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Climate Change, Food Security, and Rural Political Economy in Sokoto and Kebbi States, Northern Nigeria

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Abstract

This article analyzes the linkages between climate change, food security, and rural political economy from a historical-structural perspective in Sokoto and Kebbi States, Northwestern Nigeria. Food insecurity in these states is often attributed to climatic variations – increased temperatures, irregular rainfall, desertification in Sokoto, and frequent flooding in Kebbi. While these factors are important, such interpretations constitute environmental reductionism. This research adopts a political economy approach, arguing that food crises mediated by climate change are shaped by historically rooted agrarian relations, neoliberal restructuring, and Nigeria's dependent incorporation into the global economy. The paper reviews agrarian changes from colonial commercialization through post-1980s structural adjustment reforms that undermined state capacity and deepened rural vulnerabilities, drawing on agrarian political economy, dependency theory, and eco-Marxist perspectives. In this context, climate change acts as a "threat multiplier," exacerbating existing challenges of land pressure, infrastructural deficits, and resource conflicts. Empirically, desertification and rainfall variability in Sokoto and flooding in Kebbi demonstrate how ecological stress interacts with structural inequalities to produce food insecurity. The study concludes that integrated strategies combining climate adaptation with structural changes in land governance, rural investment, and institutional capacity are necessary for sustainable food security.

Keywords: Climate change, Food security, Agrarian transformation, Northern Nigeria, Environmental governance, Climate justice

Introduction

Climate change refers to the alteration of the earth's average weather patterns, climate, and temperature over time—changes that can be both natural and anthropogenic. Food security, by contrast, means that all people, at all times, have physical and economic access to sufficient, safe, and nutritious food to lead healthy and active lives. One of the most pressing challenges to food security in sub-Saharan Africa is climate change, particularly in rain-fed agricultural areas. Climate variability has heightened agrarian vulnerability in rural livelihoods and accentuated food insecurity in Northwestern Nigeria, especially Sokoto and Kebbi States, which fall within the Sudan-Sahel ecological zone (Mortimore, 2010).

In recent decades, climate change has emerged as one of the greatest threats to global food security, especially for agrarian economies in the Global South. Climate variability – shifts in rainfall patterns, temperature increases, and desertification – has worsened food insecurity and agricultural vulnerability in Northern Nigeria, where the majority of people depend on rain-fed agriculture. Both scholars and policymakers have sought to account for the connection between climate change and food crises, with environmental factors frequently identified as the primary culprit. This is, however, a partial view, as it does not account for the historical, political, and economic contexts that mediate the effects of climate stress on rural livelihoods.

The dominant narrative suggests that food insecurity in these regions results solely from environmental stress. The crises in Sokoto and Kebbi must instead be understood within a broader political-economic framework encompassing historical land relations, state policy failures, and market dynamics. Climate change is therefore a "threat multiplier" that compounds underlying structural vulnerabilities rather than a standalone cause of harm (Adger, 2006).

The susceptibility of Northern Nigeria to climate change must be viewed against its long history of agrarian transformation. Under British colonial rule, the agricultural economy was reorganized around cash crop production for export – groundnuts, cotton, and palm oil. This commercialization fundamentally altered land tenure systems, labour relations, and the agrarian class structure. The imposition of an export-oriented model negatively affected local subsistence farming and made rural communities more vulnerable to commodity price volatility and dependent on global markets. Furthermore, colonial policies intensified regional disparities, as the north became deeply integrated into global commodity chains while other regions experienced different forms of agricultural development (Nwosu, 2009).

These inequalities were carried into post-independence Nigeria and exacerbated by the subsequent neglect of agriculture. In the 1970s, Nigeria's economic policies were shaped by the oil boom, which produced a petro-dependent economic model. Underinvestment in rural infrastructure, agricultural extension services, and irrigation resulted from the state's focus on oil extraction. Rural populations, especially in Northern Nigeria, experienced rising poverty and food insecurity despite surging oil revenues. Although successive governments attempted to improve agricultural self-sufficiency – most notably through the Green Revolution and subsequent programs under the Structural Adjustment Program (SAP) of the 1980s – agriculture never became central to national policy, and state capacity to support smallholder agriculture remained weak (Adebayo, 2016).

The implementation of neoliberal economic reforms in the 1980s further increased rural vulnerability. SAP involved market liberalization policies that deregulated agricultural markets, removed subsidies, and reduced state support for agricultural development. Smallholder farmers, especially in Northern Nigeria, were disproportionately affected due to their limited access to credit, inputs, and technology. The reduction of government-operated infrastructure initiatives – including irrigation systems – deepened rural vulnerability. These neoliberal reforms coincided with, and interacted with, environmental stress and existing structural vulnerabilities, exacerbating rural poverty and undermining resilience to environmental shocks (Ayodele, 2001; Obi, 2013).

The effects of climate change on food security in Northern Nigeria have become increasingly pronounced in recent years. Fluctuations and extended drought periods have disrupted planting schedules, lowered yields, and increased the frequency of food price fluctuations. The encroachment of the Sahara has threatened the livelihoods of pastoralist communities as traditional grazing routes shrink due to desertification. Poor governance, weak disaster preparedness, and limited institutional coordination have compounded these challenges, leaving Northern Nigeria poorly equipped to adapt (Bassey, 2020).

Beyond environmental stress, Nigeria's rentier state structure has added to rural vulnerability. Oil wealth has generated substantial government revenues, but these have not been consistently directed toward rural development. The dominance of the oil sector has hindered agricultural modernization, as dependence on oil rents has reduced incentives for diversifying the rural economy or adopting effective climate adaptation policies (Obi, 2013). Furthermore, the imbalanced allocation of state resources has produced regional disparities in climate vulnerability. Northern Nigeria has been disadvantaged relative to the south in terms of infrastructural development and access to climate adaptation support. The region's historical underdevelopment and reliance on rain-fed agriculture make it particularly susceptible to climate change. Food insecurity in the region is therefore not merely a consequence of climate change but also of historical and political developments that have shaped the agrarian economy (Akpan, 2017).

Current food security interventions in Northern Nigeria remain predominantly technical – climate-smart agriculture, improved seed varieties, and water management systems. While important, these approaches risk overlooking the political-economic dimensions of vulnerability. Climate-smart agriculture may alleviate some food insecurity, but it does not address smallholder farmers' structural constraints in accessing land, technology, and credit. Similarly, productivity-focused policies tend to neglect the political economy of land distribution and the differential effects of market liberalization on various rural groups (Udo, 2018).

This article aims to recalibrate the debate on climate change and food insecurity in Northern Nigeria by examining the historical, political, and economic factors that condition climate change impacts on rural communities. The study contends that food insecurity in Northern Nigeria results from long-standing structural inequalities rooted in colonialism, state neglect, and neoliberal economic reforms. Effective climate adaptation policies must therefore address these structural vulnerabilities through fundamental political and economic changes, not merely technological fixes.

Approach and Scope

This study is a conceptual and policy analysis based on a critical synthesis of secondary sources, including peer-reviewed journal articles, government reports, and institutional publications. The geographic focus is Sokoto and Kebbi States in Northwestern Nigeria, situated within the broader Sudan-Sahel ecological zone. The temporal scope spans the colonial period to the present, with particular attention to the post-1980s neoliberal reform era. No primary fieldwork was conducted; the analysis draws on existing empirical studies, climate data from the Nigerian Meteorological Agency (NIMET) and the National Emergency Management Agency (NEMA), and policy documents. This approach is appropriate for a political economy analysis that aims to synthesize and reinterpret existing evidence through a structural lens.

Theoretical Framework

This study draws on several complementary theories to explain the political economy of climate change and food insecurity in Northern Nigeria: agrarian political economy, dependency theory, eco-Marxism, and rentier state theory. These theoretical lenses frame

climate-induced food insecurity as a systemic problem produced by long-standing political and economic processes, not merely an environmental challenge.

Agrarian Political Economy

Agrarian political economy provides a foundation for understanding the relationship between land, labour, and capital in rural areas, particularly regarding agricultural production. This approach is essential for analyzing how climate change interacts with structural factors—land tenure, agrarian class relations, and access to resources—to generate vulnerability. Rural populations are not homogeneous in how they experience climate impacts. Vulnerability is shaped by land ownership, class position, and access to capital and technology. In Northern Nigeria, these were profoundly influenced by colonial policies that promoted commercial agriculture and reorganized land relations around export production. The colonial emphasis on cash crops such as groundnuts and cotton left subsistence farmers with little support and no influence over the global market prices to which they became increasingly subject (Nwosu, 2009). These disparities persist in the postcolonial period, with agrarian elites, landowners, and agribusinesses dominating landholdings, while smallholder farmers face persistent challenges in accessing credit, land, and technology. Climate change thus acts as a magnifying glass for inequalities within agrarian systems, with climate shocks having varying impacts depending on socioeconomic status.

Dependency Theory and Uneven Development

Dependency theory provides a framework for analyzing Nigeria's susceptibility to climate change in the context of postcolonial global economic structures. Drawing on Marxist economics, dependency theory suggests that developing countries are integrated into the world economy in ways that maintain their subordination to advanced capitalist countries. The economies of the Global South are structurally reliant on the Global North for trade, technology, and capital, perpetuating economic inequality and constraining autonomous, sustainable development. Nigeria's transition from a diversified agricultural economy to an oil-dependent one in the 1970s exemplifies how resource extraction and global capitalist systems have undermined the rural economy. The neglect of agriculture resulting from the state's oil extraction orientation has led to chronic underinvestment in rural areas, especially in the north, intensifying food insecurity (Adebayo, 2016). The oil economy has also consolidated wealth and power among a small elite while leaving the majority of the rural population exposed to environmental shocks. Dependency theory thus illuminates how the global capitalist system, through dependency-creating mechanisms and uneven development, has made Nigeria's rural communities more vulnerable to climate change. It also sheds light on the role of unequal exchange: Northern Nigeria's agrarian economy, historically linked to global commodity markets, remains exposed to fluctuations in global food prices and value chains, with oil rent dependence leaving little policy space for sustainable agricultural development.

Eco-Marxism and the Metabolic Rift

Eco-Marxism offers a valuable lens for analyzing the ecological contradictions of capitalist production. Eco-Marxists argue that capitalist societies create a "metabolic rift" between

human societies and nature—a rupture arising from production oriented toward profit rather than ecological sustainability, disrupting natural processes of reproduction and regeneration. In Northern Nigeria, the metabolic rift manifests in soil degradation, deforestation, and water scarcity resulting from the overexploitation of land and resources. Export-oriented agricultural production that prioritizes cash crops for international markets over environmental sustainability and local food security exacerbates this disruption. Eco-Marxism illuminates how resource depletion and environmental degradation in Northern Nigeria result not only from climatic changes but also from the organization of the agrarian economy. The trend toward monoculture cash crop production, driven by colonial policies and sustained in the postcolonial period, has produced soil depletion, land fragmentation, and natural resource degradation. These environmental stresses render the region more susceptible to climate change impacts, particularly rainfall fluctuations and desertification. This perspective also reveals why technological solutions alone—drought-resistant seeds or improved irrigation—are insufficient. Such measures may mitigate some environmental stress, but they fail to address the structural drivers of environmental degradation embedded in the capitalist economic system.

Rentier State Theory

Rentier state theory, following Beblawi and Luciani (1987), analyzes states that rely heavily on external rents from natural resources—such as oil—for the majority of their revenues, rather than on domestic productivity. Nigeria's dependence on oil rents has produced a rentier economy that prioritizes the oil sector while neglecting agriculture and rural development. This rentier system has constrained the state's ability to invest in sustainable agriculture, rural infrastructure, and climate adaptation, deepening food insecurity in rural areas, especially in the north. The theory illuminates the correlation between Nigeria's oil-dependent economy and its underdeveloped agricultural sector. Because the government generates the majority of its revenue from oil, there has been little incentive to invest in agriculture, leaving rural populations highly vulnerable to climate impacts. Rentierism thus misdirects state priorities away from agricultural development and climate resilience, and the lack of economic diversification further entrenches rural vulnerability.

Synthesis

Together, these theories situate climate change and food insecurity in Northern Nigeria within a broader historical and structural perspective. Climate change is not an environmental problem in isolation but is deeply intertwined with the region's political and economic history. Rural vulnerability results not merely from volatile weather but from entrenched colonial and postcolonial economic systems, dependence on global commodity markets, capitalist agricultural organization, and the rentier state structure. These frameworks reveal the multiplicative effect of climate change on existing inequalities and the inadequacy of purely technological solutions, pointing to the need for structural changes in how the state governs land, resources, and rural development.

Historical Foundations of Agrarian Vulnerability in Northern Nigeria

Agrarian vulnerability in Northern Nigeria cannot be understood without tracing the historical trajectory set by colonial policies, postcolonial state formation, and the oil economy. This section examines how Northern Nigeria's agricultural economy evolved through colonial commercialization, land tenure transformation, postcolonial agricultural policy, and the oil boom—processes that together produced the structural vulnerability of rural populations to climate change.

Colonial Commercialization and Land Tenure Transformation

Colonialism profoundly reshaped Northern Nigeria's agrarian economy. British colonial policies prioritized agricultural commercialization, emphasizing cash crops—groundnuts, cotton, and palm oil—for export to global markets. This transformation was part of a broader strategy to integrate Nigeria into the global capitalist economy, and it fundamentally altered land tenure arrangements and labour relations in ways that would shape rural climate resilience for generations.

A key element of colonial agricultural policy was the transformation of traditional landholding systems. Under British rule, land increasingly became a commodity to be controlled, leased, or traded. The introduction of private land tenure systems, which granted rights to large landowners and commercial interests, disrupted traditional systems based on communal ownership and collective use rights. This shift produced a class of agrarian elites while marginalizing smallholder farmers who had relied on communal land for subsistence. Nwosu (2009) argues that this land tenure reform made rural farming systems less sustainable and exposed rural populations to land concentration, environmental degradation, and resource scarcity.

The colonial emphasis on cash crop exports also led to land overexploitation. Monoculture cultivation—particularly groundnuts in the north—depleted soils and disrupted ecological systems, making the region highly vulnerable to subsequent climate change. By reorienting the economy toward exports, colonial policies exposed rural communities to international market volatility, including commodity price fluctuations and shifting global demand. The economic benefits of commercialization were not equitably distributed: smallholder production remained oriented primarily toward subsistence while being subordinated to the logic of export markets.

Postcolonial Agricultural Policy and Regional Inequality

After independence in 1960, Nigeria's postcolonial governments inherited an agrarian system heavily shaped by colonial commercialization. Postcolonial agricultural policy did not reverse this legacy. Cash crops continued to be privileged over subsistence farming, perpetuating regional inequalities. The north, predominantly rural and agrarian, was largely neglected for industrial and infrastructural development, while the south experienced some industrialization and infrastructural growth.

In the early postcolonial period, the state attempted to modernize agriculture through policies such as the Green Revolution of the 1970s, which aimed to raise food production

through new technologies, fertilizers, and irrigation systems. However, these efforts largely ignored prevailing rural structural inequalities, particularly in the north. Market-oriented production policies further entrenched the dominance of export crops while neglecting rural infrastructure and the specific needs of smallholder farmers. The historical neglect of agriculture and rural development in the north perpetuated disparities in state investment. The north-south gap in agricultural development produced enduring regional inequality: southern regions were better endowed with infrastructure and more integrated into the country's industrial and commercial sectors, while Northern Nigeria continued to depend on traditional farming systems ill-equipped to address growing challenges of population growth, environmental degradation, and climatic stress (Adebayo, 2016).

The Oil Boom and Agrarian Marginalization

The discovery and commercialization of oil in the late 1960s and 1970s dramatically transformed Nigeria's economic structure. While the Nigerian state benefited enormously from oil revenues, this windfall paradoxically deepened the neglect of agriculture, especially in Northern Nigeria. The discovery of oil transformed Nigeria into a rentier state, with the economy and state budgets heavily dependent on oil revenues, marginalizing other economic sectors including agriculture.

During the oil boom, state funding for agriculture and rural development declined dramatically. Obi (2013) explains how the "oil curse" led the state to focus on oil production and export while diverting attention from other productive sectors. Insufficient investment in rural infrastructure—irrigation systems, roads, and storage facilities—undermined agricultural productivity and resilience to climate change. The state's dependence on oil rents also affected fiscal federalism: oil revenues became the central government's main revenue source, while state and local governments had fewer resources to address rural needs.

This neglect had severe consequences for Northern Nigeria. The rural economy became increasingly marginalized from national development processes. The implementation of market-oriented policies in the 1980s through the SAP pushed smallholder farmers further to the margins, as subsidy removal and state withdrawal from agricultural support left them without resources to adapt to climatic changes. The oil boom also accelerated urbanization, shifting economic focus to urban areas where oil-related industries and services were concentrated. This further diminished the political power of rural populations and marginalized the agrarian sector. Northern Nigeria's rural populace became increasingly dependent on subsistence agriculture, ill-prepared to cope with the growing effects of climate change.

The historical origins of agrarian vulnerability in Northern Nigeria thus trace back to the colonial legacy of commercialization, postcolonial policy continuity, and the oil economy. Colonial policies transformed land tenure and promoted cash crops over subsistence farming; postcolonial policies perpetuated this export orientation and regional inequality; and the oil boom marginalized agriculture while entrenching a rentier state structure. This historical trajectory produced a fragile agrarian system in which rural communities lack the resources and institutional support to cope with climate change.

Neoliberal Restructuring and Rural Precarity

The economic restructuring initiated in the 1980s under SAPs had profound impacts on Northern Nigeria's rural communities, deepening agrarian vulnerability and food insecurity. These neoliberal reforms—supported by the World Bank and International Monetary Fund—aimed at market liberalization, deregulation, and state withdrawal from agriculture. This section examines the effects of subsidy withdrawal, market liberalization, and the decline of state agricultural institutions.

Structural Adjustment and Subsidy Withdrawal

Nigeria's SAP was a direct response to the economic crisis triggered by collapsing oil prices and rising foreign debt in the mid-1980s. Its main goals were to reduce the state's economic role, promote export-oriented growth, and liberalize markets. In agriculture, this meant eliminating subsidies, devaluing the naira, and privatizing state-run enterprises.

The removal of agricultural subsidies was among the most damaging reforms. Before SAP, smallholder farmers in Northern Nigeria had benefited from subsidies on fertilizers, seeds, and fuel—inputs vital to their productivity, already constrained by environmental degradation and historical neglect. Ayodele (2001) reports that subsidy elimination caused the prices of agricultural inputs to rise sharply, pricing many small farmers out of the market and reducing their capacity to invest in crop production. For smallholders reliant on rain-fed farming, the withdrawal of subsidies severely affected agricultural productivity and food security, increasing vulnerability to market fluctuations and climate stress. The devaluation of the naira compounded these difficulties by further increasing the cost of imported agricultural inputs (fertilizers, pesticides), forcing struggling farmers to reduce production or abandon farming altogether.

Market Liberalization and Smallholder Differentiation

Market liberalization—a central feature of Nigeria's neoliberal reforms—was intended to open the economy to international competition and reduce the state's role in economic affairs. In practice, it had multiple negative consequences for Northern Nigeria's rural population. The liberalization of agricultural markets exposed smallholder farmers to global market volatility. Commodity price fluctuations made it impossible for farmers to anticipate earnings or make long-term investments. This volatility, combined with higher input costs following subsidy removal, deepened rural insecurity. For many smallholders, liberalized markets meant greater dependence on external markets for farm staples and restricted access to credit, making it difficult to expand or modernize operations. Liberalization also contributed to the breakdown of local markets and the marginalization of smallholders unable to compete with larger farmers and multinational agribusiness (Adebayo, 2016).

Market liberalization also produced differentiation within the rural economy. Large-scale commercial farmers with greater access to capital, technology, and markets were able to prosper in the liberalized environment, while smallholders—who lacked the resources to compete—saw their position deteriorate. Land became increasingly concentrated in the hands of large farmers and agribusinesses. This differentiation was especially severe in

Northern Nigeria, where existing unequal land distribution had already produced a highly stratified rural society. Smallholders who could not afford the high costs of agricultural inputs were pushed out of production, deepening rural poverty and food insecurity, and widening regional imbalances in agricultural investment and infrastructure (Nwosu, 2009; Adebayo, 2016).

The Decline of State Agricultural Institutions

A central feature of Nigeria's neoliberal restructuring was the reduction of state participation in agriculture, including agricultural extension services, irrigation schemes, and rural development programs. The privatization of state-run agricultural enterprises and cuts in public funding for rural infrastructure deprived many smallholders of access to credit, technical assistance, and training. The closure of these institutions significantly undermined rural communities' adaptive capacity in the face of market and climate shocks.

Historically, the Nigerian government had invested in irrigation, extension services, and agricultural research for smallholder agriculture. Under neoliberal policies, funding for these services was cut, and many state-run institutions were either privatized or abandoned. This collapse reduced adaptive capacity, particularly in Northern Nigeria where irrigation and water management systems had been essential for food security in a drought-prone region with irregular rainfall (Mustapha, 2002). The privatization of agricultural enterprises also pushed smallholders to the margins, as they could not access the resources needed for farm modernization. The loss of rural infrastructure—irrigation, storage, roads—that accompanied the transition from state-run to market-based agricultural systems reduced productive capacity and deepened rural poverty.

This state disinvestment has had long-term consequences for rural vulnerability. In Northern Nigeria, where agriculture is the main livelihood for most rural households, the absence of support systems has produced greater susceptibility to environmental and economic shocks. Many smallholders lack modern agricultural technologies and training, leaving them unable to cope with climate pressures and resulting in chronic food insecurity.

Specific Impacts in Sokoto and Kebbi

The adoption of SAPs in the 1980s added to the vulnerability of Sokoto and Kebbi's rural areas in distinct ways. In Sokoto, the withdrawal of subsidies on agricultural inputs (fertilizers, seeds) significantly increased production costs for smallholder farmers. Many responded by adopting low-input survival strategies, including monocropping on increasingly degraded soils—a practice that reduced yields and heightened vulnerability to rainfall variability. In Kebbi, rice farmers in Argungu and Birnin Kebbi were exposed to fluctuating market prices following the liberalization of the rice market, affecting income stability and household food security. The state's withdrawal from agricultural support services left institutions such as extension services and rural credit schemes weakened, forcing farmers to rely on informal networks and local money lenders—a dynamic that entrenched cycles of indebtedness and poverty.

Climate Variability and Agrarian Stress

Climate variability is one of the most pressing issues affecting food security in Northern Nigeria. This predominantly rain-fed agricultural and pastoralist region has been especially sensitive to climate pattern variability. This section examines the interaction of specific climate phenomena—rainfall variability, desertification, and flooding—with existing agrarian vulnerabilities to deepen food insecurity. These environmental stresses do not act alone; they canalize and exacerbate existing social, political, and economic inequalities.

Rainfall Variability and Crop Failure

One of the most significant impacts of climate variability in Northern Nigeria is the growing variability in rainfall patterns, which has substantially affected crop productivity. The region's predominantly rain-fed farming systems have experienced increasing frequency of both droughts and floods, affecting the reliability of crop production cycles and causing crop failure that drives food insecurity.

In the Sahelian and Sudano-Sahelian zones of Northern Nigeria, below-normal rainfall and early cessation of rains have been associated with poor harvests. Nhemachena and Hassan (2007) demonstrate that such rainfall anomalies have reduced yields of major crops including maize, sorghum, and millet. For smallholder farmers whose production is almost entirely rain-fed, this has resulted in crop losses—crops fail to germinate or mature due to insufficient moisture. The variability in rainy season onset also disrupts planting schedules, and many farmers lack the financial or technical means to switch to more resilient crops or invest in irrigation. Climatic uncertainty combined with reliance on rain-fed farming has made smallholder farmers in Northern Nigeria acutely susceptible to food insecurity. Adebayo (2016) notes that these rainfall changes compound other challenges such as land degradation and poor soil quality, further diminishing agricultural productivity.

Empirical evidence from Sokoto: The Nigerian Meteorological Agency (NIMET, 2020) reports that Sokoto State has experienced significant rainfall variability over the past three decades. The average length of the rainy season has decreased from approximately 120 days (1981–1990) to approximately 95 days (2011–2020), while the frequency of dry spells exceeding 10 days during the growing season has increased by approximately 40% over the same period. These trends have directly affected the major staple crops: sorghum yields in Sokoto declined from an average of 1.2 tonnes/hectare in the early 2000s to approximately 0.9 tonnes/hectare by the late 2010s (NBS, 2021). Farmers in Gudu and Illela Local Government Areas—where desert encroachment is most advanced—report that crop failure rates have risen from roughly one in five growing seasons in the 1990s to approximately one in three by the 2010s.

Desertification and Pastoral Mobility

Desertification is advancing alarmingly in the northernmost parts of Nigeria, particularly affecting Sokoto State. The region supports significant pastoralist populations, and the loss of pasture due to climate change has intensified competition between farmers and herders.

In Sokoto, herders have been forced to move into farming communities as grazing lands shrink, leading at times to violent conflict. In Kebbi, similar conflicts occur during the dry season when herders move to riverine areas in search of water and pasture.

Desertification results from both natural factors (climate change) and human factors (overgrazing, deforestation, and unsustainable land use practices). It threatens the two primary livelihood systems in the region—crop farming and pastoralism. Desertification particularly affects pastoral mobility. Northern Nigeria's extensive populations of nomadic pastoralists, who traditionally move cattle over long distances to access pasture and water, now find traditional herding routes increasingly blocked by desert expansion, farmland encroachment, and settled agriculture. Herders must travel more distant routes, creating displacement and intensifying competition with farming communities for shrinking land and water resources. Bassey (2020) notes that herders have moved into areas previously devoted exclusively to agriculture, generating tensions and violent clashes over land and water access.

Desertification also degrades the land's capacity to sustain livestock, contributing to the vulnerability of pastoralist communities already facing economic marginalization from climate stress. The combination of ongoing desertification, political marginalization, and economic precarity has eroded pastoralist adaptive capacity.

Flooding and Infrastructure Deficits

Alongside drought and desertification, flooding is a growing climate impact in Northern Nigeria, particularly in Kebbi State. The irregularity of rainfall now produces not only dry spells but also sudden, heavy precipitation events, causing flash floods and river overflow. Kebbi State, located along the Niger River, has experienced increasingly severe flooding.

Empirical evidence from Kebbi: The 2020 and 2022 floods were particularly devastating. The 2022 flood alone affected an estimated 45,000 hectares of rice farmland in Argungu, Ngaski, Shanga, and Yauri Local Government Areas, displacing over 30,000 farming households and destroying an estimated 120,000 tonnes of harvested or standing rice, valued at approximately ₦42 billion (NEMA, 2022). These floods are worsened by inadequate rural infrastructure: the region lacks sufficient drainage systems, flood protection embankments, and early warning mechanisms. As Obi (2013) argues, decades of underinvestment in rural infrastructure have significantly undermined the region's capacity to recover from climate shocks. Flooded or impassable roads prevent farmers from reaching markets, producing economic losses. Floods destroy stored crops—grains that are critical for household food security—and damage irrigation facilities and drainage systems, with effects that persist beyond the flood event itself.

The contrast between drought conditions in Sokoto and flooding in Kebbi powerfully illustrates the differential and complex effects of climate change acting upon distinct local ecologies within the same broad political-economic context.

Climate Change as a Threat Multiplier

Climate change functions as a threat multiplier in Northern Nigeria, intensifying existing socio-political, economic, and environmental vulnerabilities. Climate variability increasingly interacts with structural challenges—poverty, weak governance, and regional inequality—to produce outcomes more severe than any single factor would generate alone. Adebayo (2016) argues that climate change compounds the structural weaknesses Nigeria has historically faced—neglect of agriculture, inadequate rural infrastructure—creating a vicious cycle for rural communities in the north.

Smallholder farmers and pastoralists, already vulnerable due to limited access to resources and marginalization from mainstream political and economic processes, are most affected. These communities face not only environmental risks—unpredictable rainfall, desertification, flooding—but also political marginalization that denies them access to adaptive resources or institutional support. Poor governance and weak institutional response further aggravate the compounding impacts of climate change. Without political and institutional reform that improves the state's capacity to deliver public goods—infrastructure for climate adaptation, social protection, disaster preparedness—Northern Nigeria will remain vulnerable to heightened food insecurity in the face of accelerating climate change (Bassey, 2020).

State and Institutional Responses to Climate Change

The Nigerian government's response to climate change has been significantly inadequate, particularly in Sokoto and Kebbi States. This section reviews climate change policies, the role of agricultural institutions, and the institutional challenges that have constrained effective adaptation, arguing that the state's failure to integrate climate change into broader development planning—combined with weak institutional capacity—has left rural communities exposed to climate stress.

Weak Institutional Capacity and Policy Implementation

Despite the growing significance of climate change in development debates, Nigeria's institutional capacity for effective response remains limited, particularly in rural areas. The government has adopted several climate change frameworks and international agreements, yet implementation has been severely constrained. Ayodele (2001) identifies institutional fragmentation, inadequate coordination between federal, state, and local governments, and a lack of political will to prioritize environmental sustainability in policy planning as key barriers.

Nigeria adopted the National Policy on Climate Change and its implementation strategy in 2012, aiming to mitigate greenhouse gas emissions and build climate resilience through adaptation initiatives. However, as Obi (2013) notes, implementation has been piecemeal and slow, with limited effect on rural communities, especially in Northern Nigeria where vulnerability is greatest. Climate change activities—particularly at state and local government levels where adaptation must be operationalized—have been hampered by funding shortages, weak institutional coordination, and limited technical expertise. Bassey (2020) further points out the absence of integration between climate change policy and

poverty reduction strategy, arguing that climate change must be treated as a development problem whose effects must be incorporated into broader socio-economic planning. The current lack of integration has produced fragmented, isolated interventions that do not address underlying vulnerability factors—poverty, infrastructure gaps, and land degradation.

Agricultural Institutions and Climate Adaptation

Northern Nigeria's agricultural sector, already affected by climate variability, has been poorly supported by state agricultural institutions. The government has not invested sufficiently in sustainable agriculture, climate-smart crops, or irrigation systems, leaving rural communities exposed to direct and indirect climate impacts. The National Agricultural Extension and Research Liaison Services (NAERLS), responsible for agricultural support and extension services, is a case in point: its budget allocation has declined from approximately ₦2.8 billion in 2010 to approximately ₦1.6 billion (in real terms) by 2020, while the extension agent-to-farmer ratio in Sokoto and Kebbi has risen to roughly 1:4,500, far exceeding the FAO-recommended 1:500 (NAERLS, 2021). This has left smallholder farmers with virtually no access to technical advice on climate adaptation (Nwosu, 2009).

Although awareness of the need for climate-smart agriculture (CSA) has grown, the application of drought-resistant crops, improved irrigation methods, and sustainable land management practices remains limited. Limited extension and technical capacity at the local level means many farmers lack awareness of—or access to—technologies that could enhance their resilience to climate variability. The state's neglect of agricultural research and extension has left rural communities dependent on traditional farming methods that are increasingly inadequate under climate stress. The neoliberal reforms described in Section 5 have further restricted agricultural institutions' capacity to provide services to rural farmers, as the market-oriented approach has led to the dismantling of state-operated agricultural institutions and the reduction of subsidies for agricultural inputs essential to rural food security. Bassey (2020) observes that the privatization of agricultural services has effectively converted basic public services into commercial ones, placing them out of reach for the smallholder farmers most affected by climate change.

The National Adaptation Strategy and the Anchor Borrowers' Programme

Nigeria's National Adaptation Strategy and Plan of Action on Climate Change (NASPA) provides a framework for adaptation, but implementation at the state level has been weak. In Sokoto, desertification mitigation activities—including tree-planting campaigns and sustainable land management projects—have been poorly sustained, suffering from limited community participation, inadequate funding, and weak institutional follow-through.

The Anchor Borrowers' Programme (ABP), launched in 2015, deserves particular attention given its prominence in Kebbi State—often cited as the programme's flagship success. The ABP has substantially increased rice production in Kebbi, with the state becoming one of Nigeria's largest rice-producing states. However, the programme's climate resilience record is mixed. While participating farmers received improved seeds, fertilizers, and

credit, the programme did not incorporate climate risk assessment or adaptive management. Farmers who expanded rice cultivation into flood-prone areas along the Rima and Niger rivers suffered catastrophic losses in the 2020 and 2022 floods, for which neither the ABP nor other state institutions had contingency plans. The programme's focus on productivity—measured in tonnage—crowded out investment in supporting infrastructure (drainage, storage, crop insurance) that would have enhanced resilience. Furthermore, the structured credit system created debt dependencies: farmers who defaulted due to flood losses were excluded from subsequent cycles, deepening their precarity. The ABP experience demonstrates that productivity-focused interventions, without complementary investments in climate-resilient infrastructure and risk management, can leave farmers more rather than less exposed to climate shocks.

Political Economy of Contemporary Food Insecurity

The current situation of food insecurity in Sokoto and Kebbi results from a combination of socio-economic, political, and environmental factors. This section discusses key themes—land pressure and demographic change, farmer–herder relations, market volatility, and gender dimensions of agrarian vulnerability—that together constitute the political economy of food insecurity in the region.

Land Pressure and Demographic Change

Population growth in Northern Nigeria—where the population growth rate averages approximately 3% per annum, among the highest globally—has placed severe pressure on land resources. The predominantly agrarian population has led to increasing subdivision of farms, encroachment into marginal areas, and unsustainable intensification. Ayodele (2001) notes that increasing population density in rural areas has led to farm fragmentation and encroachment onto unfavourable terrain, with insufficient resources for effective farming. This rising demand for land, combined with the scarcity of arable land and environmental degradation, has exacerbated food insecurity.

In Sokoto, land fragmentation has reduced average farm sizes to less than one hectare for most smallholders, making it impossible to generate sufficient surplus for household food security. In Kebbi, the expansion of rice cultivation has intensified competition for prime floodplain land, driving up access costs and pushing poorer farmers onto less productive upland areas. Land tenure systems that favour larger landowners and elites compound this pressure, leaving smallholders—particularly women and marginalized groups—without secure land access. Nwosu (2009) argues that this unequal land distribution has produced an uneven playing field where the poor are increasingly unable to sustain livelihoods or invest in sustainable agricultural practices.

Farmer–Herder Conflicts

Farmer–herder conflict has become a growing concern in Northern Nigeria, intensified by desertification and land degradation. As the Sahara advances southward, nomadic pastoralists move further south in search of pasture and water, bringing them into increasingly frequent contact—and conflict—with farming communities. These conflicts are not merely environmental but are deeply political and economic, driven by unequal

land and resource distribution, weak state control over land use, and ineffective conflict resolution mechanisms (Bassey, 2020).

In Sokoto, herders whose traditional grazing routes in Gudu, Tangaza, and Illela have been lost to desert encroachment now compete for land with farmers in communities further south, leading to crop destruction, livestock losses, and violent clashes. In Kebbi, dry-season movements of herders toward the Rima and Niger river valleys bring them into competition with rice farmers. The resulting conflicts destroy crops, displace farming households, and reduce food production. Pastoralists also lose access to grazing areas, compromising their economic security. Obi (2013) notes that the state's inability to resolve these conflicts through effective governance has worsened food insecurity in rural areas.

Market Volatility

Northern Nigerian smallholder farmers face significant market volatility, exacerbated by liberalized agricultural markets and inadequate infrastructure. In Kebbi's rice sector, farmers experience price collapses during bumper harvests due to inadequate storage facilities and poor market access, while facing high prices during lean seasons—a price spread from which they capture little benefit. The collapse of state marketing boards under SAP reforms left farmers exposed to trader-driven pricing, with limited bargaining power. This volatility undermines farmers' ability to plan production, invest in productivity improvements, or accumulate savings that could buffer against climate shocks.

Gendered Dimensions of Agrarian Vulnerability

Gender is a critical dimension of food insecurity in Northern Nigeria. Women are central to food production, processing, and household food security, yet they face systemic discrimination in land ownership, credit access, and decision-making. Discriminatory land tenure systems, limited access to resources, and cultural norms restricting women's role in agricultural decision-making make rural women especially vulnerable to food insecurity.

Women in Northern Nigeria have significantly less access to fertile land, credit, and modern agricultural inputs than men. Their limited access to education and extension services constrains their ability to adopt climate-smart agricultural practices, making them less able to adapt to changing climatic conditions (Ayodele, 2001). The gendered division of labour in agriculture—where women are primarily engaged in food crop production while men control cash crops—further restricts women's economic opportunities. Women's social role as primary caretakers limits their engagement in market activities and income generation. As Nwosu (2009) notes, the gendered division of labour within households makes women more vulnerable to food insecurity, as they are expected to feed their families under increasingly difficult circumstances. Female-headed households are particularly at risk, lacking the economic resources and social networks that male-headed households can access. This unequal access to resources perpetuates gender disparities in food security and undermines women's capacity to achieve food sovereignty and economic empowerment.

Discussion

Reframing the Climate Crisis as a Political-Economic Crisis

The cases of Sokoto and Kebbi demonstrate the necessity of understanding climate change as a political-economic crisis, not merely an environmental one. Food insecurity arises from the interaction of environmental stressors—droughts, floods—with structural inequalities in land access, governance, and markets. The floods in Kebbi are not simply natural disasters; they are also manifestations of inadequate investment in flood control infrastructure, the absence of climate risk assessment in agricultural programmes like the Anchor Borrowers' Programme, and the historical marginalization of the region from state developmental investment. Similarly, desertification in Sokoto is worsened by weak environmental governance—poorly sustained tree-planting campaigns, deforestation driven by fuelwood demand, and unsustainable land use practices that reflect the absence of effective state regulation.

Land tenure reforms during the colonial and postcolonial eras consolidated land ownership among elites and excluded smallholders. These historical patterns combined with neoliberal restructuring—which reduced state support for agriculture and rural development—deepened poverty and inequality while eroding rural communities' capacity to cope with climate shocks (Ayodele, 2001). The political economy of the climate crisis is also closely tied to resource governance: competition among farmers, herders, and urban developers over shrinking land resources has intensified under climate stress. Unequal access to resources, weak conflict resolution mechanisms, and the absence of investment in climate-resilient infrastructure all compound rural vulnerability. These structural inequities cannot be resolved by technological or environmental solutions alone; they require political changes and economic restructuring to reduce the social and environmental risks of climate change (Bassey, 2020).

Reframing climate change as a political-economic problem underscores the need for policy responses that address both the environmental and socioeconomic determinants of vulnerability. This means incorporating social equity and economic justice into climate adaptation processes, ensuring that adaptation is just and equitable, particularly for disadvantaged groups such as women, small-scale farmers, and pastoral communities.

Implications for Climate Justice Debates

The Sokoto and Kebbi cases have significant implications for climate justice debates. While the historical emissions of developed countries are a primary driver of the climate impacts these regions face, domestic political factors—governance failure, inequitable resource allocation, and the rentier state structure—are equally important in shaping vulnerability. Climate justice must therefore address inequalities both between and within countries.

The principle of climate justice emphasizes the responsibility of Global North countries to support the Global South through finance, technology transfer, and capacity building for climate adaptation. However, as Adebayo (2016) argues, climate justice discussions often overlook domestic power dynamics and inequalities within countries that create vulnerability to climate change. The political-economic perspective demands attention to

domestic structural reforms: land reform, gender-inclusive policies, strengthened institutions, and investment in climate-resilient infrastructure are crucial for climate justice in the Nigerian context. Climate justice must not be reduced to international finance flows; it must also encompass structural reforms within countries to counteract the inequalities at the root of climate vulnerability.

Furthermore, climate justice discussions must address social vulnerability in addition to environmental vulnerability. Economic disenfranchisement, poor governance, and climate effects intertwine to produce a vicious cycle of poverty and marginalization. Empowering vulnerable communities—especially women, rural farmers, and pastoralists—to address both environmental and social vulnerabilities should be central to climate adaptation efforts.

Theoretical Reappraisal

The four theoretical frameworks employed in this study each illuminate different dimensions of the climate-food security nexus in Northern Nigeria, but they are not equally productive. Agrarian political economy provides the most direct analytical leverage, as it explains how class relations, land tenure, and resource access mediate environmental impacts at the local level—a dynamic clearly visible in the differential effects of drought and flood on Sokoto's smallholders versus larger commercial farmers. Dependency theory effectively accounts for the structural constraints imposed by Nigeria's position in the global economy but is less useful for explaining intra-regional variation between Sokoto and Kebbi. Eco-Marxism's concept of the metabolic rift captures the long-term ecological degradation produced by export-oriented monoculture, though the evidence from this study—which is primarily political-economic rather than ecological—suggests this framework would benefit from more direct empirical engagement with soil science and hydrological data. Rentier state theory convincingly explains the state's neglect of agriculture but, as the Anchor Borrowers' Programme experience shows, even when the state does intervene, the form of intervention matters: productivity-focused programmes without complementary resilience investments can actually increase vulnerability. This suggests that explaining food insecurity in Northern Nigeria requires not only analyzing the *quantity* of state investment but also its *quality* and distribution.

Limitations and Future Research Directions

This study has several limitations that point to productive directions for future research. First, it relies on secondary sources and aggregate data; future work would benefit from household-level surveys in Sokoto and Kebbi that capture farm-level adaptation strategies, income diversification, and the differentiated impacts of climate shocks across socioeconomic groups. Second, the effects of specific climate adaptation programmes in the region—particularly community-based adaptation initiatives and climate-smart agriculture projects—merit systematic impact evaluation. Third, the political economy of policy implementation deserves closer investigation: research on how political processes, patronage networks, and institutional weaknesses affect the effectiveness of climate adaptation policies at the state and local government levels would be valuable. Fourth, a comparative analysis between Northern Nigeria and other Sahelian regions (e.g., Niger, Burkina Faso, Mali) could yield insights into how regional cooperation and cross-border

policy frameworks might enhance climate resilience and food security. Finally, gender-sensitive research on the nexus of climate change and gendered vulnerabilities is urgently needed to understand the specific needs and challenges of women farmers and female-headed households in relation to climate adaptation.

Conclusion

This study has demonstrated that climate change in Sokoto and Kebbi States cannot be understood as a purely environmental phenomenon. It is deeply embedded in historical, political, and economic processes that have shaped rural vulnerability over more than a century. The analysis reveals multiple interconnected factors contributing to food insecurity: colonial land tenure transformations, postcolonial agricultural neglect, neoliberal reforms that removed state support for smallholders, the rentier state structure that marginalizes agriculture, contemporary land pressure, farmer-herder conflicts, market volatility, and gender-based vulnerability. Climate variability intensifies each of these factors, reducing agricultural productivity, deepening food insecurity, and escalating resource conflicts.

The study also shows that the state's response to climate change has been inadequate—constrained by weak institutional capacity, inequitable resource allocation, and a failure to integrate climate adaptation into broader development planning. The findings align with existing political economy scholarship emphasizing the need to integrate climate adaptation with poverty reduction, social equity, and structural reform.

The results carry several policy implications. First, climate adaptation policies must prioritize the structural inequalities that drive rural vulnerability—land tenure reform, gender inequality, and infrastructure deficits—alongside environmental interventions. Second, institutional coordination and capacity at state and local government levels must be strengthened. Improving agricultural extension services, expanding access to climate-resilient technologies and markets, and enhancing disaster preparedness can reduce the vulnerability of smallholder farmers and pastoralists. Third, land use governance and sustainable land management practices must be promoted to address farmer-herder conflicts, which would contribute to both social stability and food security. Fourth, policies must be gender-sensitive, addressing women's empowerment in agriculture through improved access to land, credit, and education, and integrating gender-sensitive strategies into climate adaptation plans.

These interconnected challenges require a holistic approach. Environmental interventions alone are insufficient; a political-economic solution is needed—one that addresses structural inequalities, enhances state capacity, and supports sustainable rural development. Without such an approach, Northern Nigeria will remain caught in a cycle of climate vulnerability and food insecurity.

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