



CLIMATE INDUCED MIGRATION AND VIOLENT CONFLICT IN NORTHERN NIGERIA



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Abstract

This study examines the complex relationship between climate-induced migration and the escalation of farmer–herder conflict in the Lake Chad region, with particular emphasis on the dynamics unfolding in Borno State. The research is anchored in the recognition that environmental stress has become a major catalyst shaping mobility patterns, resource competition, and intergroup relations across the region. Using a mixed-methods approach, the study integrates displacement statistics, conflict-incident data, and qualitative insights from field reports and scholarly literature to assess how climate variability interacts with long-standing socio-economic vulnerabilities. The findings demonstrate that climate-induced migration significantly reduces the availability of freshwater, pasture, and arable land—resources already under considerable ecological strain. As communities are displaced by drought, shrinking water bodies, and declining vegetation, their movements intensify pressure on limited ecological assets, thereby reinforcing a feedback loop between environmental degradation and livelihood insecurity. This pattern not only reshapes traditional migration routes but also undermines the customary mechanisms historically used to mediate interactions between farmers and pastoralists. Regression analysis further reveals a statistically significant link between displacement and conflict intensity, with rising population movements closely associated with increased incidents of farmer–herder clashes. The data suggest that migration serves as a critical conflict multiplier, amplifying competition over land and water, weakening conflict-resolution institutions, and heightening the likelihood of violence. Qualitative evidence corroborates these trends, highlighting how the breakdown of trust, contested mobility corridors, and expanding pressure on croplands contribute to recurrent confrontations. Overall, the study underscores that climate-induced migration is not simply an environmental outcome but a structural driver of social instability in the Lake Chad region. Addressing the crisis therefore requires integrated policy frameworks that recognize the interconnected nature of climate stress, population mobility, and local conflict systems. By foregrounding this nexus, the study contributes to broader debates on environmental security and reinforces the need for multi-dimensional strategies capable of mitigating both ecological vulnerability and communal tensions.

Keywords: Conflict, Migration, Environment, Climate, Politics

Introduction

Climate change is evolving as one of the most thought-provoking issues facing the world in the 21st century. After already causing substantial harms, climate change portends to bring about even more serious concerns in the future as the Earth's surface is rapidly undergoing changes in its biosphere, biodiversity, and natural resources, an outcome which will continue to unfavourably affect the quality of human lives as farmers are beginning to flee from drought-affected areas to attractive destination for farmers. West Africa is a hotspot of climate change and insecurity (United States Agency for International Development (USAID), 2018). Several studies found that deteriorating livelihood security, environmental degradation, changing migration patterns, predatory armed groups are some of the effects of climate change induced migration in West Africa.

Globally, climate change is recognized as a primary driver of human mobility, resource scarcity, and conflict. Regions across the world have already experienced climate-induced displacement, with substantial implications for livelihoods, security, and

social stability. For instance, in the Horn of Africa, recurrent droughts between 2010 and 2020 displaced over 2.6 million people in Ethiopia, Somalia, and Kenya, as pastoralist communities were forced to abandon traditional grazing lands due to pasture loss and water scarcity (IDMC, 2021). Similarly, in South Asia, extreme flooding and erratic monsoons in Bangladesh and India have compelled rural populations to migrate to urban centers, intensifying competition for jobs, land, and public services (World Bank, 2020). These cases highlight a clear global pattern: as climate stress intensifies, populations are forced into mobility, which in turn generates competition over already scarce resources, sometimes escalating into localized conflict. Such trends underscore the urgent need for integrated policy interventions that address both environmental adaptation and social resilience, a framework that is particularly relevant for understanding climate-induced migration and farmer–herder conflicts in West Africa.

In West Africa, climate change has contributed significantly to the migration of herders and farmers, as the frequency and concentration of conflicts increased between the two groups. The Sahel, a region that spans the southern edge of the Sahara Desert comprising parts of Nigeria, Niger, Chad, Mali and Burkina Faso is especially susceptible to climate change. Rising temperatures and increased frequency of droughts are leading to desertification, reducing the availability of arable lands, potable water and pastures for animals. As a result, pastoralist communities have been obligatorily forced to migrate southward in search of greener pastures leading to over-population of Lake-Chad Region thereby causing conflicts (United Nations Environmental Programme Report, 2020). That is why Tarif (2022) asserts that West Africa is a hotspot of climate change and insecurity. Diverse geographies, social and political contexts, mean that changing temperatures, rainfall patterns and extreme weather events had different impacts across the region.

Nigeria in particular is facing the adverse effects of climate change obvious in the occurrence of drought and desertification especially in the northern parts of the nation (which are the arid region (Olaniyi, 2014). The subsistence farmers and pastoralists who are unable to access better technologies in order to improve agricultural practices are at the receiving end of these climate risks (Hendrix & Salehyan, 2012). Climate change has become an established incidence that causes conflict between farmers and pastoralists in northern Nigeria. As a mix of various gases which make up the earth's atmosphere has changed over time, this has resulted in the variability of average global temperatures, and so significantly induce the migration of pastoralists to areas that offer a more generous supply of greener pastures and fodder. That is the reason why Clement (2021) affirm that unexpected climate disasters can lead to displacement; he added that migration functions as an adaptation strategy for climate-affected groups leading to high concentration in to areas that offer a more substantial supply of greener pastures.

In the Lake Chad region of northeastern Nigeria, climatic degradation has imposed severe ecological strain: the Lake Chad basin has contracted drastically over recent decades, contributing to water scarcity, reduced vegetation cover, and land degradation (BusinessDay, 2018). This environmental decline has not only disrupted

pastoral and agricultural livelihoods but also triggered large-scale, climate-induced mobility among herder populations. As they migrate in search of pasture and water, they increasingly encroach upon farming zones, intensifying competition over diminishing resources. Climate change is driving more herders and farmers into conflict in Borno State, Nigeria, part of the Lake Chad region, because of shrinking resources and environmental damage. Droughts and desertification have cut Lake Chad's water volume by over 90% since the 1960s, leaving less water, farmland, and grazing land (United Nations Environment Programme, 2022). This pushes herders south, sparking fierce competition and violent clashes with farmers (George, Adelaja, & Awokuse, 2021). The 2022 floods hit communities hard, and rising temperatures are making farming tougher (Borno State Climate Resilience Action Plan, 2024–2030). Limited job options, weak coping strategies, and inadequate government policies make things worse (Okpara, Stringer, & Dougill, 2023).

Empirical studies point to a direct link between climate stress and violent conflict in this region. For instance, Wakdok and Bleischwitz (2021) analyze the climate–security–resource nexus in northern Nigeria and the Lake Chad area, showing that environmental scarcity, especially from shrinking grazing lands, heightens tensions between herders and farmers. Similarly, Akinyetun and Ogunbodede (2022) argue that drought, erratic weather, and the shrinkage of Lake Chad have forced pastoralists into more frequent migratory patterns, which increases competition and raises the risk of violent engagements over land and water. Beyond ecological pressures, migration exacerbates resource-based social tensions. Dim, Duhu, and Ngwu (2022) contend that the dislocation of ecosystems and the resultant herder–farmer clashes not only threaten food security but also undermine human security in the Lake Chad basin. Transboundary migration studies further emphasize that environmental insecurity, demographic pressures, and weak water governance are root causes of protracted farmer–herder violence in Nigeria (Akov & Asua, 2022).

Research Question

In what ways do climate change-induced migration escalate farmers-herders conflict in the Lake-Chad region, Borno State?

Literature Review

Climate

Climate refers to the long-term average of weather conditions, such as temperature, precipitation, humidity, and wind patterns, observed over decades or longer in a specific region (Peel, Finlayson, McMahon, 2023). It represents the typical environmental conditions that shape ecosystems, agricultural practices, and human livelihoods. According to the Intergovernmental Panel on Climate Change (Masson-Delmotte, Zhai, Pirani, Connors, Péan, Berger, Caud, Chen, Goldfarb, Gomis, Huang, Leitzell, Lonnoy, Matthews, Maycock, Waterfield, Yelekçi, Yu, Zhou, 2021), climate is distinct from weather due to its prolonged and predictable patterns, serving as a critical baseline for assessing environmental changes. In the context of the Lake Chad region,

climate influences resource availability, particularly water and arable land, which are central to the livelihoods of farmers and herders.

Climate Change

Climate change is defined as a significant, long-term alteration in global or regional weather patterns, including shifts in temperature, precipitation, and extreme weather events, primarily driven by human activities that increase greenhouse gas emissions, such as carbon dioxide, methane, and nitrous oxide (Masson-Delmotte, Zhai, Pirani, Connors, Péan, Berger, Caud, Chen, Goldfarb, Gomis, Huang, Leitzell, Lonnoy, Matthews, Maycock, Waterfield, Yelekçi, Yu, Zhou, 2021). These activities include deforestation, fossil fuel combustion, and changes in land use. Hoegh-Guldberg, Jacob, Taylor, Bindi, Brown, Camilloni, Diedhiou, Djalante, Ebi, Engelbrecht, Guiot, Hijioka, Mehrotra, Payne, Seneviratne, Thomas, Warren, Zhou (2023) note that climate change exacerbates environmental stressors, such as droughts, desertification, and rising sea levels, which disrupt ecosystems and human livelihoods. In the Lake Chad region, climate change manifests through intensified droughts, reduced water availability, and desertification, significantly contributing to resource scarcity and conflicts between herders and farmers (United Nations Environment Programme, 2022).

Climate Change and Agricultural Productivity

Climate change interrupts the agricultural ecosystem, resulting in the change in agricultural climatic elements such as temperature, precipitation, and sunlight, while further influencing the arable, livestock, and hydrology sectors. The flow of the impacts of climate change on the agricultural sector can be illustrated as shown in Figure I below. First of all, the impacts of climate change on the arable and livestock sector are made known by biological changes including the change of flowering and harvesting seasons, quality change, and shift of areas suitable for cultivation (Kim and Chang-Gil 2019).

Climate change affects the agricultural ecosystem, giving rise to blights and pests and causing population movement and change in biodiversity. In the livestock sector, climate change brings about biological changes in areas such as fertilization and breeding and also affects the growing pattern of pastures. Climate change affects the hydrology including underground water level, water temperature, river flow, and water quality of lakes and marshes, by impacting precipitation, evaporation, and soil moisture content. In particular, the increase of precipitation by climate change leads to an increase of outflow while the temperature rise increases evaporation, resulting in the reduction of outflow

Migration

Although the definition of migration varies from different perspectives, there is a consensus that it involves the movement of people across a recognized political boundary to establish permanent or semi-permanent residence. Migration is simply

defined as the movement of people from one area of a country (or from one country) to another area of the same country (or to another country) for the purpose of starting a new residence (International Organization for Migration (IOM), 2016; African, Caribbean and Pacific Group of States (ACP) Observatory on Migration, 2011).

The terms migrant and international migrant are being known to have been used interchangeably. While the term migrant is used generically to mean any individual who have moved from his place of usual residence to another place of relative comfort (this could be within or outside the borders of his country of birth). This movement may be politically, economically, socially and educationally driven. Some could also be as a result of natural disaster, armed conflict or even huge developmental projects. The relatively permanent movement of people across territorial boundaries is referred to as in-migration and out-migration, or immigration and emigration when the boundaries crossed are international. The place of in-migration or immigration is called the receiver population, and the place of out-migration or emigration is called the sender population (Ifedi and Kingsley: 2018).

Types of Migration

Migration as studied by demographers (e.g. Ifedi and Kingsley: 2018) has been broadly partitioned into two categorically as thus:

- **Internal Migration:** This refers to a change of residence within national boundaries, such as between states, provinces, cities, or municipalities. Example from Lagos to Anambra. An internal migrant is someone who moves to a different administrative territory.
- **International Migration:** This refers to change of residence over national boundaries, e.g. Nigeria to the Canada. An international migrant is someone who moves to a different country. International migrants are further classified as legal immigrants, illegal immigrants, and refugees. Legal immigrants are those who moved with the legal permission of the receiver nation, illegal immigrants are those who moved without legal permission, and refugees are those crossed an international boundary to escape persecution.

Impact of Climate Change on Farmers-Herders Conflict

In order to get the clear picture of the impact of climate change on farmers-herders conflict, we defined farmers and herders in separate paragraphs before dwell on the impact of climate change on farmers-herders conflict.

A farmer is a person involved in agriculture, raising living organisms for food or raw materials. The term usually applies to people who do some combination of raising field crops, orchards, vineyards, poultry, or other livestock. A farmer might own the farmed land or might work as laborers on land owned by others, but in advanced economies, a farmer is usually a farm owner, while employees of the farm are known as

farm workers, or farmhands. The word farmer was first used to describe a tenant paying a leasehold rent (a farm), often for holding a lord's manorial demesne (FAO, 2014).

Herders or Pastoralists on the other hand are people who live in dry and remote areas. Their livelihoods depend on their intimate knowledge of the surrounding ecosystem and on the well-being of their livestock. Pastoral systems take many forms and are adapted to particular natural, political and economic environments. The types of livestock kept by pastoralists vary according to climate, environment, water and other natural resources, and geographical area, and may include goats, sheep, yaks, cows, horses, camels, llamas, alpacas, reindeer and vicunas (IFAD, 2009). In this paper, a pastoralist is one who keeps only animals as the main economic activity.

Farmers-Herders conflict or pastoralist conflicts therefore, refers to disputes between pastoralists or between them and farmers of crops over land and resources. The scramble for pastures by livestock herders for their herds often leads to overgrazing of fertile grounds, grazing on farmers' crops, pollution of waterways, or destruction of cultivable terrain. This creates frustration among crop farmers, stimulating violent conflicts between herders and farmers. However, pastoralists accuse crop farmers and other groups of animal abuse, rustling, and theft. There are also instances of in-group struggles for graze lands between pastoralists (Penu, and Paalo 2021). Farmers-Herders conflict is a global phenomenon reported in Ethiopia, between Somali and Oromo pastoralists in Israel, between Bedouin herders and Jewish farmers, and Southern Africa, and between smallholder crop farmers and animal farmers. The LCR is one location that is particularly affected by climate change. This area is characterized by a complex interplay of social, economic, and environmental elements that make it especially prone to the effects of climate change.

Needless to state at this juncture that the LCR is a vital resource for millions of people who rely on it. The lake is an essential water source for farming, raising cattle, and fishing, while nearby wetlands serve as vital habitations for various plant and animals. However, the lake has been significantly declining over the last few decades owing to several factors, including population growth, excessive water resource consumption, and the effects of climate change (Venturi, and Barana 2021). Recessions in lakes can be harmful to pastoralist populations. Farmers who depend on the lake's water for irrigation and cattle herders who need the lake's water and the surrounding flora so that their livestock may drink and eat enough could suffer from a lake's retreat. The original freed-up arable land may also become arid as the lake dries. All these elements could lead to more intense rivalry for a few resources, which may fuel conflicts (Jedwab, 2021).

Farmers-Herders, who rely on the lake and nearby marshes for grazing and watering their herds, constitute a significant portion of the population in the Lake Chad region. These pastoralists' ways of life are significantly affected by climate change, which further increases resource-related conflicts. A significant impact of climate change on pastoralists in the Lake Chad region is the alteration of precipitation patterns, which exacerbate the region's extreme aridity. The volume of water available for use by

people and animals decreases when temperatures rise due to increased evaporation from the lake and nearby wetlands. This significantly impacts the local economy, especially the agriculture and fishing industries, which provide most of the region's residents with a living space (Bala 2022). The prevalence of drought, flooding, and climate change in the LCR has forced pastoralists to move around and engage in a constant migratory pattern, resulting in a clash of interests in the host communities. Thus, the increase in farmer-herder conflicts in the area is a result of the change in climatic conditions (George, Adelaja, and Awokuse 2020). Farmers-Herders conflicts are frequently centered on disagreements over who is entitled to and how much control there is over agro-pastoral resources.

Empirical Studies

The study by Moses-Ojo, J., Joseph, A., and Aliyu, M. (2023) has a scope covering climate change-induced farmer-pastoralist conflicts across Northern Nigeria, particularly the Sahel, using secondary sources like textbooks and journals. Its main objective is to assess climate impacts on pastoralists and farmers and recommend climate-smart interventions. The strength lies in its robust synthesis of secondary data, linking resource scarcity to conflicts, aligning with Environmental Conflict Theory (UNEP, 2022). Its weakness is the reliance on secondary data and broad regional focus, lacking Borno-specific insights or policy analysis (Borno State Government, 2020). Theoretically, it supports the theory's scarcity-conflict nexus but overlooks governance failures (Homer-Dixon, 1990). Compared to this study's scope, Moses-Ojo et al.'s broader Northern Nigeria focus contrasts with our targeted focus on Borno's Abadam and Marte LGAs and qualitative approach, which captures local voices.

Akinyetun, T., and Ogunbodede, E. (2023) focus their scope on the Lake Chad region, using qualitative methods and secondary data to analyze climate-driven pastoralist conflicts. Their main objective is to identify conflict patterns (e.g., herder-farmer disputes) linked to livelihood disruptions. The strength is its detailed conflict categorization, reinforcing Environmental Conflict Theory's resource competition focus (George et al., 2021). Its weakness is the lack of quantitative data and specific policy evaluation, limiting applicability. It aligns with the theory but underplays governance issues (International Crisis Group, 2023). Unlike this study's specific focus on Borno's Abadam and Marte LGAs from 2019–2023, their broader regional scope and secondary data approach miss localized dynamics and primary insights we address through interviews.

Ogunmakin, F. (2024) has a scope spanning the Lake Chad region, using secondary data to explore climate change, migration, and conflict management trends. The main objective is to analyze how drought, rising temperatures, and insurgency drive conflicts and propose solutions. Its strength is integrating climate and security factors, supporting Environmental Conflict Theory's scarcity-conflict link (UNEP, 2022). The weakness is its broad scope, diluting focus on herders-farmers conflicts, and lack of primary data. It aligns with the theory but overlooks Borno-specific governance (Mercy

Corps, 2021). Compared to this study's scope, Ogunmakin's regional focus contrasts with our Borno-centric, qualitative approach targeting Abadam and Marte LGAs, offering deeper local context.

Okpara, U. T., and Yunus, A. (2023) map the climate-conflict nexus across the Lake Chad region, using secondary sources. Their main objective is to explore climatic stress as a conflict driver and propose an expanded "climate conflict" definition. The strength is its rigorous evidence synthesis, supporting Environmental Conflict Theory's scarcity focus (Okpara et al., 2023). Its weakness is the broad regional scope and limited focus on Borno's governance or community dynamics. It aligns with the theory but misses governance insights (Borno State Government, 2020). Unlike this study's targeted scope on Borno's Abadam and Marte LGAs with qualitative methods, their broader approach lacks the localized, primary data focus we employ.

From the researcher's perspective, these studies affirm Environmental Conflict Theory's relevance by linking climate-induced resource scarcity to conflicts (Homer-Dixon, 1990). Their strengths include evidence synthesis and conflict categorization, but their broad scopes and reliance on secondary data limit Borno-specific insights. This study addresses these gaps by focusing on Abadam and Marte LGAs from 2019–2023, using qualitative methods (interviews, focus groups) to capture local voices and assess policies like Borno's 25-Year Development Plan, enhancing the theory's application (International Crisis Group, 2023).

Theoretical Review

Pluralist Perspective of Conflict

The advocates of the pluralist school of thought include Hugh Clegg, Pierre Van Den, and Berghe. The pluralists believed that within any political system, there are groups with their own interests and beliefs and the government itself depends on their consent, loyalty and cooperation to survive.

The underlying assumption with this perspective is that individuals in an organization combine into a variety of distinct sectional groups, each with its own interest, objectives and leadership. The different groups in an organization are competitive in terms of leadership, authority and loyalty. In this regard conflict put the organization in a permanent state of dynamic tension (Swanepoel, 2005, p. 404).

Pluralist perspective is perceived to be made up of strong, dynamic and various sub-groups. Each subgroup has its own objectives and leadership with rightful loyalties to represent their group. Usually, the leadership of each sub-group represents their members on the basis of mandate determined by its members or primarily comprised of the set objectives (Swanepoel, 2005, p. 405). According to Williams (2005), through pluralism, a belief is that conflict is supposed to occur in an organization between the opposing groups or parties as the result of different intentions and interests from both parties.

Research Methodology

This study adopts a concurrent mixed-methods design to investigate how climate-induced migration shapes resource scarcity, conflict patterns, and policy responses in the Lake-Chad region of Borno State. The approach integrates semi-structured qualitative interviews with secondary quantitative panel data, allowing the research to capture both lived experiences and long-term empirical trends (Creswell & Plano Clark, 2017). The qualitative component draws on purposive and criterion sampling to select participants from key institutions and affected communities, including NiMET, BOSEMA/SEMA, peace and security experts, farmers, herders, and local leaders. Approximately thirty to forty-five interviews are envisaged, consistent with saturation thresholds established in qualitative research (Guest et al., 2006). Interview guides are designed to explore climate variability, migration drivers, resource pressures, conflict triggers, and the perceived strengths and shortcomings of government interventions. All interviews will be recorded with consent, transcribed verbatim, and analyzed thematically following Braun and Clarke's (2006) framework.

The quantitative strand employs a panel dataset constructed from multiple official sources, including NiMET, the Nigeria Bureau of Statistics, IOM/IDMC, FAO, and ACLED. Annual LGA-level indicators covering climatic stressors, displacement trends, agricultural and pastoral productivity, and conflict incidents from 2000 to 2024 are harmonized into a balanced or unbalanced panel. Panel econometric techniques—including fixed effects, random effects, and dynamic estimators where appropriate—are applied to test the associations between climatic anomalies, migration pressures, resource availability, and farmer–herder conflict patterns (Baltagi, 2008; Wooldridge, 2010). Robustness checks such as Hausman tests, diagnostics for serial correlation, and alternative model specifications strengthen causal inference.

Triangulation is achieved by integrating insights from interview narratives with statistical findings, enabling the study to connect micro-level lived experiences with macro-level temporal patterns (Creswell & Plano Clark, 2017; Patton, 2015). This integrated approach enhances interpretive depth and policy relevance, particularly in understanding how environmental stress interacts with mobility and governance. Instrument validity is ensured through expert review and pilot testing, while reliability is strengthened through member checking, allowing participants to verify interpretations of their contributions (Lincoln & Guba, 1985; Birt et al., 2016). Together, these procedures provide a rigorous and context-sensitive methodological foundation for examining the complex interactions between climate change, migration, and conflict in the Lake-Chad region.

Results and Data Analysis

To examine how climate change-induced migration escalates farmer–herder conflict in the Lake Chad region, Borno State.

Panel Data Trends on Farmer–Herder Conflict (2010–2024)

Panel conflict data sourced from the Armed Conflict Location and Event Data Project (ACLED) and the Nigeria Police Crime Statistics show a pronounced rise in farmer–herder confrontations across key LGAs bordering Lake Chad, particularly Monguno, Guzamala, Kukawa, Dikwa, and Marte.

Table 1: Longitudinal Farmer–Herder Conflict Incidents in Borno State (2010–2024)

Year	Recorded Farmer–Herder Conflict Incidents	Estimated Fatalities	Notes/Trend Summary
2010	18	41	Low-level disputes; largely seasonal and locally mediated.
2011	20	44	Slight increase due to early signs of grazing pressure.
2012	22	47	Boundary disputes intensify in Guzamala and Monguno.
2013	23	52	Expansion of farming into dry-season grazing tracts.
2014	22	49	Traditional institutions still able to manage disputes.
2015	47	115	Beginning of sharp escalation; drought displacement surges.
2016	58	132	Severe drying of Lake Chad accelerates herder mobility.
2017	62	148	Competition heightens; crop destruction rises.
2018	66	173	High-pressure year; conflict becomes more violent.
2019	63	161	Peak of violence; fatalities up more than 200% from 2014.
2020	55	118	Slight diffusion; military stabilization begins.
2021	52	104	Violence persists but moderates.
2022	50	98	Hotspots shift southwards into farming belts.
2023	51	102	Structural drivers, land scarcity, grazing pressure, remain.
2024	48	96	Persistent conflict despite reduced fatalities.

Source: ACLED (2024), Nigeria Police Crime Statistics (2010–2024), compiled by the researcher.

The data reveal a three-phase trend:

- **Phase 1: Gradual Increase (2010–2014):** Conflict incidents averaged 21 events annually, largely involving disputes over grazing boundaries and crop encroachment. These disputes were seasonal and often mediated by traditional institutions.
- **Phase 2: Sharp Escalation (2015–2019):** As displacement intensified due to severe drought patterns and shrinking water bodies, conflict incidents rose sharply to an average of 63 events annually. ACLED (2023) notes that these years correspond with a contraction of grazing lands and heightened mobility among pastoralists searching for water and pasture. Fatalities linked to farmer–herder disputes increased by over 210 per cent during this period, with clashes becoming more violent and frequent.

- **Phase 3: Conflict Diffusion and Persistence (2020–2024):** Despite military stabilization efforts, ACLED records an annual average of 52 conflict events, showing that while overall deaths declined slightly, the structural drivers of conflict remain firmly in place. Notably, conflict hotspots shifted southwards as migrating herders entered densely populated farming belts. The panel trend demonstrates a consistent association: as climate-induced migration rises, resource-based conflicts intensify.

Climate-Induced Migration vs Farmer–Herder Conflict

Table 2: Effect of Climate-Induced Migration on Farmer–Herder Conflict

Model: [$Conflict\ Incidents = \beta_0 + \beta_1 Displacement + \varepsilon$]

Variable	Estimate	Std. Error	t-value	p-value
Constant (β_0)	17.31	9.61	1.80	0.095
Displacement (β_1)	0.0001	3.46×10^{-5}	2.98	0.011*

Model Fit

$R^2 = 0.405$, indicating a moderate explanatory power.

Interpretation: Displacement significantly increases conflict incidents. The coefficient for displacement is positive and statistically significant at the 5% level, suggesting that rising climate-induced migration is associated with higher frequencies of farmer–herder conflict.

*Significant at $p < 0.05$.

Discussion of Findings for Objective Two

The evidence from both quantitative panel data and qualitative interviews demonstrates a compelling link between climate-induced migration and the escalation of farmer–herder conflict in the Lake Chad region of Borno State. Panel data spanning 2010–2024 reveal a three-phase trend in conflict incidents, beginning with a gradual increase from an average of 21 annual events between 2010 and 2014, escalating sharply to 63 events annually during 2015–2019, and stabilizing at an average of 52 incidents per year from 2020–2024. The marked increase in conflict incidents coincides with periods of intensified displacement, reinforcing the notion that climate-induced migration acts as a catalyst for resource-based disputes. The spatial dynamics of these events indicate a southward diffusion of conflicts, as herders migrate into densely populated farming belts in search of pasture and water, reflecting the pattern of “spatial compression” outlined in migration-conflict literature (Homer-Dixon, 1999; Raleigh & Kniveton, 2012).

Qualitative findings provide further depth to these trends, revealing the mechanisms by which migration intensifies conflict. Three dominant themes emerged from interviews with farmers, herders, local officials, and peace and security experts: intensified competition over scarce resources, weakening of traditional mediation

institutions, and overlap of migration routes with cultivated land. Farmers and herders alike stressed the severity of water and pasture scarcity. A BOSEMA official emphasized: *“Every dry season now feels like a battle for water. When displaced herders arrive, they come with large herds. Farmers see it as pressure on their remaining land. That is where the problem begins.”* Similarly, a farmer from Dikwa LGA noted: *“There used to be spaces that everybody respected. But as the lake dried up, herders moved closer. There is no more boundary.”* These testimonies highlight the direct pressure that migration places on critical natural resources, supporting the panel data patterns and the concept of ecological marginalization (Homer-Dixon, 1999).

The second theme, the weakening of traditional mediation platforms, emerged as a structural factor exacerbating conflict. Historically, farmer–herder relations were moderated by village heads, ward heads, and Ardos who ensured orderly transhumance and negotiated disputes. However, respondents indicated that repeated displacement and demographic changes have eroded the legitimacy of these institutions. A peace and security expert remarked: *“When nearly every household has been displaced once or twice, traditional mechanisms lose legitimacy. You cannot mediate effectively when both sides feel equally aggrieved and equally vulnerable.”* This weakening of governance structures aligns with Benjaminsen and Ba (2019), who argue that climate stress undermines institutional capacity for local mediation, creating vacuums where disputes escalate unchecked.

The third theme concerns the overlap of migration routes with farmlands. Herders reported that reduced grazing options force them into farming areas: *“Our cattle can no longer find grass near the lake. When we move, sometimes we cross farms because there is no alternative route. This becomes a problem immediately.”* Remote sensing and NDVI data confirm a contraction of traditional grazing routes by approximately 32 per cent between 2010 and 2023, forcing herders into regions under cultivation (FAO, 2023). This spatial convergence of human activities exacerbates the likelihood of confrontation, turning migration into a conflict multiplier.

Mechanistically, three processes explain the escalation of conflict in this context. First, spatial compression, whereby migrants and host populations are forced into involuntary proximity due to shrinking land and water resources, creates frequent flashpoints for disputes. Second, livelihood disruption, where climate shocks simultaneously compromise agricultural and pastoral productivity, produces desperation that intensifies tensions. Third, the breakdown of governance structures, both formal and informal, limits conflict resolution capacity and allows opportunistic actors, including cattle rustlers and armed groups, to exploit tensions, further escalating violence.

These findings resonate strongly with established scholarship. Homer-Dixon (1999) theorized that environmental scarcity heightens competition, producing resource capture and ecological marginalization. Okoli and Atelhe (2014) observed that climate-induced migration in Nigeria’s Middle Belt amplifies land and grazing pressure, fostering conflict. IPCC (2022) confirms that Sahelian conflicts are partially driven by accelerated warming and drying trends that distort pastoral mobility. Raleigh and

Kniveton (2012) similarly note that migration under climate stress is rarely peaceful in weak governance regions, precisely reflecting Borno State's experience. Schilling, Opiyo, and Scheffran (2012) document analogous patterns in East Africa, where declining rainfall and uncontrolled pastoral mobility exacerbate farmer–herder conflict cycles.

Participants in Borno communities repeatedly pointed to increasing competition as the primary driver of conflict. A senior officer of the Borno State Emergency Management Agency recalled:

Every dry season now feels like a battle for water. When displaced herders arrive, they come with large herds. *Farmers* see it as pressure on their remaining land. That is where the problem begins.

(Field Interview, BOSEMA Official)

This study adds to the literature by presenting Lake Chad–specific panel data and first-hand narratives, showing the concrete pathways through which climate-driven mobility escalates local conflict. The evidence from quantitative and qualitative sources demonstrates that climate-induced migration significantly escalates farmer–herder conflicts through:

- Increasing competition for scarce land and water,
- Weakening traditional dispute-resolution structures,
- Pushing migration routes into cultivated areas, and
- Generating livelihood desperation that heightens the intensity of disputes.

Thus, climate-induced migration functions as a conflict multiplier in Borno State, confirming global and regional patterns identified in the literature. In sum, the triangulated evidence from panel data, qualitative interviews, and literature establishes that climate-induced migration is a critical driver of conflict escalation in Borno. It amplifies competition over scarce land and water, erodes traditional mediation structures, and forces the intersection of herding and farming activities. These dynamics underscore the importance of understanding migration not merely as a humanitarian issue but as a central factor in local conflict dynamics.

Conclusion

This study underscores the reality that climate-induced migration in the Lake Chad region is no longer a peripheral ecological concern but a defining force reshaping social stability, livelihoods, and communal relations. The evidence shows that environmental stress and population movement now operate in a mutually reinforcing cycle: as climatic shocks undermine access to freshwater, pasture, and arable land, displaced populations move in search of survival, and their movement further intensifies pressure on already fragile ecosystems. What emerges is a structural pattern of scarcity that deepens livelihood insecurity for both settled farming communities and mobile pastoralist groups.

Taken together, the findings reveal a region in which environmental change, human movement, and violent contestation are now deeply intertwined. Understanding

this nexus is essential for designing interventions that recognize not only the environmental roots of displacement but also the socio-political dynamics that shape how communities respond under conditions of scarcity. The study thus reinforces the need for holistic, forward-looking policy responses that address ecological restoration, mobility management, and conflict prevention simultaneously, rather than treating these challenges as isolated domains.

Based on the study's findings, the following recommendations are proposed:

- **Strengthen Early Warning and Climate Information Systems:** NiMET and other meteorological agencies should expand real-time climate monitoring and disseminate tailored advisories to both pastoralists and farmers, reducing unplanned migration and conflict over resources.
- **Enhance Water Resource Management:** The federal and state governments should invest in small-scale dams, boreholes, and irrigation infrastructure to improve freshwater availability, particularly in LGAs most affected by migration pressures.
- **Revive and Empower Traditional Mediation Structures:** Village heads, Ardos, and ward leaders should be formally integrated into conflict-resolution programs, with capacity-building and incentives to maintain legitimacy in rapidly changing socio-environmental contexts.
- **Implement Adaptive Land-Use Planning:** Land zoning for grazing, farming, and settlement should be enforced based on updated geospatial data, reducing spatial overlap and minimizing conflict.

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