Climate Change and Resource Conflicts in Northeast and North Central Nigeria: Threats and Responses

Praise Fisayo Duyile[*, a,1], **Nenpomingyi Sarah Gowon-Adelabu** [b,2]
[a] Nigerian Defence Academy, Kaduna, Nigeria
[b] University of Jos, Jos, Nigeria
[1] praiseduyile@nda.edu.ng*, [2] nenpipi20@gmail.com

Abstract

Climate change is increasingly recognized as a significant driver of resource-related conflicts, particularly in regions where natural resources are scarce and communities depend heavily on them. Nigeria, a resource-rich nation, has witnessed a rise in violent inter-communal conflicts, particularly in the North-Central region, where climate-induced constraints on land, water, and fodder access exacerbate tensions. This study investigates the impact of climate change on resource conflicts in Nigeria and evaluates the responses of both governmental and community-based efforts to mitigate these challenges. Employing a mixed-methods approach—including desk reviews, key informant interviews, and focus group discussions. This research reveals that climate change has intensified various forms of conflict, such as farmer-herder clashes and kidnappings, particularly in northern regions. The findings indicate that existing mitigation strategies are inadequate and lack long-term planning. To address these challenges effectively, the study advocates for an integrated, multi-stakeholder approach involving the government, community organizations, and the private sector to enhance sustainable resource management and conflict prevention. Furthermore, policymakers are urged to prioritize locally tailored climate adaptation measures, promote resilient livelihoods, and strengthen environmental governance to foster long-term stability in Nigeria.

Keywords: Climate Change, Resource Conflict, Scarcity, North-East Nigeria, North-Central Nigeria

I. INTRODUCTION

At the dawn of the 21st century, discussions surrounding resource conflicts have gained considerable scholarly attention, particularly in relation to newly independent states in Asia and Africa. The dissolution of colonial rule led to intense competition for control over natural resources, which, in turn, became a major driver of civil wars, guerrilla warfare, and prolonged violent conflicts. Scholars widely acknowledge resource conflicts as a primary catalyst for instability in these regions, with mounting evidence linking them to environmental changes, economic vulnerabilities, and weak governance structures.

One of the critical dimensions of resource conflicts is their intersection with climate change. Several empirical studies have demonstrated that climate variability significantly exacerbates competition over natural resources, thereby increasing the likelihood of conflict. Zhang *et al.*,[1] provide historical evidence of climate-induced conflicts over a 300-year period in North America, as well as temperature-driven conflicts affecting grain production in eastern China over a millennium. Similarly, contemporary research underscores climate change as a key contributor to environmental stress and security challenges. Busby *et al.*,[2] found that rising population density, flooding, and droughts have intensified existing vulnerabilities, overwhelming governmental

capacities to respond effectively to environmental and social crises. Furthermore, research highlights that changing rainfall patterns, rising sea levels, and temperature fluctuations are critical factors exacerbating conflict in regions heavily dependent on natural resources.

In this context, northern Nigeria has emerged as a focal point for climate-induced resource conflicts. The region is increasingly susceptible to environmental degradation due to desertification, water scarcity, and land-use disputes, all of which have been amplified by rising temperatures and erratic weather patterns. Nigeria, as one of Africa's most climate-vulnerable nations, relies heavily on rain-fed agriculture, which employs over 70% of the population [3]. This dependence on climate-sensitive economic activities renders the country particularly susceptible to adverse climatic conditions. Odjugo [4] reported a consistent rise in temperature and a decline in both the quantity and duration of rainfall, with northern Nigeria experiencing disproportionate impacts compared to the southern region.

The increasing scarcity of resources in northern Nigeria has intensified tensions among various groups, particularly between farmers and herders, resulting in escalating violence. Socioeconomic and political factors such as poverty, inequality, and weak governance further exacerbate these conflicts. Critics argue that the Nigerian government has failed to implement adequate policies to address climate change and its role in fueling resource conflicts. According to Tukur [5], government responses have been largely reactive, with minimal long-term planning or investment in climate adaptation strategies. Despite the establishment of the Ministry of Environment and the Nigeria National Emergency Management Agency (NEMA) in 1999, which have developed policies to mitigate climate change impacts [6], implementation remains inadequate due to limited resources, poor coordination, and a lack of political will [7].

Moreover, the government's approach to resolving conflicts between farmers and herders has been widely criticized. Amnesty International [8] reported that governmental interventions have been biased, often favoring herders over farmers, leading to increased tensions and cycles of reprisal attacks. This lack of an impartial conflict resolution framework has further deepened hostilities and prolonged violence in the region. Although some initiatives have been introduced to address climate change and resource conflicts, their effectiveness remains questionable due to systemic governance challenges and the entrenched nature of these conflicts.

This study explores the intricate relationship between climate change and resource conflicts in northern Nigeria, aiming to understand the key factors driving these conflicts and their broader implications. By examining the causal link between climate change and resource disputes, the research seeks to uncover how environmental shifts contribute to tensions over land, water, and other essential resources. Additionally, it investigates the socioeconomic and political conditions that intensify these conflicts, shedding light on the structural and systemic challenges at play. Furthermore, the study evaluates the effectiveness of existing governmental and non-governmental interventions in addressing climate-induced conflicts. Based on these insights, it aims to propose strategic solutions for mitigating disputes and fostering sustainable resource management in the region.

The urgency of this research stems from the increasing frequency and intensity of climate-related conflicts in northern Nigeria. According to the National Bureau of Statistics [9], over 55% of conflicts in the north-central region are directly linked to disputes over land and water resources. Additionally, the Nextier SPD Violent Conflict Database (2021) recorded 71 instances of farmer-herder clashes within 12 months, resulting in 406 fatalities, 49 injuries, and 15 abductions. These statistics underscore the pressing need for comprehensive policy interventions to address climate-induced resource conflicts.

II. LITERATURE REVIEW

A. Climate Change

Climate change is a multidimensional phenomenon that has garnered extensive academic attention across various disciplines, including environmental science, economics, social sciences, and public policy. The Intergovernmental Panel on Climate Change (IPCC) has been instrumental in consolidating the scientific consensus on this issue, emphasizing that the Earth's climate is undergoing significant and unequivocal warming, primarily driven by human activities, particularly the combustion of fossil fuels [10]. Defined as long-term shifts in temperature, precipitation, and atmospheric conditions, climate change is influenced by both anthropogenic factors—such as industrial emissions and deforestation—and natural forces, including volcanic activity and solar radiation [10].

The origins of human-induced climate change trace back approximately two centuries to the onset of the Industrial Revolution, a period marked by a surge in greenhouse gas emissions resulting from fossil fuel combustion and land-use changes [11]. Over time, the accumulation of greenhouse gases—primarily carbon dioxide (CO_2), methane (CH_4), and nitrogen dioxide (NO_2)—has intensified the greenhouse effect, trapping solar heat within the Earth's atmosphere and consequently altering global climate patterns [12]. This acceleration of warming has been directly linked to an increase in extreme weather events, including prolonged droughts, intensified storms, and rising sea levels, thereby exacerbating ecological and socio-economic vulnerabilities.

The consequences of climate change extend across multiple sectors, affecting agriculture, water resources, public health, and ecosystems. Shifts in temperature and precipitation patterns have led to more frequent and severe climatic disruptions, such as droughts, floods, and heatwaves, which pose serious threats to global food security, freshwater availability, and human well-being [12]. Notably, the most severe impacts disproportionately affect vulnerable populations, particularly in developing nations where adaptive capacity is limited due to socio-economic constraints [13]. Additionally, climate change has been linked to environmental transformations, including diminishing snow cover, melting polar ice caps, and ocean acidification—an outcome of excessive carbon dioxide absorption by seawater [11].

A growing body of scholarly research suggests a complex interrelationship between climate change and resource-based conflicts. Several studies highlight how environmental stressors—such as population displacement, water scarcity, and erratic rainfall patterns—can exacerbate socio-political tensions, thereby increasing the likelihood of conflict [2]. This correlation underscores the challenges faced by governments in responding effectively to climate-induced crises, particularly in regions with inadequate infrastructure and fragile political systems. Furthermore, climate change is increasingly recognized as a catalyst for geopolitical instability, amplifying existing vulnerabilities and straining global governance mechanisms. Given the extensive and interconnected nature of climate change, addressing this global challenge necessitates a comprehensive and interdisciplinary approach. Future policy and research efforts must integrate scientific innovation, economic strategies, and governance frameworks to mitigate its adverse effects and enhance societal resilience. The urgency of this issue underscores the need for sustained international cooperation and evidence-based policy interventions aimed at fostering a sustainable and adaptive global environment.

B. The Concept of Conflict

Conflict is a multifaceted phenomenon that has been defined and interpreted differently across various academic disciplines. The term commonly evokes notions of competition, disputes, and tensions, often culminating in overt confrontations between individuals, groups, or nations. As an intrinsic aspect of human interaction, conflict is both inevitable and pervasive, occurring at multiple levels within society. Quincy Wright [14] succinctly conceptualized conflict as "opposition among social entities directed against one another," highlighting its fundamental nature as a state of discord or antagonism.

From a psychological and social perspective, Schmid [15] posits that conflict emerges from perceived incompatibilities between two or more individuals or groups. These incompatibilities may encompass divergent needs, interests, values, or access to resources. While conflict does not always manifest in observable behavior, its mere perception can create tensions that influence interpersonal and group dynamics. Schmid [15] further emphasizes that the manner in which conflict energy is channeled determines its consequences, which may range from constructive dialogue to destructive violence.

In political discourse, conflict is frequently associated with the struggle for power and resource allocation. The distribution of resources—whether economic, political, or social—is inherently limited, making competition inevitable. Political conflicts often arise when governmental decisions regarding resource allocation are perceived as unjust or inefficient, thereby exacerbating tensions among competing interests. The possible outcomes of such conflicts are varied and may include dominance, surrender, coercion, discrimination, or, conversely, resolution, negotiation, and transformation.

The process of conflict escalation has been systematically analyzed in academic literature. Deutsch [16] outlined a four-stage model comprising latent conflict, perceived conflict, felt conflict, and manifest conflict. In the latent stage, potential tensions exist due to underlying differences in goals or values, but the parties involved remain unaware. As the conflict transitions to the perceived stage, individuals or groups recognize the presence of discord and may perceive it as a direct threat. The felt conflict stage is characterized by emotional responses such as frustration or hostility, which can intensify the conflict dynamics. Finally, in the manifest conflict stage, tensions become overt, often leading to verbal or physical confrontation.

Indeed, conflict has profound implications for individuals, organizations, and societies. Effective conflict management necessitates an understanding of its underlying causes, escalation patterns, and potential resolutions. While scholars continue to debate the fundamental relationship between conflict and natural resources, many agree that competition over access and control of resources serves as a significant catalyst for social and political unrest. Thus, the study of conflict remains an essential field of inquiry, contributing to strategies for mitigation, negotiation, and sustainable resolution.

C. Resource Conflict

Scholarly discourse lacks a universally accepted definition of resource conflict, with significant debate surrounding its legal dimensions. While many researchers and policymakers advocate for a standardized definition to distinguish between the lawful and unlawful use of revenues derived from natural resources in conflict settings, others argue that a singular, overarching definition oversimplifies the complexities involved and may lead to misinterpretations [17]. A clear conceptualization, however, could serve as a critical tool for identifying the role of natural resources as potential catalysts of conflict and for developing preventive measures.

Resource conflict broadly refers to disputes arising from competition over access to, control over, and distribution of natural resources, as well as the unequal allocation of associated costs, benefits, and power structures. Natural resources can play a pivotal role in the onset, escalation, and perpetuation of socio-political conflicts [18]. While conflicts may emerge over livelihood resources such as land, water, and pasture—often manifesting at the community level—more frequently, extractable and high-value commodities such as timber, crude oil, and gemstones are central to resource-driven conflicts. Within this context, "resources" refer specifically to natural resources, which are integral components of the environment that fulfill human needs and possess both economic and non-economic value, including minerals, energy sources, soil, biological resources, and freshwater supplies.

From an international legal standpoint, Global Witness [19] defines resource conflicts as those in which the systematic extraction and trade of natural resources within a conflict setting contribute to, sustain, or result in severe human rights violations, breaches of international humanitarian law, or even acts amounting to international crimes. This distinction is crucial in differentiating between the legitimate use of natural resources to finance conflict-related expenditures and their unlawful exploitation to support illicit activities.

Furthermore, resource conflict definitions are often specific to particular commodities. For example, "timber conflict," as conceptualized by P. Le Billon [20], refers to timber that has, at some stage in its supply chain, been traded by armed groups—including insurgents, military forces, or governing authorities involved in armed conflict—for the purpose of sustaining hostilities or profiting from war economies. The legal status of such timber is contingent upon national regulatory frameworks, meaning that not all timber-related conflicts are inherently illegal. This nuanced understanding underscores the multifaceted nature of resource conflicts and highlights the necessity of adopting a comprehensive and multidisciplinary approach to analyzing and addressing their implications.

D. The Relationship Between Climate Change and Conflict

Climate change has increasingly been recognized as a critical driver of conflict, particularly in regions where natural resources are scarce and communities are highly dependent on environmental stability. Climate-related stressors such as rising temperatures, extreme weather events, and shifting precipitation patterns contribute to resource scarcity, economic instability, and social tensions, all of which create conditions conducive to conflict.

Nigeria presents a clear example of how climate change exacerbates conflict [21]. The country's northern and central regions have experienced increasing violent clashes between farmers and herders due to competition over land and water resources. Climate variability, particularly prolonged droughts and erratic rainfall, has pushed nomadic herders further south in search of grazing land, often encroaching on farmlands. This has led to frequent violent confrontations, resulting in casualties, displacement, and destruction of property.

The Nigerian government has attempted to address these conflicts through policies such as anti-open grazing laws, climate adaptation strategies, and military interventions. However, these measures have often been inadequate due to poor implementation, lack of coordination, and weak enforcement. Without sustainable land-use policies and climate adaptation initiatives, conflicts driven by climate change will likely persist.

Climate change is a growing driver of conflict, particularly in fragile and resource-dependent societies. The Nigerian case highlights how environmental stressors interact with socioeconomic and political factors to exacerbate tensions and violence. Addressing climate-induced conflicts

requires a multi-sectoral approach that combines sustainable resource management, climate adaptation, and inclusive governance. Without proactive measures, climate change will continue to be a destabilizing force, increasing the frequency and severity of conflicts worldwide.

III. METHOD

This study operates under several key assumptions: *first*, climate change is a significant driver of resource conflicts in northern Nigeria; *second*, socioeconomic and political factors, including poverty and governance deficiencies, exacerbate these conflicts; and *third*, current governmental responses are inadequate to address the root causes of climate-induced resource conflicts effectively. To test these assumptions, the research employs a mixed-methods approach, combining qualitative and quantitative methodologies. Primary data collection will involve structured interviews with policymakers, local community leaders, and environmental experts. Additionally, surveys will be conducted among affected populations to gauge perceptions of climate change and its impact on resource competition. Secondary data will be sourced from government reports, academic literature, and conflict databases to establish historical trends and policy analyses.

The impact of climate change on resource conflicts in northern Nigeria presents a significant challenge that requires urgent and coordinated action. While existing policies have acknowledged the role of climate change in exacerbating conflicts, their implementation remains insufficient. This study contributes to the growing body of literature by offering a comprehensive analysis of climate-related conflicts in northern Nigeria and proposing viable strategies for mitigating resource-based disputes. Addressing these challenges requires a multi-sectoral approach that integrates environmental sustainability, economic resilience, and governance reforms. Enhanced collaboration between government agencies, civil society organizations, and international partners is essential in developing effective policies that promote long-term peace and security in the region.

IV. RESULTS AND DISCUSSION

A. Environmental Conflict: The Nexus between Climate Change and Resource Conflict

Environmental conflict theory provides an interdisciplinary framework for analyzing the intricate relationship between environmental factors—such as resource scarcity and ecological degradation—and the emergence of conflicts at individual, communal, and national levels [22]. This theoretical perspective, particularly as developed by Philippe P. Le Billon [23], posits that environmental conflicts arise not merely from ecological pressures but also from broader socio-economic and political dynamics. P. Le Billon [20] asserts that competition over scarce natural resources generates power struggles and deepens social inequalities, necessitating a multidimensional approach to understanding environmental conflicts [24].

Empirical studies further substantiate this theoretical foundation. For instance, in an investigation of climate change and violent conflicts in Kenya, Adano *et al.*,[25] employed Environmental Conflict Theory to demonstrate how environmental stressors—such as climate variability and resource depletion—exacerbate pre-existing socio-political and economic tensions, ultimately leading to conflict over access to essential resources. Within this theoretical framework, environmental conflicts can be classified into two primary categories: distributive conflicts and structural conflicts [11]. Distributive conflicts emerge when competing groups vie for finite resources such as arable land or freshwater, often resulting in violence and displacement. Structural conflicts, conversely, stem from the ways in which environmental stressors—such as prolonged

droughts or extreme flooding—amplify existing disparities in power, wealth, and political representation, further intensifying disputes over resource access and governance [22].

Beyond the immediate environmental triggers, P. Le Billon [20] underscores that environmental conflicts are deeply embedded in historical, cultural, and political contexts. He argues that resolving such conflicts necessitates an analysis that extends beyond ecological factors to consider the broader socio-political structures that shape access to and control over resources [24]. This perspective is particularly relevant in regions such as Northern Nigeria, where climate change and resource scarcity have been identified as pivotal drivers of violent conflict [25]. Northern Nigeria's arid and semi-arid climate, characterized by erratic rainfall and recurrent droughts, has resulted in severe depletion of essential resources such as land and water. Consequently, competition over these dwindling resources, particularly between agrarian and pastoralist communities, has intensified, escalating tensions and contributing to outbreaks of violence [25].

The destabilizing effects of climate change and resource scarcity in Northern Nigeria are further compounded by deep-seated socio-economic and political challenges, including widespread poverty, weak governance, and interethnic and interreligious tensions [5]. These factors, when combined with environmental stressors, create a highly complex conflict dynamic that necessitates a nuanced, interdisciplinary analytical approach. Environmental Conflict Theory, as articulated by P. Le Billon [24] and other scholars, highlights the intricate interplay between environmental, social, economic, and political determinants in shaping conflict patterns. By adopting this holistic perspective, researchers and policymakers can more effectively conceptualize and implement conflict resolution strategies that address both the immediate ecological pressures and the underlying systemic inequities fueling environmental conflicts. Thus, environmental conflict theory serves as a critical lens for examining the nexus between climate change and resource conflicts, particularly in ecologically vulnerable and politically fragile regions such as Northern Nigeria. This framework underscores the necessity of addressing the broader socio-economic and political factors that interact with environmental stressors to drive conflict and violence. Furthermore, it highlights the need for interdisciplinary research and policy interventions capable of tackling the multifaceted nature of environmental conflicts in a comprehensive and sustainable manner.

TABLE I. DRIVERS OF CLIMATE CHANGE AND ELEMENTS OF RESOURCE CONFLICT IN NIGERIA

Climate Change Drivers	Resource Conflict Drivers	Potential Impacts
Rising temperatures and changing precipitation patterns	Competition over land and water resources	Reduced agricultural productivity, increased food insecurity, displacement of communities
Sea level rise and coastal erosion	Competition over fishing grounds and coastal resources	Loss of livelihoods for coastal communities, increased tensions between fishermen
Increased frequency and intensity of extreme weather events (e.g., floods, droughts, hurricanes)	Competition over natural resources in disaster-prone areas	Loss of life, destruction of infrastructure, displacement of communities
Deforestation and land use change	Competition over land for agriculture, logging, and other uses	Loss of biodiversity, soil erosion, reduced water quality, displacement of communities

Source: Authors' compilation

B. Drivers, Impacts, and Climate Threats in Northeast and North-Central Nigeria

Drawing from the postulations of the environmental conflict theory, it is trite to submit that the relationship between climate change and resource conflict in Nigeria is a complex and multifaceted issue that is influenced by a range of factors. Table I provides an overview of some of the key drivers of climate change and resource conflict in Nigeria, as well as some of the potential impacts of these issues.

The interplay between environmental drivers and their socio-political impacts is complex and often exacerbates existing challenges. Rising temperatures and shifting precipitation patterns intensify competition over water resources, which, in turn, can trigger conflicts over land use and displace communities. Similarly, coastal erosion diminishes fishing grounds, leading to food insecurity and heightened tensions among different social groups. These interconnections are particularly evident in several states across northeastern and central northern Nigeria. Thus, it is imperative to analyze Nigeria's security challenges through the lens of political ecology, which offers a pragmatic approach to understanding the nature and evolution of conflicts in the northern region, especially in relation to climate change. A comprehensive analysis requires a detailed characterization of the agro-environment of the region, as well as an identification of key drivers and their subsequent impacts on climate and resource availability. The primary drivers of resource-related conflicts in these areas include drought, desertification, water scarcity, extreme weather events, and deforestation. These climatic stressors have directly contributed to violent confrontations among various groups, including community conflicts, criminal activities, jihadist movements, clashes between farmers and vigilantes against herders and bandits, and forced migration. The economic, humanitarian, and social ramifications of these conflicts further compound national security concerns.

The northeastern states of Nigeria include Adamawa, Bauchi, Borno, Gombe, Taraba, and Yobe, while the north-central region comprises Benue, Kogi, Kwara, Nasarawa, Niger, and Plateau states. This geographical and political subdivision experiences a climate characterized by alternating wet and dry seasons. According to Ugbem [26], the highest temperatures in these regions occur in March or April, particularly in areas north of Latitude 9°N, while the lowest temperatures are recorded in December or January. Rainfall patterns exhibit early onset and cessation. The predominant vegetation types include Guinea, Sudan, and Sahel Savanna [26]. Agriculture remains the dominant economic activity; however, the increasing impacts of climate change have significantly undermined both livelihoods and food security in the region.

The persistent tensions between farmers and herders can largely be attributed to the effects of climate change. Periodic droughts and flooding have disrupted agricultural productivity and destroyed homes. Reports from the National Emergency Management Agency (NEMA) indicate that approximately 1.9 million Nigerians have been displaced due to flooding [27]. These environmental disruptions also pose significant challenges to the realization of the Sustainable Development Goals (SDGs), particularly in the areas of good health and well-being, clean water and sanitation, responsible consumption and production, biodiversity conservation, and climate resilience [28].

Historically, the Sahel Savanna region supported both agriculture and pastoralism, while the central region, with its savanna and lowland rainforest, served as Nigeria's primary agricultural hub. Nomadic herders traditionally migrated southward in search of water and pasture during the dry season and returned northward during the rainy season. Meanwhile, the southern region, characterized by abundant rainfall and mangrove forests, remained largely reliant on plantation

agriculture, fishing, and a limited presence of Fulani herders. During this period, security threats were minimal, and socioeconomic activities proceeded with relative stability Ekitistate [27]. However, climate variability and declining water availability have increasingly disrupted traditional agricultural cycles, placing severe socioeconomic stress on affected communities. As Wakdok and Bleischwitz [21] argue, erratic weather patterns have altered agrarian practices, thereby intensifying competition for land among various groups. The shrinking availability of grazing land, exacerbated by overgrazing and desertification, has forced Fulani herders into prolonged stays in farmlands, escalating conflicts with local farming communities.

Atelhe and Okoli [29] identify desertification as a primary driver behind the loss of productive grazing and agricultural land. This suggests a direct causal relationship between climate change and heightened human insecurity in the region. In contrast, Benjaminson *et al.*,[30] attribute the persistence of conflicts to governance failures, including rent-seeking behavior, unregulated migration, and the existence of ungoverned spaces. While their argument emphasizes institutional deficiencies, it does not account for climate change as a catalyst for resource scarcity and forced migration of herders into farmland. In reality, climate-induced resource shortages, compounded by limited institutional interventions, have significantly contributed to regional instability in northeastern Nigeria. Historically, nomadic herders coexisted peacefully with indigenous farmers. However, the increasing scarcity of pasture and grazing lands has led to forced displacements and violent clashes. Herders are now compelled to remain in farming regions longer due to the unavailability of sufficient grazing areas during the rainy season. Consequently, as noted by Wakdok and Bleischwitz [21], escalating competition over fertile land and water has fueled a series of violent confrontations between migrating herders and host communities in the north.

These conflicts align with the tenets of environmental conflict theory, which posits that resource scarcity—intensified by climate change—leads to power struggles and social inequalities among competing groups. Environmental stressors, such as declining water and land resources, exacerbate existing socioeconomic and political tensions, culminating in violent disputes. The clashes between farmers and vigilantes versus herders and bandits in northern Nigeria exemplify this intersection of climate change and resource conflict. The far-reaching consequences of climate-induced resource conflicts in Northeast and North-Central Nigeria underscore the need for a systematic and evidence-based approach to conflict resolution. Understanding the broader socio-economic, environmental, and historical contexts of these crises is crucial for developing sustainable policies that mitigate climate risks, enhance resource management, and promote long-term peace and stability in the region.

TABLE II. IMPACTS OF RESOURCE CONFLICTS AND THREATS OF CLIMATE CHANGE IN NORTH EAST AND NORTH CENTRAL NIGERIA

Impact	Description
Humanitarian Crises	Over 2 million displaced individuals, and millions more affected by food insecurity
Economic Disruption	Significant decline in agricultural productivity, and heightened living costs
Insecurity and Instability	Surge in violent clashes between farmers and herders. Easy recruitment by extremist groups
Environmental Degradation	Desertification, soil degradation, and water scarcity
Health Challenges	Increased incidence of cholera and other waterborne diseases, and rising mental health issues among displaced populations

Source: Authors' compilation

The impacts of resource conflicts and climate change in Northeast and North Central Nigeria are multifaceted, affecting humanitarian conditions, economic stability, security, environmental health, and public health. Addressing these challenges requires comprehensive and coordinated efforts from the government, international organizations, and local communities to enhance resilience and promote sustainable development in the region.

In April 2021, President Muhammadu Buhari participated in a virtual summit convened by President Joe Biden alongside other global leaders to discuss the economic and environmental imperatives of enhanced climate action. During this summit, Buhari reaffirmed Nigeria's commitment to the Paris Agreement, initially adopted in 2015 at the 21st United Nations Conference of the Parties [21], which aimed to combat climate change and mitigate its adverse effects [18]. The agreement seeks to limit global temperature increases to well below 2°C, preferably to 1.5°C, relative to pre-industrial levels, when fossil fuel combustion had yet to significantly alter the climate [31].

To meet these objectives, the Nigerian government enacted the Climate Change Act in November 2021, incorporating its Nationally Determined Contributions (NDCs) in alignment with the Paris Agreement. The act establishes a framework for reducing greenhouse gas emissions and fostering sustainable, green economic growth, with the aim of achieving net-zero emissions between 2050 and 2070 [32]. While the NDC mandates periodic updates every five years, Nigeria has yet to provide substantial updates beyond reaffirming its commitments. In response to climate challenges, the Department of Climate Change, within the Federal Ministry of Environment, developed the "2050 Long-Term Vision for Nigeria (LTV-2050): Towards the Development of Nigeria's Long-Term Low Emissions Development Strategy (LT-LEDS)" in November 2021. This policy document outlines strategies for implementing low-carbon agricultural technologies, low-methane animal feed, enhanced soil carbon storage techniques, and reduced reliance on synthetic fertilizers and pesticides. Additionally, it emphasizes transitioning from fossil fuels to renewable energy sources and strengthening farmer education, research, and development in sustainable agricultural practices [32].

However, governmental efforts have predominantly focused on reducing greenhouse gas emissions within the oil and gas sectors, often neglecting critical issues such as large-scale irrigation projects, land encroachment policies, and tenure administration—particularly in rural areas where farming and pastoral activities are most concentrated. Progress in transitioning to renewable energy sources remains slow, with Nigeria continuing to rely heavily on fossil fuels, particularly oil and gas [21]. Furthermore, the National Climate Change Policy and Response Strategy lacks sufficient funding and implementation mechanisms to achieve its intended objectives [33]. To address farmer-herder conflicts, several state governments have enacted anti-open grazing laws, which prohibit the free movement of livestock and mandate transportation by vehicles or rail. These laws were first introduced in 2016 in Middle Belt states, including Ekiti, Edo, Benue, and Taraba [34]. While these policies have contributed to a decline in violent clashes, some pastoralist communities perceive them as a direct threat to their nomadic way of life. Consequently, the extent to which these laws have directly reduced conflict remains debatable.

Additionally, the Nigerian federal and state governments have adopted various security measures to counter escalating violence in the North-East and North-Central regions. However, these interventions primarily target the symptoms rather than the root causes of resource conflicts. Strategies have ranged from deploying security forces and military operations—such as Exercise Cat Race and Operation Whirl Stroke [34]—to offering amnesty programs for certain armed groups. Despite these initiatives, the results have been modest, with continued instability in affected regions.

Moreover, traditional conflict resolution mechanisms, including mediation by community leaders, have not yielded significant improvements. While Nigeria has made strides in addressing climate change and resource conflicts, substantial work remains. A more comprehensive and integrated approach is required, emphasizing investment in renewable energy infrastructure, sustainable agricultural practices, and equitable land management policies. Additionally, fostering collaboration among government agencies, local communities, civil society organizations, and international stakeholders is essential for achieving lasting solutions to these pressing challenges.

V. CONCLUSION

The prospects for addressing climate change and farmer-herder conflicts in Nigeria are both challenging and promising. On the one hand, the impacts of climate change are expected to intensify in the coming years, exacerbating competition for scarce resources and increasing the risk of conflict between farmers and herders. Climate change is expected to worsen droughts, floods, and desertification, which will continue to negatively affect crop yields, grazing land, and water availability. Furthermore, efforts to address farmer-herder conflicts and climate change face challenges such as political instability, weak governance structures, and limited financial resources. This can make it difficult to implement policies and programs that effectively address the root causes of these challenges and promote sustainable practices. On the other hand, there are reasons for optimism. Nigeria has a large and growing youth population, which presents an opportunity for the country to harness the potential of young people in driving innovative solutions to address climate change and farmer-herder conflicts. Additionally, civil society organizations, private sector actors, and international partners are increasingly engaging in efforts to promote sustainable practices and support conflict resolution.

Furthermore, the Nigerian government has demonstrated a commitment to addressing climate change and promoting sustainable practices. Nigeria has ratified the Paris Agreement and established a National Climate Change Policy and Response Strategy, which provides a framework for addressing the impacts of climate change. Overall, the prospects for addressing climate change and farmer-herder conflicts in Nigeria are mixed, but there is potential for progress if stakeholders continue to work collaboratively to address these complex challenges. Indeed, climate change and farmer-herder conflicts in Nigeria are complex and interrelated issues that require a holistic approach to address. The impacts of climate change, such as droughts, floods, and desertification, have led to increased competition for scarce resources such as water and grazing land, exacerbating tensions between farmers and herders. To address these challenges, it is important to implement policies and programs that promote sustainable land and resource management, encourage dialogue and cooperation between farmers and herders, provide education and training on sustainable practices, and support alternative livelihood options. Early warning systems for climate-related hazards and peacebuilding efforts can also help reduce conflicts and promote more sustainable practices.

The growing intersection of climate change and farmer-herder conflicts in Nigeria presents a critical challenge that demands a comprehensive and strategic response. As climate change intensifies, the scarcity of arable land and water resources exacerbates tensions between these groups, whose livelihoods depend on access to these vital resources. To mitigate these conflicts, the Nigerian government must strengthen land and resource management policies by implementing sustainable land-use planning, reducing deforestation, and promoting reforestation efforts. Additionally, fostering dialogue and cooperation between farmers and herders through community-

based initiatives can help rebuild trust and establish shared resource management practices. Education and training programs on sustainable agriculture and responsible grazing techniques can further empower these communities to adopt practices that minimize environmental degradation and reduce competition over scarce resources. Diversifying income sources by promoting alternative livelihoods such as agroforestry, beekeeping, and fish farming can also alleviate pressure on land while enhancing economic resilience.

In addition to economic and environmental strategies, institutional support is essential in mitigating conflicts and fostering long-term stability. Investing in early warning systems for climate-related hazards, such as droughts and floods, will enable farmers and herders to take proactive measures to safeguard their livelihoods, reducing desperation and the likelihood of disputes. Moreover, peacebuilding efforts that encourage intercommunal dialogue, reconciliation programs, and the integration of marginalized groups into society can address the root causes of these conflicts. Without intentional efforts to build social cohesion, economic and environmental interventions alone may prove insufficient in achieving lasting peace. By integrating climate adaptation strategies, sustainable resource management, and conflict resolution mechanisms, Nigeria can work toward a future where both farming and herding communities coexist peacefully in an environmentally sustainable and economically viable landscape.

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