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A Complex Threat: The Implications of Climate Change for Food Security and Social Conflict in the Sahel

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Executive Summary

This paper examines the intersecting impacts of climate change on food security and social conflict in the Sahel, a sub-Saharan region stretching from Senegal to Sudan that is among the world's most environmentally, socially, and economically fragile. The paper argues that climate change in the Sahel is not merely an environmental stressor but a primary driver of multidimensional crises, undermining livelihoods, accelerating environmental degradation, and fueling violent resource conflicts.

Climate projections for the Sahel indicate temperatures are rising 1.5 times faster than the global average, extreme heat events are becoming more frequent, and rainfall patterns are growing increasingly erratic. These shifts are devastating agricultural production and degrading soil fertility. With over 80% of the population dependent on agriculture and pastoralism, these climate impacts have catastrophic effects on food security. The crisis is compounded by civil strife and violent conflict over scarce resources, particularly between herders and farmers. The combination of climate change, rapid population growth, and poor resource management is projected to cause per capita water availability to decline by as much as 77% by 2080.

The paper traces how environmental pressures—particularly desertification and land degradation—trigger a cascade of consequences. This cycle begins with the loss of productive land, leads to displacement and migration, and culminates in conflict that unravels the social fabric. This instability creates a vacuum exploited by non-state actors, including extremist groups. The human cost is stark: more than 10 million people across five central Sahelian countries face acute hunger, and child malnutrition rates are dangerously high.

This complex threat presents a critical test for Sahelian nations and their international partners. It demands a coordinated and proactive response to protect vulnerable populations, restore the environment, and build a more stable future. This paper emphasizes the urgent need for integrated solutions that link climate adaptation, peacebuilding, and sustainable resource management.

Keywords

climate change, food security, Sahel region, resource conflict, desertification, environmental degradation

Introduction

Stretching as a semi-arid belt from the Atlantic Ocean to the Red Sea, the Sahel is a vital transition zone between the Sahara Desert to the north and the tropical savannas to the south. This region is inherently prone to climate extremes and is globally recognized as one of the most vulnerable to the impacts of climate change. The five central Sahelian countries (Burkina Faso, Chad, Mali, Mauritania, and Niger) are among the least developed in the world, with a 2021 average GDP per capita of just $790 and approximately 31% of the population living below the international poverty line. The region confronts a "triple crisis" of fragility, conflict, and climate change, where climate change acts as a threat multiplier, exacerbating existing vulnerabilities and fueling instability. This interaction creates a complex threat that deepens poverty, drives large-scale displacement, and severely hinders development. The socio-economic fragility of the Sahel amplifies the effects of climate change, transforming environmental stress into large-scale humanitarian crises. Because the livelihoods of over 80% of the population are directly linked to agriculture and pastoralism, any negative environmental shift—such as drought, flooding, or land degradation—immediately undermines the economic foundation of millions of households.

This paper provides a comprehensive analysis of the multifaceted impacts of climate change on food security and social conflict in the Sahel. It focuses on how climate change interacts with and exacerbates existing tensions and violent extremism, ultimately hampering adaptation efforts. The analysis concludes by offering strategic recommendations to address this complex threat. The report draws on data and insights from leading international organizations, including the World Food Programme (WFP), the Food and Agriculture Organization (FAO), the World Bank, UNHCR, the UN Convention to Combat Desertification (UNCCD), the Intergovernmental Panel on Climate Change (IPCC), and the Armed Conflict Location & Event Data Project (ACLED).

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I: Observed and Projected Climate Shifts

The Sahel is warming at an alarming rate—1.5 times faster than the global average. Temperatures are projected to increase by at least 2°C by 2040 and by 2.0–4.3°C by 2080 compared to pre-industrial levels. This trend will lead to a significant increase in the number of days per year with extreme heat (above 35°C), potentially quadrupling heat-related deaths by 2080.

1- Rainfall Variability and the Challenge to Agriculture

While overall annual rainfall may increase slightly, its growing unpredictability poses a greater threat to the region's agriculture. Over 90% of Sahelian farmers rely on rain-fed agriculture, which is critically dependent on the timing and distribution of rainfall. Increasingly, the rainy season is marked by "false starts," where early rains trick farmers into planting, only for their crops to wither during subsequent dry spells. Furthermore, short, intense downpours cause rapid water runoff and soil erosion, reducing the moisture available for crops. These erratic patterns undermine traditional agricultural calendars and make subsistence farming increasingly untenable. Consequently, adaptation strategies must focus not just on water scarcity but on water retention, soil health, and climate-smart agricultural practices that can withstand extreme and unpredictable rainfall.

2- Dwindling Water Resources: A Driver of Insecurity

Future climate patterns are expected to produce more extreme wet and dry periods. Rising temperatures are accelerating evaporation, leading to a decrease in average soil moisture. Although the Sahel has abundant renewable water resources, they are unevenly distributed and poorly managed. Climate change and inadequate infrastructure are now diminishing their availability. A critical threat to human security is the projected 76–77% drop in per capita water availability by 2080. While climate change reduces the total supply of water, this steep per capita decline is primarily driven by the Sahel's rapid population growth, which massively increases demand for drinking water, sanitation, and agriculture. When an essential resource like water becomes critically scarce for a growing population, an environmental challenge transforms into a direct threat to human survival. This intensifying competition over dwindling resources is a direct driver of conflict between communities. Addressing this crisis requires integrated strategies that manage water resources, promote efficiency, and account for demographic trends to prevent widespread humanitarian crises.

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Table 1: Projected Climate Change Impacts in the Sahel by 2080

The table compares projections under two IPCC scenarios: RCP2.6, a low-emissions scenario requiring radical and immediate emissions reductions, and RCP6.0, a higher-emissions scenario with delayed mitigation action.

Climate Indicator 2080 Projection (RCP2.6 Scenario) 2080 Projection (RCP6.0 Scenario)

Projections of temperature and precipitation changes in the Sahel region by 2080 under RCP scenarios , developed by the Intergovernmental Panel on Climate Change (IPCC), which is used to model and project the effects of climate change based on different amounts of future greenhouse gas emissions. The comparison is based on a comparison between RCP2.6, a low-emissions scenario - requiring radical emissions reductions starting in the current decade, and RCP6.0, a higher intermediate scenario - relying on subsequent stabilization but with delayed mitigation actions.

Climate indicator	2080 projections (RCP2.6 scenario)	2080 projections (RCP6.0 scenario)
Temperature rise	About 2.5 degrees Celsius above pre-industrial levels	3.6°C above pre-industrial levels (up to 4.3°C)
Increase in extremely hot days (>35°C) per year	Significant increase confirmed	59 additional days on average (up to 125 days in some regions)
Increased heat-related deaths	–	4-fold increase (from 2.4 to 9.6 deaths per 100,000 people per year)
Change in total annual precipitation	Strong initial increase and then a drop to 8 millimeters	Up to 16 millimeters increase
Changing precipitation events	General increase in the number of days	Increased number of days (up to 7.6 additional days in northern Chad)
Change in average annual soil moisture	Down 0.8%	Down 1.2%
Increased potential evaporation	–	6.4% increase
Low per capita water use	76% drop	77% drop

II: A Vicious Cycle: Environmental Degradation and Social Conflict

As climate change accelerates, it intensifies desertification and degrades agricultural land, shrinking the natural resources vital to local populations. This environmental decline has profound social and economic dimensions, exacerbating conflict over limited resources and complicating development efforts.

1- Land Degradation and Desertification

The Sahel is a global hotspot for land degradation and desertification. This crisis stems from a combination of climate factors (recurrent droughts and erosion) and unsustainable human activities (overgrazing, deforestation, and poor farming practices). For example, 46% of arable land in Burkina Faso is now degraded, , while Niger loses up to 120,000 hectares of productive land annually. Across the five central Sahelian countries, nearly 80% of agricultural land is degraded, crippling its productive capacity and forcing millions to abandon their livelihoods.

2- The Feedback Loop of Environmental Destruction

Climate impacts and human pressures have created a self-reinforcing cycle of destruction. As climate change degrades land, communities—driven by population growth and the need for food—expand farming and livestock herds into new areas. This leads to the clearing of natural vegetation, depletion of soil nutrients,

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depletion of soil nutrients, and soil compaction. The loss of vegetation cover accelerates wind and water erosion, further reducing fertility and speeding up desertification.

This forces people to move onto even more marginal lands, which then degrade faster. In the last 50 years, this vicious cycle has led to the loss of 650,000 square kilometers of productive land, directly threatening the 80% of the population who depend on it. Breaking this cycle requires a holistic approach that integrates climate adaptation, sustainable land management, and economic diversification.

3- The Unraveling of the Social Fabric

Intensifying competition for dwindling land and water between sedentary farmers and mobile pastoralists is a primary source of conflict in the Sahel. This dynamic is inflaming tensions and escalating localized disputes into deadly, large-scale violence. Historically, traditional grazing systems were resilient, but modern pressures—including population growth, the expansion of settled agriculture, and the fencing of land—have severely restricted pastoral mobility. Climate change shrinks the resource base even further, forcing herders into direct and often violent competition with farmers.

The breakdown of traditional conflict-resolution mechanisms, combined with weak governance, has allowed these resource conflicts to fester. The climate crisis is not just an environmental issue; it is fundamentally altering the social fabric by pitting traditional livelihoods against one another. This erosion of social cohesion and state authority creates a vacuum that violent extremist groups are adept at exploiting. Solutions must therefore integrate climate adaptation with peacebuilding, improved resource governance, and support for local conflict-resolution mechanisms.

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III: The Food Security Crisis: A Deepening Challenge

The food security crisis in the Sahel is a direct consequence of the interplay between climate, environmental, and social pressures. Land degradation reduces the resources available for food production, while population growth and conflict magnify the fragility of local food systems. Together, these factors have created a humanitarian catastrophe that threatens the stability of the entire region.

The food and nutrition situation across the Sahel and West Africa is dire. In 2024, over 38 million people in the region were acutely food insecure. In the five central Sahelian countries alone, 10.2 million people faced severe food insecurity between June and August 2023. This figure includes over 900,000 people in emergency conditions and 45,000 experiencing famine-like conditions in Burkina Faso and Mali. Child malnutrition has reached alarming levels. As of 2024, global acute malnutrition has risen for the sixth consecutive year.

Surveys from 2021 revealed that malnutrition rates among children under five in Mauritania, Niger, and Chad exceeded the "alarm" threshold of 10%, with rates in several areas surpassing the "emergency" threshold of 15%. In 2022, an estimated 6.3 million children in the central Sahel required treatment for wasting—a 27% increase from 2021 and a 62% increase from 2018.

The complex impacts of climate change in the Sahel demonstrate that environmental, social, and economic challenges are deeply interconnected and cannot be addressed in isolation. Desertification and environmental degradation have fueled local disputes and armed conflict, which in turn have devastated food security and social stability. The fragility of the region's ecosystems and economies acts as a compounding factor, increasing the vulnerability of communities and undermining sustainable development.

Addressing this crisis requires a multidimensional approach that integrates environmental policy with peacebuilding and economic development. Siloed efforts are doomed to fail. The urgency of the situation demands that governments, international organizations, and local communities work in concert to strengthen climate resilience and foster stability.Understanding the intertwined dynamics between climate change, conflict, and food security is the cornerstone of designing effective policies that can secure a sustainable future for the Sahel. This requires continued research, bold investment, and a collective commitment to developing innovative solutions to the complex threats facing the region.

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Recommendations

1. Strengthen Climate Adaptation Capacities

- Establish specialized training centers in countries like Niger and Mali to promote drought-resistant farming. Thisincludes training farmers in conservation irrigation and the use of improved seed varieties, in partnership with research bodies like the International Center for Agricultural Research in the Dry Areas (ICARDA).

2. Integrate Climate Risk into Security and Development Policies

- Develop national food security plans, like in Chad, that incorporate climate emergency scenarios, establish strategic food reserves, and link relief efforts to social support programs targeting the most vulnerable families, in coordination with partners like the WFP.

3. Mobilize Multilateral Partnerships and International Finance

- Launch large-scale, joint initiatives, such as a Sahel-World Bank project to plant wind-breaks and expand green belts. These projects help combat desertification and improve local microclimates while creating farmer-friendly financing mechanisms for sustainable land use.

4. Empower Local Communities in Decision-Making

- Establish and support local environmental committees in rural communities, such as in Burkina Faso, to monitor local conditions and advise governments on appropriate interventions. Ensure the meaningful participation of women and youth in these committees to promote inclusive and effective decision-making.