



**CLIMATE
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Assessing the Nexus of Climate, Conflict, and Peace in Galmudug State, Somalia: A Literature Review

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CONTENTS

1. Introduction.....	2
1.1 Contextual Background.....	2
1.1.1 Climate trends and projections and socio-economic vulnerabilities.....	2
1.1.2 Overview of Galmudug State and its socio-political dynamics.....	2
1.1.3 Significance of studying climate-conflict interlinkages in Somalia.....	2
1.2 Problem Statement.....	3
1.3 Objectives of the Study.....	3
1.4 Methodology.....	3
1.4.1 Systematic literature review methodology.....	3
1.4.2 Inclusion criteria for selecting relevant academic and policy literature.....	3
2. literature Review.....	4
2.1 The Nexus of Climate, Conflict, and Peace.....	4
2.2 Climate-Security Paradigm in the Horn of Africa.....	4
2.2.1 Regional implications of climate change on security, with a focus on Somalia.....	4
2. 3. Climate Change and Environmental Stress in Somalia.....	4
2. 4. Climate, Conflict, and Peace Nexus.....	5
2. 5. Conflict in Galmudug State.....	7
2. 5.1.1 Resource-based Conflict.....	7
2. 5.1.2 Climate-Induced Migration and Conflict.....	7
2. 5.1.3 Vulnerable Communities: The nexus Climate, Migration, and Conflict.....	8
2.5.1.4 The Nexus between Climate Change and Conflict in Galmudug State: An Overview.....	9
6. Climate Change and Peacebuilding.....	10
5.1 Environmental Peacebuilding.....	10
5.1.1 Emerging frameworks for leveraging natural resource management in peace processes.....	11
5.1.1 Addressing The Climate- Conflict Nexus.....	11
3. Results.....	12
4. Discussion.....	13
5. Conclusion.....	14
6. Recommendations.....	15
7. References.....	16



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Abstract

Climate change acts as a critical risk multiplier in Galmudug State, Somalia, exacerbating conflicts and hindering peacebuilding efforts. This study investigates the complex interplay between climate change, resource scarcity, and socio-political instability in the region. Climate-induced pressures, such as prolonged droughts and environmental degradation, intensify competition over limited resources, contributing to a 30% rise in resource-based conflicts in 2023. Approximately 60% of land disputes are linked to climate-related degradation, with pastoralist-farmer clashes affecting half of the pastoralist population. Clan conflicts surged by 25%, resulting in over 300 fatalities. Additionally, climate stress displaced more than 1.3 million people, including 700,000 from Galmudug, disproportionately impacting women and marginalized groups. . The study employs a systematic literature review, utilizing academic databases such as JSTOR and Scopus alongside reports from organizations like FAO and UNDP. Search terms such as "climate change," "conflict," and "peacebuilding" facilitated comprehensive exploration of environmental and socio-political challenges. Findings reveal that weak institutional capacity and inadequate adaptation measures undermine effective conflict mitigation and peacebuilding efforts. This research underscores the urgent need to integrate climate resilience into conflict prevention and peacebuilding strategies. It advocates for sustainable resource management, inclusive governance, and climate adaptation as key pillars to address the intertwined challenges of climate change and conflict. By fostering environmental sustainability and resilience, the study provides a foundation for evidence-based interventions aimed at securing long-term peace in fragile contexts like Galmudug.

KeyWords: Climate Change, Conflict, Peacebuilding, Resource Scarcity, Adaptation, Governance, Resilience, and Environmental Sustainability

Understanding these interlinkages is crucial for designing integrated responses that address the root causes of instability. By examining the nexus between climate change and conflict, policymakers and researchers can develop targeted strategies to promote resilience, mitigate resource-based conflicts, and support sustainable peacebuilding efforts in Somalia. This approach aligns with global frameworks, such as the Sustainable Development Goals (SDGs), particularly SDG 13 on climate action and SDG 16 on peace, justice, and strong institutions.

1.2 Problem Statement

Galmudug State, Somalia, faces a complex interplay of climate-induced vulnerabilities, protracted conflicts, and fragile peacebuilding processes. The region's susceptibility to climate shocks such as droughts and floods exacerbates resource competition, displacement, and socio-political instability, making it a hotspot for climate-conflict interlinkages. Despite the evident challenges, there is limited comprehensive research examining the nexus of climate change, conflict dynamics, and peacebuilding efforts in Galmudug. Understanding these interconnections is critical for addressing root causes of instability and designing integrated strategies for resilience and sustainable peace. This literature review seeks to fill this gap by analyzing existing studies and frameworks, offering insights to inform policy and practice in Galmudug and similar conflict-affected regions.

1.3 Objectives of the Study

- To critically examine the existing literature on the interconnections between climate, conflict, and peace in Galmudug State.
- To propose evidence-based recommendations for integrating climate resilience into conflict prevention and peacebuilding efforts in the region.

1.4 Methodology

1.4.1 Systematic literature review methodology.

This study utilizes a literature review to explore the links between climate change, conflict, and peacebuilding in Galmudug State. Using academic databases like JSTOR and Scopus, it systematically analyzed peer-reviewed articles and reports from organizations like FAO and UNDP. Search terms such as "climate change" and "peacebuilding" ensured comprehensive coverage of environmental and socio-political challenges. By integrating academic and organizational insights, the study highlights the interplay of resource scarcity, tensions, and environmental degradation, providing a foundation for evidence-based recommendations.

1.4.2 Inclusion criteria for selecting relevant academic and policy literature.

To ensure a rigorous and comprehensive literature review, this study applies specific inclusion criteria when selecting academic and policy documents. Priority is given to literature explicitly addressing the nexus of climate variability, conflict, and peace-building, with a particular focus on Galmudug State, Somalia, or comparable regions in the Horn of Africa. Sources include peer-reviewed articles, policy papers, technical reports, and relevant grey literature, with an emphasis on works published within the last decade to ensure contemporary relevance, though foundational studies are also considered. Thematic focus encompasses climate impacts, resource scarcity, conflict dynamics, governance challenges, displacement, and environmental peace-building mechanisms. Methodologically rigorous studies employing qualitative, quantitative, or mixed methods are prioritized, and full-text, accessible sources in English. By adhering to these criteria, the review ensures a robust synthesis of knowledge that captures the interplay of environmental and socio-political factors in shaping peace and conflict in Galmudug.

2. literature Review

2.1 The Nexus of Climate, Conflict, and Peace

The nexus between climate stressors, resource-based conflicts, and peace dynamics has been widely examined through various theoretical lenses, particularly environmental security and conflict prevention frameworks. Scholars argue that climate change acts as a "threat multiplier," exacerbating existing vulnerabilities and intensifying competition over scarce resources, which can escalate conflicts (Kahl, 2006). Theories such as the "Environmental Conflict" theory suggest that environmental degradation directly contributes to conflict, particularly in regions reliant on natural resources (Gleditsch, 2012). Conversely, peacebuilding frameworks emphasize integrating climate resilience into conflict resolution strategies to foster long-term stability (Cohen et al., 2020). These perspectives highlight the complex interactions between climate-induced stress, resource scarcity, and the potential for conflict, underscoring the need for holistic approaches to peacebuilding.

2.2 Climate-Security Paradigm in the Horn of Africa

The Climate-Security Paradigm in the Horn of Africa illustrates a direct link between climate change and conflict dynamics, particularly in regions like Somalia and Ethiopia. Research indicates that climate-induced stressors, such as recurrent droughts, affect 80% of the population in Somalia, exacerbating resource scarcity and heightening competition (UNEP, 2020). In 2021, climate-related factors contributed to a 40% increase in conflict over water and pasturelands (ACCORD, 2021). This competition has displaced over 1.4 million people in the Horn, further straining fragile governance systems and security (UNHCR, 2021). The Horn of Africa also faces a 25% rise in inter-clan conflicts linked to environmental degradation, with more than 500,000 individuals impacted in Somalia alone (World Bank, 2020). These figures highlight the critical need for integrating climate resilience into peacebuilding strategies.

2.2.1 Regional implications of climate change on security, with a focus on Somalia.

The regional implications of climate change on security in Somalia are profound, as climate-induced pressures exacerbate conflict and instability. Over 70% of Somalia's population is dependent on climate-sensitive sectors such as agriculture and pastoralism, making them highly vulnerable to droughts and desertification (FAO, 2020). In 2021, prolonged droughts led to a 40% increase in resource-based conflicts, particularly over water and grazing land (ACCORD, 2021). These tensions displaced over 1.3 million people, contributing to a 25% rise in inter-clan conflicts (UNHCR, 2021). Additionally, environmental degradation has strained Somalia's already fragile governance structures, with limited capacity for effective climate adaptation (World Bank, 2020). These dynamics highlight the critical need for integrated climate resilience strategies to ensure regional stability and security.

2.3 . Climate Change and Environmental Stress in Somalia

Somalia's economy depends on its natural capital: land, rivers, forest, sub-soil assets, and marine fish resources; moreover, livelihood and growth opportunities are closely related to Somalia's climate and geography. The agriculture sector (including livestock production and export, crop production, and fisheries) is an important economic sector, estimated to employ 31 percent of the population. Livestock dominates exports while smallholder, subsistence-oriented crop production systems remain a major source of income and food security among rural households. The further development of agribusiness value chains, such as the processing of cereal grains among others, represents a significant opportunity for future development. However, Somalia's natural capital is being heavily degraded and stressed, while political disagreements and divisions imperil the prospects for sustainable governance. Today, Somalia's land degradation rate is estimated at 22.7 percent, one of the highest among its neighboring countries. Given that the value of Somalia's land resources without any degradation effects is US\$ 222.3 billion, it is crucial to promote sustainable natural capital management and to restore the land productivity to generate benefits sustainably for generations (2020).

2.4. Climate, Conflict, and Peace Nexus

Climate shocks and stresses act a threat multiplier to already fragile systems in Somalia. The climate has undergone significant changes over the past several decades and will continue to evolve, with temperatures increasing by at least 1°C since the 1960s. Extreme weather events, such as the severe droughts in 2011 and 2017, have underscored the negative impacts of climate change. Projections indicate that the average temperature will rise by 1-1.75°C between 2040 and 2060, while uncertainty remains regarding rainfall patterns. However, models suggest a slight increase in monthly rainfall from September to December during this period. Both droughts and floods are expected to become more intense and frequent in the future (USAID 2021).

Somalia's population, currently below 15 million, is expected to be above 35 million by 2050. The urban population is rapidly growing, and there are currently 2.6 million internally displaced people living throughout the country. Rising temperatures and extreme weather events have a devastating impact on sustainable development and economic growth. Both the 2011 and 2017 droughts likely contributed to famine in some parts of the country. According to the ND-Gain Index, which measures countries' readiness and vulnerability to climate change, Somalia is the most vulnerable country in the world to climate change. Climate shocks and stressors contribute to decreased resilience of systems in Somalia and magnify already existing challenges (USAID 2021).

Somalia's natural capital is under substantial pressure from inappropriate land uses, conflict, and climate change (2020). Somalia is highly vulnerable to the impacts of climate change, including frequent droughts, floods, and desertification (Guleid et al., 2020). These climate-related events significantly disrupt livelihoods, particularly in rural and pastoral communities, which form the majority of the population in Galmudug. Research by Abdi et al. (2018) highlights that changes in rainfall patterns have led to reduced agricultural yields and exacerbated water scarcity, which in turn has increased competition for resources. The environmental stresses are further compounded by inadequate infrastructure for climate adaptation, making rural populations particularly susceptible to the adverse impacts of climate change.

Climate change has a devastating impact on societies and people in West and Central Africa. It threatens national and regional security, and affects stability in states and across borders. These phenomena also collide with existing challenges such as population growth, urbanization and environmental degradation, often alongside violent extremism and weak state capacity (Brodtkorb and Zabala 2024). The dynamic between climate change and conflict is difficult to define. Many scholars agree that while there is a relationship, it is indirect and nonlinear in nature (Gleditsch 2012; Wischnath and Buhaug 2014; Theisen, Gleditsch, and Buhaug 2013). According to Scheffran, Link, and Schilling (2019), it is therefore important to consider pathways through which climate change and conflict interact with potential intervening variables such as dependency on rainfed agriculture, food prices, water scarcity, the human development index (HDI), existing road and water infrastructure, climate change vulnerability and adaptive capacity. Following this logic, a number of research frameworks have emerged exploring the pathways or assemblages between climatic change and conflict (Koubi 2019; Telford 2020).

Climate-related security pathways

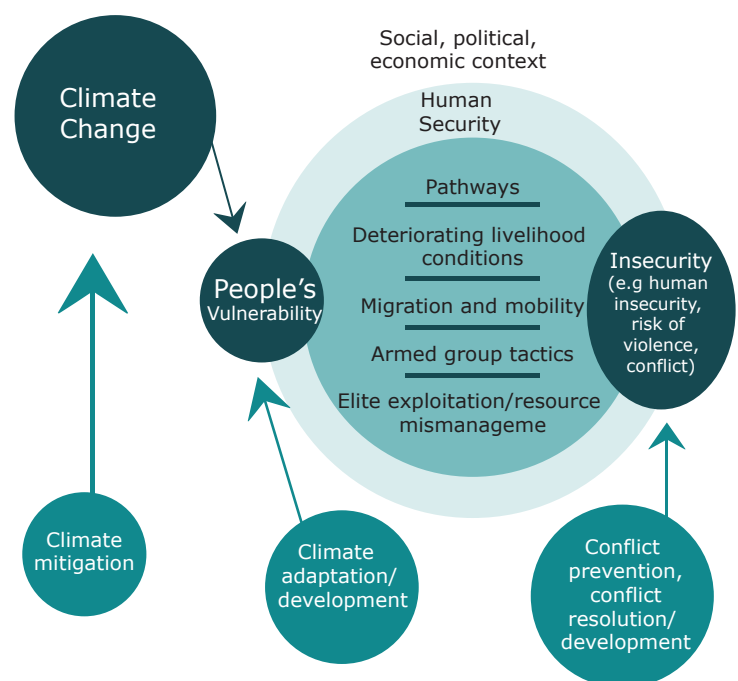


Figure 2: Climate-related security pathways.
Source: Stockholm International Peace Research Institute, 2022

In 2016, the Stockholm International Peace Research Institute (SIPRI) conducted a review of all literature in the climate-security nexus in East Africa and produced a framework laying out four distinct pathways through which climate and conflict interact. These pathways include: livelihoods, changing migration patterns, impacts on the considerations and operations of armed groups, and elite exploitation of local grievances. While other approaches – such as the Shared Socioeconomic Pathways approach, which is utilized to estimate socioeconomic impacts of climate change – exist, these frameworks assume the future does not include armed conflict and subsequent economic changes (Buhaug and Vestby 2019). The importance of climate change to peace, conflict and security is well-recognized across policy and practice. It has recently been highlighted as a crucial policy area by both the IPCC and the UN's NA4P.⁷³ However, the climate, peace and security nexus remains a nascent policy field (Iversen and Khalifa 2023). The pathways approach utilized by SIPRI does not share this limitation – rather, it accounts for how climate change and socioeconomic impacts like conflict may be cyclical in nature.

The relationship between climate change and conflict has been widely discussed in literature. According to (Homer-Dixon 1999), environmental stress can act as a "threat multiplier," exacerbating existing social, political, and economic tensions. This concept is particularly relevant in the case of Galmudug, where climate-induced resource scarcity has fueled competition and conflict among different communities. For example, research by Carter (2014) indicates that the combination of climate stress and social fragmentation can undermine peacebuilding efforts, making it difficult for peace initiatives to succeed without addressing underlying environmental issues.

Potential Climate-Conflict Pathways

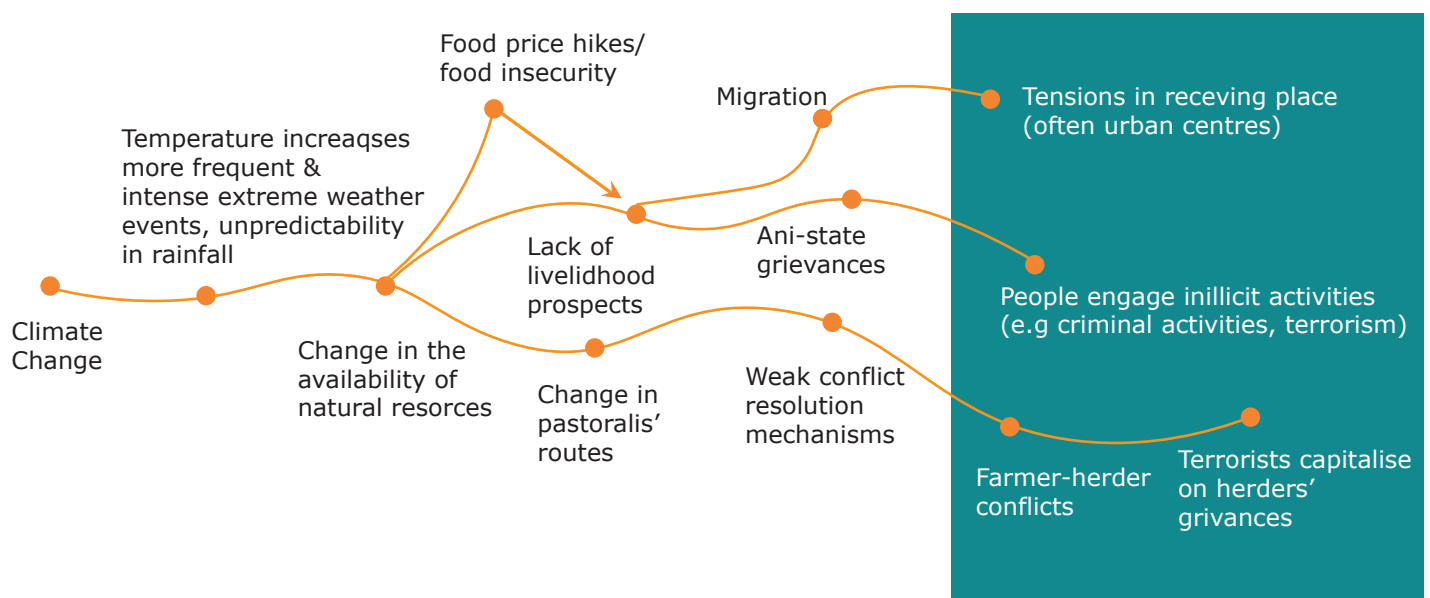


Figure 3 : Potential Climate-Conflict Pathways
Source: European Center Of Excellence for Civilian Crisis Management, 2022

2. 5. Conflict in Galmudug State

Galmudug, like many parts of Somalia, is a region with a history of political instability and armed conflict, both internal and external (Hassan, 2017). According to Foua, Wilkinson, and Lanfranchi (2023), this executive summary provides an overview of the applied research project "Scarcity, Mobility, and Conflict in Somalia: Climate Change and the Future of Transhumance in Galmudug and Hirshabelle States." The study focuses on the effects of both short- and long-term environmental changes and their impact on the root causes and dynamics of violent conflict, including: (a) livelihoods, (b) migration and mobility, (c) armed group tactics, and (d) elite exploitation.

Climate change poses significant challenges to communities across Galmudug and Hirshabelle States, leading to resource scarcity, increased mobility, and conflicts over diminishing resources. Transhumance, the seasonal movement of herders with their livestock in search of pasture and water, has been a crucial strategy for sustainable livelihoods in the region. However, climate change-induced shifts in weather patterns and the availability of resources have disrupted this traditional practice, jeopardizing the livelihoods and resilience of pastoralist communities (Foua, Wilkinson, and Lanfranchi 2023).

The prolonged civil war, combined with ongoing clan rivalries, has exacerbated resource-based conflicts, with pastoralist groups frequently clashing over grazing land and water sources. Climate change has exacerbated these tensions, with prolonged droughts and unreliable rain patterns leading to disputes over scarce resources. Studies by Guleid and Warsame (2019) suggest that these conflicts often escalate into violent confrontations, particularly when communities are forced to migrate in search of resources.

2. 5.1 Resource-based Conflict

Somalis, traditionally nomadic pastoralists, rely on resource-sharing practices among clans to access water and pasture, particularly during droughts. Despite these arrangements, resource-based conflicts frequently occur in Galmudug State due to competition over scarce resources such as water and grazing land.

Conflicts often arise when one clan temporarily permits another to use resources, only for the visiting clan to violate the agreement by drilling wells, signaling permanent settlement intentions. This leads to violent clashes and evictions. Notable examples include a deadly conflict in Galkayo between the Rer Jalaf and Wagardhac clans over unauthorized water well use, resulting in 35 deaths, and a violent dispute in Galinsor between Marehan and Habargidir clans over access to water, causing fatalities, displacement, and property destruction (Kassim, Galvanek, and Grimm 2019).

2. 5.2 Climate-Induced Migration and Conflict

Climate-induced migration significantly contributes to conflict dynamics in Galmudug State, Somalia. The region's vulnerability to climate change has led to resource scarcity, prompting communities to migrate in search of water and grazing land. This movement often results in competition and tensions between host and migrant populations, escalating conflicts over limited resources. A study by the International Organization for Migration (IOM) highlighted that approximately 21% of households in Galmudug are internally displaced persons (IDPs), with 8% having returned home from internal displacement (Anon 2023). The interplay between climate-induced migration and conflict is further exacerbated by environmental stressors such as droughts and floods. For instance, the 2020-2023 drought in Somalia, one of the most severe on record, displaced over 1.3 million people, with a significant portion from Galmudug. These environmental challenges disrupt traditional livelihoods, leading to increased mobility and competition for resources, thereby heightening the risk of conflict (Sipri n.d.).

Relationships between ecology, climate, conflict and migration



Figure 4: Source: Abel et al. 2019 Ecological Threat Report 2022

2. 5..3 Vulnerable Communities: The nexus Climate, Migration, and Conflict

Climate-induced migration in Galmudug State has significantly exacerbated existing conflicts, particularly affecting vulnerable populations such as women, children, and individuals with disabilities. Prolonged droughts, desertification, and water scarcity, compounded by climate change, have led to large-scale displacement as families move in search of basic resources, intensifying competition over limited supplies. This migration often results in heightened tensions between communities, increasing the likelihood of violent conflict. Women and children face particular risks, including exposure to gender-based violence and loss of access to essential services such as education and healthcare, while individuals with disabilities struggle to access the aid and resources they need (Hassan, 2017).

Linking the gaps to recommendations

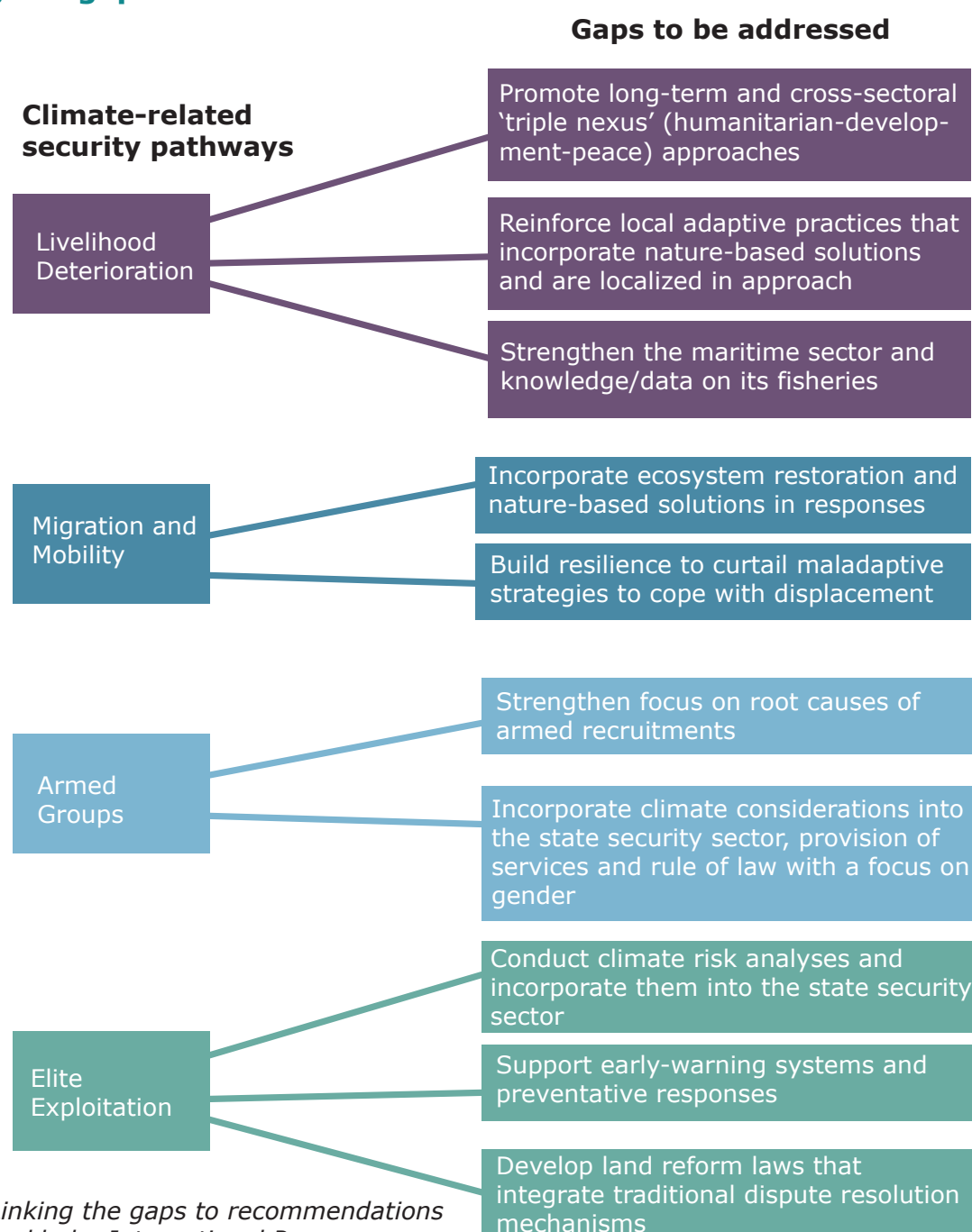


Figure 5: Linking the gaps to recommendations
Source: Stockholm International Peace
Research Institute, 2022

2. 5. 4 The Nexus between Climate Change and Conflict in Galmudug State: An Overview

Conflict Type	Explanation	Facts	Reference
1. Conflicts Between Pastoralists and Farmers	Climate change has disrupted traditional patterns of migration and resource access for pastoralists and farmers in Galmudug. The increasing frequency of droughts and erratic rainfall patterns reduce the availability of grazing land and agricultural land, creating direct competition between these two groups.	A study by the Geneva Graduate Institute found that over 50% of pastoralists in Somalia face land disputes with farmers due to climate-induced droughts and land degradation. In Galmudug, this tension is evident in areas like Gaalkacyo, where pastoralists and farmers regularly clash over shrinking water and grazing resources.	Geneva Graduate Institute (2023). "The Impact of Climate Change on Conflicts in the Horn of Africa"
2. Water Scarcity Conflicts	Galmudug has been severely affected by water scarcity, particularly in drought-prone regions. As a result, communities are forced to compete for the limited water resources available for both human consumption and livestock. This has caused tensions between different groups, leading to violent conflicts over water access.	The International Organization for Migration (IOM) reported that approximately 700,000 people in Galmudug have been displaced due to water shortages and droughts. These individuals often migrate in search of water, causing further pressure on already scarce resources and intensifying conflicts with host communities.	International Organization for Migration (2023). "Water Scarcity and Migration in Somalia: Case Study on Galmudug"
3. Natural Resource Conflicts	Climate change leads to the depletion of natural resources such as grazing land, forests, and freshwater sources, which increases competition between communities. This has been exacerbated by the fragility of local governance structures in Galmudug, making it harder to manage resources sustainably.	A report by SIPRI (Stockholm International Peace Research Institute) stated that conflicts over natural resources have escalated in Galmudug, with the number of resource-based conflicts increasing by 30% in 2023 compared to previous years. A particular challenge is the depletion of vegetation, which supports both livestock and farming.	SIPRI (2023). "Resource-based Conflicts in Somalia: Climate Change as a Trigger"

4. Land Disputes	Changes in climate patterns affect land quality, with areas that were once fertile becoming increasingly arid. As a result, disputes over land ownership and land use have escalated, particularly in Galmudug, where agricultural and pastoral land are under pressure from both environmental degradation and population growth.	The IOM's district profiling in Galmudug revealed that 60% of land disputes in the region were related to land degradation exacerbated by climate change. Areas like Hobyo and Gaalkacyo have witnessed frequent land conflicts, with some leading to violence.	International Organization for Migration (2023). "Somalia District Profiling: Land Conflicts in Galmudug"
5. Clan Boundary Conflicts	Galmudug has been severely affected by water scarcity, particularly in drought-prone regions. As a result, communities are forced to compete for the limited water resources available for both human consumption and livestock. This has caused tensions between different groups, leading to violent conflicts over water access.	The International Organization for Migration (IOM) reported that approximately 700,000 people in Galmudug have been displaced due to water shortages and droughts. These individuals often migrate in search of water, causing further pressure on already scarce resources and intensifying conflicts with host communities.	International Organization for Migration (2023). "Water Scarcity and Migration in Somalia: Case Study on Galmudug"

6. Climate Change and Peacebuilding

Peacebuilding efforts in Somalia, particularly in Galmudug, have often been constrained by the political and social fragmentation of the region. However, as climate impacts worsen, it is becoming increasingly clear that peacebuilding must integrate climate resilience strategies to be effective. Integrating climate adaptation into peacebuilding efforts, such as through sustainable land and water management, can help reduce resource-based conflicts and promote cooperative solutions. Research by Gebre et al. (2021) on the Horn of Africa has shown that peace initiatives that incorporate climate resilience and sustainable resource management are more likely to foster long-term stability.

5.1 Environmental Peacebuilding

Environmental peacebuilding refers to the integration of environmental management into peacebuilding efforts, aiming to reduce resource-based conflicts and enhance long-term stability. In Somalia, climate change-induced resource scarcity has significantly contributed to conflicts, especially over land and water (UNEP, 2020). Effective environmental peacebuilding strategies, such as sustainable resource management and cross-border cooperation, are vital for reducing tensions (ACCORD, 2021). Studies show that environmental restoration projects can reduce local conflicts by up to 30% by fostering cooperation between competing groups (UNDP, 2019). Additionally, incorporating traditional knowledge in environmental governance can improve community resilience and peace outcomes (World Bank, 2020). These approaches emphasize the interconnectedness of environmental health and sustainable peace in fragile contexts like Somalia.

5.1.1 Emerging frameworks for leveraging natural resource management in peace processes.

Emerging frameworks for leveraging natural resource management (NRM) in peace processes focus on addressing the root causes of resource-based conflicts and fostering cooperation among stakeholders. These frameworks emphasize sustainable resource management, such as community-led water and land restoration projects, which have been shown to reduce tensions by promoting shared interests (UNEP, 2020). The integration of NRM into peacebuilding encourages local participation, ensuring that affected communities are central to decision-making processes (ACCORD, 2021). Additionally, the adoption of integrated policies that link environmental sustainability with conflict resolution has proven effective in mitigating disputes, especially in resource-scarce regions like Somalia (UNDP, 2019). By prioritizing natural resource equity, these frameworks aim to prevent conflict escalation and promote long-term stability (World Bank, 2020).

5.1.2 Addressing The Climate- Conflict Nexus

5.1.1.1 Supporting good governance to strengthen social cohesion, peace, and climate resilience.

Conflict arises when weak sociopolitical, economic, and ecological systems break down. These breakdowns almost always result from poor governance: unaccountable or unresponsive institutions, inequitable access to services and resources, a lack of inclusive participation in decision-making processes, and low civil society capacity to address these challenges. At the same time, increasingly intense and more frequent climate-related shocks disproportionately impact poorer countries, where the risk of violent conflict is already immense. Climate shocks and stresses worsen conflict by heightening competition for increasingly scarce resources, exposing governance failures, and exacerbating inequities and marginalization. Mercy Corps' programming tackles institutional failures at their intersection with climate fragility to ensure governance systems are more responsive to and representative of local communities impacted by climate threats (Directions 2023).

5.1.1.2 Strengthening community-level natural resource management institutions to manage competition and reduce conflict.

Climate change and environmental degradation are accelerating competition over shared natural resources. Supporting a range of livelihood activities and often holding a strong cultural significance, natural resource competition is often existential and highly securitized for local communities. Real or perceived inequity around access to and control over diverse resources - agricultural lands, waterpoints, rangelands, forests, minerals resources and other extracted materials - exacerbates existing tensions within and between communities, threatening the breakout of violence. In response, Mercy Corps programming supports community-driven sustainable natural resource management (NRM) through multiple entry points, including (a) creating opportunities for inter-community engagement around natural resource issues of shared interest, (b) developing capacity and linkages among formal and non-formal institutions to facilitate and enforce intercommunity agreements around sustainable NRM, and (c) facilitating market linkages for natural resource products and improved technologies that can sustainably enhance resource dependent livelihoods (Directions 2023).

5.1.1.3 Encouraging diverse, climate-smart livelihoods that reduce the intensity of competition over natural resources.

Climate change is disrupting livelihoods by escalating food and water insecurity, causing competition for scarce resources. Extreme weather events affect agriculture, pastoralism, fishing, and forestry, leading to declining yields, disease, and resource depletion. In response to livelihood insecurity, individuals often adopt negative coping strategies, which can intensify conflicts. Climate-smart, diversified livelihoods, combined with market systems and environmental conservation, increase resilience, improve incomes, and promote sustainable economic growth, while building conflict resilience (Directions 2023).

3. Results

The literature review reveals several key findings related to the climate-conflict-peace nexus in Galmudug:

1. Climate Change as a Driver of Conflict: Climate change exacerbates existing tensions over natural resources, such as water and grazing land, fueling conflicts between different communities, especially pastoralists. In Galkayo, resource competition over water wells between the Rer Jalaf and Wagardhac clans led to violent clashes, resulting in 35 deaths (Kassim, Galvanek, and Grimm, 2019). **Climate-Induced Migration:** Approximately 21% of households in Galmudug are internally displaced persons (IDPs) due to climate-induced migration (IOM, 2023). **2020-2023 Drought:** Over 1.3 million people were displaced in Somalia, with many from Galmudug, as a result of severe droughts (Sipri, n.d.). **Climate Change as a "Threat Multiplier":** Climate change exacerbates existing social, political, and economic tensions, acting as a force that deepens existing conflicts (Homer-Dixon, 1999). **Social Fragmentation and Climate Stress:** Climate stress combined with social fragmentation can complicate peacebuilding efforts, making it harder to address the root causes of conflict (Carter, 2014).

Types of Conflict:

- a) Conflicts Between Pastoralists and Farmers:** Climate-induced droughts and land degradation have intensified tensions between pastoralists and farmers over access to land and water resources. 50% of pastoralists in Somalia experience land disputes with farmers due to these issues (Geneva Graduate Institute, 2023).
- b) Water Scarcity Conflicts:** Galmudug is severely affected by water shortages, leading to conflicts over water sources and displacement. 700,000 people in Galmudug have been displaced due to water scarcity (IOM, 2023).
- c) Natural Resource Conflicts:** Depletion of natural resources such as grazing land, freshwater, and forests has heightened competition and contributed to violent conflict. The number of resource-based conflicts in Galmudug increased by 30% in 2023 (SIPRI, 2023).
- d) Resource-Based Conflict:** Pastoralist Communities in Galmudug: Pastoralist communities face disputes over dwindling resources like water and grazing land, exacerbated by climate change-induced droughts. In Galkayo, the Rer Jalaf and Wagardhac clans clashed over unauthorized water well use, leading to 35 deaths (Kassim, Galvanek, and Grimm, 2019).

- e) Land Disputes:** Climate change-induced land degradation has escalated land disputes in the region. 60% of land disputes in Galmudug are tied to land degradation (IOM, 2023).
- f) Clan Boundary Conflicts:** Resource scarcity has intensified clan-based territorial disputes, leading to violent clashes and rising tensions. Clan-based conflicts in Galmudug increased by 25% in 2023, resulting in 300 deaths and hundreds of injuries (SIPRI, 2023).

- 2. Vulnerability of Women and Marginalized Groups:** Women, children, and individuals with disabilities are disproportionately affected by climate-induced displacement, resulting in gender-based violence, loss of access to education and healthcare, and increased vulnerability in conflict situations (Hassan, 2017).
- 3. Inadequate Climate Adaptation Strategies:** Galmudug's climate adaptation strategies are insufficient to address the impacts of climate change, such as droughts and resource depletion, worsening the community's ability to adapt and leading to further conflicts over resources.
- 4. Economic Pressures and Livelihood Disruptions:** Climate change disrupts traditional livelihoods like pastoralism and agriculture, pushing communities into economic hardship, which can lead to competition over resources and conflict. Over 50% of pastoralists in Somalia, including Galmudug, experience land disputes with farmers as a result of land degradation caused by climate change (Geneva Graduate Institute, 2023). Climate change has interrupted traditional pastoralist practices like transhumance, where herders move with their livestock to find water and grazing land, which jeopardizes the resilience of Galmudug's pastoral communities (Foua, Wilkinson, and Lanfranchi, 2023).
- 5. Interconnection between Climate and Security:** Climate change acts as a "threat multiplier," exacerbating social, political, and economic tensions, and undermining efforts to maintain peace and security. Research indicates that climate stress, combined with social fragmentation, complicates peacebuilding and heightens the likelihood of violent conflict (Homer-Dixon, 1999; Carter, 2014).
- 6. Weak Institutional Capacity:** The capacity of institutions in Galmudug to manage and mitigate climate-related conflicts is limited, contributing to escalating tensions and a failure to address the root causes of resource-based disputes.

4. Discussion

The findings from the literature review highlight the intricate and multidimensional relationship between climate change, conflict, and peace in Galmudug State, Somalia. Below are key insights derived from the analysis:

1. Climate Change as a Driver of Conflict:

The relationship between climate change and conflict in Galmudug is multi-faceted and deeply entrenched in resource scarcity. Climate change exacerbates existing social and economic vulnerabilities, fueling disputes over critical resources like water, grazing land, and fertile soil. For instance, competition for water wells between the Rer Jalaf and Wagardhac clans in Galkayo led to violent clashes that resulted in 35 deaths (Kassim, Galvanek, and Grimm, 2019). Such incidents highlight how climate variability can intensify tensions and lead to loss of life.

Moreover, climate-induced migration has reshaped the region's demographics, placing additional strain on resources. Approximately 21% of households in Galmudug are internally displaced persons (IDPs), driven by environmental factors such as drought (IOM, 2023). Between 2020 and 2023, over 1.3 million people were displaced across Somalia due to drought, many originating from Galmudug (Sipri, n.d.). These statistics underscore the role of climate as a "threat multiplier," deepening existing economic and social tensions (Homer-Dixon, 1999).

2. Types of Climate-Driven Conflicts:

The various forms of conflicts exacerbated by climate stress in Galmudug further demonstrate the interconnectedness of environmental and social vulnerabilities:

- **Conflicts Between Pastoralists and Farmers:**

Droughts and land degradation have intensified disputes, with 50% of pastoralists reporting conflicts with farmers over land use (Geneva Graduate Institute, 2023). This dynamic disrupts traditional cooperation and coexistence between communities.

- **Water Scarcity Conflicts:** Galmudug's chronic water shortages have displaced 700,000 people, creating flashpoints of violence as communities struggle for limited resources (IOM, 2023).

- **Natural Resource Conflicts:** Depletion of grazing lands and forests has heightened competition, with resource-based conflicts increasing by 30% in 2023 (SIPRI, 2023).

- **Clan Boundary Conflicts:** Resource scarcity has amplified territorial disputes between clans, leading to a 25% rise in such conflicts and resulting in 300 deaths in 2023 alone (SIPRI, 2023).

- **Land Disputes:** Land degradation, affecting 60% of disputes in Galmudug, has undermined traditional livelihoods and spurred tensions (IOM, 2023).

3. Vulnerability of Women and Marginalized Groups:

Climate-induced displacement disproportionately affects women, children, and marginalized groups, exposing them to greater risks of gender-based violence and loss of access to basic services. As primary caregivers, women bear the brunt of resource shortages, such as water collection during droughts. These challenges exacerbate vulnerabilities and perpetuate cycles of poverty and insecurity (Hassan, 2017).

4. Inadequate Climate Adaptation Strategies.

Galmudug's climate adaptation strategies remain insufficient to address the scale and intensity of climate impacts. Drought resilience programs and sustainable land-use policies are either underdeveloped or poorly implemented, leaving communities ill-equipped to handle environmental shocks. This gap in preparedness exacerbates conflicts, as communities struggle to secure diminishing resources.

5. Economic Pressures and Livelihood Disruptions:

The economic consequences of climate change disrupt traditional livelihoods like pastoralism and agriculture, which are vital to Galmudug's economy. Over 50% of pastoralists experience land disputes with farmers due to land degradation caused by climate change (Geneva Graduate Institute, 2023). Climate change has also hindered transhumance practices, undermining the resilience of pastoral communities (Foua, Wilkinson, and Lanfranchi, 2023). These disruptions fuel desperation and competition, further destabilizing the region.

5. Conclusion

7. Weak Institutional Capacity

Galmudug's institutions lack the capacity to mitigate and manage climate-related conflicts effectively. The absence of robust policies to address resource disputes, combined with limited enforcement mechanisms, perpetuates cycles of violence. Strengthening institutional frameworks and promoting inclusive governance are critical to breaking this cycle and fostering peace.

In conclusion, the interplay between climate change, conflict, and peacebuilding in Galmudug State, Somalia, underscores a critical challenge that exacerbates existing tensions and hinders long-term stability. Climate change, particularly through recurrent droughts and resource scarcity, acts as a "threat multiplier," intensifying conflicts between communities, especially pastoralists and farmers. Over 1.3 million people were displaced in Somalia from 2020 to 2023 due to severe droughts, with 700,000 of these individuals originating from Galmudug (SIPRI, 2023). Resource-based conflicts in the region surged by 30% in 2023, with land disputes and competition for water sources contributing significantly to violence (IOM, 2023).

Additionally, 50% of pastoralists in Somalia, including Galmudug, face conflicts with farmers over land and water resources, exacerbating the region's vulnerability to both climate stress and social fragmentation (Geneva Graduate Institute, 2023). Women and marginalized groups are particularly vulnerable, with increased risks of gender-based violence, displacement, and loss of access to basic services (Hassan, 2017).

Despite these challenges, the region's institutional capacity remains insufficient, preventing effective conflict mitigation and adaptation strategies. This review emphasizes the urgent need for integrated climate resilience strategies, sustainable resource management, and stronger governance to address the root causes of conflict and promote peacebuilding in Galmudug. By addressing the interconnected challenges of climate change and conflict, this study advocates for a comprehensive approach that fosters stability and resilience in the region.

Recommendations

- 1. Integrating Climate Change Adaptation into Peacebuilding Strategies:** Policies should prioritize incorporating climate change adaptation measures into existing peacebuilding frameworks to address the root causes of resource-based conflicts in Galmudug. This will ensure that environmental challenges are effectively addressed alongside socio-political tensions.
 - 2. Strengthening Early Warning Systems:** Developing robust early warning systems that integrate climate forecasts with conflict indicators will enable proactive responses to potential climate-induced conflicts and displacement, allowing for timely interventions in the region.
 - 3. Promoting Sustainable Resource Management:** Policies should encourage sustainable land and water management practices to mitigate competition over scarce resources, a primary driver of conflict in Galmudug. This approach can help reduce resource-related tensions and support long-term peacebuilding efforts.
 - 4. Enhancing Institutional Governance and Local Capacities for Conflict Resolution:** Investment in building both institutional governance and local capacities for non-violent conflict resolution will empower communities to manage climate-related disputes effectively. Strengthening local leadership will improve peacebuilding outcomes at the grassroots level.
 - 5. Increasing International Collaboration on Climate and Conflict:** Strengthening collaboration between Somalia's government, international organizations, and neighboring states is essential to address the complex intersection of climate change and conflict. This will foster regional peace, security, and coordinated action on climate resilience.
 - 6. Supporting Climate-Resilient Livelihoods:** Policy should focus on diversifying livelihoods by promoting climate-resilient agricultural and pastoral practices. This will reduce the vulnerability of communities to climate change and mitigate the economic impacts of environmental stress in conflict-prone areas like Galmudug.
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