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Human security under climate stress: environmental peacebuilding pathways in Somalia

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Introduction: Somalia provides a critical case for examining how climate change undermines human security and peace in fragile states. Climate-related environmental stress continues to intensify resource pressures, displacement, and governance challenges, shaping pathways toward instability.

Methods: The study applies qualitative content analysis using academic literature, United Nations and NGO reports, and national policy documents. It examines three interconnected mechanisms through which climate stress influences insecurity: inter-clan competition over land and water, tensions between displaced and host communities, and the exploitation of livelihood vulnerabilities by armed groups.

Results: Findings show that climate change acts as a threat multiplier, heightening resource disputes, displacement pressures, and institutional fragility. These dynamics collectively amplify economic, community, and political insecurity. The study develops the Environmental Peacebuilding Pathways Framework to illustrate how conflict-sensitive climate adaptation can strengthen resilience and cooperation.

Discussion: The research contributes theoretically by linking human security and environmental peacebuilding perspectives, and empirically by situating Somalia within wider climate-security debates. Practically, it highlights the importance of integrating peacebuilding approaches into national and local climate adaptation strategies in line with Sustainable Development Goal 13.

KEYWORDS

climate change, human security, environmental peacebuilding, displacement, inter-clan conflict, armed groups, fragile states, sustainable development goals

1 Introduction

Climate change is increasingly acknowledged as a “threat multiplier,” particularly within fragile and conflict-affected states where socio-economic vulnerabilities are heightened by environmental stresses. In regions like Somalia, these dynamics are starkly evident. The nexus of rising temperatures, recurrent droughts, and severe flooding intensifies competition for scarce resources, exacerbating existing tensions and undermining governance structures that are already fragile due to prolonged conflict and humanitarian crises (Shahid and Adil, 2023; Chigudu, 2024). Research underscores the complexities surrounding this intersection, illustrating how climate-induced environmental risks interact with socio-political factors to affect human security deeply (Buhaug and Uexkull, 2021; Hegre et al., 2016).

In Somalia, climate variability has repeatedly exposed the country’s structural fragility and governance weaknesses. The 2011 famine and the 2016–2017 droughts demonstrated how environmental shocks intersect with political instability and resource-based clan

rivalries, leading to large-scale displacement and humanitarian crises. These events highlight how climate change acts as a threat multiplier, intensifying competition over land, water, and livelihoods while deepening existing governance and social vulnerabilities (Hussein, 2023).

The convergence of decades of instability and recurrent climate shocks leads to multifaceted insecurities, including food insecurity, displacement, and resource-based conflicts. The relentless environmental stress exacerbates poverty and fosters conditions conducive to violence, creating a feedback loop wherein climate change and conflict mutually reinforce one another (Makki et al., 2024). To grasp the full implications of these interactions, the human security perspective is essential, as it allows for an understanding of how economic, community, and political dimensions of security are impacted by climate variability (Causevic, 2017). Moreover, the need for integrated approaches that bridge environmental peacebuilding with local conflict management strategies has gained recognition as vital for fostering sustainable peace in the region (Conca and Dabelko, 2024).

Despite increasing attention to the climate-security nexus, existing scholarship often limits itself to examining broad correlations or focuses narrowly on resource disputes (O'Sullivan and Ramsay, 2015). This paper seeks to contribute to a deeper understanding by operationalizing the concept of environmental peacebuilding pathways, a framework that elucidates how climate stressors lead to human insecurity and thereby hinder prospects for sustainable peace in Somalia and similar contexts. By examining the operational pathways through which environmental stress exacerbates insecurity, this research endeavors to fill a conceptual gap in current literature (McClain et al., 2025).

The findings from Somalia can offer broader insights for other fragile states facing similar climate-induced risks, showcasing the urgent need for policies that intertwine conflict-sensitive climate adaptation with grassroots peacebuilding efforts (Makki et al., 2024; Conca and Dabelko, 2024). Enhancing the resilience of governance structures and communities against environmental pressures will be paramount for reversing the cycles of violence and instability exacerbated by climate change (Buhaug and Uexkull, 2021; Hegre et al., 2016).

Despite the growing body of research on the climate–security nexus, limited attention has been paid to how human security challenges mediate environmental peacebuilding processes in Somalia. This study addresses this gap by asking three guiding questions: How does climate-induced environmental stress affect human security in Somalia? Through which pathways does climate stress obstruct peacebuilding and stability? What strategies can integrate conflict-sensitive climate adaptation into peacebuilding efforts? The main objectives are to identify and analyze these pathways, assess their implications for sustainable peace, and propose a framework that links climate adaptation to human security and peacebuilding. Given Somalia's high vulnerability to both environmental shocks and governance fragility, investigating this intersection is urgent for informing national policy and advancing global understanding of how climate change functions as a threat multiplier in fragile states.

2 Literature review and theoretical framework

2.1 Climate change and human security

The intersection of climate change and human security has garnered increasing scholarly attention, particularly in light of the multidimensional implications of environmental stressors. Human security, as defined by the 1994 United Nations Development Programme (UNDP) Human Development Report, extends beyond state-centric security to include individual safety and dignity across various dimensions such as economic, food, health, and environmental security (Ruppel and Wyk, 2013). This broadened conceptual framework is critical for understanding the insecurities exacerbated by climate change, which function as “threat multipliers” in fragile contexts. Climate change does not cause conflict directly but intensifies existing vulnerabilities, such as economic and food insecurity, particularly in resource-dependent societies (Ngaruiya and Scheffran, 2016).

Research indicates that climatic disruptions disproportionately affect agricultural systems, thereby compromising food security and economic stability (Harvey et al., 2014). For instance, a synthesis of models suggests that maize and cassava production could see mean yield reductions of 22% and 8%, respectively, by mid-century across sub-Saharan Africa. These reductions highlight the direct impact of climate variability on livelihoods (Harvey et al., 2014). This agricultural instability often leads to increased competition for scarce resources, particularly in regions already experiencing socio-economic conflicts or governance issues (McClanahan et al., 2013). The food-insecure population faces compounded risks, particularly among vulnerable groups such as pregnant women, whose nutritional and mental health is negatively impacted during environmental shocks, as evidenced in studies from rural Bangladesh (Hasan et al., 2021).

Climate-induced migration is another crucial mechanism through which climate change exacerbates human insecurities. Displaced populations often clash with host communities over limited resources, leading to social tension and instability (Onyenekwe et al., 2022). The socio-ecological dynamics in contexts like coastal communities and pastoralist environments exemplify these conflicts, where economic stress from climate impacts can lead either to migration or escalation of local disputes over resources (Friel et al., 2014). Moreover, environmental degradation further complicates these issues by eroding social cohesion and amplifying governmental instability, thus creating fertile grounds for non-state actors to exploit the vulnerabilities of displaced populations (Ngaruiya and Scheffran, 2016).

However, much of the academic discourse regarding climate and human security tends to focus on generalized global patterns, frequently sidelining the localized processes that mediate these dynamics. Areas experiencing extreme fragility, such as Somalia, illustrate the necessity for localized analyses to unpack the interactions between climate stress, governance failures, and conflict potential (McClanahan et al., 2013). Examining these localized dynamics through the lens of human security not only elucidates the individual and community experiences of climate-induced insecurities but also underscores the importance of

integrating adaptive and peacebuilding frameworks that prioritize community participation and resilience-building measures (Mutisya et al., 2016).

The implications of such research are profound, suggesting that sustainable governance practices need to account for the intricate interplay between climate change effects and social stability. Developing systematic approaches to enhance resilience at both community and governance levels is essential for mitigating the risks posed by climate change. Future studies should aim to close the existing gap by focusing on specific case studies that elucidate the lived experiences of vulnerable communities facing climate-induced threats to their security (Abdulwaliyu et al., 2023).

By adopting a comprehensive human security perspective that accounts for these diverse vulnerabilities, scholars, and policymakers can better address the complexities surrounding the intersection of climate change and human security, ultimately fostering more robust strategies for peace, stability, and environmental resilience.

2.2 Environmental peacebuilding

The concept of environmental peacebuilding has gained traction over the past two decades, presenting an innovative framework that recognizes the integral relationship between natural resource management, environmental governance, and peacebuilding in areas afflicted by conflict. Initially rooted in environmental security discourse from the 1990s, which highlighted the risks of resource scarcity and ecological degradation as potential conflict drivers, the focus has shifted toward utilizing environmental cooperation as a mechanism for fostering peace and stability (Ruppel and Wyk, 2013). Modern definitions of environmental peacebuilding broadly encompass the integration of sustainable environmental and resource management strategies into conflict prevention and resolution frameworks, as well as post-conflict recovery initiatives (Ngaruiya and Scheffran, 2016).

Central to the literature are three primary pathways through which environmental factors contribute to peace: First, institutional development involves establishing governance structures that facilitate equitable resource management, thus reducing competition for resources while concurrently enhancing state legitimacy. Governance systems aimed at fairness and accountability can address tensions arising from resource disputes, as evidenced by various case studies (Harvey et al., 2014). Second, cooperation and trust-building enhance cross-community or cross-border collaboration in addressing shared environmental challenges, which can act as entry points for dialogue and reconciliation. Such collaborative efforts have been documented in contexts where shared environmental projects led to the emergence of trust and cooperation between historically conflicting parties (McClanahan et al., 2013). Third, livelihood security, focusing on sustainable resource-based livelihoods, aims to bolster resilience in communities at risk of conflict. These strategies can reduce vulnerability to conflict recruitment by supporting viable economic activities (Hasan et al., 2021).

Scholars have emphasized the potential for “environmental peace dividends” resulting from such cooperation, where

partnerships over shared resources spur broader social and political cooperation (Onyenekwe et al., 2022). However, it is crucial to recognize that such dividends are not automatic; they depend on conflict-sensitive approaches that take into account existing inequalities and governance weaknesses (Friel et al., 2014).

In contexts like Somalia, where natural resources hold significant importance for both livelihoods and cultural identity, the potential for environmental peacebuilding is especially pronounced. The region’s recurrent exposure to severe climate events—such as droughts, floods, and desertification—directly threatens pastoralist and agricultural systems. Thus, resource governance becomes both a source of conflict and a prospective platform for peace (Mutisya et al., 2016). Nevertheless, the application of environmental peacebuilding strategies in Somalia has often been characterized by reactive measures, primarily focusing on emergency relief instead of proactive strategies emphasizing conflict-sensitive adaptation and resilience (Abdulwaliyu et al., 2023). There exists an urgent need to interlace environmental peacebuilding with human security perspectives, positioning Somalia as a pivotal case for examining how climate adaptation strategies can simultaneously mitigate environmental vulnerabilities and promote pathways to peace.

Integrating environmental peacebuilding practices within conflict-affected regions highlights the necessity of addressing human security dimensions alongside resource governance. Such interdisciplinary efforts can yield sustainable outcomes that not only enhance stability but also promote equitable resource management practices, ultimately contributing to lasting peace.

2.3 The climate–conflict nexus in fragile states

The climate–conflict nexus, particularly within fragile states, has become a significant focus of scholarly discourse as researchers investigate how climate change exacerbates existing vulnerabilities and contributes to violent conflict. While debate surrounds the direct pathways linking climate change to conflict, a growing consensus acknowledges that climate-related shocks—such as droughts, floods, and resource scarcity—do not directly cause violence but rather heighten underlying grievances, reduce livelihood options, and strain weak governance structures Silander (2021). This nuanced understanding underscores the critical role of environmental stressors in conflictual contexts.

Empirical evidence illustrates the complexity of this relationship. For instance, the Sahel region has experienced recurrent droughts that have intensified longstanding conflicts between pastoralists and farmers, resulting in cycles of violence in countries like Mali and Niger (Singh, 2022). Similarly, in the Lake Chad Basin, environmental degradation and diminishing water resources have not only triggered intercommunal disputes but have also created conditions conducive to insurgent groups, like Boko Haram, to thrive amid chaos (Kamta et al., 2021). In South Sudan, erratic rainfall patterns exacerbate food insecurity, deepening ethnic tensions that contribute to broader regional instability (Koubi, 2019). These cases demonstrate that in areas where institutions lack the capacity to manage environmental stress,

climatic changes can act as “threat multipliers” (Schleussner et al., 2016), intensifying conflicts rather than directly initiating them.

Despite these insights, gaps persist in the literature regarding the localization of climate-related vulnerabilities and conflict dynamics. Much existing research relies on large-N statistical analyses that establish broad correlations but often overlook the intricacies of the local mechanisms through which environmental shocks can lead to insecurity. Studies addressing local contexts frequently regard climate stress as a background variable, failing to adequately examine how it shapes specific conflict dynamics and peacebuilding opportunities (Mach et al., 2020). Furthermore, the integration of human security and environmental peacebuilding perspectives remains limited, with few studies establishing frameworks that capture the lived experiences of affected populations in fragile states.

Somalia serves as a poignant example, embodying many of the challenges associated with the climate–conflict nexus. As one of the most climate-vulnerable and politically fragile nations, Somalia presents an acute case for understanding how climate stress interacts with weak governance, ongoing conflict, and humanitarian crises (Okpara and Yunus, 2024). Despite its relevance, academic inquiries into the climate–conflict dynamics in Somalia remain sparse compared to the extensive work conducted on regions like the Sahel and Lake Chad (Griffin, 2020). Addressing this gap, it is crucial to develop comprehensive frameworks that articulate the complex interconnections between environmental stressors and human security, elucidating how these factors obstruct pathways toward sustainable peace in such unstable contexts.

The comparative research emphasizes that the climate–human security–governance nexus, while central to Somalia’s context, is mirrored in other fragile-settings. For example, Decentralizing Climate Governance in the Global South: Lessons from Itezhi-Tezhi and the Kafue Wetlands, Zambia (Ndambwa and Moonga, 2024) shows how local institutions in Zambia struggled with devolution, delegation, deconcentration, and privatization of climate governance under pressure, reinforcing that governance capacity matters as much as environmental stress. Transforming Social Capital to Strengthen Local Government Resilience in Hazard-Prone Areas (Karso et al., 2025) demonstrates how social capital becomes a critical mediator between climate/hazard exposure and human-security outcomes in Indonesia. Together, these studies underscore that effective environmental peacebuilding demands more than natural-resource management—it requires human-security dimensions, resilient institutions, and inclusive governance. By drawing in this regional comparative evidence, this study extends those insights into Somalia, where such linkages remain under-explored.

2.4 Conceptual framework

Building upon the discussions surrounding human security, environmental peacebuilding, and the climate–conflict nexus, this study proposes a novel framework termed “environmental peacebuilding pathways.” This framework seeks to analyse how

climate-induced stress translates into insecurity and undermines peace prospects within fragile contexts. It is grounded in three interrelated propositions.

Firstly, climate change is framed as a significant stressor. Environmental shocks like droughts, floods, and desertification exacerbate resource scarcity and livelihood insecurity across vulnerable communities. These incidents serve as “threat multipliers,” intensifying existing fragilities rather than spawning new conflicts independently Silander (Kamta et al., 2021). For instance, in fragile states such as Somalia, recurrent droughts intensify competition over water and arable land, thus escalating tensions among local communities (Okpara and Yunus, 2024).

Secondly, human security emerges as a crucial mediating lens through which to understand the impacts of climate stress. Climate-induced pressures undermine multiple dimensions of human security, namely, economic through disrupted livelihoods, community through displacement and social fragmentation, and political through weakened state legitimacy and heightened grievances (Schleussner et al., 2016; Mach et al., 2020). This transition necessitates a shift from a state-centric focus to a more nuanced understanding centered on the lived experiences of individuals and communities.

Finally, environmental peacebuilding is conceptualized as a pathway to resilience. In contexts where resource scarcity leads to conflict, conflict-sensitive resource management can present opportunities for cooperation and trust-building amongst affected populations. Research indicates that environmental peacebuilding interventions, when rooted in local contexts, inclusive, and sensitive to prevailing power dynamics, can effectively mitigate insecurities and foster conditions conducive to peace (Dresse et al., 2018; Chigudu, 2024). Such initiatives highlight the potential to turn competition into collaborative resource governance, thereby enhancing social cohesion.

When applying this framework to Somalia, three key pathways emerge through which climate stress propagates human insecurity and obstructs peace:

- **Escalation of Inter-Clan Disputes over Land and Water:** Competition for dwindling resources can exacerbate historical grievances among different clans, leading to escalated violence and conflict (Singh, 2022; Kamta et al., 2021).
- **Tensions between Displaced Populations and Host Communities:** Climate-induced migration often exacerbates existing divisions, straining social cohesion and undermining local communities’ capacities to respond to shared challenges (Okpara and Yunus, 2024; Eckersley, 2015).
- **Exploitation of Vulnerabilities by Armed Groups:** Non-state actors can capitalize on livelihood losses and the weaknesses of governance structures to expand recruitment efforts and assert control in conflict-ridden areas (Neef et al., 2023).

This integrated framework not only clarifies the mechanisms that connect environmental instability with insecurity but also elucidates potential entry points for effective peacebuilding interventions. By contextualizing these elements within larger climate, security debates, this framework offers both a

conceptual innovation, the pathways model and an empirical contribution aimed at understanding how fragile states, like Somalia, can effectively intertwine climate adaptation strategies with peacebuilding efforts.

3 Methodology

This study employs a qualitative content analysis to examine how climate-induced environmental stress generates human insecurity and obstructs peace in Somalia. This approach enables the systematic coding and interpretation of diverse secondary sources while remaining sensitive to contextual dynamics in fragile settings. Data were drawn from peer-reviewed studies on climate change, human security, and conflict in fragile states; reports from the United Nations and non-governmental organizations documenting climate impacts, displacement, and peacebuilding in Somalia; and national policy documents such as the National Adaptation Programme of Action and the National Climate Change Policy. Sources were identified through searches in Scopus, Web of Science, Google Scholar, and institutional repositories including UNDP, FAO, UNEP, IOM, and Somali government agencies, with inclusion limited to publications from 2000 to 2024.

The analysis proceeded in three stages: first, documents were coded under categories of climate stressors, human security impacts, and peacebuilding implications; second, patterns were identified to trace causal linkages between environmental stress and insecurity; and third, these patterns were synthesized into three pathways, inter-clan disputes, displacement tensions, and armed group exploitation, that form the analytical contribution of the study. Somalia was chosen as an extreme case due to its acute vulnerability to both climate shocks and conflict, offering insights with potential transferability to other fragile states such as those in the Sahel and Lake Chad Basin.

While the study provides valuable findings, it is limited by its reliance on secondary data, which may reflect donor or organizational biases and exclude local community voices. Establishing direct causality is also difficult given the complexity of overlapping drivers of conflict. These limitations are mitigated by triangulating diverse sources and situating findings within robust theoretical frameworks, allowing the study to synthesize fragmented evidence into a coherent model of environmental peacebuilding pathways.

This study contributes to theory, practice, and policy. Theoretically, it introduces the *Environmental Peacebuilding Pathways Framework*, linking human security and environmental peacebuilding. Practically, it offers context-specific insights into how climate stress shapes insecurity and governance in Somalia. At the policy level, it provides guidance for conflict-sensitive climate adaptation aligned with Somalia's national frameworks. These contributions highlight the study's originality and relevance to the climate-security discourse.

4 Findings: environmental peacebuilding pathways in Somalia

4.1 Escalation of inter-clan disputes

The challenges posed by climate change in Somalia significantly exacerbate existing inter-clan disputes over vital resources, particularly water, land, and pasture. The reliance of Somalia's agro-pastoral economy on rain-fed agricultural systems renders communities particularly susceptible to climatic fluctuations, such as increasingly severe droughts and erratic flooding. These climatic changes have been shown to diminish the availability of arable land and key grazing areas, leading to intensified competition and conflict among pastoralist and farming communities over these scarce resources (Hussein, 2023). The historical grievances tied to clan-based territorial claims further complicate these disputes, converting environmental pressures into catalysts for violent clashes. For instance, during the 2011 famine, prolonged droughts compelled pastoralists to encroach upon agricultural territories, resulting in conflicts over water points and grazing lands (Busby, 2023; Hussein, 2023).

The pattern of inter-clan violence in response to environmental stresses was starkly visible during the droughts of 2016–2017, wherein mass livestock casualties and critical water shortages became flashpoints for violence in central and southern Somalia (Busby, 2023). These violent overlaps are more than mere survival struggles; they severely compromise community security and amplify distrust among groups, leading to broader societal fractures. As traditional conflict resolution mechanisms, such as customary law (xeer), falter under the weight of escalating disputes, the lack of robust state institutions fails to contain the violence, further entrenching cycles of retaliation and instability (Hussein, 2023).

Recurrent droughts in the Shabelle and Hiiraan regions between 2016 and 2019 triggered a series of violent disputes between agro-pastoralist and pastoralist clans such as the Abgaal, Hawadle, and Murusade over control of irrigated farmland and shallow wells near Jowhar and Beledweyne. According to FAO (2020) and SIPRI (2022), these conflicts were not isolated incidents but reflected a broader pattern in which competition over scarce water points, coupled with weak district-level mediation, escalated into cycles of revenge killings and displacement. Customary elders attempted to negotiate compensation (diya) arrangements, but prolonged drought undermined the economic base needed to sustain such settlements. These dynamics exemplify how climate stress translates directly into localized violence in central Somalia.

At the heart of these issues lies a critical human security concern: disputes over resources not only threaten individual livelihoods but also undermine community cohesion, exposing vulnerable populations to violence and displacement (Hussein, 2023). Therefore, the first step toward effective environmental peacebuilding is the urgent need for conflict-sensitive resource governance. A multifaceted approach would involve revitalizing local institutions, integrating customary practices with formal governance structures to create fair and sustainable resource management frameworks (Böhle and Tarif, 2025; Hussein, 2023).

Initiatives aimed at promoting cooperative management of resources, such as solar power and regenerative agriculture, can also serve as avenues for reducing tensions and fostering collaboration between competing groups (Böhle and Tarif, 2025, 2024).

The interplay between climate change and inter-clan disputes in Somalia calls for comprehensive strategies that align humanitarian, development, and peacebuilding agendas (HDP Nexus) to promote resilience and conflict resolution (Hussein, 2023; Busby, 2023). By addressing the environmental roots of these conflicts and reinforcing community institutions, it is possible to forge pathways toward sustainable peace and stability in the region.

4.2 Tensions between displaced populations and host communities

The interrelation between climate-induced displacement and the resultant tensions in Somalia illustrates the profound impact of environmental changes on human security and social dynamics. Climate stressors, particularly recurrent droughts and floods, have initiated significant disruptions in traditional livelihoods for pastoralists and smallholder farmers. This forced migration, driven by the search for food, water, and security, has rendered internal displacement a hallmark of Somalia's humanitarian crisis, especially as impacted populations often seek refuge in urban centers such as Mogadishu, Baidoa, and Kismayo (Broek and Hodder, 2022; Osman and Abebe, 2023).

According to reports from entities like UNHCR and IOM, the yearly displacement of hundreds of thousands highlights how climate-related shocks exacerbate pre-existing vulnerabilities, particularly amid ongoing socio-political conflicts (Maystadt et al., 2013; Mohamed, 2025). The influx of internally displaced persons (IDPs) into already strained host communities has led to heightened competition for diminishing resources, including housing, water, and job opportunities.

In Baidoa, the influx of more than 500,000 internally displaced persons during the 2022 drought created severe strain on limited municipal services. IOM (2023) reports that IDP settlements such as Barwaaqo and Tawakal became flashpoints for disputes over land tenure between the Digil-Mirifle host community and displaced families from Bakool and Lower Shabelle. Humanitarian agencies recorded incidents in which local landlords evicted IDPs to reclaim land for cultivation once rains returned, heightening grievances and eroding trust. Similar dynamics have been documented in Mogadishu's Kahda district, where competition over water trucking and sanitation services intensified social tensions (UNHCR, 2023).

Such competition often breeds resentment and tensions, with local communities perceiving IDPs as usurpers of scarce resources (Abdi et al., 2024). Fueled by historical grievances and inter-clan rivalries, these tensions can escalate into violence, undermining community security and wellbeing (Brzoska and Fröhlich, 2016).

In rural settings, the entry of climate migrants into established agricultural or pastoral lands poses further risks of conflict, as local residents may respond defensively to protect their resources (Mohamed and Nageye, 2020). Mistrust between IDPs and host community members can solidify, potentially restricting

opportunities for peaceful coexistence and resource-sharing. The implications for human security are multifaceted; displaced populations frequently reside in informal settlements characterized by inadequate living conditions, reduced access to essential services, and higher susceptibility to exploitation (Osman and Abebe, 2023; Ali et al., 2023). Conversely, host communities grapple with the pressures that increased population density places on limited resources, which reinforces perceptions of injustice and fuels grievances.

Addressing these challenges necessitates an integrative approach that reconsiders migration not solely as a crisis but as a potential gateway for enhanced cooperation and community resilience. Effective solutions may include inclusive governance frameworks that integrate IDPs into local decision-making processes, equitable resource distribution strategies, and investment in joint livelihoods, such as collaborative agricultural projects or shared water management systems. These strategies can mitigate tensions while enhancing communal bonds and fostering a culture of resilience in the face of climate and social adversities (Ome and Casimir, 2015; Burrows and Kinney, 2016).

While climate-induced displacement exacerbates tensions between displaced populations and host communities, there exists an opportunity to transform these dynamics through inclusive and cooperative initiatives. The critical task for policymakers and practitioners involves designing adaptive strategies that address the immediate needs of displaced populations and enhance social cohesion and community security in fragile contexts like Somalia.

4.3 Armed group exploitation of vulnerabilities

The exploitation of environmental vulnerabilities by armed groups in Somalia significantly undermines peace, particularly through the actions of Al-Shabaab. This phenomenon is largely driven by climate-induced disruptions to livelihoods, forced displacements, and the consequent deterioration of governance structures. As climate change continues to affect the Somali landscape, the socio-economic fabric of communities becomes increasingly fragmented. During periods of severe drought, for instance, pastoralist families experience substantial livestock losses, which are critical for their food security and income. The lack of adequate alternative livelihoods, coupled with ineffective state support, exacerbates their economic insecurity, making them vulnerable to recruitment by armed groups that promise financial support, food, and protection in exchange for allegiance. Field assessments by the United Nations Assistance Mission in Somalia (UNSOM, 2024) found that Al-Shabaab expanded recruitment in drought-affected villages in Middle Juba, offering small cash payments or access to captured water points in exchange for logistical support. In parts of Bay and Lower Shabelle, the group taxed humanitarian aid deliveries and used control of boreholes to extract revenue from desperate communities (Busby, 2022; Maxwell and Majid, 2016). These examples illustrate how environmental stress and governance vacuums converge to create opportunities for armed actors to entrench control.

This manipulation was evident during the 2011 famine when Al-Shabaab obstructed humanitarian aid, consolidating its control over rural regions by exploiting the dire humanitarian situation (Hussein et al., 2025).

Further complicating the situation, armed groups like Al-Shabaab strategically target vital natural resources, including water sources and fertile land. By controlling these assets, they impose taxes or sanctions that allow them to financially sustain their operations while posing as providers of security and order in areas where state authority is weak. This control enhances their legitimacy among local populations and perpetuates a cycle of coercion against communities struggling to access essential resources (Busby, 2023). The overarching effect is a direct affront to human security, as the inability of the state to deliver basic services erodes public trust in governance and institutions, creating a vacuum that armed groups are eager to fill with their own brand of rule (Kheira, 2024).

Addressing these vulnerabilities from the perspective of environmental peacebuilding necessitates comprehensive resource management strategies that incorporate climate resilience and conflict sensitivity. Initiatives focusing on equitable governance of resources and livelihood diversification are essential. Without these, vital resources may continue to function as tools of oppression and instability rather than as means for fostering peace (Böhle and Tarif, 2024). The intertwined nature of climate adaptation and peacebuilding in Somalia emphasizes that any effective approach must not only seek to enhance resilience against environmental shocks but also aim to diminish opportunities for armed groups to exploit such insecurities (Bunse and Delgado, 2024; Ibrahim, 2025).

The intersection of climate stress and armed conflict in Somalia highlights the urgent need for inclusive governance and community-driven peacebuilding initiatives that address both environmental and socio-political vulnerabilities. Only through holistic strategies that promote ecological sustainability and social cohesion can the cycle of exploitation by armed groups, particularly during crises, be disrupted and reversed (Böhle and Tarif, 2025; Krause et al., 2024).

5 Discussion

The interactions between climate-induced environmental stress and pre-existing socio-political fragilities in Somalia illustrate the complexity of human insecurity in fragile contexts. The ongoing threats to economic, community, and political security can be attributed to various factors, including the collapse of agro-pastoral livelihoods, the erosion of social cohesion due to displacement, and the exploitation of vulnerabilities by armed groups. For instance, Osman and Abebe emphasize that rural communities in Somalia have become increasingly defenseless against asset seizures and attacks due to a lack of stable governance and protection mechanisms, particularly following severe droughts and food shortages intensified by climatic changes (Osman and Abebe, 2023). The findings indicate that these climatic pressures exacerbate inter-clan tensions and conflicts, supporting the assertion that climate stress is not merely an environmental issue but also a significant driver of social fragmentation and insecurity.

The significance of human security within environmental peacebuilding pathways in Somalia becomes clearer when compared with previous empirical findings. Busby (2023) emphasizes that environmental shocks in Somalia deepen livelihood insecurity and inter-clan fragility—an observation consistent with this study's finding that climate stress erodes both economic and community security. Similarly, Maystadt et al. (2013) show that drought-induced price shocks indirectly fuel conflict through their effects on livestock markets, reinforcing the link between environmental stress and violence outlined in this paper. Furthermore, Maxwell and Majid (2016) highlight how governance failures during the 2011 famine exacerbated inequality and weakened trust in institutions, echoing the argument here that weak governance magnifies the human-security impacts of climate change.

Somalia's climate-security risks are inseparable from the political economy of state-building. De Waal's account of the Horn underscores how elite bargaining over money, coercion, and external rents shapes what the state can realistically deliver; expecting a Weberian monopoly of force in this context is misplaced (De Waal, 2015). Menkhaus likewise shows that Somalia's formal institutions remain thin, with hybrid, clan-mediated governance doing much of the everyday work of order; external state-building projects have repeatedly collided with these realities (Menkhaus, 2018). Read through this lens, climate shocks do not enter a governance vacuum, they interact with elite deals and informal authority structures, which helps explain why adaptation and humanitarian responses are uneven and sometimes captured.

Taken together, these studies support the conclusion that climate stress operates as a threat multiplier by undermining local resilience and obstructing peacebuilding pathways.

The parallels between the Somali case and other fragile contexts (Ndambwa and Moonga, 2024; Karso et al., 2025) suggest that governance resilience and social-capital pathways mediate the impact of climate-driven human-security threats, supporting a more generalizable environmental peacebuilding logic.

The human security framework is enriched by this study, as it underscores how climate stress undermines security across multiple dimensions. Economic security is jeopardized by the degradation of livelihood sources like agriculture and pastoralism, leading to heightened competition for dwindling resources. Community security deteriorates as displacement disrupts social networks, resulting in increased vulnerabilities among the most resilient individuals and communities. Simultaneously, political security is weakened when the state fails to adequately manage resources and stabilize competition between clans. This interplay reinforces cycles of vulnerability where insecurities amplify one another rather than unfold sequentially, portraying a more complex landscape of risk.

Furthermore, the concept of environmental peacebuilding is expanded through the introduction of environmental peacebuilding pathways. This framework is critical in identifying how climate adaptation efforts can either mitigate or exacerbate insecurity based on local contexts and governance structures. The examination of Somalia presents a specific case that resonates with global patterns found in regions such as the Sahel and South Sudan but also highlights unique challenges posed by the extreme fragility of Somali governance. The inclusion of comparative insights allows for a broader understanding of climate-security linkages in fragile

states, demonstrating how resource scarcity becomes an instigator of conflict and a barrier to peacebuilding.

The empirical contributions of this study to the climate-conflict discourse are significant, especially considering the notable underrepresentation of Somalia in existing literature compared to regions like the Sahel and Lake Chad Basin. Somalia serves as an extreme case study that illustrates the fraught relationship between environmental stress and governance failure, thereby enriching the theoretical frameworks of the human security paradigm and environmental peacebuilding. Thus, addressing climate risks in fragile states necessitates more than merely technical solutions; it requires conflict-sensitive, locally informed approaches that can foster resilience while aiding peace.

6 Policy and practice implications

The synthesis of the policy and practice implications emerging from Somalia's environmental peacebuilding pathways highlights an integrated approach, emphasizing that climate change adaptation and peacebuilding must be interwoven. This critical analysis reveals that all actions taken in these contexts need to recognize the dual challenges posed by environmental change and socio-political instability, which can exacerbate competition over scarce resources if not carefully managed.

6.1 Conflict-sensitive climate adaptation

Adaptation strategies in Somalia must be intricately designed to acknowledge the potential for climate interventions, such as establishing water points or supporting livelihoods, to inadvertently intensify conflicts if deployed without a thorough conflict analysis. Prior research stresses the necessity of incorporating do-no-harm principles alongside conducting regular conflict sensitivity assessments to curtail the exacerbation of inter-clan disputes and resource competition (Morales-Muñoz et al., 2023; Medina et al., 2023). The integration of conflict-sensitive frameworks into climate adaptation strategies can facilitate more peaceful coexistence among community members, diminishing the risks associated with resource scarcity (Sändig et al., 2024; Morales-Muñoz et al., 2022).

6.2 Strengthening local institutions for environmental governance

Moreover, revitalizing customary institutions, notably the *xeer* (clan-based law), while integrating them with formal governance structures can significantly enhance equitable resource management (Ensor, 2022; Broek and Hodder, 2022). Building the capacity of local authorities and community organizations to mediate disputes is critical; this includes empowering women and youth in decision-making processes, as their inclusion fosters legitimacy and sustainability in resource-sharing arrangements (Ryan and Almagro, 2024). Such participatory governance can mitigate the risks posed by climate-induced resource scarcity and thereby contribute to a more stable socio-political landscape (Smith, 2022).

6.3 Addressing displacement and social cohesion

Displacement exacerbated by climate change must be integrated into broader climate adaptation strategies rather than treated as distinct humanitarian issues. Policies should prioritize communal service provision, such as access to water and sanitation, for both internally displaced persons (IDPs) and host communities to balance perceived inequalities (Löhr et al., 2021; Thalheimer et al., 2024). Investments in collaborative livelihood projects, which leverage shared resources for climate-resilient agriculture and vocational training, can facilitate cooperation and transform potential conflicts into opportunities for joint engagement (Morales-Muñoz et al., 2023; Odawa et al., 2024).

6.4 Reducing armed group exploitation

Strengthening community resilience through diversified livelihoods is essential in reducing vulnerability to armed group enlistment, such as organizations like Al-Shabaab (Broek and Hodder, 2022; Marulanda et al., 2024). The management of critical resources, including wells and agricultural lands, in a transparent manner not only aids in community development but also limits the manipulation of scarcity by violent actors (Sändig et al., 2024; Ben-Shmuel and Halle, 2023). By integrating climate adaptation initiatives into national security frameworks, Somalia can better safeguard against the monopolization of environmental vulnerabilities by armed groups (Eufemia et al., 2020).

6.5 Aligning with national and global frameworks

At the national level, it is vital that Somalia's existing climate policies embody explicit conflict-sensitive approaches. Coordination with international frameworks, like the Sustainable Development Goals, particularly Goal 13 on Climate Action, can enhance funding and support for integrated programs that address climate resilience while fostering peace (Paffenholz, 2021; Simangan, 2024). Encouraging development partners to adopt holistic strategies that tackle both climate change and peacebuilding simultaneously will also be essential in moving toward a sustainable future for Somalia (Paffenholz et al., 2023; Morales-Muñoz et al., 2022).

The interdependence of climate adaptation and peacebuilding necessitates a concerted and holistic approach anchored in local realities and inclusive governance. By recognizing these intertwined pathways, Somalia can leverage its unique environmental and cultural contexts to foster lasting peace and resilience.

7 Conclusion

This study investigated how climate-induced environmental stress undermines human security and constrains prospects for sustainable peace in Somalia. Employing a human-security and

environmental-peacebuilding lens, the analysis shows that climate change operates as a threat multiplier that simultaneously disrupts livelihoods, fractures social cohesion through displacement, and weakens confidence in political authority. These effects unfold through three interlinked pathways identified in the findings: escalation of inter-clan disputes over land and water, intensification of tensions between displaced populations and host communities, and the strategic exploitation of vulnerability by armed groups. Taken together, these mechanisms clarify how climate pressures impede peacebuilding in fragile settings.

Conceptually, the article advances the literature by proposing the Environmental Peacebuilding Pathways Framework, which integrates human-security analysis with conflict-sensitive climate adaptation. Empirically, it synthesizes dispersed secondary evidence on Somalia into a coherent account that aligns with regional patterns while foregrounding country-specific dynamics.

The policy implications are direct. Climate adaptation should be explicitly conflict-sensitive and guided by rigorous do-no-harm analysis. Strengthening local institutions for equitable resource governance, integrating customary mechanisms such as *xeer* with formal arrangements, and ensuring inclusive decision-making that meaningfully involves women, youth, and displaced populations can reduce grievance and enhance resilience. Coherence between national climate policy and peacebuilding objectives, and alignment with international frameworks such as the Sustainable Development Goals, can facilitate sustained, programmatic support.

The analysis is limited by reliance on secondary sources and by the inherent difficulty of isolating climatic effects from other drivers of insecurity. Future research should prioritize primary data collection with community leaders, practitioners, and policymakers, and undertake comparative testing of the proposed framework across the Horn of Africa and other fragile contexts.

Addressing climate change in Somalia is, therefore, not solely an environmental or technical undertaking. It is a peacebuilding imperative. Integrating human-security concerns into climate adaptation and governance reform offers a credible pathway to reduce violence risks, strengthen social cohesion, and support durable peace in one of the world's most climate-vulnerable states.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

MA: Writing – original draft, Investigation, Methodology, Writing – review & editing.

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