adaptation financing, and the promotion of legal and institutional accountability for environmental harm.

Ultimately, the Niger Delta represents not only a crisis zone but also a testing ground for rethinking the interface between climate change, conflict, and development. It offers a critical lens through which to examine the failures of global environmental governance and the possibilities for locally embedded, justice-oriented responses. Without a paradigmatic shift grounded in the principles of vulnerability reduction and resilience enhancement, the poly-crisis will continue to escalate, threatening not only regional peace and sustainability but Nigeria's broader developmental trajectory.

3.1. Role of stakeholders in tackling the poly-crisis of climate change, migration and conflict, in the Niger Delta

The convergence of climate change, forced migration, and conflict in Nigeria's Niger Delta constitutes a paradigmatic *poly-crisis* - a multi-scalar, mutually reinforcing web of socio-environmental disruptions. Addressing such a complex and layered crisis demands an analytically grounded and coordinated multi-stakeholder response. These include state institutions, international organizations, non-governmental organizations (NGOs), the private sector, and the affected communities themselves. Each actor possesses distinct capacities and obligations in mitigating this systemic crisis and fostering long-term resilience. Drawing from the theoretical frameworks of *vulnerability* and *resilience*, this discussion reframes stakeholder engagement as part of a broader structural response to systemic fragility and climate insecurity. As Graham (2020) rightly emphasizes, the Nigerian government must lead by formulating and implementing comprehensive policy frameworks that address the structural roots of conflict, manage environmentally induced displacement, and tackle climate degradation.

Interact with pre-existing political, economic, and social inequalities to determine who suffers, how severely, and with what long-term consequences (Füssel, 2007; Thomas et al., 2018; Zebisch et al., 2021) As such, the Niger Delta's acute susceptibility to environmental shocks is inseparable from its long-standing marginalization, oil-driven ecological degradation, and weak governance infrastructure. This reinforces the need for a resilience paradigm that is not merely technocratic or infrastructural, but deeply *transformative* - centred on adaptive governance, local agency, and equitable power redistribution (Rahaman et al., 2017; Ford et al., 2020; Ketola et al., 2024).

Within this context, the Nigerian state bears primary responsibility for establishing enabling conditions that reduce structural vulnerability. This involves not only enacting robust environmental legislation but also investing in enforcement capacity, transitioning to low-carbon pathways, and restoring degraded ecosystems (Graham, 2020; Okafor et al., 2024, 2025). However, as vulnerability is systemically produced and historically sedimented, the state's role must extend beyond regulation toward redistributive justice and inclusive development (Cairney et al., 2023; See et al., 2024). State institutions must also facilitate community-based adaptation initiatives, build climate-resilient infrastructure, and promote diversification of livelihoods away from climate-sensitive sectors. (Kirby, 2021; Maela et al., 2024). The Sendai Framework for Disaster Risk Reduction 2015-2030 emphasizes that actions for early warning systems should encompass access to data, diverse perspectives, political threats and vulnerabilities, and larger-scale dialogues about disaster risk creation (Tindan et al., 2022). This framework is key to managing risks and mitigating climate change events such as droughts, floods, heat waves, and extreme rises in temperature that aggravate vulnerabilities in biophysical systems.

Graham (2020) stresses that international actors - including multilateral organizations and development partners - must move beyond episodic financing toward sustained technical cooperation and norm entrepreneurship in climate governance. As Shamsuddin (2020) argues, resilience-building requires holistic policy frameworks that address the interplay of climatic, economic, and political drivers of vulnerability. In this regard, the role of international stakeholders lies not only in resourcing but also in reshaping policy discourses and institutional architectures toward anticipatory governance.

Given the fiscal and institutional constraints confronting many African states, inclusive *multi-stakeholder coalitions* emerge as critical vehicles for resilience. Empirical studies underscore that successful climate adaptation and disaster risk reduction are rooted in participatory, cross-sectoral models that are context-sensitive and locally legitimate (Holler et al., 2020; Graham, 2020; Edlmann and Grobbelaar, 2021; Petzold et al., 2023) These coalitions comprising government agencies, scientists, local farmers, civil society, and the private sector can jointly co-produce knowledge and design interventions that are ecologically sound and socially embedded. By integrating local knowledge and cultural dimensions, such partnerships can enhance the effectiveness of adaptation processes while bridging the gap between research and field-level practice (Islam and Nursey-Bray, 2017).

The financing of resilience cannot be decoupled from broader questions of development equity. As Davis and Vincent (2017) emphasize, resilience must be seen as a global public good that requires distributed responsibility. Mechanisms like the African Development Bank's ADRF programme illustrate the potential for anticipatory, regional-scale responses to climate shocks, though such mechanisms must be embedded in local priorities to ensure legitimacy and sustainability (Graham 2020; Maina & Parádi-Dolgos, 2024). Without meaningful local participation, even well-financed interventions risk reproducing dependency and disempowerment (Biekart and Fowler, 2018).

Civil society, particularly NGOs, plays an indispensable role in both service delivery and accountability (Mundau and Tanga, 2016; Henry et al., 2019). Geekiyanage et al., (2020) notes NGO's are instrumental in fostering environmental literacy, mobilizing grassroots advocacy, and providing humanitarian aid. Graham (2020) observed that NGO's also act as watchdogs, monitoring state and corporate behaviour, and challenging practices that entrench ecological injustice or exacerbate displacement. These initiatives enhance both *social capital* and *institutional resilience* at the community level critically.

The private sector, especially actors in extractive industries, must move from extractive to *regenerative* models of engagement. As Elia et al. (2020) argue, corporate social responsibility (CSR) must be reframed through a resilience lens where companies not only mitigate harm but actively invest in climate-smart infrastructure, sustainable livelihoods, and transparent community development. Through such approaches, businesses can become agents of ecological repair and local empowerment (An Emerging Blueprint for Companies to Advance Local Climate Resilience, 2023). Innovative applications of business' core skills and competencies improve disaster response and recovery operations and community resilience (Dobie et al., 2018). Universities and research institutions can act as knowledge brokers to promote evidence-informed policy and practice. According to Stone et al., universities can conduct interdisciplinary research, develop climate models, and provide technical training to local stakeholders.

Ultimately, the Niger Delta's poly-crisis cannot be addressed through piecemeal, sectoral interventions. The interlocking nature of vulnerability in the region produced by climate hazards, migration pressures, conflict dynamics, and institutional fragility requires stakeholders to operate within a *coordinated ecosystem of responsibility*. While national and international actors may shape the strategic landscape, the durability of any intervention depends on whether it empowers affected communities to adapt, transform, and thrive in the face of compounding risks. A resilience-oriented, justice-centered approach grounded in inclusive governance, environmental accountability, and local agency is thus not merely aspirational, but essential.

4. Conclusion and recommendation

This study has explored the interwoven dynamics of climate change, migration, conflict, and gender in Nigeria's Niger Delta, revealing a poly-crisis that is not only multidimensional but structurally recursive. Each of these factors - ecological degradation, forced displacement, livelihood disruption, and gendered violence interacts in a feedback loop that amplifies systemic risk and deepens the region's fragility. Far from being discrete challenges, these crises are symptoms of a deeper architecture of *vulnerability* - a condition produced by historical marginalization, institutional failure, and environmental injustice.

The vulnerability framework provides a critical lens through which to understand the Niger Delta's crisis not as a series of exogenous shocks, but as a structurally embedded condition shaped by unequal exposure, differential capacity to cope, and deeply stratified access to power and resources. For marginalized groups particularly women, children, and rural communities - vulnerability is not merely ecological, but political and institutional. The degradation of farmlands, rising sea levels, and erratic rainfall intersect with exclusionary land tenure systems, inadequate social protection, and gender-based barriers to education and justice (Rahman and Hickey, 2020; Atkinson and Atkinson, 2023) This convergence transforms environmental stress into compounded insecurity.

Yet within this deeply fraught context, a resilience framework invites a shift from reactive responses to anticipatory, adaptive, and transformative action. Resilience, properly understood, is not a return to pre-crisis conditions, but the cultivation of capacities to absorb, adapt to, and transform in the face of adversity (Folke et al., 2010; Rashid, 2024; Rudiarto et al., 2025) In this light, resilience-building must centre community agency, gender equity, and inclusive governance, recognizing that the ability to navigate crisis is socially and institutionally mediated.

The study's findings call for a paradigmatic shift in both analysis and intervention. First, stakeholders must move beyond technocratic fixes and siloed mandates. A systems-thinking approach is imperative - one that integrates climate adaptation, migration governance, peacebuilding, and gender justice into a unified strategic framework. This requires that interventions engage with both *structural vulnerability* and *adaptive capacity*, targeting root causes while enabling locally situated forms of resilience.

Policy recommendations must therefore be anchored in five interrelated principles that together provide a holistic and justice-oriented response to the poly-crisis in the Niger Delta. First, responses must be guided by intersectional governance and policy coherence. It is imperative to recognize the interconnected nature of climate change, gender inequality, and forced displacement. Integrated governance structures that bring together environmental, humanitarian, agricultural, and peacebuilding actors should be institutionalized. Such coordination can break down existing silos, enhance synergy, and ensure that interventions reflect the complexity of people's lived realities rather than isolated sectoral agendas.

Second, community-embedded resilience must form the foundation of any long-term strategy. Resilience is most effective when it is rooted in local experiences and driven by community participation. Investments in climate-smart agriculture, adaptive social protection systems, early warning mechanisms, and participatory planning must prioritize the knowledge and leadership of local communities. Indigenous knowledge systems, often overlooked in formal planning processes, are essential for designing contextually grounded and culturally resonant responses.

Third, gender-responsive strategies are indispensable. Climate-induced displacement and environmental degradation disproportionately affect women and girls, exacerbating pre-existing vulnerabilities and exposing them to heightened risks of violence, dispossession, and social exclusion. As such, gender analysis must inform all phases of policymaking - from conceptualization to implementation. Women must be supported to access land, education, and justice, and to participate meaningfully in governance structures that shape adaptation and development pathways.

Fourth, environmental accountability and resource justice must be prioritized. The Nigerian state must act decisively to hold corporations accountable for ecological degradation, especially in oil-producing regions. This involves the rigorous enforcement of environmental impact assessments, legally binding corporate social responsibility mechanisms, and the establishment of reparative justice systems. Environmental regeneration should not be treated as an ancillary goal - it is central to human security, social cohesion, and long-term peacebuilding in the region.

Finally, data, research, and climate finance architecture must be strengthened. Evidence-based policymaking requires granular, disaggregated data on climate risks, migration patterns, and conflict dynamics. National and regional research institutions must be capacitated to generate timely and relevant knowledge that informs adaptive governance. In tandem, climate finance must be expanded, democratized, and targeted to reach the most vulnerable communities. Accountability frameworks must be instituted to ensure that resources are used effectively and equitably, without being siphoned off through elite capture or bureaucratic inefficiency.

Together, these principles form the bedrock of a resilient, inclusive, and sustainable response to the complex challenges facing the Niger Delta. Finally, transformative peacebuilding in the Niger Delta will not come from external intervention alone. It must emerge from an architecture of justice that confronts systemic inequality, empowers local agency, and embeds resilience into the political, ecological, and economic fabric of

the region. Averting future collapse requires more than adaptation; it demands a new social contract - one that enshrines ecological stewardship, equitable development, and inclusive governance as the pillars of sustainable peace.

In sum, the Niger Delta stands as both a cautionary tale and a transformative possibility. It exemplifies how extractive economies, weak governance, and climate volatility can produce cascading insecurity - but it also reveals the power of integrated, community-driven, and resilience-oriented approaches to redress entrenched vulnerabilities.

References

Abbass, K., Qasim, M.Z., Song, H., Murshed, M., Mahmood, H. and Younis, I. (2022), "A Review of the global climate change impacts, adaptation, and sustainable mitigation Measures", *Environmental science and pollution research*, Vol. 29 No. 28, pp. 42539-42559. https://doi.org/10.1007/s11356-022-19718-6

Abdou, H., Hassimi, M.S., Habi, B., Marichatou, H. and Tillaberi, N. (2022), "Perception and Resilience Strategies of Livestock Farmers and Agro-Pastoralists Affected by Climate Change: Case of the urban commune of Tera, Niger", *Niger. Environ. Nat. Resour. Res.*, Vol. 12 No. 2, pp. 53-65. https://doi.org/10.5539/enrr.v12n2p53

Adisa, R. and Adekunle, O. (2010), "Farmer-Herdsmen Conflicts: A Factor Analysis of Socio-economic Conflict Variables among Arable Crop Farmers", *Journal of Human Ecology,* Vol. 30, No. 1, pp. 85-99. https://doi.org/10.1080/09709274.2010.11906266

Akerele, O.N. (2024), "Enforcement of environmental laws in the oil and gas industry: quo vadis Nigeria?", Doctoral Dissertation, Robert Gordon University.

Amaraegbu, D.A. (2011), "Violence, Terrorism and Security threat in Nigeria's Niger Delta: An old Problem taking a new Dimension", *African Journal of Political Science and International Relations*, Vol. 5 No. 4, pp. 208-217.

Babatunde, A.O. (2020), "Oil pollution and water conflicts in the riverine communities in Nigeria's Niger Delta region: Challenges for and Elements of Problem-solving Strategies", *Journal of Contemporary African Studies*, Vol. 38 No. 2, pp. 274-293. https://doi.org/10.1080/02589001.2020.1730310

Babatunde, A.O. and Ibnouf, F. O. (2024), "The Dynamics of Herder-Farmer Conflicts in Plateau State, Nigeria, and Central Darfur State, Sudan", *African Studies Review*, Vol. 67 No. 2, pp. 321-350. https://doi.org/10.1017/asr.2024.45

Balogun, V.S. and Onokerhoraye, A.G. (2022), "Climate change vulnerability mapping across ecological zones in Delta State, Niger Delta Region of Nigeria". *Climate Services*, Vol. *27* No. 1, pp. 10020- 100304. https://doi.org/10.1016/j.cliser.2022.100304

Benson, A. (2020), "Social and environmental drivers of climate change vulnerability in the Niger Delta region, Nigeria", *European Journal of Environment and Earth Sciences*, Vol. 1 No. 5, pp. 101-119. https://doi.org/10.24018/ejgeo.2020.1.5.69

Biekart, K. and Fowler, A. (2018), "Ownership Dynamics in Local Multi-Stakeholder Initiatives", *Third World Quarterly*, Vol. 39 No. 9, pp. 1692–1710. https://doi.org/10.1080/01436597.2018.1450139

Biswas, S. and Nautiyal, S. (2023), A Review of socio-economic Vulnerability: The Emergence of its theoretical concepts, models and methodologies", *Natural Hazards Research*, Vol. 3 No. 3, pp. 563-571. https://doi.org/10.1016/j.nhres.2023.05.005

Bodo, T. and B.G. Gimah (2019), "Oil Crisis in the Niger Delta Region of Nigeria: Genesis and Extent". *European Scientific Journal*, Vol. 15 No.36, pp. 1857-7881. https://doi.org/10.19044/esj.2019.v15n36p141

Bousquet, F., Botta, A., Alinovi, L., Barreteau, O., Bossio, D., Brown, K. and Staver, C. (2016), "Resilience and development: mobilizing for Transformation". *Ecology and society*, Vol. 21 No.3, pp. 205-216. https://doi.org/10.5751/ES-08754-210340

Browne, J., Coffey, B., Cook, K., Meiklejohn, S. and Palermo, C. (2019), "A Guide to Policy Analysis as a Research Method". *Health Promotion International*, Vol. 34 No. 5, pp. 1032-1044. https://doi.org/10.1093/heapro/day052

Buhaug, H., Benjaminsen, T.A., Gilmore, E.A. and Hendrix, C.S. (2023), "Climate-driven Risks to Peace over the 21st century", Climate *Risk Management*, Vol. *39* No. 2 pp. 100471-100489. https://doi.org/10.1016/j.crm.2022.100471

Cairney, P., Timonina, I. and Stephan, H. (2023), "How can policy and policymaking foster climate Justice? A Qualitative Systematic Review"*, Open Research Europe*, Vol. 3 No. 51, pp. 140-155. https://doi.org/10.12688/openreseurope.15719.1

Cartwright, R. and Atampugre, N. (2020), "Organised Oil Crime in Nigeria–the Delta Paradox: Organised Criminals or Community Saviours?", *ENACT Research Paper*, Vol. 1, 21. pp. 55-69.

Cheong, H.I., Lyons, A., Houghton, R. and Majumdar, A. (2023), "Secondary Qualitative Research Methodology Using online data within the context of Social Sciences", *International Journal of Qualitative Methods*, Vol. *22*, pp. 160-1705. https://doi.org/10.1177/16094069231180160

Daoust, G. and Selby, J. (2024), "Climate change and migration: A review and new framework for Analysis", *Wiley Interdisciplinary Reviews: Climate Change,* Vol 15 No. 4, pp. 886-89. https://doi.org/10.1002/wcc.886

Davis, C.L. and Vincent, K. (2017), "Climate Risk and Vulnerability: A handbook for Southern Africa". Retrieved from http://researchspace.csir.co.za/dspace/handle/10204/10066

Dias, M.C., Araújo, M., Silva, S. and Santos, C. (2022), "Sustainable olive culture under climate change: the potential of biostimulants". *Horticulturae*, Vol. 8 No. 11, pp. 1048-1063. https://doi.org/10.3390/horticulturae8111048

Dobie, S., Schneider, J., Kesgin, M. and Lagiewski, R. (2018), "Hotels as Critical Hubs for Destination Disaster Resilience: An Analysis of Hotel Corporations", *CSR Activities Supporting Disaster Relief and Resilience Infrastructures,* Vol. 3 No. 4, pp. 46-57. https://doi.org/10.3390/infrastructures3040046

Edlmann, F.R.P. and Grobbelaar, S. (2021), "A Framework of engagement practices for Stakeholders Collaborating Around Complex Social Challenges", Sustainability, Vol. 13 No.19, pp. 10828-1038. https://doi.org/10.3390/su131910828

Ejumudo, K.B.O. (2014), "Youth Restiveness in the Niger Delta: A Critical Discourse", *SAGE Open*, Vol. 4 No. 2, pp. 2158-2170. https://doi.org/10.1177/2158244014526719

Elia, G., Margherita, A. and Petti, C. (2020), "Building Responses to Sustainable Development Challenges: A Multistakeholder Collaboration Framework and Application to Climate Change", *Business Strategy and the Environment,* Vol 12. No. 22, pp 122-135. https://doi.org/10.1002/bse.2514

Emuedo, C.G. (2015), "Oil multinationals and conflicts construction in oil-host communities in the Niger Delta", *African Journal of Political Science and International Relations*, Vol. 9 No. 5, pp. 170-180. https://doi.org/10.5897/AJPSIR2014.0736

Eze, N.O., Nnanna, N. and Aniago, E. (2021), "Antimonies of Crude Oil Production in the Niger Delta: Reflection on Ahmed Yerima's Trilogy", *Rupkatha Journal on Interdisciplinary Studies in Humanities*, Vol. 13 No. 3 pp. 1-12. https://doi.org/10.21659/rupkatha.v13n3.17

Eze-Michael, E.N. (2020). "Youth Restiveness and Economic Development in Nigeria", *Journal of Political Science and International Relations*, Vol. 3 No. 3. https://doi.org/10.11648/j.jpsir.20200303.14

Folke, C., Carpenter, S.R., Walker, B., Scheffer, M., Chapin, T. and Rockström, J. (2010). "Resilience Thinking: Integrating Resilience, Adaptability and Transformability", *Ecology and society*, Vol. 15 No. 4, pp. 55-72. https://doi.org/10.5751/ES-03610-150420

Ford, J.D., King, N., Galappaththi, E.K., Pearce, T., McDowell, G. and Harper, S.L. (2020), "The Resilience of Indigenous Peoples to Environmental Change", *One Earth,* Vol. 2 No. 6, pp. 532-547. https://doi.org/10.1016/j.oneear.2020.05.014

Füssel, H. (2007), "Vulnerability: A Generally Applicable Conceptual Framework for Climate Change Research", *Global Environmental Change,* Vol. 17 No. 2, pp. 155-172. https://doi.org/10.1016/j.gloenvcha.2006.05.002

Geekiyanage, D., Fernando, T. and Keraminiyage, K. (2020), "Assessing the State of the Art in Community Engagement for Participatory Decision-making in Disaster Risk-Sensitive Urban Development", *International Journal of Disaster Risk Reduction*, Vol. 5 No. 2, pp. 101847-101859. https://doi.org/10.1016/j.ijdrr.2020.101847

Godwin, W. (2018), "Enquiry Concerning Political Justice", In: *The Economics of Population*, pp. 37-40. Routledge. https://doi.org/10.4324/9781351291521-5

Graham, C. (2020), "Managing Climate Change: The Role of Multi-stakeholders' Partnership in Building Climate Resilience in Sub-Saharan Africa", *Interdisciplinary Journal of Partnership Studies,* Vol. 7 No. 2, pp. 101-119. https://doi.org/10.24926/ijps.v7i2.3386

Henry, L.A., Sundstrom, L.M., Winston, C. and Bala-Miller, P. (2019), "NGO participation in global governance institutions: International and domestic drivers of engagement", *Interest Groups & Advocacy*, Vol. 8 No. 1, pp. 291-332. https://doi.org/10.1057/s41309-019-00066-9

Holler, J., Bernier, Q., Roberts, J.T. and Robinson, S. (2020), "Transformational Adaptation in Least Developed Countries: Does Expanded Stakeholder Participation Make a Difference?", *Sustainability*, Vol. 12 No. 4, pp. 1657-1667. https://doi.org/10.3390/su12041657

Homer-Dixon, T. Michael, L. and Scott, J. (2023), "Dismissing the Term "Polycrisis" Has One Inevitable Consequence -Reality Always Bites", *The Globe and Mail*, February 18, pp. 8.

Idemudia, U. and Ite, U.E. (2006), "Corporate–community relations in Nigeria's oil industry: challenges and Imperatives", *Corporate Social Responsibility and environmental management*, Vol. 13 No.4, pp.194-206. https://doi.org/10.1002/csr.101

Islam, M.T. and Nursey-Bray, M. (2017), "Adaptation to Climate Change in Agriculture in Bangladesh: The Role of Formal Institutions", *Journal of Environmental Management*, Vol. 6 No. 2, pp. 347-358. https://doi.org/10.1016/j.jenvman.2017.05.092

Johnson, M.F., Ide, T. and Cruz, J.G. (2023), "Conceptualizing resilience within environmental Peacebuilding", *Current opinion in environmental sustainability*, Vol. 6 No 5, pp. 101362-101372. https://doi.org/10.1016/j.cosust.2023.101362

Josiah, U.G. and Akpuh, C.C. (2022), "Multinational oil corporations, policy violation and environmental damage in Rivers State of Nigeria: A Theistic Ethics Approach.", *Humanities and Social Sciences Communications,* Vol. 9 No. 1, pp. 69-81. https://doi.org/10.1057/s41599-022-01146-z

Ketola, Z., Tiwari, S. and Schelly, C. (2024), "How forcing Community Resilience in Rural Communities Harms Sustainable Development.", *Sustainable Earth Reviews,* Vol. 7, No 1, pp. 89-106. https://doi.org/10.1186/s42055-024-00071-0

Kirby, A. (2021), "Analysing climate Adaptation Policies in the Context of the Local State", *Environmental Science & Policy,* Vol. 3 No. 2, pp. 123-136. https://doi.org/10.1016/j.envsci.2021.05.013

Koubi, V. (2019), "Climate Change and Conflict", *Annual Review of Political Science*, Vol. 22 No. 1, pp. 343–360. https://doi.org/10.1146/annurev-polisci-050317-070830

Kwanhi, T., Modiba, F.S., Mago, S., Matindike, S. and Damiyano, D. (2024), "Conceptualizing Climate-induced Migration in Africa", *Environmental Development,* Vol. 6 No. 1 pp. 52- 79. https://doi.org/10.1016/j.envdev.2024.101049

Ladan, S.I. (2014), "An appraisal of climate change and agriculture in Nigeria", *Journal of Geography and regional planning*, Vol. 7 No 9, pp. 176-184. https://doi.org/10.5897/JGRP2013.0405

Lawrence, M., Homer-Dixon, T., Janzwood, S., Rockstöm, J., Renn, O. and Donges, J.F. (2024), "Global polycrisis: the causal mechanisms of crisis entanglement", *Global Sustainability*, Vol. 7 No. 6, pp. 167-178. https://doi.org/10.1017/sus.2024.1

Lawrence, M., Homer-Dixon, T., Janzwood, S., Rockström, J., Renn, O. and J.F. Donges (2023), "Global Polycrisis: The causal mechanisms of crisis entanglement", Version 1.0. Pre-print. Cascade Institute. Available at: https://cascadeinstitute.org/technical-paper/global-polycrisis-the-causal-mechanisms-of-crisis-entanglement (accessed 28 June 2025). https://doi.org/10.2139/ssrn.4483556

Lawrence, M., Janzwood. S. and Homer-Dixon, T. (2022), "What Is a Global Polycrisis? And How Is It Different from a Systemic Risk?", Discussion Paper 2022-4. Version 2.0. Cascade Institute.

Lenshie, N.E. and Jacob, P.K. (2020), "Nomadic migration and rural violence in Nigeria: Interrogating the conflicts between Fulani herdsmen and farmers in Taraba State", *Ethnic Studies Review*, Vol. 43 No. 1, pp. 64-95. https://doi.org/10.1525/esr.2020.43.1.64

Lerch, D. (2023), "Polycrisis, Unraveling, Simplification, or Collapse: Coming Soon to a Planet Near You?", available at: https://www.resilience.org/stories/2023-06-15/polycrisis-unraveling-simplification-or-collapse-coming-soon-to-a-planet-near-you/ (accessed 28 June 2025).

Luke, A., Mina, M.O. and James, E.A. (2015), "Climate change and feminist environmentalism in the Niger Delta, Nigeria", *African Journal of Political Science and International Relations,* Vol. 9 No. 9, pp. pp. 361-371. https://doi.org/10.5897/AJPSIR2015.0795

Lyammouri, R. (2021), Central Mali: Armed Community Mobilization in Crisis", available at: https://www.policycenter.ma/publications/central-mali-armed-community-mobilization-crisis (Accessed May 20, 2024). https://doi.org/10.37805/cbags2021.4

MacCarthy, D.S., Adiku, S.G., Valdivia, R., Freduah, B.S., Karl, K., Wesley, G.O., Guarin, J.R., Yang, M., Freeman, C., Owusu, J.S. and Castellano, A.A. (2025), "Towards a Food Secure Future under Changing Climate in Ghana: The Role of Opportunity Crops. https://doi.org/10.21203/rs.3.rs-5908570/v1

Maela, K.D., Zitha, H.E. and Maemu, E. (2024), "Developmental State as a Catalyst for Sustainable Development: Praxis of Local Government", *Journal of Public Administration and Development Alternatives,* Vol. 9 No. 1, pp. 68-80. https://doi.org/10.55190/JPADA.2024.316

Maina, P. and Parádi-Dolgos, A. (2024), "The Effectiveness of Climate Adaptation Finance and Readiness on Vulnerability in African Economies", *Climate,* Vol. 12 No. 5, pp. 59-71. https://doi.org/10.3390/cli12050059

Makinde, O. A., Olamijuwon, E., Mgbachi, I. and Sato, R. (2023), "Childhood exposure to armed conflict and nutritional health outcomes in Nigeria", Conflict *and Health*, Vol. 17 No. 1, pp. 15-32. https://doi.org/10.1186/s13031-023-00513-0

Martín, Ó.M. (2021), "Understanding Niger Delta's violence from a World-Ecology perspective", *Revista de Estudios En Seguridad Internacional,* Vol. 7 No. 1, 29-49. https://doi.org/10.18847/1.13.4

Mikailu, N. (2016), "Making Sense of Nigeria's Fulani-Farmer Conflict", *BBC News*, *Africa Section*, 5 May 2016.

Moon, M.P. (2024), "How does climate change affect the food security and vulnerability of women? A systematic review of gender perspectives", available at: https://www.frontiersin.org/journals/climate/articles/10.3389/fclim.2024.1374469/full (accessed 28 June 2025). https://doi.org/10.3389/fclim.2024.1374469

Mundau, M. and Tanga, P.T. (2016), "An Assessment of the Level of Community Participation and Localization of Decision-Making in Donor-Funded Projects in Zimbabwe", *Perspectives on Global Development and Technology,* Vol. 15 No. 6, pp. 716-731. https://doi.org/10.1163/15691497-12341414

Nduwe Kalagbor, A., Idowu, S.O. and Mulat-Weldemeskel, E. (2022), "Corporate Social Responsibility (CSR), service failures and recovery strategies for sustainable business: the case of Nigeria", *Economic Insights-Trends and Challenges*, (1/2022), pp. 1-12. https://doi.org/10.51865/EITC.2022.01.01

Nguyễn, T.T., Grote, U., Neubacher, F., Rahut, D.B., Hung, M. and Paudel, G.P. (2023), "Security risks from climate change and environmental degradation: implications for sustainable land use transformation in the Global South", *Current Opinion in Environmental Sustainability*, Vol. 63. https://doi.org/10.1016/j.cosust.2023.101322

Nowell, L.S., Norris, J.M., White, D.E. and Moules, N.J. (2017), "Thematic analysis: Striving to Meet the trustworthiness Criteria", *International journal of qualitative methods*, Vol. 16 No. 1, pp. 1601-1620. https://doi.org/10.1177/1609406917733847

Obiam, S.C. and Amadi, O.S. (2022), "The Nigerian State and Development in the Niger Delta Region", *World Journal of Advanced Research and Reviews*, Vol. 14 No. 1, 125-138. https://doi.org/10.30574/wjarr.2022.14.1.0296

Ogele, E.P. (2021), "Resource Based Conflict and Climate Change in the Niger Delta Region, Nigeria", *South Asian Journal of Social Studies and Economics,* Vol. 4 No. 2 pp. 206-220. https://doi.org/10.9734/sajsse/2021/v12i430327

Okafor, C.C., Ajaero, C.C., Madu, C.N., Nzekwe, C.A., Otunomo, F.A. and Nixon, N.N. (2024), "Climate Change Mitigation and Adaptation in Nigeria: A Review of Climate Change Mitigation and Adaptation in Nigeria", *Sustainability,* Vol. 16 No. 16, pp. 7048-7065.

Okafor, C.C., Madu, C. N., Nwoye, A.V., Nzekwe, C.A., Otunomo, F.A. and Ajaero, C.C. (2025), "Research on Climate Change Initiatives in Nigeria: Identifying Trends, Themes and Future Directions", *Sustainability,* Vol. 17 No. 9, 3995-4012. https://doi.org/10.3390/su16167048

Okpaleke, F.N. and Abraham-Dukuma, M.C. (2020), "Dynamics of Resource Governance, Climate Change, and Security: Insights from Nigeria and Norway", *Journal of Strategic Security,* Vol. 13 No 4, pp.123-135. https://doi.org/10.5038/1944-0472.13.4.1824

Omoleye, A.U. and Segun, J. (2018), "Border, Insurgency and National Security: A Study of Fulani Herdsmen Transversing Chad and Nigeria", *International Journal of Social Sciences and Humanities Review,* Vol. 8 No. 1, pp. 105-129.

Omotayo, A.M. (2010), "The Nigerian Farmer and the Elusive Crown". 30th Inaugural Lecture University of Agriculture, Abeokuta.

Onwuegbuzie, A.J., Frels, R.K. and Hwang, E. (2016). "Mapping Saldana's Coding Methods onto the Literature Review Process", *Journal of Educational Issues*, Vol. 2 No. 1, pp. 130-150. https://doi.org/10.5296/jei.v2i1.8931

Petzold, J., Hawxwell, T., Jantke, K., Gresse, E. G., Mirbach, C., Ajibade, I., Bhadwal, S., Bowen, K., Fischer, A.P., Joe, E.T., Kirchhoff, C., Mach, K.J., Reckien, D., Segnon, A.C., Singh, C., Ulibarrí, N., Campbell, D., Crémin, É., Färber, L., … Garschagen, M. (2023). "A global assessment of actors and their roles in climate Change Adaptation", *Nature Climate Change*, Vol. 13 No 11, pp. 1250-1269. https://doi.org/10.1038/s41558-023-01824-z

Rahaman, S.M.W., Bharti, J., Kumari, M., Meena, L.K. and Bairwa, S. (2017). "Conceptualization of Vulnerability, its Linkages to Climate Change and Policy Implications", *International Journal of Current Microbiology and Applied Sciences,* Vol. 6, No 5, pp.523-536. https://doi.org/10.3390/su12145654

Rahman, H.T. and Hickey, G.M. (2020), "An analytical Framework for assessing context-specific rural livelihood vulnerability", *Sustainability*, Vol. 12 No. 14, pp.5654-5667. https://doi.org/10.3390/su12145654

Ribot, J. (2014), "Cause and response: vulnerability and climate in the Anthropocene". *The Journal of Peasant Studies,* Vol. 41 No. 5, pp. 667-689. https://doi.org/10.1080/03066150.2014.894911

Rudiarto, I., Elisa, D. N., Insani, T.D., Handayani, W. and Dewi, S.P. (2025), "Livelihood resilience and adaptive cycles of farming households during the implementation of social restriction policies due to COVID-19 in Indonesia: case study from Grobogan Regency, Central Java". *Environment, Development and Sustainability*, Vol. 5 No. 2, pp. 1-30. https://doi.org/10.1007/s10668-025-06135-1

Scheffran, J. (2025), "Planetary Boundaries, Polycrisis and Politics in the Anthropocene: Climate Pathways, Tipping Cascades and Transition to Sustainable Peace in Integrative Geography", In: *Towards Rethinking Politics, Policy and Polity in the Anthropocene: Multidisciplinary Perspectives*. Cham: Springer Nature Switzerland, pp. 339-444. https://doi.org/10.1007/978-3-031-71807-6_8

See, J., Fuentes, A.S., Porio, E. and Wilmsen, B. (2024), "Conceptualising and enacting pathways to transformative climate justice: examples from the Philippines". *Local Environment*, Vol 5 No. 2, pp. 1-18.

Shamsuddin, S. (2020). "Resilience resistance: The challenges and implications of urban resilience implementation", *Cities*", Vol. 103, p. 102763. https://doi.org/10.1016/j.cities.2020.102763

Shin, S., Ichihara, M., Sokourenko, K. and Liao, C. (2024), "Everyday climate adaptation practices in agriculture contribute to food security in Sub-Saharan Africa", *Ecology and Society*, Vol. *29* No. 4, pp. 155-168. https://doi.org/10.5751/ES-15686-290432

Simpson, N.P., Williams, P. A., Mach, K. J., Berrang-Ford, L., Biesbroek, R., Haasnoot, M., Segnon, A. C., Campbell, D., Musah-Surugu, J.I., Joe, E.T., Nunbogu, A.M., Sabour, S., Meyer, A.L.S., Andrews, T. M., Singh, C., Siders, A.R., Lawrence, J., Aalst, M. van. and Trisos, C.H. (2023), "Adaptation to compound climate risks: A systematic global stocktake", *iScience,* Vol. 26 No. 2, pp. 105926- 105938. https://doi.org/10.1016/j.isci.2023.105926

Sobomate, S. (2016), "Vulnerability and adaptive capacity in livelihood responses to oil spill in Bodo, Niger Delta", Being a Ph.D Dissertation submitted to the University of Brighton.

Sommerville, M., Essex, J. and Le Billon, P. (2014), "The Global Food Crisis" and the Geopolitics of Food Security", *Geopolitics,* Vol. 19 No. 2, pp. 239–265. https://doi.org/10.1080/14650045.2013.811641

Stanturf, J.A. (2021), "Forest landscape restoration: building on the past for future success", *Restoration Ecology*, Vol 29 No. 4, pp. 13349-13359. https://doi.org/10.1111/rec.13349

Tarif, K. (2022), "Climate Change and Violent conflict in West Africa: Assessing the Evidence", *SIPRI Insights on Peace and Security,* Vol 5 No. 3, pp. 2022-2038. https://doi.org/10.55163/VHIY5372

Thomas, K.A., Hardy, D., Lazrus, H., Méndez, M., Orlove, B., Rivera-Collazo, I., Roberts, J. T., Rockman, M., Warner, B.P. and Winthrop, R. (2018). "Explaining differential vulnerability to climate change: A social science review", *African Journal of Political Science and International Relations,* Vol. 9, No. 9, pp. 109-128. https://doi.org/10.1002/wcc.565

Tindan, P.D., Appiah, D.O. and Segbefia, A.Y. (2022), "Attentiveness to Early Warning Drought Information: Implications for Policy Support and Climate Risk Reduction in Ghana" *International Journal of Disaster Risk Science,* Vol. 13 No. 1, pp. 25-35. https://doi.org/10.1007/s13753-021-00390-2

Tonah, S. (2006), "Migration and Herder-Farmer Conflicts in Ghana's Volta Basin", *Canadian Journal of African Studies,* Vol. 40 No. 1, pp. 152-178. https://doi.org/10.1080/00083968.2006.10751339

Torero (2023), "Rising Global Food Insecurity: Assessing Policy Responses", available at: https://openknowledge.fao.org/server/api/core/bitstreams/2f7d11db-dad5-442e-934d-836d7cec2723/content (Accessed 20 May 2025)

Tuholske, C., Di Landro, M. A., Anderson, W., van Duijne, R. J. and de Sherbinin, A. (2024), "A framework to link climate change, food security, and migration: unpacking the agricultural pathway", *Population and Environment*, Vol. 46, No. 1, pp. 8-29. https://doi.org/10.1007/s11111-024-00446-7

Ukwe C. (2025), Nigeria and Food Security Challenges: Intertwining of Climate Change and Non-State Armed Groups and Policy Interventions. Worldwide Megatrends in Food Safety and Food Security", available at: https://www.intechopen.com/online-first/1189542 (Accessed May 20, 2025). https://doi.org/10.5772/intechopen.1006922

UNICEF (2023), "Prospects for Children in the Polycrisis: A 2023 Global Outlook. Prospects for Children in 2023" available at: https://www.unicef.org/innocenti/reports/prospects-children-polycrisis-2023-global-outlook (Accessed May 21, 2025).

Von Uexkull, N. and Buhaug, H. (2021), "Security Implications of Climate Change: A Decade of Scientific Progress", *Journal of Peace Research,* Vol. 58, No. 1, pp. 3-17. https://doi.org/10.1177/0022343320984210

Wakdok, S. S. and Bleischwitz, R. (2021), "Climate Change, Security, and the Resource Nexus: Case Study of Northern Nigeria and Lake Chad", *Sustainability,* Vol. 13, No. 19, pp. 10734-10745. https://doi.org/10.3390/su131910734

Watts, M.J. and Ibaba, I.S. (2011), "Turbulent oil: Conflict and insecurity in the Niger Delta", *African Security*, Vol. 4, No. 1, pp. 1-19. https://doi.org/10.1080/19392206.2011.563181

Welzer, H. (2017), *Climate Wars: Why People Will Be Killed in The Twenty-First Century*, Paperback edition, Translated by P. Camiller and P. Camilleri. Cambridge, Malden, Mass: Polity.

Wolf, M. (2022), "How to Think about Policy in a Poly-crisis", *Financial Times*, November 29.

World Economic Forum (2023), "The Global Risks Report 2023 18th Edition INSIGHT REPORT", available at https://www.weforum.org/reports/globalrisks-report-2023 (Accessed May 21, 2025).

Zagre, I., Akinseye, F.M., Worou, O.N., Kone, M. and Faye, A. (2024), "Climate change adaptation strategies among smallholder farmers in Senegal's semi-arid zone: role of socio-economic factors and institutional supports", *Frontiers in Climate*, Vol 6 No 2, pp. 133-142. https://doi.org/10.3389/fclim.2024.1332196

Zebisch, M., Schneiderbauer, S., Fritzsche, K., Bubeck, P., Kienberger, S., Kahlenborn, W., Schwan, S. and Below, T. (2021), "The vulnerability sourcebook and climate impact chains – a standardised framework for a climate vulnerability and risk assessment", *International Journal of Climate Change Strategies and Management,* Vol. 13, No. 1, pp. 35-49. https://doi.org/10.1108/IJCCSM-07-2019-0042