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CLIMATE CHANGE, HUMAN SECURITY,120 AND GENDERED VULNERABILITY: A HISTORICAL ANALYSIS OF WOMEN AND CHILDREN IN THE LAKE CHAD REGION, 1960–2020

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Abstract
Climate change has emerged as one of the most pressing environmental and human security challenges of the twenty-first century, with its impacts disproportionately affecting vulnerable populations across the Global South. In the Lake Chad Region, decades of environmental transformation have profoundly altered livelihoods, intensified resource scarcity, and exacerbated human insecurity, with women and children bearing the greatest burden of these changes. While existing scholarship has extensively examined the environmental degradation of the Lake Chad Basin and its implications for conflict and displacement, limited attention has been given to the historical evolution of gendered vulnerability within the broader human security discourse. This study addresses this gap by undertaking a historical analysis of the relationship between climate change, human security, and the lived experiences of women and children in the Lake Chad Region from 1960 to 2020. Employing a qualitative historical research design, the study relies on documentary analysis of archival materials, peer-reviewed literature, government publications, and reports from international and regional organisations. Guided by the Human Security Framework and Feminist Political Ecology, the article traces the changing patterns of environmental degradation and examines how successive climatic events including prolonged droughts, desertification, shrinking water resources, and ecological decline have reshaped livelihoods, food security, health, migration, and protection for women and children. The study argues that gendered vulnerability in the Lake Chad Region is not solely a consequence of climatic variability but is historically produced and reinforced by structural inequalities, weak governance, environmental mismanagement, and protracted insecurity. It concludes that sustainable climate adaptation and human security policies must adopt historically informed and gender-responsive approaches that recognise women and children not merely as victims of environmental change but as essential actors in building resilient communities and advancing sustainable development across the Lake Chad Basin.

Keywords: Climate change; Human security; Gendered vulnerability; Lake Chad Region; Environmental history.

Introduction

Climate change has become a defining global challenge, with anthropogenic drivers since the mid-twentieth century accelerating environmental degradation and extreme weather events. These disruptions severely threaten developing regions where livelihoods depend directly on natural resources (IPCC, 2023). The Lake Chad Region spanning Nigeria, Niger, Chad, and Cameroon represents one of Africa‟s most fragile socio-ecological zones. In the 1960s, Lake Chad covered approximately 25,000 km²; however, persistent droughts since the 1970s, coupled with population growth and upstream water abstraction, led to a dramatic contraction of its surface area (Coe & Foley, 2001; Gao et al., 2011).

This environmental transformation extends far beyond ecological decline. Shrunk water resources have undermined agricultural and fisheries productivity, accelerated desertification, and intensified resource competition. These pressures feed livelihood insecurity, forced migration, and social tensions that intersect with regional political instability. Consequently, climate change operates as a multidimensional human security threat impacting economic, food, health, personal, and political security (UNDP, 1994; Adger, 2006).

Critically, these impacts are unevenly distributed. Women and children face disproportionate exposure to climate risks due to structural inequalities governing resource access, education, and economic mobility (UN Women, 2022). In the Lake Chad Basin, women underpin household food production, water collection, and caregiving, meaning environmental degradation directly inflates their labor burden. Children face parallel vulnerabilities, including heightened risks of malnutrition, interrupted schooling, and exploitation (UNICEF, 2023).

This gendered vulnerability cannot be uncoupled from historical governance challenges and regional conflict. Since the late 2000s, violent insurgencies like Boko Haram have compounded ecological shocks by displacing millions and decimating local infrastructure. Climate change acts as a threat multiplier here, exacerbating structural fault lines rather than directly causing violence (Ide et al., 2021). Because existing literature heavily favors contemporary policy analyses, a long-term historical perspective spanning 1960 to 2020 is required to understand how present patterns of insecurity cumulatively formed. This article integrates environmental history, human security, and gender studies to fill this analytical gap.

Literature Review

Scholarly focus has shifted from treating climate change as a purely ecological issue to understanding it as a socio-political crisis intersecting with governance, inequality, and conflict (Adger, 2006; Barnett & Adger, 2007). The human security paradigm shifted focus away from state sovereignty toward protecting individuals from chronic vulnerabilities like hunger, disease, and violence (UNDP, 1994). Scholars note that environmental hazards directly undermine human security by eroding the adaptive capacities of marginalized populations (Barnett, 2003; O'Brien et al., 2008).

In the Lake Chad Basin, research documents severe ecological contractions since the 1960s driven by climatic variability and demographic demands (Coe & Foley, 2001). However,

recent scholarship cautions against environmental determinism; Magrin (2016) notes that ecological stress produces insecurity only when mediated by political marginalization and institutional failures. Similarly, regarding the post-2009 Boko Haram insurgency, researchers challenge simplistic resource-scarcity conflict models (Homer-Dixon, 1999) by demonstrating that climate change acts as a threat multiplier heavily mediated by institutional collapses and livelihood disruptions (Ide et al., 2021; Okpara et al., 2023).

Feminist scholarship highlights that environmental risks are intrinsically gendered because social norms dictate resource allocation and labor divisions (Rocheleau et al., 1996). Climate-induced resource scarcity directly translates into expanded workloads, depleted asset bases, and heightened exposure to violence for women (Dankelman, 2010). Concurrently, climate shocks jeopardize children's security via nutritional deficits, displacement, and increased susceptibility to early marriage or armed recruitment (UNICEF, 2023).

Research Gap and Contribution to Knowledge

Despite these insights, three major gaps persist in the literature:

1. **Temporal Shortcomings:** Most literature is contemporary and post-2010 policy-oriented, ignoring the long-term historical processes that gradually institutionalized vulnerability.
2. **Homogenization:** Women and children are frequently grouped into flat, static categories, missing intergenerational shifts and the deeply intertwined vulnerabilities unique to children.
3. **Disciplinary Silos:** Environmental, security, and gender studies remain analytically segregated.

This study bridges these gaps by utilizing an interdisciplinary approach tracing the 1960–2020 period. It offers a historically informed human security framework, proving that vulnerability is both environmentally produced and socially mediated. Policy-wise, it argues that sustainable adaptation must move past emergency aid to dismantle historical structural inequalities.

Conceptual Clarification Climate Change

Climate change entails persistent shifts in global temperature and weather patterns, primarily driven by anthropogenic greenhouse gas emissions and unsustainable land use (IPCC, 2023). Beyond environmental metrics, its core significance lies in how it erodes livelihoods and amplifies structural inequalities (Adger, 2006). In the Lake Chad Basin, climate change presents as erratic rainfall and desertification, though its local severity is heavily accelerated by demographic pressures and poor environmental governance (Coe & Foley, 2001; Gao et al., 2011). Thus, this study views climate change as a coupled socio-ecological process of long-term transformation.

Human Security

Originating as a post-Cold War critique of militaristic security, human security prioritizes protecting individuals from non-military vulnerabilities (UNDP, 1994). It encompasses seven dimensions including economic, food, health, and environmental security operationalized through "freedom from fear" and "freedom from want." Climate change directly disrupts these dimensions by destabilizing resource bases and triggering forced migration (Barnett & Adger, 2007). In this study, the framework is applied to capture how the ecological decline of Lake Chad simultaneously compromises the daily survival, health, and dignity of local populations.

Gendered Vulnerability

Vulnerability is not an inherent trait, but a socially constructed condition dictated by unequal resource distribution and political marginalization (Adger, 2006). Gendered vulnerability denotes how institutionalized roles and power disparities cause women and children to experience environmental shocks differently (Dankelman, 2010). Because institutional barriers deny women equal land rights or credit, environmental degradation expands their caregiving and resource-gathering burdens while stripping away their adaptive capacity (UN Women, 2022). For children, this vulnerability manifests as structural dependencies causing nutritional deprivation, educational loss, and exploitation during crises (UNICEF, 2023). This study treats gendered vulnerability as a historically produced process where climate stress compounds pre-existing socio-cultural inequalities.

Theoretical Framework: Integrating Human Security And Feminist Political Ecology

To construct a structurally robust analytical framework capable of explaining the complex socio-political dynamics of the Lake Chad Basin, this study departs from conventional environmental security paradigms. Traditional environmental security models, frequently rooted in neo-Malthusian assumptions, tend to treat environmental degradation as an independent variable that directly and linearly triggers resource scarcity, social collapse, and armed conflict. Such frameworks operate under a deterministic logic that overlooks how institutional arrangements, historical inequalities, and political economies mediate the human experience of environmental change.

This study rejects this linear causality. Instead, it constructs an integrated framework that synthesizes Human Security Theory with Feminist Political Ecology (FPE) to map how vulnerability is historically produced, socially structured, and unevenly distributed within fragile dry land ecosystems.

Human Security Theory, as articulated by the United Nations Development Programme (UNDP) in its seminal 1994 Human Development Report, serves as the foundational pillar for reorienting the analytical lens away from state-centric, militarized notions of security toward the lived realities of individuals and communities. Traditional national security paradigms prioritize the defense of territorial borders and state sovereignty, often rendering the domestic struggles of marginalized populations invisible.

The human security framework emphasizes "freedom from want" and "freedom from fear," identifying seven distinct yet profoundly interconnected dimensions of security: economic, food, health, environmental, personal, community, and political. Within the context of the Lake Chad Basin, this multidimensional typology is critical. Environmental degradation does not operate within an empirical vacuum; rather, it functions as a catalytic disruption that triggers cascading shocks across all seven dimensions of human well-being simultaneously. When the open-water surface of Lake Chad receded, riparian communities did not merely witness an ecosystem shift; they experienced a wholesale destabilization of the institutional and material baselines that guaranteed daily survival, transforming localized ecological stress into a structural crisis of human security.

However, while Human Security Theory provides a comprehensive diagnostic tool to identify *what* dimensions of human well-being are under threat, it possesses a notable analytical limitation: it frequently treats vulnerable populations as homogeneous categories. It lacks the internal conceptual mechanisms required to explain why specific demographic cohorts experience significantly higher levels of deprivation and violence during the same ecological event. To resolve this limitation and expose the internal power dynamics that dictate the asymmetric distribution of environmental risks, this study integrates Feminist Political Ecology.

FPE posits that gender is a primary axis of power that intersects with class, age, ethnicity, and geographic location to shape how human beings interact with, access, and control the natural environment (Rocheleau et al., 1996). FPE explicitly rejects the essentialist notion that women are inherently or biologically closer to nature, or that their vulnerability to climate change stems from intrinsic, natural characteristics. Instead, FPE establishes that gendered vulnerability is an engineered product of social, political, and economic institutions.

Applying FPE to the Lake Chad Basin, this study systematically unpacks how access to, ownership of, and control over vital productive resources such as arable flood-recession draw-down lands, formal credit, agricultural extension services, technologies, and institutional decision-making bodies are strictly demarcated along gendered and age-cohort lines. Customary patriarchal structures and colonial-era legal legacies have historically combined to restrict women‟s formal land tenure, leaving them dependent on male kin for temporary usufruct rights. Consequently, when environmental degradation shrinks the total pool of available resources, these asymmetric power structures are reinforced, forcing women and children to absorb disproportionate survival burdens while minimizing their institutional leverage to adapt.

The integration of Human Security Theory and Feminist Political Ecology thus shifts the scholarly discourse beyond the visible symptoms of contemporary crises. It enables this study to conceptualize gendered vulnerability not as a passive, biological status or an immediate casualty of modern climate variability, but as a historically accumulated structural trap. This trap is continuously reproduced by social institutions that simultaneously increase the domestic survival responsibilities of women and children while systematically stripping them of the adaptive resources necessary to withstand ecological shocks.

Methodology

This study utilizes a qualitative, historical-sociological research design centered on the systematic application of process tracing. In the study of climate change and human security, standard quantitative methodologies frequently rely on cross-national correlation designs that map macro-level indicators, such as rainfall anomalies against conflict data or poverty indices. While these statistical approaches offer valuable insights regarding broad correlations, they regularly obscure the precise, localized causal mechanisms through which environmental changes translate into human suffering and institutional collapse. Process tracing is uniquely suited to overcome this methodological deficit. It functions as an analytical tool designed to look inside the "black box" of causality, enabling the researcher to identify the intermediate steps, feedback loops, and structural contingencies that link an initial independent variable (ecological transformation) to a final dependent outcome (gendered vulnerability and human insecurity) over an extended chronological trajectory.

The geographical scope of this inquiry is bounded by the conventional Lake Chad Basin, focusing primarily on the riparian zones directly encompassing portions of Nigeria, Niger, Chad, and Cameroon. The temporal parameters span a sixty-year horizon from 1960 to 2020, a timeframe sufficient to trace the long-term historical accumulation of structural vulnerabilities across multiple generations. To construct a reliable empirical ledger, this study executes a rigorous protocol of data triangulation, drawing from three independent qualitative and historical data streams:

1. **Archival and Documentary Records:** This stream includes historical policy briefs, legislative acts from riparian states, official colonial and post-colonial land tenure registries, hydrological and meteorological datasets maintained by the Lake Chad Basin Commission (LCBC), and longitudinal demographic and health reports published by national statistical bureaus.
2. **Scholarly Literature:** A systematic, multidisciplinary meta-analysis of historical, anthropological, sociological, and development studies literature concerning the socioeconomic evolutions, migration patterns, and agrarian transformations of the West African Sahel.
3. **Institutional and Human Rights Reports:** This stream encompasses evaluative assessments, human rights monitoring briefs, humanitarian response bulletins, and emergency reports generated by international non-governmental organizations and United Nations agencies (such as the UNHCR, UNDP, FAO, and UNICEF) operating within the basin.

The operationalization of the process-tracing methodology proceeds by dividing the sixty-year historical continuum into four distinct, sequential periods: 1960–1972, 1973–1989, 1990–2008, and 2009–2020. For each individual epoch, the process-tracing protocol measures and maps the interaction between three strictly operationalized variables:

- **The Biophysical State of the Ecosystem:** Characterized by water volume, surface area, rainfall variability, and land fertility.
- **The Governance Paradigm:** Encompassing state-level legislative interventions,

regional institutional actions, macroeconomic policies, and the operational presence or withdrawal of formal institutions.

- **Localized, Gender-Differentiated Household Survival Strategies:** Documenting changes in labor allocation, resource access, migration, household asset liquidations, and intra-household distribution patterns.

Systematically tracking how these three variables intersected within each temporal boundary, this methodology does not treat history as a passive background. Instead, it captures the precise moments where governance omissions and structural inequalities hardened environmental adjustments into permanent socio-economic vulnerabilities, explicitly exposing the historical chains of causality that underpin the contemporary humanitarian emergency.

THE CHRONOLOGICAL NARRATIVE: CLIMATE, GOVERNANCE, AND SECURITY (1960–2020)

The Illusion of Abundance and Foundations of Structural Inequality (1960–1972)

The immediate post-independence era within the Lake Chad Basin was defined by a highly favourable climate regime known in hydrological literature as "Normal Lake Chad." During this inaugural decade of statehood for the riparian countries, the lake‟s open-water surface area maintained a vast and stable footprint, fluctuating between 22,000 and 25,000 square kilometers. Regular, predictable West African monsoonal rain cycles recharged the Chari and Logone river systems, ensuring high water levels and maintaining a robust, highly resilient ecosystem. This environmental baseline sustained a complex, complementary, and historically adaptive tripartite local economy. Riparian populations successfully combined rain-fed and flood-recession agriculture, extensive transhumant pastoralism that migrated fluidly across international borders, and high-yield artisanal fisheries that produced thousands of tons of fish annually for regional markets.

During this period, explicit indicators of acute humanitarian crisis were low; the natural carrying capacity of the basin was substantial enough to absorb localized shocks without precipitating widespread destitution. However, this ecological abundance masked the deliberate construction of the structural and institutional faults that would later fracture the region. As the newly independent states of Nigeria, Niger, Chad, and Cameroon embarked on centralized state-building projects, their administrative apparatuses systematically marginalized traditional, decentralized, and highly flexible local resource-management institutions.

Post-colonial states prioritized grand, capital-intensive, and top-down development schemes designed around commercial export-oriented agricultural initiatives and large-scale state-managed irrigation networks. These modern legal frameworks overwritten customary, flexible resource-sharing pacts that had historically negotiated peaceable co-existence between mobile pastoralists and sedentary agrarian communities.

Concurrently, these state-led modernizing interventions actively codified and entrenched deeply patriarchal socio-legal systems. Formal land allocation, state agricultural credits, and subsidized modern inputs were channelled exclusively to male household heads and male traditional authorities, under the flawed assumption that households operated as unified,

egalitarian economic units. Women, who performed more than 60% of the manual labor required for subsistence farming and dominated the localized fish-processing and marketing sectors, were completely denied independent legal titles to land.

Furthermore, when the riparian states established the Lake Chad Basin Commission (LCBC) via te Fort Lamy Convention in 1964 to coordinate regional resource use, the institution was structured as an elite, technocratic, state-centric body. It entirely excluded local resource usersparticularly women‟s agricultural collectives and smallholder cooperatives from participating in environmental governance. Consequently, Phase I established a highly precarious socio-ecological landscape: an economy dependent on a stable climate, governed by centralized states that ignored local ecological knowledge, and structurally organized to exploit the uncompensated labour of women while denying them the institutional assets necessary for long-term security.

Great Climatic Shocks and the Demise of Rural Capital (1973–1989)

The structural vulnerabilities built during the post-independence decade were exposed when the macro-climate of the West African Sahel shifted violently. This era was defined by the catastrophic Sahelian droughts of 1972–1974 and 1983–1985, events characterized by unprecedented drops in average monsoonal rainfall and skyrocketing evaporation rates. The hydrological response of the basin was catastrophic: Lake Chad fractured and dropped into a "Small Lake Chad" state. Its surface open-water area collapsed by more than 90%, shrinking to a fragmented network of shallow, disconnected pools and seasonal marshes covering less than 2,000 square kilometers. Large-scale, state-managed commercial irrigation projects became completely non-operational as water intakes stranded kilometers away from the receding shoreline. Traditional open-water fish stocks crashed due to rising salinity and dropping oxygen levels, and extensive pastures transformed into hyper-arid, bare terrain.

The institutional response from national governments during this critical juncture was profoundly inadequate. Hampered by structural economic constraints, rising foreign debts, and systemic internal political instability including a series of military coups across the sub-region the states failed to implement comprehensive rural safety nets, emergency livelihood diversification programs, or coherent regional adaptation strategies. Instead, state interventions were largely reactive, short-term, and concentrated near urban centers, effectively leaving rural populations to absorb the full impact of ecological devastation.

This sudden environmental and institutional collapse fundamentally rearranged localized gender relations and household survival strategies. As traditional cattle herding and commercial fishing ceased to be economically viable, millions of working-age men engaged in mass distress migration. They moved southward toward larger urban conglomerations or clustered around the remaining southern pools of the lake to secure casual wage labour. This demographic drain resulted in an unprecedented rise in de facto female-headed households across the rural basin.

These women were forced to assume sole responsibility for household survival under highly discriminatory institutional conditions. Because they lacked formal land titles to use as

collateral, they were systematically frozen out of formal banking systems and emerging NGO credit schemes, preventing them from purchasing drought-resistant seeds, fertilizers, or small-scale mechanized water pumps.

At the same time, the radical retreat of water bodies directly inflated the domestic labour burdens of women and young girls. The average time required to collect water and fuel-wood

escalated from under one hour to upwards of four to six hours daily. This severe escalation in unpaid domestic labor had immediate, intergenerational consequences: it forced families to systematically pull young girls out of primary schools to assist with domestic survival tasks, triggering an immediate drop in female educational enrolment that permanently constrained the human capital and socio-economic mobility of an entire generation of young women.

Structural Adjustment, State Withdrawal, and the Commercialization of Draw-Down Lands (1990–2008)

During the 1990s and early 2000s, the biophysical state of Lake Chad did not recover; rather, it stabilized into a highly volatile, chronically compressed, and unpredictable environment characterized by high spatial and temporal variability in water distribution. This ecological instability collided with a profound structural transformation of the state apparatus across the riparian nations. Facing severe macroeconomic crises, Nigeria, Niger, Chad, and Cameroon were compelled to adopt mandatory Structural Adjustment Programs (SAPs) designed by the International Monetary Fund (IMF) and the World Bank. These neoliberal policy packages required radical rollbacks in state spending, the elimination of agricultural subsidies, the privatization of state enterprises, and the downsizing of public sector employment.

The enforcement of SAPs effectively institutionalized the abandonment of the rural Lake Chad Basin. Governments eliminated subsidies on essential farming inputs, dismantled agricultural extension services, and withdrew funding from rural healthcare and public infrastructure projects. The total withdrawal of the state insulated urban political elites while leaving the rural population highly exposed, forcing them to absorb the dual shocks of extreme climate variability and economic marginalization without any institutional cushion.

As formal state support dissolved, competition over the remaining fertile draw-down landsthe highly productive, moist soils exposed by the receding lake watersintensified dramatically. This era saw a sharp escalation in localized, violent conflicts between sedentary farming communities and mobile pastoralists, whose traditional migratory pathways were forced to shift directly through cultivated areas due to advancing desertification.

Within this hyper-competitive and unregulated space, the intersection of economic reform and climate stress produced severe asset poverty for women and children. As the draw-down lands emerged as the primary source of agricultural wealth in the basin, a process of elite land grabbing occurred. Powerful male political actors, wealthy urban merchants, and well-connected traditional leaders utilized formal legal mechanisms and customary networks to privatize and enclose these communal lands. This process systematically squeezed out female smallholders, who had previously relied on communal access rules to cultivate small plots of vegetables for household nutrition.

To prevent total household starvation, women were forced to expand into the high-risk, low-return informal economy. They turned to the intensive harvesting and marketing of wild biomass, specifically firewood collection and artisanal charcoal production. This survival strategy created a destructive feedback loop: the desperate reliance on wood fuel accelerated localized deforestation, which directly worsened regional desertification, increased local temperatures, and further expanded the daily distance women and children had to travel to find wood. By the close of this period, the complete erosion of rural assets and the absolute withdrawal of state security had pushed the civilian population to the absolute brink of systemic failure.

The Convergence of Insurgency, Militarization, and Acute Human Security Collapse (2009–2020)

By 2009, the cumulative effects of forty years of ecological decline, state abandonment, economic structural adjustment, and systemic gender inequality converged to create a catastrophic humanitarian and security emergency. The emergence and rapid geographical expansion of the violent extremist organization Boko Haram, and its subsequent splinter factions such as the Islamic State West Africa Province (ISWAP), cannot be understood purely as an ideological or religious phenomenon. Rather, the insurgency directly capitalized on the deep grievances of an economically marginalized, climate-displaced, and structurally abandoned population. Decades of livelihood collapse in agriculture, herding, and fisheries had generated an immense pool of underemployed, disenfranchised young men who possessed zero socioeconomic stakes in the state system, making them highly vulnerable to the financial incentives and structural counter-narratives offered by insurgent recruiters.

The response from the riparian states was heavily militarized, coordinated through the Multinational Joint Task Force (MNJTF). While necessary to counter violent extremism, the enforcement of strict counter-insurgency operations resulted in severe unintended consequences for civilian human security. To isolate insurgent networks, the military enforced sweeping bans on motorized transport, restricted access to major regional cattle and fish markets, and forced the wholesale evacuation of entire rural populations from the islands and shores of the lake into guarded, highly congested garrison towns and Internally Displaced Persons (IDP) camps. These state-enforced mobility restrictions completely disrupted remaining local livelihood systems, transforming previously self-sufficient food producers into populations entirely dependent on external humanitarian assistance.

In these militarized spaces, the intersection of climate collapse and armed conflict produced an asymmetric catastrophe for women and children, who consistently comprised over 80% of the internally displaced population. Agricultural fields were transformed into active combat zones embedded with improvised explosive devices (IEDs), completely cutting women off from food cultivation. Within the IDP camps, international humanitarian assistance was chronically underfunded and plagued by significant distribution deficits.

To secure basic food rations, potable water, and medical supplies for their children, thousands of displaced women and adolescent girls were forced to adopt hazardous coping mechanisms.

These included survival sex with security actors and local elites, exploitative child labor, and the strategic arrangement of early forced marriages for young girls to reduce the number of mouths the household had to feed. Furthermore, decades of severe nutritional deprivation, untreated maternal trauma, and broken educational cycles culminated in extensive childhood stunting, widespread psychosocial disorders, and a profound, generational hollowing out of local human capital. This stark reality demonstrates that by 2020, human insecurity in the Lake

Chad Basin was no longer an isolated environmental or military problem; it had evolved into a deeply entrenched, multi-layered structural crisis of human survival.

Discussion: Reframing Climate Change, Human Security, and Gendered Vulnerability

The historical evidence compiled across the sixty-year trajectory of the Lake Chad Region demonstrates that understanding human vulnerability requires moving decisively beyond the analytical constraints of environmental determinism. While climate change has altered the basin's biophysical landscape, environmental degradation alone cannot explain the specific patterns of human insecurity experienced by women and children between 1960 and 2020.

Instead, vulnerability must be conceptualized as an institutionally produced systemic output, generated through the cumulative, multi-decade interaction of ecological change, governance deficits, macro-economic structural adjustments, and deeply embedded patriarchal social relations. This multi-causal reality challenges reductionist, neo-Malthusian narratives that dominate contemporary security discourses, which frequently portray climate change as an isolated, independent driver of regional conflict and human displacement.

Crucially, this historical perspective reveals that human insecurity in the Sahelian zone evolved cumulatively rather than episodically. A significant portion of contemporary scholarship privileges immediate, short-term manifestations of insecurity, treating regional instability as an abrupt post-2009 phenomenon linked almost exclusively to the rise of violent extremism and counter-insurgency responses (Ide et al., 2021; Okpara et al., 2023). While these contemporary studies provide valuable insights into active humanitarian operations, they obscure the deep-seated historical processes through which vulnerability was constructed across generations.

As this study proves, the current crisis did not emerge overnight; it developed upon a highly fragile socio-ecological foundation engineered over six decades. The successive Sahelian droughts of the 1970s and 1980s initialled a massive erosion of rural capital, which was then exacerbated by the implementation of IMF-mandated Structural Adjustment Programs in the 1990s. By slashing public expenditure on rural infrastructure, agricultural extension services, and social safety nets, the state systematically dismantled the adaptive capacity of the rural population long before the arrival of Boko Haram. Climate stress did not independently generate the contemporary emergency; rather, it functioned as a potent threat multiplier, accelerating and intensifying pre-existing institutional, economic, and social structural crises.

Furthermore, the empirical data strongly reinforce the central proposition of Human Security Theory that environmental degradation triggers cascading, cross-sectorial shocks that collapse multiple dimensions of human well-being simultaneously. Within the Lake Chad Basin, women and children do not experience food, health, economic, and personal insecurities as

isolated, compartmentalized challenges, but as mutually reinforcing, integrated conditions.

For instance, the drying of local water sources did not simply manifest as an environmental or hydrological issue; it directly expanded women's unpaid domestic labour burdens, forcing them to travel extensive distances. This physical displacement systematically stripped away their opportunities to engage in formal education, secure independent income generation, or participate in local civic governance. Simultaneously, it exposed adolescent girls to heightened

risks of gender-based violence and physical insecurity while in transit. This integrated reality illustrates that human security cannot be effectively analysed or addressed through fragmented, sector-specific interventions, but must be understood as an interconnected system of human dignity.

In alignment with the foundational tenets of Feminist Political Ecology, these findings confirm that gendered vulnerability is historically produced and structurally reinforced rather than biologically determined (Rocheleau et al., 1996). Women within the basin did not exhibit higher levels of vulnerability due to any inherent, biological weaknesses, but because long-standing customary legal institutions, patriarchal land-tenure frameworks, and post-colonial state regulations combined to restrict their formal ownership of land, access to financial credit, and representation in environmental decision-making bodies. As ecological conditions deteriorated, these structural inequalities functioned as an adaptive ceiling, locking women into highly vulnerable socioeconomic positions while simultaneously increasing their responsibilities for household survival.

Children experienced parallel structural disadvantages; climate change functioned as a long-term developmental hurdle rather than a temporary crisis. The severe nutritional deprivation, chronic stunting, and interrupted school cycles experienced during historical ecological shocks generated permanent, negative consequences for childhood development, psychological well-being, and future livelihood mobility, hollowing out the region's human capital across generations.

However, the historical record compiled in this study refutes paternalistic representations that depict women solely as passive, homogeneous victims of climate change. Across all four historical periods, women consistently exercised distinct agency and acted as central drivers of community resilience. When environmental shocks and male migration threatened household survival, women innovated. They diversified household income streams by pioneering flood-recession vegetable farming, establishing small-scale fish-processing networks, and navigating high-risk informal cross-border trade, all while maintaining vital mutual-aid social networks during periods of acute resource scarcity.

Recognizing this active agency is not merely an academic exercise; it is a prerequisite for shifting regional public policy away from top-down, patronizing external humanitarian interventions toward inclusive, bottom-up adaptation strategies that build directly upon existing local capacities and knowledge.

Ultimately, the integrated analytical framework developed in this study has broad relevance beyond the geographical boundaries of the Lake Chad Basin. Many environmentally fragile

drylands across Sub-Saharan Africa are currently experiencing a similar convergence of climate variability, rapid demographic growth, structural economic marginalization, and fragile governance systems. The historical-sociological process-tracing approach utilized here provides an adaptable analytical model to inform comparative research on climate security in other vulnerable regions, such as the Horn of Africa or the western Sahelian corridor.

More importantly, it underscores a vital policy truth: sustainable climate adaptation in dryland Africa cannot be achieved through short-term technological innovations or increased militarization alone. It requires deep institutional reforms, the democratization of land tenure, absolute gender equity, and inclusive governance architectures capable of dismantling the historical structural traps through which human vulnerability is continuously reproduced across generations.

Conclusion

This study has executed a comprehensive historical-sociological analysis of the relationship between climate change, human security, and gendered vulnerability in the Lake Chad Region from 1960 to 2020. By utilizing process tracing to explore sixty years of empirical evidence, this article demonstrates that the profound insecurities currently experienced by women and children within the basin cannot be understood as the direct, linear consequences of modern climatic shocks. Instead, contemporary human insecurity is the product of a long-term historical convergence of ecological decline, state institutional failures, neoliberal macroeconomic structural adjustments, and deeply entrenched patriarchal social structures. By synthesizing Human Security Theory with Feminist Political Ecology, this study has shifted the analytical focus away from short-term emergency and counter-insurgency policies toward a historically grounded explanation of how vulnerability accumulates over time.

The findings confirm that while structural and institutional barriers have historically amplified the environmental risks borne by marginalized demographics, women have consistently served as the central pillars of household survival and communal resilience across all four historical epochs. Consequently, this study concludes that sustainable climate adaptation, humanitarian intervention, and regional development frameworks within the Lake Chad Basin must look beyond short-term relief operations or purely militarized security paradigms.

True socio-ecological resilience and human dignity can only be achieved if national governments, international development partners, and the Lake Chad Basin Commission design and implement historically informed, gender-responsive policies. These frameworks must prioritize dismantling the deep-seated structural inequalities that continue to restrict access to productive resources, education, and formal decision-making power, thereby addressing the root conditions of vulnerability to build a secure, just, and lasting future for the region.

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