Climate Change, Resource Scarcity and Conflicts in Omor and its Environs, Anambra State, Nigeria

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ABSTRACT

Climate change-induced environmental stress is intensifying localized resource conflicts in agrarian communities, particularly where governance is weak and livelihoods depend heavily on land and water. This study investigates the nexus of climate variability, resource scarcity, and conflict dynamics in Omor and its environs within Ayamelum Local Government Area, Anambra State, Nigeria. Using an integrated theoretical lens, the study employs a qualitative, multi-method approach including two rounds of in-depth interviews, key informant consultations and direct participant observations. Findings reveal that prolonged dry seasons, erratic rainfall, and drying streams have diminished access to water and fertile land, increasing competition and triggering violent disputes, particularly over farmland boundaries and fishing rights. Community observations identified poor borehole infrastructure, reliance on seasonal streams, and fragmented governance structures. Land and water emerged as flashpoints, with conflicts often escalating into intercommunal violence and herderfarmer clashes, some resulting in deaths and military intervention. Field data indicates that the community's governance is largely traditional but poorly resourced, with low to moderate conflict-mediation capacity. While local actors employ traditional mediation and avoidance behaviors, state responses remain reactive and under sustained. Participants expressed hope for future state-led interventions, particularly around boundary demarcation and water infrastructure, yet also criticized elite manipulation, political fragmentation, and institutional delays. Despite pervasive conflict, adaptive behaviors such as rain harvesting, informal negotiation, and artisanal resource use (example is clay mining) reveal community resilience. This research provides rare empirical insight into southeastern Nigeria's underexplored climate–conflict landscape. It highlights how climate-induced stress intersects with structural inequality, poor governance, and historical land rivalries to produce complex conflict ecologies. It concludes by advocating for participatory land reforms, robust governance support, and integrated peacebuilding approaches to mitigate rising climate-security risks in rural Nigeria.

Keywords: Climate change; Climate-security risks, Resource scarcity; Resource conflict; Violent conflicts; Communal tensions, Inter-communal violence, Land disputes, Conflict mitigation, Anambra-Nigeria.

BACKGROUND

Climate change represents one of the most profound and complex challenges confronting human societies and natural ecosystems in the 21st century. Its multifaceted impacts extend beyond the physical environment, influencing socio-economic dynamics, exacerbating existing inequalities, and intensifying competition over scarce natural resources especially in low-income regions (Bartrem *et al,* 2022). In regions where livelihoods are closely tied to climate-sensitive sectors such as agriculture, forestry, and fisheries, the repercussions are particularly severe. Nigeria, characterized by significant ecological diversity and deep socio-economic disparities, stands as one of the country's most vulnerable to the adverse effects of climate change (USAID, 2023). In rural Nigeria, where the majority of the population depends heavily on land and water resources for farming and pastoralism, climate change is not only an environmental issue but also presents a critical issue as a likely driver of livelihood insecurity and conflict (Adedeji *et al,* 2021). Irregular rainfall patterns, prolonged droughts, flash floods, and rising temperatures have disrupted traditional agricultural cycles and decreased the availability of fertile land and freshwater resources (Abaje et al., 2016; McDonald et al., 2011). These environmental stressors are further exacerbated by deforestation, land degradation, and weak natural resource governance, heightening competition among rural groups and contributing to the outbreak of violent conflicts (Urama and Ozor, 2010; Homer-Dixon, 1991).

One of the most prominent manifestations of this trend in Nigeria is the increasing frequency and intensity of farmer-herder conflicts which are increasingly taking on religious and ethnic dimensions (Gürsoy, 2020). As desertification and droughts encroach upon traditional grazing lands in the northern regions, pastoralist communities are compelled to migrate southward in search of pasture. This migration often brings them into conflict with sedentary farming communities over already-scarce arable land and water resources (UNDP Nigeria, 2024). Simultaneously, extreme weather events such as gully erosion and flash floods, particularly prevalent in southeastern Nigeria, have destroyed infrastructure and displaced entire communities, further straining rural livelihoods (World Bank Group, 2022).

These developments reflect broader global patterns where environmental change intersects with social, political, and economic vulnerabilities to produce complex forms of insecurity and conflict (Cattaneo and Massetti, 2015). In Nigeria, the situation is compounded by rapid population growth, historical patterns of marginalization, land tenure disputes, and weak institutional responses. Resource-related disputes in rural areas are thus rarely isolated environmental problems; they are embedded in a web of socio-political dynamics that reflect broader structural inequalities and failures of governance (Mullen, 2024).

Despite growing attention to climate-conflict linkages in the global discourse, empirical studies at the local level in Nigeria remain limited. Much of the existing literature focuses on the northern regions (Duyille and GowonAdelabu, 2025; Tiwo, 2023; Sambo and Sule, 2023; Oyewo, 2024), while the dynamics of climate-induced resource conflicts in the southeast, particularly in states like Anambra, have been largely underexplored. This gap in localized research limits the development of context-specific interventions and policies that are attuned to the realities of affected communities. In addressing the study gap, this study aims to explore climate change, resource scarcity, and conflict in Omor and its environs, in Anambra State, Nigeria. In doing so, the study asks:
i) how do community members perceive climate change and its impacts on land and water resources in Omor? ii) what are the main causes and consequences of resource-related conflicts in the community? and iii) what adaptation and conflict management strategies do communities employ in response to environmental and resource-related stress? Omor thus serves as a critical site for examining how climate change-induced livelihood pressures interact with local histories of contestation, ecological vulnerability, and state absence. By focusing on the community of Omor in Ayamelum Local Government Area, Anambra State, an agrarian area facing both climatic and resource pressures, this study is expected to increase understanding on how climate-

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induced environmental changes shape resource availability, conflict dynamics, and social relations (e.g., community versus government conflict mediation), in a rural setting in southeast Nigeria.

In addition, the study aims to contribute to filling a critical geographic and empirical gap and provides locally grounded insights that can inform more region-sensitive conflict mitigation and climate adaptation policies, particularly for that region. Thus, contributing to ongoing debates on the climate-security nexus by centering the lived experiences and agency of rural communities. By illuminating the specific ways in which environmental stress intersects with local social dynamics at the local context, it offers policy-relevant insights for climate adaptation, conflict prevention, and sustainable rural development in Nigeria and comparable contexts.

LITERATURE REVIEW

This section critically reviews theories and frameworks related to climate-conflict, including their historical patterns and dynamics in Africa and Nigeria. It is organized into two main parts. The first outlines the theoretical framework, followed by a section that examines the patterns and dynamics of climate-related conflicts in Africa and Nigeria.

THEORETICAL FRAMEWORK

This study adopts a combined theoretical approach to deepen understanding of the relationship between climate change and conflict in Africa, with a particular focus on Nigeria. By integrating diverse perspectives, this approach offers a holistic view of climate-related conflicts, especially the case examined in this study. The frameworks employed include Environmental Scarcity Theory (EST), Political Ecology (PE), Eco-Violence Theory (EVT), and the broader paradigm of Environmental Security (ES). Combining these four approaches allows for a nuanced analysis of how environmental stressors intersect with governance, power, identity, and historical injustice to either generate or mitigate conflict.

Environmental scarcity theory

At the core of this analysis is Environmental Scarcity Theory, as articulated by Homer-Dixon (1994, 2010), which posits that environmental degradation can lead to violent conflict when three interrelated types of scarcity, namely: supply-induced, demand-induced, and structural scarcity converge. Supply-induced scarcity arises from resource depletion; demand-induced scarcity results from population growth and increased consumption; and structural scarcity reflects unequal access due to governance failures or elite capture (Benjamin, 2001). HomerDixon (1994, 2010) argues that rapid population growth and expanding global economies are driving down access to renewable resources such as cropland, fresh water, and forests, particularly in developing countries. These scarcities rarely trigger violence directly; rather, they interact with poverty, large-scale migration, social fragmentation, and institutional weakening, creating fertile conditions for insurgencies, ethnic clashes, and urban unrest (e.g., Chiapas, Mexico; sub-Saharan Africa; parts of Asia). He emphasizes that while capable governance, functioning markets, and informed citizens can mitigate these pressures, scarcity remains a potent indirect driver of conflict, especially for the half of humanity reliant on local renewable resources for daily survival. This framework provides the foundation for our analysis. It identifies how environmental degradation, demographic pressure, and governance failures create the conditions for resource-driven tensions. To explain how and when these tensions escalate into localized conflict, we integrate complementary perspectives from Political Ecology, Eco-Violence Theory, and Environmental Security.

In Omor, we examine how deteriorating water resources and unreliable rainfall threaten agriculture, food systems, health, and social cohesion. Climate-induced pressures, such as water scarcity, migration, and declining soil fertility, reflect both supply- and demand-induced scarcity. Structural scarcity, however, is

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especially significant, as unequal access to land and water, mediated by customary tenure, political patronage, or social status, exacerbates marginalization and injustice. These dynamics mirror broader patterns across Nigeria and sub-Saharan Africa, where environmental scarcity interacts with socio-political vulnerabilities to heighten conflict risk (Dramé, 2024; Nweke, 2024; Nwaugha et al., 2024; Wiriranai, 2023).

Nevertheless, the theory has limitations. Critics note its neo-Malthusian leanings and its tendency to overlook political and institutional mediators (Floyd, 2008). Many scarcity-affected communities pursue cooperation over violence, highlighting the critical role of governance, cultural norms, and adaptive capacity.

Political ecology

Political Ecology aims at expanding the analytical lens to address these limitations of the environmental scarcity theory above. It does this by incorporating insights from political ecology, a framework rooted in critical geography, post-structuralism, and Marxist political economy. Political ecology reframes environmental conflict not as a consequence of resource scarcity per se, but as the outcome of historical inequalities and power relations that shape access to and control over natural resources (Peluso and Watts, 2001; Le Billon and Duffy, 2018).
In Omor, long-standing inequalities in land distribution, weak formal institutions, and ethicized narratives of land entitlement, if in any way spotted, will play a crucial role in structuring community responses to environmental change. Political ecology compels scholars to ask: *Who benefits from environmental transformation? Are there cases of neglect? Who bears the costs? And how are these outcomes shaped by institutional legacies and power asymmetries?* For instance, conflicts between farmers and pastoralists in Omor are not only about land access but also reflect broader issues of political marginalization, contested citizenship, and legal pluralism in land tenure systems.

By foregrounding social justice, institutional power, and governance failures, political ecology provides a critical counterweight to more deterministic readings of scarcity. However, its structural orientation can sometimes obscure the immediacy of environmental stress and the identity dynamics that often catalyze conflict (Nwankwo, 2024). Therefore, it must be used in concert with other frameworks to capture the full spectrum of factors influencing climate-related conflict.

Eco-violence theory

Eco-Violence Theory on the other hand complements the political ecology by explicitly linking environmental stress to migration-induced identity conflict. Developed as an extension of scarcity thinking, this framework argues that climatic disruptions can trigger population movements, particularly of pastoralist groups, into agriculturally dense areas, often resulting in inter-group tensions (Homer-Dixon, 2010; Olumba, 2024). The Nigerian Middle Belt, where drought-induced southward migration of Fulani herders has intensified conflict with settled farmers, exemplifies this dynamic (Olumba et al., 2022).

In Omor, we will seek to assess how the seasonal migration of herders into agrarian zones is perceived by local farmers not only as an economic threat but also as a cultural and existential one. These encounters can activate latent ethnic, religious, and political tensions, especially when herders lack legal recognition or political representation. Eco-violence theory thus helps explain the “us vs. them” narratives that escalate everyday disputes into protracted conflicts. Nevertheless, this theory, too, must be applied cautiously. It may overstate the causal power of migration while downplaying the agency of communities to negotiate peaceful coexistence. Not all climate-related migration results in violence, and some Nigerian communities may have histories of intergroup accommodation.

Environmental security

Last but not the least framework is the Environmental Security, that not only bridges the environment, development, and peacebuilding but also widens the analytical lens to encompass the implications of climate

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change for national and human security. It "emphasizes how environmental factors, including climate change, intersect with political, social, and economic contexts to shape conflicts. This perspective challenges the deterministic notion that environmental shifts inevitably lead to conflict, highlighting instead the importance of understanding how such environmental changes are influenced by power dynamics, governance shortcomings, and historical antagonisms among groups" (Dramé, 2024, p. 64). This theory brings a similar lens as the other theories above, hence the decision to highlight it as an interconnected theory.

Viewing these challenges as environmental security issues supports integrating climate adaptation into peacebuilding and development. Yet securitization risks militarized or technocratic responses that overlook root vulnerabilities (Floyd, 2008), so environmental security must follow rights-based, participatory, and contextspecific methods.

Toward a holistic climate–conflict framework for Omor

This study employs a multi-theoretical framework, combining Environmental Scarcity Theory, Political Ecology, Eco-Violence Theory, and Environmental Security, to examine climate–conflict dynamics in Omor. By integrating these perspectives, we can explore how environmental degradation, shifting climate patterns, and sociopolitical structures converge to create vulnerabilities. Specifically, this approach reveals how erratic weather interacts with unclear land tenure, historical inequalities, and political exclusion, as well as communal identity tensions, to either precipitate or mitigate conflict. Mapping both proximate and root causes in this way offers targeted pathways for peacebuilding, conflict prevention, and climate adaptation that reflect local realities.

Patterns, Magnitude, And Dynamics of Climate-Related Conflicts in Africa and Nigeria

Climate-conflict dynamics across the Sahel, Lake Chad Basin, and Horn of Africa Across the Sahel, as reported by Dramé (2024), Lake Chad Basin, and the Horn of Africa, climate change has intensified environmental stressors, rising temperatures, desertification, rainfall variability, and water scarcity, contributing to resource-based conflicts. In the Sahel, shrinking arable and grazing lands have heightened tensions between farmers and pastoralists. The Darfur conflict exemplifies how environmental degradation, land disputes, and ethnic divisions can escalate into protracted violence. In the Lake Chad Basin, the lake's 90% shrinkage since the 1960s has devastated livelihoods, enabling insurgent groups like Boko Haram to exploit local grievances. In the Horn of Africa, recurrent droughts and erratic rainfall have fueled violent clashes between herders and farmers in Kenya (Dramé, 2024). These examples highlight that climate change acts as a conflict multiplier, deepening pre-existing social, economic, and political vulnerabilities across regions.

Conflict dynamics in Nigeria Farmer–herder conflicts in Northern and Middle Belt Nigeria

While farmer-herder conflicts in Nigeria have received growing attention in recent years, the overwhelming majority of empirical studies have concentrated on the Middle Belt and northern regions of the country. These areas, including Benue, Plateau, Nasarawa, Taraba, and Kaduna States, have served as hotspots for examining the link between climate change, resource scarcity, and conflict. However, there remains a significant research gap regarding the southeastern states, including Anambra, where similar environmental and social stressors exist but have not been well studied. This study contributes to filling this gap by investigating the case of Omor in Ayamelum LGA, an area similarly affected by ecological stress and socio-economic tension, but underrepresented in the literature.

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Table 1: Patterns of climate-induced resource scarcity in Nigeria

Resource Type	Scarcity Pattern	Geographic Distribution	Seasonal Variation	Source(s)
Water	Reduced rainfall, drying rivers, shrinking aquifers	North, Middle Belt	More intense in dry season	Adigun (2019); Lanshima (2020); George et al. (2022)
Grazing Land	Pasture degradation due to drought and desertification	Northern and North Central Nigeria	Worsens during dry periods	Jeje et al. (2020); Furini (2019); Okwor (2016)
Arable Land	Increasing encroachment by farmers and loss of fertile soil due to erosion and flooding	Middle Belt and Southeast (Anambra)	Affected yearround	Nnaji et al. (2022); Olumba (2021); Nwokoye et al. (2021)
Temperature	Higher ambient temperatures and unpredictable weather patterns impacting crop and livestock productivity	Nationwide	Stronger in dry and transitional seasons	Thoenig et al. (2020); Castaing (2021); Omotayo and Oladele (2018)

A review of studies between 2010 and 2024 reveals consistent findings linking climate-induced resource scarcity with conflict escalation in the Middle Belt. The most frequently cited environmental factors include reduced rainfall, prolonged dry seasons, rising temperatures, desertification of grazing lands, and drying water sources (Lanshima, 2020; Adigun, 2019; George et al., 2022). These changes intensify during dry seasons, compounding stress on water availability and grazing land and contributing to the southward migration of pastoralists (Thoenig et al., 2020). Resource scarcity manifests in several forms (see Table 1). Across the studies reviewed, the depletion of pastoral resources, like water, pasture, and arable land, was often reported as a key driver of competition between herders and sedentary farming communities. In Benue State, for instance, Jeje et al. (2020) found that both farmers and herders perceived rainfall variability and rising temperatures as significant contributors to land degradation. These perceptions were accompanied by increased reports of crop destruction and livestock loss, highlighting the dual burden of ecological and economic impacts. Similarly, Castaing (2021) reported that cross-border transhumance during peak dry periods has intensified pressure on Nigeria's shrinking grasslands, raising tensions particularly along the Niger–Nigeria corridor.

Table 2: Conflict Escalation Mechanisms Linked to Resource Scarcity

Time Period	Escalation Mechanism	Conflict Hotspots	Climate–Resource Link	Source(s)
2010–2017	Direct confrontation over access to water and pasture	Nasarawa, Plateau, Benue	Droughts and water scarcity	Furini (2019); Okwor (2016)
2014–2018	Political manipulation of farmer–herder identities and alliances	Middle Belt	Land pressure + weak institutional response	Olumba (2021); Jeje et al. (2020)
2018–2019	Resource loss leads to displacement, retaliatory attacks	North Central, emerging in Anambra	Livelihood loss (crops and livestock)	Nnaji et al. (2022); Nwokoye et al. (2021)
1997–2014	Temperature increases trigger violent conflict, especially in mixed-use zones	Mixed rural zones nationwide	Temp rise by 1°C increases conflict by 54%	Thoenig et al. (2020)
2006–2016	Transhumance into Nigeria from Niger and Cameroon intensifies local land pressure	Border states (Adamawa, Taraba, Benue)	Overgrazing and border insecurity	Castaing (2021); Lanshima (2020)

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Mechanisms through which climate-related scarcity escalates conflict were found to be both direct and mediated by socio-political structures (see Table 2). Direct mechanisms include competition over critical resources such as water and pasture, particularly during the dry season (Furini, 2019). Indirect mechanisms, on the other hand, involve factors such as poor land tenure systems, weak governance, political manipulation of resource claims, and insecurity linked to criminal elements such as cattle rustling (Okwor, 2016; Olumba, 2021). Studies such as Nnaji et al. (2022) also report significant consequences of these conflicts for household food security, underlining the compounding effects of violence on agricultural productivity and rural resilience. The reviewed literature also provides insights into the complexity of conflict escalation. For example, Thoenig et al. (2020) show that the incidence of violence between farmers and herders increases disproportionately in "mixed-use zones," areas where pastoral and agricultural activities overlap geographically. These zones are highly vulnerable to climate shocks and are often the sites of the most severe clashes. Empirical analysis suggests that a +1°C increase in temperature corresponds to a +54% increase in the probability of conflict in such mixed areas (Thoenig, Eberle and Rohner, 2020). Importantly, several studies also highlight the role of policy failures in either mitigating or exacerbating conflict.

Table 3: Mediating Factors and Policy Implications in Farmer–Herder Conflicts

Mediating Factor	Description / Policy Insight	Source(s)
Land Tenure Insecurity	Absence of codified land use rights fuels disputes and limits legal resolution mechanisms	Jeje et al. (2020); Olumba (2021)
Political and Ethnic Framing	Politicians inflame ethnic divisions; conflicts framed along group identity lines	Okwor (2016); Olumba (2021)
Cross-Border Movement	Weak regional cooperation allows influx of herders during dry season, straining Nigerian ecosystems	Castaing (2021); Lanshima (2020)
Food Insecurity	Reduced agricultural output and destruction of farms worsen household vulnerability	Nnaji et al. (2022); George et al. (2022)
Climate Adaptation Deficit	Limited investment in pastoral resilience and farmer adaptation strategies	Adigun (2019); Omotayo and Oladele (2018)
Conflict Resolution Gaps	Local mediation efforts exist but are underfunded and often politically undermined	Okwor (2016); Furini (2019)
Security Vacuum	Absence of early-warning systems and police presence allows conflicts to escalate quickly	George et al. (2022); Thoenig et al. (2020)

Table 3 summarizes key mediating factors and policy implications identified across the literature. Issues such as cross-border migration policies, land tenure reform, climate adaptation strategies, and local governance capacity are central to understanding how similar environmental stressors yield different outcomes across regions. In Plateau State, for instance, Okwor (2016) emphasized that political economy and access-related issues were equally, if not more, important than environmental degradation in explaining the persistence and escalation of conflicts. Despite the abundance of literature from the Middle Belt, very few studies have explored these dynamics in Nigeria's southeast. Omor, an agrarian community in Anambra State, experiences many of the same environmental pressures, including flooding, soil erosion, and contested land use, yet it has remained largely absent from national and academic climate-conflict discourse. Given that political ecology and eco-violence theories suggest context-specific manifestations of climate stress and violence, the neglect of regions like Omor limits the generalizability of national analyses and the effectiveness of policy interventions. Across the selected studies, consistent patterns emerge linking climatic shifts, particularly droughts, desertification, and rainfall variability, to intensified farmer–herder tensions in Nigeria's Middle Belt. While the majority of these conflicts are framed around access to land and water, some studies emphasize ethnic and political dimensions.

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By applying the theoretical insights developed in the previous section to a new regional context, this study makes an important empirical contribution to the broader climate-conflict literature in Nigeria. It uses grassroots qualitative methods, field observations and interviews to uncover how environmental stress, livelihood disruption, and social identity converge to shape local narratives of conflict. These findings will be compared with established patterns in the Middle Belt, helping to discern both commonalities and divergences that may inform more inclusive and geographically-sensitive policy responses.

METHODOLOGY

This section is divided into two subsections: the first describes the study area, while the second outlines the methods used for data collection and analysis.

Main Study area

The study was carried out in Omor and its environs, located on the banks of the Omambala River in the Ayamelum Local Government Area of Anambra State, Nigeria. Geographically, the area lies between latitudes

6°28’N and 6°32’N, and longitudes 6°55’E and 6°59’E (Figure 1). Omor comprizes the villages of Akanator, Aturia, Amikwe, and Orenja, which are bordered by Umumbo, Anaku, Igbakwu, Umerum, and Ogbosu. The area is accessible via the Enugu–Onitsha Expressway, the Awkuzu–Igbariam Road, and the Ezu River Bridge, along with several minor routes that provide easy access to the villages.

This location was selected for the study because it represents a unique microcosm of climate-related environmental stress and resource conflicts in Nigeria’s underrepresented Southeast region. While most existing studies focus on the Middle Belt, Omor has emerged as a new hotspot for farmer–herder conflict, making it a compelling site for a focused investigation of this nature.

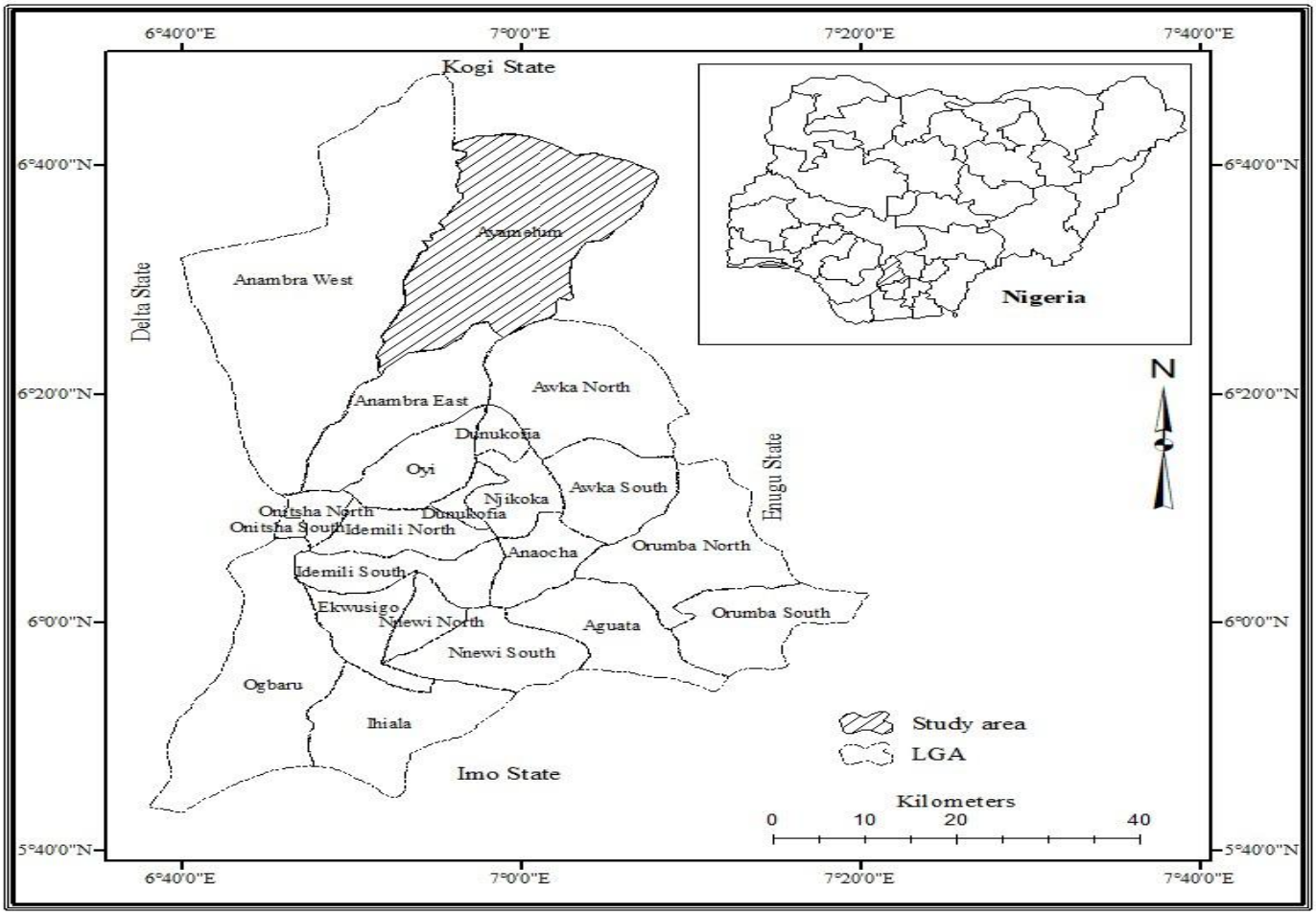

Figure 1 a): Map of Nigeria showing Ayamelum LGA

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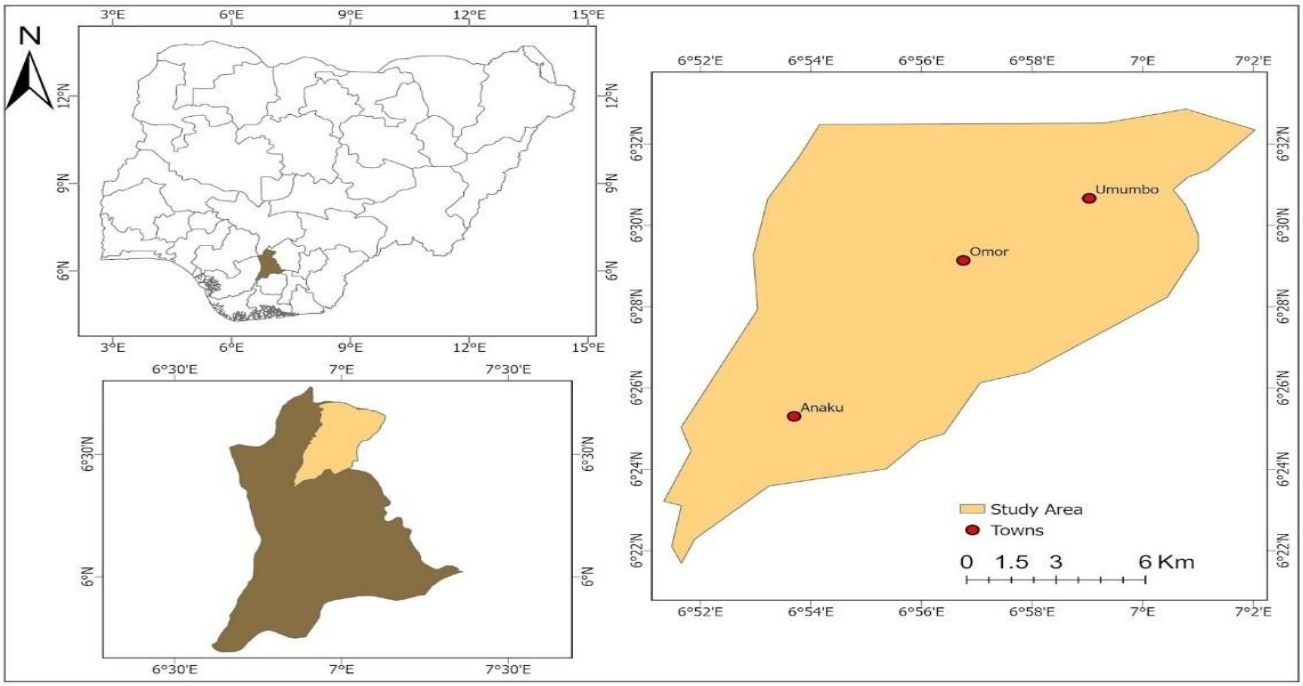

Figure 1b: Map showing study area (Omor, Umumbo and Anaku*)*

Aside from the location, Omor experiences a tropical climate with a significant rainy season, typically from April to October, and a dry season from November to March (Olorunfemi, 2013). Rainfall patterns contribute to soil erosion, with high erosivity rates observed due to intense rainfall, leading to varying soil loss across the region (Fagbohun et al., 2016). The soils in Omor are primarily classified into different types, with some areas exhibiting Class II soils suitable for diverse crops like yams and maize (Ayadiuno et al., 2021). Soil erosion is a significant concern, with approximately 39.49% of the area experiencing slight erosion, while other areas face moderate to severe erosion (Fagbohun et al., 2016). The vegetation is predominantly tropical, supporting various crops and woody species, which are essential for maintaining ecological balance (Oyelowo et al., 2023). The Land Use Systems in Omor is predominantly mixed, with urban-related activities such as commercial and sociocultural uses dominating (Ayadiuno et al., 2022). While agricultural practices are the primary economic activity, these activities are presently under pressure due to increased population density and urban expansion, leading to reduced productivity and land availability (Anaeto et al., 2005; Ho, 2022). Environmental hazards, such as gully erosion and flooding, are exacerbated by land misuse and infrastructural development (Ho, 2022; Efobi and Anierobi, 2013).

Methods of Data Collection

This study employed a latitudinal qualitative research design to examine how climate-induced resource stress contributes to conflict between herders and farmers in Nigeria, with particular attention to how these dynamics evolve and are experienced across multiple, ecologically linked communities over time. A latitudinal design was deemed most appropriate, as it allows for data collection at two or more intervals, thereby enabling the researcher to assess changes in perceptions, pressures, and local responses to climate-related conflict. This approach aligns with the study's objective of capturing evolving community-level perspectives in response to shifting environmental conditions and conflict triggers.

The research focused primarily on the community of Omor within Ayamelum Local Government Area (LGA) of Anambra State, with supplementary insights drawn from the neighboring communities of Anaku and Umumbo. While Omor served as the core study site, Anaku and Umumbo were included to provide contextual depth and enable a comparative understanding of how climate-related conflict manifests across similarly situated but distinct local settings. All three communities share ecological characteristics and rely heavily on land and water resources, making them jointly vulnerable to climate-induced pressures. The inclusion of Anaku

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and Umumbo helped to situate the findings from Omor within a broader localized landscape of experience, offering richer insight into regional variations in perception, impact, and adaptation. This selective multi-site approach avoided the narrowness of a single-case study while preserving the contextual embeddedness and local specificity of the research.

Purposive sampling was employed to ensure the inclusion of participants with specific, relevant expertise or lived experience of climate-related conflict, while snowball sampling facilitated the identification of additional informants with insider knowledge who might otherwise be difficult to access. Participants included a community leader, an agricultural expert, and a public safety official, selected based on local knowledge and referrals. Interviews were conducted in English, recorded with consent, and transcribed for thematic analysis. Interview questions, which lasted for about one hour on average, focused on the causes and impacts of climate related conflict, resource stress, institutional responses, and local adaptation strategies. Of the three participants, two were from Omor and one from neighboring Anaku village. Throughout the data collection process, we sought to contextualize and verify these broader trends in seasonal variations in rainfall, water availability, agricultural pressure, including conflict patterns at a local level.

Interviews

Phase One: Field Observation

The first phase of data collection took place between 1st March and May 2024 and involved direct field observations. The researcher documented land and water conditions, environmental degradation, and physical indicators of past conflict (e.g., burned structures, abandoned farms). These observations provided a foundation for understanding the ecological and socio-spatial dimensions of resource conflict in the study area.

Phase Two: In-depth Interviews

The second phase, conducted in May 2025, comprised two rounds of semi-structured interviews with a total of six community participants. For the first round there were two participants from Omor and one from Anaku. For the second, two participants from Umumbo and one from Omor.

In addition to community interviews, the study conducted three key informant interviews using purposive and snowball sampling techniques (Nwozor et al., 2021). Purposive sampling was used to target individuals with specific knowledge or decision-making roles in conflict mitigation and resource governance, while snowball sampling helped identify additional informants with insider perspectives who might otherwise be inaccessible.

All participants were long-term residents with direct or observed experience of land-based conflict, seasonal farming pressures, and local institutional responses. Interviewees were selected based on availability, local knowledge, and willingness to speak on the sensitive subject of climate-related conflict, which limited recruitment. The small sample size reflects both the difficulty in securing informed consent on conflict-related issues and the qualitative research emphasis on depth over breadth, particularly when thematic saturation is achieved.

Data Analysis

All interview transcripts and field notes data were manually coded and organized into thematic categories to generate a codebook. Findings were triangulated across methods to enhance analytical rigor and reduce bias.

We applied thematic analysis to each transcript, coding excerpts against our study objectives, (1) perceptions of climate change, (2) conflict dynamics, and (3) adaptation responses, and the corresponding research questions. Codes were then synthesized into three principal themes. For anonymity, we labelled the participants 1, 2, 3, 4, 5, and 6 as P1 to P6, respectively.

The results of in-depth interviews with stakeholders, particularly community leaders, on the dynamics of climate, resource conflict linkages were ranked and categorized using the Delphi method of expert opinion

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(Steurer, 2011). These rankings were classified into five levels: very low (1), moderately low (2), neither low nor high (3), moderately high (4), and very high (5). The aggregated rankings were then analyzed to identify the key drivers of climate, resource conflict in the study area.

Additionally, a tertiary review of literature focused on Africa and northern Nigeria was conducted to integrate findings from various primary and secondary sources. This review supports a summarized narrative aimed at enhancing understanding of national and regional patterns, including the magnitude and theoretical frameworks of climate, resource conflict linkages.

Addressing Scope and Limitations

The initial geographic focus on Omor was broadened to include Anaku and Umumbo to reflect the interconnected nature of climate-related conflicts in the region and to enrich the comparative depth of the study. Including multiple communities allowed for an investigation into how shared ecological stressors (particularly around land and water access) manifest similarly or differently across contexts within Ayamelum LGA.

Nevertheless, several limitations were encountered. Security risks and limited resources restricted broader field engagement, and the small number of participants, though sufficient for qualitative saturation, may not capture the full diversity of perspectives, particularly from women, youth, and pastoralist groups. Additionally, longitudinal follow-up beyond the two-time intervals was constrained. However, the triangulation of methods, observational data, interviews, and key informant insights, strengthened the internal validity and contextual richness of the findings.

Furthermore, in delineating the study area, one major limitation encountered was the absence of publicly available or clearly defined administrative boundaries for the three communities (Anaku, Omor, and Umumbo) within Anyamelum LGA. Existing maps and satellite imagery did not provide town-level demarcations, making it difficult to draw precise polygons for each settlement. To address this, representative coordinate points within each community were identified and used to anchor the study area. The overall extent (6.24°N–6.32°N and

6.55°E–7.02°E) was adopted to capture all three towns together. This approach ensured that the study area was adequately represented, while also acknowledging that fine-scale boundary distinctions were not possible.

Ethical Considerations

All ethical protocols were strictly observed. Participants gave their free, prior and informed consent, were assured of confidentiality, and were made aware of their right to withdraw at any time. All participants volunteered and were compensated for their time.

RESULTS

This section presents the findings from field observations and in-depth interviews. It begins by presenting the findings on the Omor community's structure and resource endowment, followed by insights into water resources, socioeconomic and security issues, land and resource disputes, and the role of political leadership in managing communal tensions. Table 4 presents a summary of the interview outcome under key thematic areas.

Table 4: Summary of Participant's Observation

Issue Observed	Governance Structure	Experts' Judgement on Level of Governance	Ability to Mediate Conflicts
Community Structure and Resources	Traditional	Well established structure	Excellent
Water Resources and Their	Weak/informal	Poorly coordinated	Low

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Sources			
Socioeconomic and Security Concerns	Fragmented	Largely informal with unequal access	Moderate
Issue Observed	Governance Structure	Experts' Judgement on Level of Governance	Ability to Mediate Conflicts
Land and Resource Disputes	Customary and Political	Weak enforcement and unclear boundaries	Poor
Adaptation and Coping Strategies	Community-led	Resilient but overstretched	Moderate to Low
Boundary and Land Tenure Administration	Disputed/Unclear	Deeply politicized and tribalized	Low

Community Structure and Resources

During the field observation, Omor was found to have a well-established traditional governance structure, led by the Igwe (traditional ruler) and the Council of Chiefs, who oversee community affairs, mediate conflicts, and preserve cultural heritage. Additionally, town unions and youth organizations actively contribute to local governance and development initiatives. The community is also characterized by a strong sense of communal living, with extended family systems playing a crucial role in social organization. The results of the field observation also revealed that the primary occupation in the town is agriculture, owing to the community's fertile alluvial soil, making it suitable for crop farming, focusing on staple crops such as rice, okra (Fig. 2), maize, cassava, and yam. This indicates that the town's economy is heavily dependent on farming, and any factors affecting agricultural productivity, such as water availability, can have significant impacts on the community's overall well-being and economic stability. Furthermore, results showed that commercial activities, agricultural markets in Omor and neighboring communities, serve as hubs for selling farm produce. These markets attract traders from different parts of Anambra and beyond, strengthening the local economy. Apart from farming and trading, the field observation revealed that residents engage in small-scale enterprises and livelihood activities, such as fishing, palm oil production, trading, and artisanal clay mining. Women play a significant role in food processing and trading activities.

Water Sources

Streams and Endorheic Water Bodies: The town relies on small endorheic water bodies and streams such as "Ugwu Nwangene," "Mmirimalaovu," and "Adama stream" (Fig 3). These sources are not consistently reliable, particularly during the dry season, which compounds the problem of water scarcity. The variability in these water sources means that their availability is subject to seasonal fluctuations and weather conditions.

Boreholes*:* There is only one borehole facility in the community, which is inadequate for the entire population's needs. Boreholes are crucial for providing a more stable and clean water supply compared to surface water sources, but the single borehole is insufficient to meet the demands of the entire community, leading to dependence on less reliable sources.

Fig 2; Okra farmland in Omor

Fig 3; Adama stream in Omor

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Socioeconomic and Security Concerns

Conflicts and Disputes: Burnt houses and evidence of conflict along the Anaku-Omor Road indicate severe clashes between Anaku and Omor communities in early 2021 and 2022 (Fig 4). These conflicts are symptomatic of deeper issues related to resource scarcity, particularly land and water, which are crucial for agricultural and domestic needs.

Socioeconomic Disparities: There are significant socioeconomic disparities in Omor, with vulnerable households facing increased difficulties due to resource scarcity and climate impacts. These disparities contribute to social tensions and conflicts, as economically disadvantaged groups are more likely to experience the negative effects of resource shortages and climate variability.

Fig 4a) Burnt house seen along Anaku-Omor Road Fig 4b) Burnt house inside Anaku

Fig 4c) Burnt commercial vehicle along Anaku

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Land and Resource Disputes

Escalation of Conflicts*:* Conflicts over land and water resources have led to frequent disputes and violent confrontations. These disputes are often driven by the competition for limited resources, which are critical for farming and other livelihood activities. The intensity of these conflicts can disrupt community cohesion and exacerbate existing tensions.

Local Perceptions of Climate-Induced Environmental Change

Climate Stress, Water Scarcity, and Conflict Drivers

Participants consistently described unreliable rainfall and drying water sources as critical stressors undermining agriculture and livelihoods. In Omor and Umumbo, water scarcity was tied to the inability to farm outside the rainy season, disputes over fishing rights, and fierce competition for limited boreholes. Land shortages and unclear boundaries compounded tensions, with water and land emerging as the primary flashpoints for conflict. These shortages were directly linked to climate variability, as communities became heavily dependent on seasonal rain and vulnerable to environmental stress. Participant 1 (P1), an engineer, highlighted several ways in which shifting seasonality and unreliable rainfall deepen climate vulnerability, highlighting the inability to farm or build in dry seasons, over-reliance on the rainy season, and competition over scarce resources like fishing sites and farmlands.

"*Water is one of those major issues too because farmers need water and most of, in fact, 90% or 80% of the occupation of people in villages, in my village, is farming. So, you can understand what happens when there is a shortage of water. Means they can't irrigate or farm during off seasons. You can't build because you need water to build any projects. And you know how expensive it is. That's why people build houses during the rainy season just to show you how much of an impact water is in our village…. So, water is a big issue. Another one is farming and fishing. Fishing is also a big factor because, let's say there's a river somewhere and this river now is not quite in my village or not quite in another village, so how do you share the fishing rights to a river like that? That's another big issue. People fight a lot. People have lost their lives fighting over fishing rights over a small piece of water somewhere, you get. So, water and land are very big issues that drive a lot of conflicts. If any conflict happens, either they are fighting about a piece of land somewhere in the bush for farming, or they could also be fighting for water. Those are the major causes. Anything aside that could just be normal, general, social disputes that occur within any other community. But fishing, lack of water, lack of land, those are very contested areas in my local government. It's very common for you to hear about them fighting over that*."

He also added, "*Well, you know how humans are when there is limited availability of resources like land and water, mainly for rural communities because they don't have those basic social amenities like light or roads or even government water for them to fight about. So, what causes issues or clashes between communities in the sense of scarce resources are majorly water and land*." This strongly backs up the point that shifting rainfall and drying streams escalate disputes over water and land.

Unequal Access and Local Vulnerabilities

Accounts revealed strong disparities in access to groundwater across Ayamelum communities. In Umumbo, failed boreholes and salty or hot water meant residents relied solely on streams, rain, and water vendors, further straining household incomes. The lack of irrigation systems forced total dependence on rainfall for farming. These conditions highlighted how climate change deepens structural inequalities, leaving some communities disproportionately exposed to livelihood disruption and conflict. P2, also an engineer, also highlighted similar issues, mentioning water scarcity and unequal access to reliable groundwater sources, as well as reliance on seasonal rain for farming, highlighting the links to climate vulnerability faced: "*Truthfully, some parts of Ayamelum have water. You can actually dig a borehole and see water, but in Umumbo, to be precize, if you dig a borehole according to what I heard, I am not sure about this one, but according to what I*

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heard, there is no borehole water in Umumbo. If you dig in some part of Ayamelum, too, if you dig for the first 6 feet, you will see all this swampy water and dirty water. But going to the part where there is supposed to be clean water now, fresh water, borehole water and related stuff, the water is not there anymore. There is no water for the borehole in Umumbo. Digging a borehole in Umumbo to be precize is just a waste of time. After digging, you will not see water. Some people say the people that dug and saw water, that the water was salty or hot. I don't know. But according to what I heard, there is no water, there is no borehole water in the whole of Umumbo, both for the rich and the poor. The only source of water that Umumbo has is rain and stream. And then there are all these tankers that supply water from other regions and other communities and sell them in Umumbo. That's the three main sources of water in Umumbo. And for farming, we Umumbo, Ayamelum don't farm until the rainy season. There's nothing like irrigation or anything." This highlights disparities where some areas have groundwater, while others (like Umumbo) don't, leaving them more vulnerable.

Adaptive Use of Resources and Local Coping Mechanisms

In contrast to scarcity narratives, some communities leveraged environmental assets creatively. In Anaku, residents described abundant farmland, productive streams, and artisanal clay ("ulo") extraction as economic buffers. By valorizing red clay and strengthening reliance on wells, the community transformed local geology into alternative livelihoods. This illustrates grassroots resilience: even as environmental degradation fuels disputes, communities innovate with context-specific coping strategies that reshape livelihood systems and reduce pressure on contested land and water. Although the last participant, P3, did not explicitly mention climate change stressors (e.g. shifting rainfall, drought), exacerbating environmental conditions or vulnerability. His comments on environmental resources were limited to descriptions of existing water sources and livelihoods but still provided valuable context. "*The people in Anaku are mainly farmers…. The farmlands are big, so they are farmers. Also, fishing as well. Our people catch a lot of fish from our streams. Then we have this place where we dig clay, it's called 'ulo'. We dig it and sell it to these trucks; they say they use it to build houses and make other things… There is something called 'well', it's like a borehole but it's a well. That well is used for bathing and cooking in the house. Then there is also a stream. One of the stream waters in Anaku is 'Ikpa'. It is the best stream in Anaku and is used for drinking. Others are small and you cannot drink it. But the major source of water is well. 80 – 70 percent of the families have their own well in their compound"* This backs up the adaptation narrative, showing how Anaku leveraged local resources (clay, wells, farmland) as coping strategies.

Character and Drivers of Resource Conflicts

The drivers of conflict in the study area are summarized in table 5 below, highlighting corresponding aggregates of the levels of conflicts and the inferred levels of future conflicts from the two rounds of interview.

Table 5: Summary of the Characters and Drivers of Present and Perceived Future Conflicts

Issue Raised by Participant	Climate Resources Conflicts Drivers (1st Round of Interview)	Current Level of Conflicts Generated	Future Level of Conflicts to be Generated	Issue Raised in the 2nd Round of Interviews	Current Level of Conflicts Generated	Future Level of Conflicts to be Generated
Dispute over Land and its Administration	Vague boundaries, lack of formal land surveys, communal rivalries	High	Very High	Boundary conflicts, elite manipulation, tribal interference	High	Very High
Water as Flashpoints	Borehole failures, drying streams, disputed	Moderate to High	High	Dry streams, buying water, unsafe sources	High	Very High

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	fishing and stream access					
Farmer–Herder Clashes	Crop destruction, seasonal migration, lack of irrigation	Moderate	High	None explicitly mentioned in 2nd round	Moderate	Moderate
Governance Failures	Delayed or absent intervention, weak traditional enforcement	High	Very High	Leadership failures, lack of boundary enforcement	High	Very High

Land and Water as Flashpoints

Land disputes, often rooted in vague or unsurveyed boundaries, dominated all interviews. Across the interviews, land and water emerged repeatedly as the most contested and conflict-prone resources (see Table 5). Key P1 emphasized how vague ownership boundaries and seasonal scarcity heighten tensions both within and between communities*: "Land disputes are always common even among families. It's common to see brothers and sisters fighting for land and it's also the same among communities. There's always a sketchy piece of land somewhere that no one quite knows who owns it. So, there are bound to be disagreements about it and sometimes it spills over into violent clashes where people lose their lives. In my village, it happens regularly. If it's not two villages fighting over a piece of land on the farm, it'll be my whole town, and another town, say Umumbo and Omor fighting over another piece of land... So, the other one is water. Water is one of those major issues too because farmers need water... So, you can understand what happens when there is a shortage of water... You can't build because you need water to build any projects. And you know how expensive it is. That's why people build houses during the rainy season just to show you how much of an impact water is in our village."*

P1 also highlighted how serious and deliberate resort to violence is in these communities and the role natural resource competition due to scarcity plays in exacerbating it:

"I think resource plays a major development in anything happening in those communities because for one, they are not very malicious people. They don't go around looking for trouble. They have very old elders and before those communities tend to make a decision to say, 'go and fight another community', they must have deliberated, and a lot of people must have approved it. So, anything that will cause sort of a fight between communities will be very serious, and the only thing that can do that is either politics or land and water. So, if it's not politics, then it's land and water. I know a lot of times I've been in the village where they have told me that it's unsafe to go to maybe another village or somewhere because of quarrel or a fight. I know most of the causes of these quarrels are water and land. Either someone or two people are fighting over a piece of land, or two communities are fighting over a piece of land or, there's water somewhere and one community has claimed it."

Table 5 further illustrates that governance failures such as delayed interventions and elite manipulation exacerbate both land and water disputes, while a culture of retaliation sustains cycles of violence. As P2 noted:

"*What caused the fight was land disputes, and I would say that Omor people over the years have been known as people that like to look for trouble. If you and they have land, if your community and their community have land close to each other, they would always like to drag the land with you."* Water scarcity also emerged as a critical environmental pressure point highlighted by P2, particularly in Umumbo, where access to potable water is increasingly difficult: "*According to what I heard, there is no borehole water in Umumbo. If you dig in some part of Ayamelum too, if you dig for the first 6 feet, you will see all these swampy water and dirty water... the water is not there anymore."*

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As with the other interviews, P3 affirmed that land remains the most contested resource in Ayamelum, with conflicts often rooted in the absence of formal boundaries: "*The major cause of the war was land dispute, caused by lack of boundary between Anaku and Omor."* The participant also confirmed the community's dependence on natural water sources like wells and streams, which, while functional, may be vulnerable to seasonal stress and contamination, which may have heightened tensions and competition over the limited water sources*: "There is something called 'well', it's like a borehole but it's a well. That well is used for bathing and cooking in the house. Then there is also a stream. One of the stream waters in Anaku is 'Ikpa'. It is the best stream in Anaku and is used for drinking. Others are small and you cannot drink it. But the major source of water is well. 80 to 70 percent of the families have their own well in their compound".*

Conflict Forms and Frequency

The interviews revealed two distinct yet recurring patterns of conflict: inter-communal clashes and farmer–herder confrontations. While large-scale violence between villages erupted sporadically, farmer–herder conflicts followed a more predictable, moderate cyclical pattern linked to the agricultural calendar (see Table 5). P1 recounted both forms, emphasizing the frequency and retaliatory nature of local responses:

"The period crisis, I think you are referring to, is the one that happened recently between Umumbo and Omor, then Omor and Anaku.... I think it happened in 2022. I was not in the village... But the one I can tell you of, is the one I've witnessed which I know about, and it's the one between my village and Fulani herdsmen, you get. That one is like the most common. And it has been happening, although it goes under the radar... So, when I asked about it, they said that our villagers are fighting with some herdsmen in the bush. And what caused this fight was the destruction of farmlands... They said these herdsmen were destroying farmlands or have been destroying farmlands for a long time... If my village decides that the herdsmen are getting too much, they will come together, and they plan it. And they go and they defend their farmlands... And because of this, they also tend to kill those cows in retaliation too. And some lives are lost... It was quite popular back then... it happened as frequently as twice a year or sometimes three times in two years, you get."

P2 describes the recurrent nature of natural resource-related conflicts and how they have intensified over time, with increasing violence and loss of life, likely worsening insecurity and undermining cooperative farming or seasonal planning. Also, how the community is collectively dependent on rainfall, which has in recent years grown ever uncertain in its intensity and frequency, all leading to an increase in exacerbated livelihood challenges and tensions: *"At the four corners of Omor, they are having land disputes every two years. The last two land disputes that they had, they took more action than they used to take. Like the one that they had with my community and the one that they had with the other community, they took more action, and they lost a lot of people. And what caused the fight is that Omor people are too proud of themselves to leave something that you and them already talked about or something like that."* Also stating, *"there is no water, there is no borehole water in the whole of Umumbo, both for the rich and the poor. The only source of water that Umumbo has is rain and stream."*

P3 provided a rare exact date for the onset of intercommunal violence and confirmed that the conflict has reoccurred, intensifying over time to include confrontations with state actors like the military, highlighting a significant escalation in the nature of violence, from community-level fighting to confrontations involving armed state intervention. *"The fight started in early 16th May 2021, early morning. So, after that, the government intervened through the army. So, on that 16th, Omor people intervened Anaku. That's where the fight started. So, they started shooting guns and burning houses in Anaku... It also happened again in 2022, but this time, it was between Anaku, Omor and military. The military came to intervene in the fight, but they went straight to one guy's house and burnt his house. They said the guy was the one causing fight, and because they did not see him there, they must burn the house. And when the guy came back, the fight started. They started shooting the military."*

Impacts on Livelihoods and Social Cohesion

Beyond the immediate violence, conflicts over land and water in Ayamelum have long-term consequences for both economic survival and inter-community trust. For predominantly farming communities, the destruction of crops or farmland access disruption undermines food security and livelihoods. According to P1, the recurring

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cycle of conflict has also eroded trust and fostered collective retaliation strategies: *"You can go to your farm tomorrow or today and you see that half of the crops have been eaten by cows and the others have been sold off or packaged by some herdsmen and my communities have been told not to like to kill, or pursue, or do anything against the herdsmen.... If my village decides that the herdsmen are getting too much, they will come together, and they plan it. And they go and they defend their farmlands... So, this is like a retaliation for the destruction of farms and the stealing of people's farm produce that has been going on for a while… they also tend to kill those cows in retaliation too. And some lives are lost.... But in things like this, lives tend to be lost, although it's on a very small scale, let's say maybe 2 to 5 people, for the ones that I witnessed though."* P2 highlighted the vulnerability of livelihoods in the region due to a lack of irrigation infrastructure and heavy dependence on seasonal rainfall, which likely contributes to uncertainty over planting cycles and food production stability: "And for farming, we Umumbo, Ayamelum don't farm until the rainy season. There's nothing like irrigation or anything." He also highlighted narratives of domination by more powerful communities suggest deepening mistrust and social division, complicating cooperation over shared land and water resources, *"Omor people... pretty much look down on other communities and want to bully them and collect their things most of the time."* While less explicit in emotional terms, the response from P3 hinted at the agricultural vulnerability of the community and the potential exposure of women, key agricultural actors, to conflict risks: *"The people in Anaku are mainly farmers. Many of the families have their own farm where the women produce cassava, okra, to sell."*

Together, these first-round insights paint a vivid picture of how resource scarcity, and particularly competition over land and water, serves as both catalyst and context for recurring violence in Ayamelum. Vague or unsurveyed boundaries have been seen to ignite family- and village-level land disputes, while drying boreholes and contested streams amplify water tensions. Conflicts manifest cyclically: farmer–herder clashes erupt semiannually in retaliation for crop destruction, and episodic intercommunal violence, most recently in May 2021 and again in 2022, which even drew in military forces. Beyond immediate losses of crops, livestock, and lives, these clashes corrode social cohesion, prompting villages to organize collective defense yet deepening mistrust of neighboring groups. When viewed alongside the above section on shifting seasonality and unreliable rainfall, it becomes clear that climate-driven environmental stress not only intensifies underlying rivalries but also entrenches a self-reinforcing conflict ecology, where tactical retaliation and institutional vacuums perpetuate cycles of insecurity.

Adaptation/Coping and Response Strategies

Table 6: Conflict mediating/coping and Response Strategies

Participants Point	ClimateResources Conflict Mediating Measure (1st Round of Interviews)	Current Level of Conflict Mediating Capacity	Future Level of Conflict Mediating Capacity	ClimateResources Conflict Mediating Measure (2nd Round of Interviews)	Current Level of Conflict Mediating Capacity	Future Level of Conflict Mediating Capacity
Community-Led Measures	Community patrols, traditional authority intervention (chiefs, elders), informal dialogues	Moderate	Moderate to High	Informal negotiations, avoidance strategies, elder involvement	Moderate	High

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External Interventions and Recommendations	Military checkpoints, politician visits, proposed land surveys, delayed state support	High	Moderate	Appeals to government, hope for boundary demarcation, request for enforcement	Low	Moderate to High

Community-Led Measures Reliance on Traditional Authority and Self-Organized Defense

The respondents described reliance on the traditional authority and self-organized deference as the key current and future community-led conflict mediating/coping and response strategies (Table 6). As shown in table 6, the current reliance on traditional authority and self-organized defense is moderate; however, in the future, this approach is expected to become highly important. In the absence of effective formal institutions, such measures offer a promising means of conflict resolution, as communities depend on traditional leaders and self-organized patrols to address threats, particularly from herdsmen. These measures are framed as essential for survival and protecting livelihoods. P1 described coordinated action led by local authority: *"They've met with their chiefs and all to try and put a stop to it.... If my village decides that the herdsmen are getting too much, they will come together, and they plan it. And they go and they defend their farmlands…*" These community-led measures serve as both a conflict deterrent and an immediate protective strategy, compensating for the lack of sustained government intervention.

External Interventions and Recommendations Sporadic and Security-Centric Government Intervention

Respondents consistently described government involvement as reactive and focused mainly on security deployment rather than long-term solutions (Table 6). Currently, this intervention is highly used (Table 6) and often comes after repeated incidents rather than at the onset of conflict. P1 noted the delayed and limited nature of action: *"The only time the government started doing something was when it started becoming more frequent… they brought a checkpoint… I think that was the extent of what the government did."*

Precisely, the respondents said that government action was mostly military presence but that this intervention may likely wane in the future as community-led approach gradually becomes popular (Table 6)**.** *"They sent some soldiers for a while… they manned it 24/7… Was their impact good? Yes, it was good temporarily… but it did not really stop Omor from continuing… what the government did the first time wasn't enough to discourage them from doing it a second time" [P1].* While another respondent described a complete absence of intervention in the early days of conflict: *"The thing happened the first day, the second day and the third day. Not even the police came… the government did not help" [*P2*].*

Perceived Negligence and Political Disconnect

Another issue highlighted was that participants felt ignored by political leaders, especially when local representatives had no direct ties to the affected communities. P2 highlighted political disengagement: *"They called on a lot of politicians… none of them reacted or came… those that had connections… made calls, and nobody answered."* As P3 explained that political promises did not translate into tangible outcomes, *"The government promised to give their own boundary… although to date, no boundary has been chosen."*

Need for Structural and Development-Oriented Solutions

Furthermore, across participants, there was a call for long-term, structural measures to address the root causes of recurring conflicts, such as water scarcity, land disputes, and underdevelopment. P1 proposed broader development to reduce tensions: *"…maybe if they can build it and send a permanent military presence… there's no light, there's no water… there are so many things that they can work on. No road, education is poor… they should start working."* P3 emphasized formal boundary demarcation as key: *"If the government should issue a boundary and give orders that no one should cross… each community will obey the government."*

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Mixed Perceptions of Government Effectiveness

While most participants criticized the state's limited or delayed role, some acknowledged temporary benefits from interventions. P1 saw short-term de-escalation: *"The presence of the government… helped reduce the propensity for it to enter more violence… I think the soldiers were a good help."* P3 acknowledged attempts at mediation: *"They intervened… through the military to settle the conflict… even the governor… came and… promised to give their own boundary."*

RESULTS AND ANALYSIS (SECOND-ROUND DATA COLLECTION)

Perceptions of Climate Change and Environmental Impacts

This section presents the results of the interview analysis. The first subsection focuses on perceived seasonal variability and climate stress, the second examines limited water infrastructure and the resulting exacerbation of scarcity, and the final subsection explores the effects of climate stress on livelihoods.

Perceived Seasonal Variability and Climate Stress

All three participants described increasingly unpredictable rainfall, extended dry seasons, and extreme heat, undermining traditional farming calendars and productivity. Participant 4 (P4) stated, "*In the last 10 to 15 years, during summertime, it's always summer. That's our cultivation time, we plant then. Right now, most plantations are focused on rice. That's the most common crop we cultivate here."* Participant 5 (P5) mentioned, *"For the past 10 to 15 years… I would say the amount of rainfall has reduced to some extent… I've noticed it. Most people here are farmers, and when the rain doesn't fall well for a long time, it affects their crops… especially last year."* Participant 6 (P6) also said*, "The weather has changed noticeably. It's difficult to describe in detail, but the changes have made things harder for people, especially farmers. The environment isn't as predictable anymore, and it's affecting how people live and work."*

Limited Water Infrastructure and Climate-Exacerbated Scarcity

Participants all highlighted the absence of reliable water systems (e.g., boreholes) and growing dependence on inconsistent streams and rainwater collection. P4 stated, "*We use stream water. We don't have boreholes… During the rainy season, we collect rainwater, but in the dry season, we go to neighboring communities to buy water. Most water around here is dirty and unsafe.*" P5 also had this to add, *"Even now, although we're entering the rainy season, the stream is not the same. It usually dries up… but once the rain starts falling properly, it starts flowing again*." P6 added, "*We used to fetch water from streams, but many of those streams have dried up. Now, people are forced to buy water from suppliers, and the cost is becoming a heavy burden on us."*

Effects of Climate Stress on Livelihoods

Two of the respondents stressed that water scarcity and weather unpredictability impact every economic activity and social practice, not just crop production. P4 mentioned, *"Everyone, water affects all of us equally. We don't have alternative sources in our own land*." P6 added, *"The environment isn't as predictable… it's affecting how people live and work."*

Nature, Drivers, and Dynamics of Resource-Related Conflict

Contested community borders and blurred tenure maps consistently emerged as the primary flashpoint for intercommunal violence, with P4 saying, *"Land is our major problem here… some neighboring communities try to claim power over us, dragging land boundaries and causing fights."* P5 stated, "Land disputes are the main issue. In the past, people knew the boundaries, but now others think they are more powerful and want more land." P6 also mentioned, *"There was a serious dispute between my community and a neighboring one. It was a violent conflict over land boundaries."* P4 went on to highlight how elite competition, tribal loyalties, and boundary solutions driven by partisan interests prevent durable peace. *"Tribalism is a problem. If a boundary solution doesn't come from someone's political or tribal group, they reject it. Everyone wants to be the leader, so nothing is ever finalized... People's lands are being taken, and the leadership here lacks unity... Even road projects are blocked by local politics, people sabotage good efforts if they don't come from their*

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side... Chiefs and elders are not doing justice. They are selfish, focusing on personal gain... Our elders must agree and do it properly. But they won't, because they only care about what they can gain."

Participants all mentioned how even after ceasefires, tensions resurface unpredictably, perpetuating fear and limiting land use. P4 said, *"everyone is afraid of losing responsibility or land... Things may be quiet now, but they can start again anytime. Once someone tries to continue where the last issue stopped, fighting resumes... Because of the conflict, both communities fear entering certain farmlands. People avoid going alone due to fear of being attacked.*" P5 noted, *"The last one was really serious. They were burning houses and all… it was that bad."* p6 stated, *"People almost killed each other. Military personnel were brought in to calm the situation."* P4 and P6 both hinted at economic impacts like how conflict undermines informal credit and equipment-sharing arrangements, increasing the cost and risk of farming, further compounding the communities already volatile situation. P5 stated, *"The pattern is still the same, but it's harder now. People used to get loans from neighboring communities to farm, but that's difficult now.... Most people here are farmers, and when the rain doesn't fall well for a long time, it affects their crops... The crops don't do well, like, they don't produce properly." P4 said, "Many of the resources we used to get easily from those areas are no longer accessible."* participant mentions how violence frequently peaks during planting, when disputed land is most valuable, and also how this leads to retaliation, hence breeding climate-induced losses and damages. P4 highlighted, *"During planting season, people want to farm. If someone from my community goes to disputed land, the other side might intervene violently. If someone is attacked or killed, retaliation follows... It [conflict and retaliation] keeps happening because boundaries are unclear."*

Participants underscored that both local and external institutions have failed to address core drivers of resourcebased conflict, particularly around boundary disputes and infrastructural neglect. p4 noted that *"the boundary has only been partially made. Some say they were not informed, and others are still disputing the location..."* The same participant mentioned impacts of bad leadership on development, *"We're suffering from bad leadership... Caterpillars were once brought to start construction, but the work stopped...* Farmers have *no machinery. They suffer a lot.*" Similarly, participants reported an absence of visible or effective state support in resolving critical water or land-related issues. p5 reflected, *"No government official came. I think they settled it themselves*," while p6 remarked*, "Not that I know of. If they did, I'm not aware of it,"* in reference to government involvement during past land conflicts and water negotiations.

Adaptation and Conflict Response Strategies

Informal Negotiation, Avoidance, and Fear-Based Coping

In the face of escalating tensions, communities have relied heavily on informal negotiations and avoidance behaviors. Several respondents described how disputes, especially over water, were sometimes managed through dialogue, though rarely with lasting agreements. As P6 explained, "some people from outside the community have come to negotiate about water sources, but nothing has been agreed upon yet. Eventually, both communities involved their leaders and invited government officials to help resolve it." Similarly, P5 recalled that past land disputes had been resolved informally without external intervention: "I think they settled it themselves… Not that much [farming didn't stop despite violence]."

Yet, where negotiation failed, fear dictated daily behavior. Access to farmlands diminished as residents avoided dangerous areas. As P4 put it, "People avoid going alone due to fear of being attacked." These fear-driven strategies reveal both the physical risks and the psychological toll of living with unresolved disputes.

Adaptive Water Access Strategies and Household Resilience

Scarcity of water, worsened by erratic rainfall and failing infrastructure, forced households to improvise. Residents increasingly turned to rainwater harvesting during wet months and to expensive water vendors during the dry season. P4 explained, "During the rainy season, we collect rainwater, but in the dry season, we go to neighboring communities to buy water," while P6 lamented the economic strain: "Now, people are forced to buy water from suppliers, and the cost is becoming a heavy burden on us." Though these strategies keep households afloat, they come at significant financial cost, reinforcing vulnerability. Nonetheless, many residents cling to faith in future government intervention as a source of psychological strength. P4's words

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capture this trust: “If the government steps in, we believe the matter can be resolved… When the government speaks, people listen.”

Visions for Solutions, Governance, and Livelihood Adaptation

Participants articulated a spectrum of solutions, some rooted in community consensus, others in external governance. While some called on elders to draw from historical land rights, many doubted their impartiality. P4 reflected, “The solution must come from our people… But they won’t, because they only care about what they can gain.” Others emphasized shifting focus away from land disputes altogether: P5 urged, “Honestly, I think they should just take their eyes off land issues. There are more important things they could focus on.”

A number of participants stressed institutional measures, particularly boundary demarcation. P6 was clear: “The government should properly demarcate boundaries between communities. There are eight communities in this area, and clearly defined boundaries would prevent many of these disputes.”

Despite insecurity, livelihoods persist. Farming has even intensified as a survival mechanism amidst Nigeria’s economic decline. As P6 noted, “In fact, farming has increased despite the conflict… many people are returning to agriculture as a means of survival.” This return to farming highlights rural adaptability and resilience, even in fragile contexts.

The Role of Political Leadership in Addressing Communal Tensions

Figure 5 illustrates the Speaker of the Anambra State House of Assembly, Rt. Honorable Uche Okafor, meeting with community leaders in Anaku and Omor to broker dialogue and peace. His visit represents a rare instance of high-level political engagement, signaling official acknowledgment of the protracted land and water disputes and demonstrating a willingness to mediate directly with local stakeholders. By convening traditional rulers, youth representatives, and town unions, this intervention underscores the potential for political leadership to complement grassroots coping strategies with structured conflict-resolution mechanisms.

Figure 5: The speaker of the House of Assembly, Rt Honorable Uche Okafor during his visit to Anaku and Omor, in his efforts to enthrone lasting peace between the communities (Modilim, 2021)

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DISCUSSION

From Acute Resource Conflicts to Systemic Climate Vulnerability and Community-Driven Adaptation

The integrated findings from two rounds of interviews in Omor, Anambra State, reveal the deeply interwoven nature of climate-induced environmental stress, entrenched governance failures, and the sociopolitical dimensions of resource conflicts. These findings directly respond to all three research questions and underscore the need for holistic, development-oriented interventions in fragile rural communities.

Perceptions of Climate Change and Resource Stress

Across both rounds of interviews, participants perceived climate change as a lived, daily reality rather than an abstract phenomenon. They consistently described erratic rainfall, prolonged dry seasons, and extreme heat as the most pressing stressors undermining agriculture and household well-being. In the first round, participants emphasized immediate disruptions such as failing boreholes, drying streams, and water shortages that constrained farming and even construction activities. As one participant explained, "People build houses during the rainy season just to show you how much of an impact water is in our village" (P1).

By the second round, perceptions had shifted toward recognizing climate stress as a systemic vulnerability. Shorter, unpredictable rains and drastically reduced stream levels were linked directly to crop failures and household financial strain. For example, P4 noted, "During the rainy season, we collect rainwater, but in the dry season, we go to neighboring communities to buy water." Such accounts echo findings elsewhere in Nigeria where communities identify water scarcity and rainfall variability as the most tangible dimensions of climate change (Terdoo, 2024; Francisca et al., 2023).

Viewed through the lens of Environmental Scarcity Theory (Homer-Dixon, 1999), these narratives demonstrate all three forms of scarcity: supply-induced scarcity (drying streams and borehole failures), demand-induced scarcity (competition for dwindling fertile land and water), and structural scarcity (institutional neglect and vague land boundaries). Together, these perceptions illustrate how climate change is understood locally as an everyday struggle over water, land, and survival.

Drivers and Consequences of Resource Conflicts

Resource conflicts in Omor were described as deeply embedded within historical and institutional fault lines, exacerbated by climate-induced scarcity. Both interview rounds revealed farmland and water as the primary flashpoints. Disputes over unclear boundaries, seasonal water shortages, and pastoralist incursions were repeatedly cited. As one participant observed, "…between my village and Fulani herdsmen, that one is like the most common" (P5). These findings align with eco-violence theory, which highlights how ecological stress interacts with social cleavages such as ethnicity and tenure insecurity to escalate into violence (Sobowale, 2020; Osewezina, 2016).

The consequences are far-reaching: restricted farmland access, declining yields, reduced household income, and recurring episodes of violence. Violence was not described as spontaneous but deliberate, surfacing when informal negotiations collapsed. As one participant remarked, "They don't go around looking for trouble… before those communities tend to make a decision, they must have deliberated, and a lot of people must have approved it." This echoes studies in Plateau and Nasarawa states where violence often follows prolonged disputes over tenure and pastoralist access (Okwor, 2016; Olumba, 2021).

Governance failures emerged as a critical aggravator. Participants accused local leaders of self-interest, elite capture, and political tribalism. P5's words capture this sentiment: "Even road projects are blocked by local politics; people sabotage good efforts if they don't come from their side. We're suffering from bad leadership." These narratives align with Political Ecology Theory (Le Billon and Duffy, 2018), which stresses that conflicts are not triggered by scarcity alone but by unequal access, power asymmetries, and institutional dysfunction.

Adaptation, Coping, and Emerging Resilience

Despite constraints, communities have developed diverse coping strategies, illustrating both vulnerability and resilience. In the first round, reliance on traditional leaders, informal patrols, and temporary military presence

was common. However, by the second round, strategies had become more household-driven: rainwater harvesting, water trading, and livelihood diversification. P6 described the growing dependence on vendors: "Now, people are forced to buy water from suppliers, and the cost is becoming a heavy burden on us." These practices mirror adaptive strategies documented in other Nigerian agrarian communities facing climate stress (Onumadu and Osahon, 2014; Lanshima, 2020).

Interestingly, innovation extended beyond water. In Anaku, residents leveraged red clay ("ulo") for artisanal production and income, demonstrating how local geology was repurposed as a resilience resource. Yet, as studies warn (Furini, 2019; Castaing, 2021), such adaptive innovations remain underleveraged without formal governance support, secure tenure, and infrastructure. At the same time, residents expressed both skepticism and hope toward state intervention. While local leaders were often mistrusted, the government was still seen as the ultimate arbiter. P4 reflected, "The government should intervene. When the government speaks, people listen." This paradox, distrust in local authority but enduring hope in state-led solutions underscores the fragile legitimacy of governance in conflict mediation.

Finally, adaptation was not limited to water management. Farming itself has become both a conflict driver and an adaptive strategy. Despite insecurity, P6 observed that "farming has increased despite the conflict… many people are returning to agriculture as a means of survival." This highlights a critical duality: while environmental stress fuels disputes, economic necessity drives resilience, underscoring the complex balance between vulnerability and agency in Omor.

Synthesis: Toward an Integrated Understanding

A critical synthesis of both interview rounds paints a coherent picture: climate change, through its disruption of water availability and agricultural predictability, acts as a stress multiplier on already fragile social systems. But it is the intersection of this stress with unresolved land claims, institutional failures, and identity politics that transforms environmental tension into violent conflict. This layered causality illustrates the limitations of monocausal theories and affirms the necessity of multi-scalar frameworks such as political ecology and eco-violence theory. These findings also highlight climate-induced loss and damage, as communities face escalating livelihood disruption, property destruction, loss of lives and livelihoods, and forced displacement linked to worsening environmental stress and unresolved conflict.

Furthermore, both sets of interviews highlight a feedback loop wherein climate stress fuels conflict, conflict inhibits governance, and poor governance impedes adaptation, thus perpetuating a "conflict ecology" rooted in both natural and human systems. This insight is particularly critical for informing intervention design. Development strategies that focus narrowly on security or environmental conservation without addressing land tenure reform, political inclusion, and institutional capacity-building are likely to fail. Across both Omor and its neighboring communities, participants shared a consistent perception that climate-induced resource stress and unclear land boundaries are central to escalating conflict, yet notable differences emerged in their responses, while all expressed frustration with weak leadership, residents of both Omor, Anaku, and Umumbo, in Ayamelum LGA, emphasized informal negotiation and economic resilience more strongly than the more fear- and obstruction-dominated narratives from Omor. In all, these findings align with prior research, such as Francisca et al. (2023), Haider (2019), Sayne (2011), and Olorunfemi (2013), which also link climate change to resource conflicts and environmental hazards in Nigeria.

CONCLUSION

This study has illuminated the complex interplay between climate variability, resource scarcity, and conflict in Omor and its neighboring communities of Umumbo and Anaku in Ayamelum LGA, demonstrating that environmental stress alone does not lead to violence. It shows that erratic rainfall, water scarcity, and prolonged dry seasons acts as a threat multiplier rather than a direct cause of conflict. Violence emerges where these climatic pressures intersect with structural weaknesses: unclear land tenure, fragile institutions, and politicized governance. While Omor residents described fear-driven avoidance and repeated mediation failures, Umumbo and Anaku highlighted informal negotiation, economic resilience, and adaptive coping strategies.

These findings confirm that conflict outcomes are shaped less by scarcity alone and more by how governance structures and power dynamics mediate resource stress.

Policy Implications

Implementing land tenure reform and clear boundary demarcation through participatory mapping and legal codification is vital to reducing disputes, as demonstrated in similar contexts where such approaches strengthened farmer resilience (Terdoo and Feola, 2020). Likewise, investment in climate-resilient water infrastructure such as multi-season boreholes, rainwater harvesting, and community-led maintenance can ease competition and buffer households against variability, in line with UNDP Nigeria's (2023) call for integrated water security solutions. Finally, strengthening local governance structures by empowering chiefs, councils, and community organizations with transparent and inclusive decision-making will improve conflict mediation and resource management, addressing institutional weaknesses that often undermine adaptation and peacebuilding (Francisca et al., 2023; Olorunfemi, 2013).

Research Recommendations

1. Future studies should disaggregate vulnerabilities by gender, age, and socioeconomic status to capture differentiated impacts.
2. Inclusion of pastoralist and neighboring community perspectives will provide a fuller picture of regional conflict dynamics.
3. Participatory action research should be prioritized to co-design adaptation pathways that complement, rather than displace, local knowledge.

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