

# Peacebuilding in the Commons

United Nations Peacekeeping as Conflict Mitigation and Climate Adaptation

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February 7, 2025

## Abstract

United Nations peacekeeping operations (UN PKOs) increasingly deploy in settings experiencing both violent conflict and climate change. Given this overlap, our paper presents an interdisciplinary analytical framework for understanding how UN PKOs' conflict mitigation strategies may support climate adaptation. We focus specifically on activities UN PKOs undertake to address intercommunal violence related to natural resources impacted by climate change. In short, we argue that contemporary UN PKOs reduce the risk of intercommunal violence by engaging in de-facto common pool resource (CPR) management when deployed to climate-impacted settings, helping strengthen the institutions required to cooperatively manage shared resources like water for livestock. We generate this argument inductively, relying on qualitative evidence from four multidimensional UN PKOs in the Sudano-Sahelian zone—a region where intercommunal violence is increasing, partly due to the effect of climate change on shared grazing lands. These data highlight how contemporary UN PKOs' capacities for local patrolling, building infrastructure, and mediating disputes strengthen various aspects of CPR management and subsequently reduce the risk of intercommunal violence. Overall, this study meets practitioners' calls to better capture the impact of conflict mitigation strategies on climate resilience and vulnerability.

## Introduction

Climate change threatens human well-being, particularly in fragile and conflict-affected settings. A key concern is that intensifying climate impacts will erode the foundations needed to build and sustain peace. For example, recent climate-driven flooding in South Sudan disrupted humanitarian access to displaced populations and heightened the risk of violence related to land-use conflicts along transhumance routes ([International Rescue Committee 2025](#)). Although much research explores the security implications of climate change ([Burke, Hsiang and Miguel 2015](#); [Ide 2017](#); [Koubi 2019](#); [Mach et al. 2019](#)), concrete strategies for supporting communities facing such destabilizing effects in conflict-affected settings remain elusive. Lacking clear conceptual structure, designing and evaluating of such strategies faces significant obstacles. This article addresses these challenges by introducing an analytical framework to explain how United Nations (UN) peacekeeping operations (PKOs) can simultaneously mitigate conflict and build resilience to climate change.

UN peacekeeping operations are concentrated in regions of acute climate vulnerability, particularly in Africa. According to one measure, the UN sent an average of 15,000 peacekeepers per deployment to seven out of the ten most climate-vulnerable countries in the world, highlighting the intersection of conflict, instability, and climate-related risks.<sup>1</sup> Worsening climate impacts in these countries pose significant challenges to peacebuilding, affecting stability through multiple channels. For UN peacekeeping operations, a critical concern is how climate change intensifies the risk of intercommunal violence, further complicating efforts to maintain peace and security. ([Hyman, Mpyisi-White and Donati 2020](#); [McGuirk and Nunn 2024](#)).

While recent work explores the conditions under which UN PKOs adopt mandates which consider environmental issues ([Bakaki and Bohmelt 2021](#); [Böhmelt 2024](#)), less well understood is how

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<sup>1</sup>ND-GAIN accessed February 4, 2025. Countries: Chad, Central African Republic, Democratic Republic of Congo, Sudan, South Sudan, Mali, Sierra Leone. Deployment numbers from [Hunnicut and Nomikos \(2020b\)](#).

this orientation might prevent climate-related intercommunal violence. This uncertainty persists despite experts proposing UN PKOs as a tool for mitigating climate-driven conflict (Mach et al. 2019) while also noting how climate change can undermine the effectiveness of UN peacekeeping (Krampe 2020). Thus, conceptualizing how UN PKOs' activities might facilitate the peaceful resolution of intercommunal disputes in a climate-changed world is of critical importance to scholars and practitioners alike.

Our primary theoretical insight is that UN PKOs can reduce the risk of intercommunal violence resulting from climate change by supporting the design of institutions governing access to common pool resources (CPRs) such as shared grazing lands Ostrom (1990). Much research suggests that institutions moderate the effect of climate change on conflict (e.g., see Buhaug et al. (2021)). Our analysis first traces how climate change directly undermines the effectiveness of institutions governing access to CPRs, resulting in lower levels of cooperation among resource users during periods of scarcity. These lower levels of cooperation translate into higher levels of intercommunal violence in the conflict-affected settings where UN PKOs are deployed. However, UN PKOs can reverse this trend through activities that disrupt the effects of climate change on existing CPR institutions or construct new CPR institutions that are resilient to climate change.

We propose a framework centered on three activities contemporary UN PKOs undertake. First, UN PKOs support CPR governance by *building* physical infrastructure such as freshwater wells to align resource management with changing ecological conditions. Second, they enhance monitoring and enforcement through frequent local *patrolling*, which helps establish boundaries, ensure compliance, and prevent disputes from escalating. Finally, they *mediate* conflicts by facilitating negotiations and designing inclusive agreements that reflect local needs and realities. Together, these activities enable CPR institutions to adapt to the stresses imposed by climate change, fostering resilience and reducing the risk of climate-related violence.

We generate intuition for our argument by reviewing all publicly available operational reports from four UN PKOs deployed in the Sudano-Sahelian region of Africa: the United Nations

Multidimensional Integrated Stabilization Mission in the Central African Republic (MINUSCA), the United Nations Multidimensional Integrated Stabilization Mission in Mali (MINUSMA), the United Nations African Union Hybrid Mission in Darfur (UNAMID), and the United Nations Mission in South Sudan (UNMISS). These PKOs are similar because they deployed under broad operational mandates to settings where increasing exposure to climate change has coincided with an uptick in intercommunal violence (Hyman, Mpyisi-White and Donati 2020). We use qualitative evidence from these missions inductively to describe what UN peacekeepers are doing and generate theory from the ground up. While this article does not aim to evaluate the effectiveness of UN peacekeeping operations, we provide an analytical framework that lays the foundation for future empirical work to investigate the conditions under which peacekeepers reduce climate-related intercommunal violence.

This paper contributes to three distinct yet interrelated research agendas. First, it advances the debate on the linkages between climate change and conflict. By focusing on the role of common-pool resource (CPR) institutions, this study builds on existing research to provide a nuanced understanding of how environmental stressors intersect with local governance structures to shape conflict dynamics (Barnett and Adger 2007; Buhaug et al. 2021). Second, the paper engages with an emerging literature linking conflict mitigation strategies to climate adaptation (Abrahams and Ober 2024). Our analytical framework extends existing research to include the unique contributions of international peacekeeping efforts. Finally, the study contributes to the peacekeeping literature by demonstrating how UN peacekeeping operations can transcend their traditional roles to engage in environmental management and natural resource governance (Beevers 2019; Bakaki and Böhmelt 2021; Hunnicutt 2023; Böhmelt 2024).

Our article proceeds as follows: we begin with some discussion of existing research on the climate-conflict nexus and, in particular, its focus on institutions. We then use environmental governance research to trace how climate change erodes the institutions underpinning effective CPR management, resulting in lower levels of cooperation across settings and higher levels of intercom-

munal violence in conflict-affected settings specifically. Next, we briefly describe how UN PKOs have evolved over the last three decades into entities that do much more than “peacekeeping,” such that they may be engaged in de-facto CPR management today. Our main analysis follows, wherein we connect several on-the-ground practices of UN peacekeepers to the attributes of institutions that underpin effective CPR governance. Subsequently, we discuss the limitations of our argument before concluding with a research agenda aimed at evaluating whether UN PKOs can support effective CPR management and reduce intercommunal violence in settings dually impacted by climate change and conflict.

## **Climate Change, Conflict, and Institutions**

The relationship between climate change and conflict remains a topic of considerable debate. Some research suggests that climate change heightens the risk of both civil war ([Burke et al. 2009](#); [Hsiang, Meng and Cane 2011](#)) and smaller-scale political violence, including intercommunal conflict, protests, and riots ([Fjelde and von Uexkull 2012](#); [Hendrix and Salehyan 2012](#)). This scholarship argues that climate change influences conflict through several mechanisms, such as the abundance or scarcity of natural resources ([Homer-Dixon 1999](#); [Gleditsch, Christiansen and Hegre 2013](#)), economic conditions including agricultural productivity and food prices ([Miguel, Satyanath and Sergenti 2004](#); [Dell, Jones and Olken 2012](#); [Blakeslee and Fishman 2018](#)), migration patterns ([Koubi et al. 2021](#)), and individuals’ emotions ([Anderson and Bushman 2002](#)). Conversely, other research contends that the connection between climate change and conflict is tenuous, if not entirely unfounded ([Buhaug 2010](#); [Selby and Hoffmann 2014](#); [Selby et al. 2017](#)). Even meta-analyses and systematic reviews of the climate-conflict literature yield conflicting conclusions ([Burke, Hsiang and Miguel 2015](#); [Koubi 2019](#); [Mach et al. 2019](#)), potentially reflecting the epistemological diversity of the field ([Ide 2017](#)).

Despite widespread disagreement about the aggregate effect of climate change on conflict, the current debate provides two crucial insights. First, the effect of climate on conflict is highly variable and extremely context-specific. This assertion resembles early scholarship on the environment and violence ([Homer-Dixon 1999](#)), which depicts environmental scarcity as an “INUS condition” ([Mackie 1965](#)). That is, environmental scarcity is an insufficient but necessary condition among a larger set of conditions that, when simultaneously operative, can cause violence; but the same violence may stem from other sets of conditions which do not include environmental scarcity. A second, related insight from the climate-conflict debate is that social and political institutions almost invariably moderate the effect of climate change on conflict ([Barnett and Adger 2007](#); [Buhaug et al. 2021](#)). When faced with growing climate impacts, societies may—and often do—adapt. Various institutions influence the prospects for and nature of this adaptation, and thus are critical for understanding the conditions under which climate change will lead to conflict. For example, informal institutions governing access to Kenya’s Loita forest preempted the outbreak of violence when increased rainfall variability exacerbated local competition over grazing lands ([Adano et al. 2012](#)). Other research shows that exclusionary political institutions which marginalize certain ethnic groups amplify the positive relationship between drought, rainfall shocks, and intercommunal violence ([Fjelde and von Uexkull 2012](#)).

While existing research underscores the critical role of institutions in the climate-conflict nexus, less attention has been paid to identifying the qualities of institutions that successfully prevent climate-induced conflict. We build on this literature by focusing on common pool resource (CPR) institutions, which play a crucial role in regulating access to natural resources like shared grazing lands.

## Climate Change and Common Pool Resource Institutions

Our argument begins by tracing how climate change can erode existing CPR institutions, thereby reducing cooperation between different user groups as resource scarcity increases. CPRs are natural or human-made resources that are open-access (“non-excludable”) but finite in use (“subtractible”). Despite initial pessimism about the fate of CPRs ([Hardin 1968](#)), an expansive body of evidence documents how communities sustain CPRs through the use of effective institutions (see [Feeny et al. \(1990\)](#) and [Agrawal \(2003\)](#) for early reviews). In particular, [Ostrom \(1990\)](#) documents and analyzes the emergence of diverse institutions which help communities around the world sustainably manage CPRs. These institutions—ranging from *zanjeras* regulating shared irrigation systems in the Philippines to communal systems of land tenure restricting access to pastures in the Alps—adhere to several “design principles” which make them effective (see the first two columns of [Table 1](#)).

**Table 1: Ostrom’s Design Principles, Peacekeeping Activities, and Examples**

<b>Design Principle</b>	<b>Definition</b>	<b>PKO Activity</b>	<b>Example</b>
<b>Clearly Defined Boundaries</b>	Resource boundaries and appropriators (i.e., individuals and households with access to the resource) must be clearly identified.	Patrol	Peacekeepers demarcate shared resources (e.g., water catchments) along transhumance routes.
<b>Congruence Between Rules and Local Conditions</b>	Appropriation and provision rules should align with local ecological and social conditions.	Build	Construction of water catchments aligned with seasonal migration needs in Darfur.
<b>Collective-Choice Arrangements</b>	Most appropriators participate in decision-making to modify operational rules.	Mediate	Peacekeepers facilitate inclusive transhumance migration conferences to establish new rules around shared resource use.
∞ <b>Monitoring</b>	Monitors who are (accountable to) appropriators regularly track CPR conditions and appropriator behavior.	Patrol	UN troops conduct joint patrols to track resource use in shared grazing lands, often using geospatial technologies.
<b>Graduated Sanctions</b>	Sanctions for rule violations are proportional to the severity of the offense and administered by either the appropriators themselves or an accountable entity.	Mediate	Traditional peacekeeping forums support restorative justice mechanisms like proportional fines for crop destruction.
<b>Conflict Resolution Mechanisms</b>	Low-cost and rapid dispute resolution systems are available to appropriators.	Mediate	Peacekeepers extend mobile courts to areas hotspots for farmer-herder conflict as conventional dispute resolute mechanisms become overwhelmed.
<b>Minimal Recognition of Rights to Organize</b>	External authorities recognize appropriators’ rights to self-organize CPR governance.	Mediate	Peacekeepers ensure alignment between national agreements for shared resource use and local governance structures (e.g., the Marial Bai Agreement).



The impacts of climate change on the physical characteristics of common pool resources (CPRs) are well-documented. For instance, shifting precipitation patterns and rising temperatures have altered the availability and productivity of grazing lands, affecting pastoralist livelihoods and increasing the likelihood of resource-based conflicts (Sloat et al. 2018). Similarly, climate change has contributed to declining groundwater levels and increased variability in recharge rates, posing serious challenges for communities reliant on aquifers for drinking water and irrigation (Wu et al. 2020). In forested regions, rising temperatures and prolonged droughts have exacerbated tree mortality and altered species composition, threatening the stability of forest-dependent economies and governance systems (McDowell et al. 2020). Fisheries, too, have been profoundly affected, as ocean warming, acidification, and deoxygenation drive shifts in fish stock distributions and reduce the productivity of many marine and freshwater ecosystems, often disrupting established access arrangements and increasing competition over dwindling resources (Sumaila et al. 2011).

Beyond these physical changes, climate change also has the potential to reshape the social dynamics of CPR systems. One key mechanism is migration, as climate-induced resource degradation may force populations to relocate in search of more viable livelihoods, thereby altering established user groups and increasing the potential for disputes over resource access (Feng, Krueger and Oppenheimer 2010). Adaptation and mitigation initiatives, such as reforestation programs, water conservation projects, and renewable energy infrastructure, can additionally lead to the reallocation of land and resources, sometimes resulting in the displacement of local populations or the restructuring of traditional governance systems (De Sherbinin et al. 2011). These disruptions can weaken existing institutional arrangements and undermine cooperation, exacerbating tensions in regions where resource competition is already high.

The physical and social impacts of climate change may contribute to the erosion of existing CPR institutions, especially those designed prior to the acceleration of climate change in the late 20th century. For example, consider a CPR institution governing several communities' access to groundwater in a peri-urban area. Imagine that the communities formed the institution during the

19th century, and that, due to climate change, (1) the groundwater basin has gotten smaller, (2) its level has become more variable, (3) the communities' populations have grown as people from more rural, drought-prone areas in the country have begun migrating towards major urban centers, and (4) the country's central government has established a new groundwater management agency which can overrule local rules about groundwater use. Given these conditions, there are many reasons to believe the communities' CPR institutions would break down in the future. The changing extent and level of the groundwater basin would require the communities to demarcate new boundaries, as would the influx of migrants from even more drought-prone areas. New variation in groundwater levels would throw the CPR institutions existing allocation rules out of alignment with local conditions, and the communities would need to consider possible changes in management rules which account for their new, larger populations. At the same time, it is not given that government officials in the new groundwater management agency would recognize the communities' allocation and management rules as legitimate. Navigating these uncertainties might undercut individual appropriators' incentives to contribute to sustainable groundwater management, ultimately increasing overextraction.

Indeed, research shows how climate change can undermine existing CPR institutions via the processes described above ([Jodha, Singh and Bantilan 2012](#)). [Schlager and Heikkila \(2011\)](#) provide first-hand evidence of climate change overwhelming the historical compacts allocating access to shared waterways like the Colorado River in the American West. Experimental evidence also confirms that heightened uncertainty about the availability of CPRs can lead its users to underinvest in the institutions governing access ([Safarzynska 2018](#); [Dipierrri and Zikos 2020](#)).

When the institutions governing CPRs begin to erode, competition between different users over the remaining resources increases. For example, a growing population and increasingly complex hydrological dynamics led to the breakdown of effective groundwater governance in San Bernardino County, subsequently inciting use-conflicts between local agricultural and industrial interest groups ([Ostrom 1990](#)). Population growth similarly overwhelmed the institutions manag-

ing local fisheries in the Sri Lankan town of Mawelle, and clashes between fishermen and police ensued ([Ostrom 1990](#)).

## **Common Pool Resource Institutions and Intercommunal Violence**

As CPR institutions deteriorate, escalating resource competition can spark broader social unrest, particularly in contexts where alternative governance mechanisms are weak or absent. The next stage of our argument explores how these dynamics contribute to heightened levels of intercommunal violence in conflict-affected settings. Specifically, we examine how climate-induced pressures on CPR institutions create conditions conducive to violent competition between social groups, often in the absence of state intervention.

Intercommunal violence is distinct from other forms of political violence in that it occurs without the direct involvement of state actors or insurgent groups. Instead, it involves individuals or social groups operating independently of the state, typically with low levels of organizational complexity. These groups are often bound by a shared identity—such as race, ethnicity, clan, or tribe—shaping the nature of their conflicts ([Sundberg, Eck and Kreutz 2012](#)). The drivers of intercommunal violence vary widely: disputes may arise when traditional land boundaries clash with formal legal demarcations, when displacement from civil wars or severe droughts forces different communities into competition, or when political parties and armed groups deliberately inflame ethnic divisions for strategic gain. The consequences of such violence are profound. In sub-Saharan Africa alone, intercommunal conflicts have claimed nearly 250,000 lives since the turn of the century—surpassing the number of deaths caused by violence perpetrated by governments and rebel groups ([Raleigh et al. 2010](#)).

The erosion of CPR institutions often precedes bouts of intercommunal violence in conflict-affected settings experiencing climate change. Perhaps nowhere is this trend more prominent than

Africa's Sudano-Sahelian region, where climatic variability is contributing to increasing conflict between and among agricultural and transhumant pastoralist communities. Indeed, a large literature debates the causes and consequences of agropastoral conflict across the Sahel and into Sudan (see [Adams et al. \(2023\)](#) for a recent synthesis). We review its findings below, focusing specifically on the institutions governing access to shared grazing resources, how they have evolved in the last fifty years, and how their erosion today contributes to intercommunal violence.

In the pre-colonial period, agricultural and pastoral communities across the Sahel maintained what many label as symbiotic host-client relationships rooted in norms of reciprocity ([Haller 2010](#); [Moritz 2010](#)). Various common property regimes and local institutions governed these relationships, promoting the management of shared infrastructure and peaceful dispute resolution. During the colonial period, some existing arrangements for managing shared grazing resources were integrated into the colonial state while others were dissolved outright. This trend towards institutional change and pluralism continued after World War II, particularly as newly formed post-colonial governments pursued agricultural expansion and mineral extraction by granting land to private actors.<sup>2</sup> Nonetheless, many claim that traditional relationships and systems of self-governance still support pastoral commons management in the Sahel, acknowledging that West African pastoral systems do not fit neatly into [Ostrom \(1990\)](#)'s conceptual framework ([Moritz et al. 2013](#); [Jyothi 2022](#)).

Of course, the shift towards privatizing shared grazing resources in the Sahel both disrupted historical CPR institutions and increased conflicts between different user groups, contributing to the heightened level of agropastoral violence observed today ([Adams et al. 2023](#)). Recent research indicates climate change is amplifying these dynamics as well; primarily, by reshaping pastoralists' seasonal migration patterns ([McGuirk and Nunn 2024](#); [Nwankwo 2024](#)). Historically, transhumant pastoralists in the Sahel graze their livestock on marginally productive lands during the wet season, allowing agriculturalists to cultivate crops on more productive lands. Following the onset of

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<sup>2</sup>See [Benjaminsen and Ba \(2009\)](#) for a description of this institutional evolution in Mali's inner Niger Delta.

the dry season, pastoralists migrate to graze their livestock on agriculturalists' recently harvested lands, where phytomass is available year-round. Several arrangements formed between pastoralists and agriculturalists govern this migration, including those establishing migration corridors and mechanisms for dispute resolution (Stenning 1994). However, increased rainfall variability resulting from climate change has resulted in earlier and more expansive dry-season migrations by transhumant pastoralists. This early migration renders existing grazing arrangements irrelevant, i.e., they are no longer in congruence with local conditions. As a result, intercommunal violence sometimes occurs when pastoralists' livestock destroy crops or consume resources still required for cultivation (Moritz 2010; Kitchell, Turner and McPeak 2014; Brottem 2016).

It follows from this evidence that factors which help adapt existing institutions for managing CPRs in conflict-affected settings experiencing climate change may reduce the risk of intercommunal violence. The following section presents our analysis of how contemporary UN peacekeeping operations may achieve this goal.

## **Multidimensional UN Peacekeeping and Common Pool Resource Management**

Sweeping changes to the operational mandates of UN PKOs in the early 2000s set the stage for UN peacekeepers to engage in de-facto CPR management. Until the 1990s, UN PKOs narrowly worked to monitor ceasefires between countries and, on occasion, rebel group disarmaments. However, the failures of the early UN PKOs in Rwanda and elsewhere led to then UN Secretary-General Kofi Annan commissioning a panel to assess the shortcomings of past UN peace operations. This panel, led by former Algerian Foreign Minister Lakhdar Brahimi, released a report (the "Brahimi Report") calling for UN PKOs to prioritize local-level activities to prevent the violent escalation of intercommunal disputes, rebuild social trust, and restore confidence in local institutions (Hultman, Kathman and Shannon 2020; Nomikos and Villa 2022; Nomikos 2025). Following the release

Mission	Total Reports	First Report	Last Report	Farmer-Herder	Build	Patrol	Mediate
MINUSCA	26	2014-11-01	2024-06-01	7	0	4	9
MINUSMA	36	2012-11-01	2022-01-01	1	1	2	5
UNAMID	52	2007-08-01	2019-04-01	16	5	6	23
UNMISS	47	2011-11-01	2024-10-01	17	0	9	18

**Table 2: Summary of Mission Reports** Tallies the number of reports reviewed per mission and notes the dates on which each mission’s first and last report was published. Additionally, counts provided in the “Farmer-Herder” column represent the number of reports per mission where intercommunal violence is attributed to conflict between transhumant pastoralists and sedentary agricultural communities. Finally, counts in the final three columns (“Build,” “Patrol,” and “Mediate”) represent the number of reports per mission describing peacekeeping personnel engaging in de-facto resource governance through the pathways we describe in this article.

of the Brahimi Report, many UN PKOs deployed under broader “multidimensional” mandates what enabled this doctrinal shift by authorizing peacekeepers to intervene in economic, political, and social processes related to peacebuilding. For example, multidimensional UN PKOs are tasked with restoring the rule of law (Blair 2020), promoting gender equality (Karim and Beardsley 2017), monitoring post-conflict elections (Smidt 2020), delivering humanitarian aid (Sauter 2022), and—central to our argument—engaging in the management of natural resources (Beevers 2019; Bakaki and Böhmelt 2021; Hunnicutt 2023; Böhmelt 2024).

To identify how contemporary UN PKOs might bolster CPR management and reduce climate-related intercommunal violence, we review all publicly available Reports of the Secretary General (hereafter, “Reports”) for the United Nations Multidimensional Integrated Stabilization Mission in the Central African Republic (MINUSCA), the United Nations Multidimensional Integrated Stabilization Mission in Mali (MINUSMA), the United Nations African Union Hybrid Mission in Darfur (UNAMID), and the United Nations Mission in South Sudan (UNMISS).<sup>3</sup> Deployed PKOs publish Reports multiple times per year both to document important political, economic, and security-related developments within a mission’s host-country and to track a mission’s progress towards implementing its mandate. For example, MINUSMA, MINUSCA, UNMISS, and UNAMID have a common mandate to prevent armed groups from victimizing civilians. Reports for all four PKOs subsequently describe ongoing threats to the civilian population and efforts to safeguard civilians. Table 2 catalogs the Reports containing the evidence we present below.

<sup>3</sup>Reports were accessed [here](#) for MINUSCA, [here](#) for MINUSMA, [here](#) for UNAMID, and [here](#) for UNMISS.

Qualitative evidence from MINUSCA, MINUSMA, UNAMID, and UNMISS indicates there are three categories of activities contemporary UN PKOs implement which may help sustain effective CPR governance as climate change intensifies. UN PKOs task their personnel with *building* physical infrastructure, local and frequent *patrolling* to monitor economic, political, and social processes, and *mediating* local disputes. Table 2 reports how frequently each mission in our sample engaged in these activities.

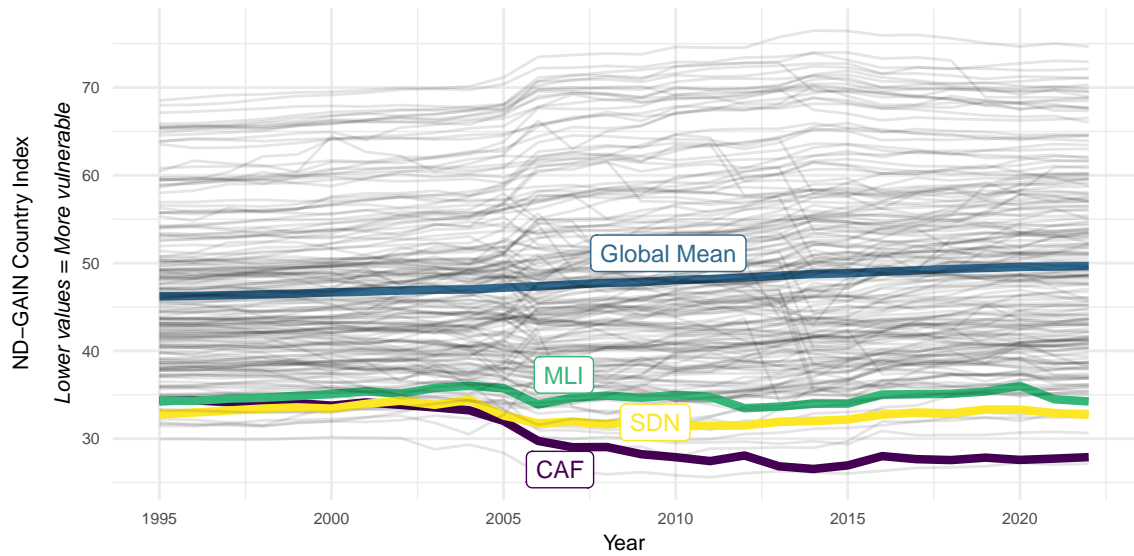
In this section, we begin by describing our data collection process and our rationale for selecting these cases. Then, we detail how each set of activities—building, patrolling, and mediating—may strengthen CPR governance in conflict-affected settings experiencing climate change and, subsequently, prevent the violent escalation of local disputes. As we go through case, we inductively construct an analytical framework for understanding how UN peacekeepers can reduce conflict driven by climate change.

## **Data Collection**

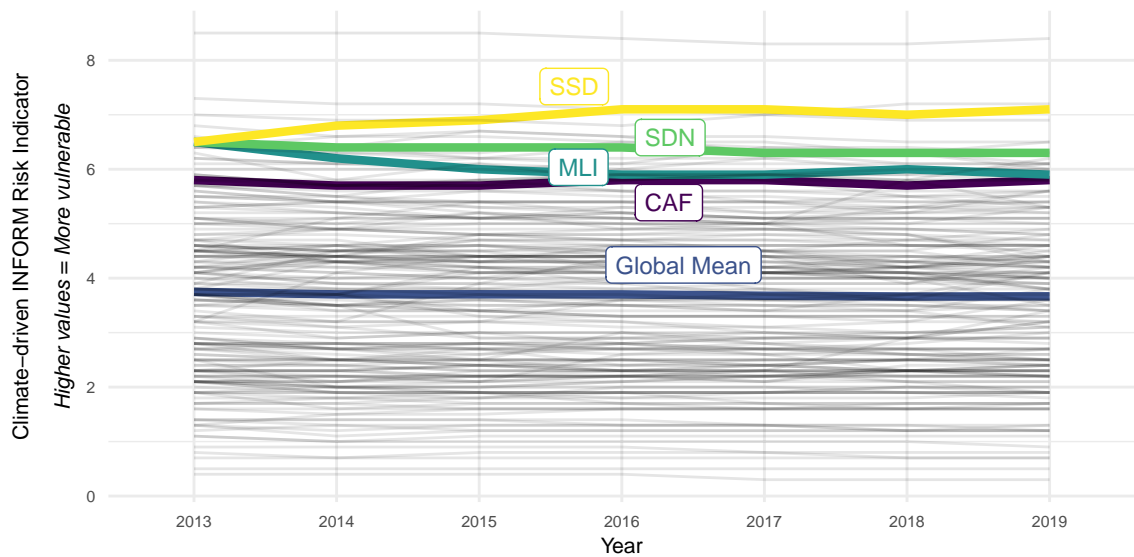
We focus on MINUSCA, MINUSMA, UNAMID, and UNMISS for two reasons, in addition to each mission’s multidimensional operational mandate. First, each mission is or was recently deployed to a host country that is highly vulnerable to climate change (Figure 1). The Notre Dame Global Adaptation Initiative (ND-GAIN) annually evaluates countries’ vulnerabilities to climate change along two dimensions: their current and projected experiences of climate change’s impacts and their capacities to engage in effective climate adaptation. The Central African Republic, Mali, and Sudan are among the most climate-vulnerable countries globally along both elements of the ND-GAIN index, both currently and historically. Alternative measures from the International Monetary Fund’s Climate-driven INFORM Risk Indicator confirm that the host countries of mission in our sample are among the most vulnerable to climate change globally.

Second, the effects of climate change on transhumant pastoralism appear linked to intensified intercommunal violence in all four host countries. Reporting suggests that armed groups increase

(a) Vulnerability to Climate Change, ND-GAIN Index



(b) Vulnerability to Climate Change, IMF Climate-driven INFORM Risk Indicator



**Figure 1: MINUSCA, MINUSMA, UNAMID, and UNMISS operate in some of the world’s most climate-vulnerable countries.** (a) Visualizes over-time and between-country variation in the Notre Dame Global Adaptation Initiative’s (ND-GAIN) Country Index, which is a composite measure of vulnerability to climate change. Lines in black correspond to countries where the peacekeeping missions in our sample have not deployed. Data accessed [here](#), 30-January-2025. (b) Visualizes over-time and between-country variation in the International Monetary Fund’s (IMF) Climate-driven INFORM Risk Indicator, which is a composite measure of vulnerability to climate change. Lines in black correspond to countries where the peacekeeping missions in our sample have not deployed. Data accessed [here](#), 30-January-2025.



their recruiting efforts during drought conditions in an effort to enlist struggling pastoralists (Ojewale 2022). To the same point, the UN Office for the Coordination of Humanitarian Affairs claims that the link between climate change and violence in South Sudan is “inextricable” (United Nations Office for the Coordination of Humanitarian Affairs 2022). Indeed, at least one Report from each mission in our sample explicitly attributes intercommunal violence to rising tensions between transhumant pastoralists and the host communities with whom they sharing grazing lands during the dry season (Table 2).

Our analysis additionally features data drawn from two other UN-based sources. First, we review press releases missions from missions in our sample. These press releases contain more detailed information about the events and activities referenced in missions’ Reports; hence, they enable us to better characterize how multidimensional PKOs engage in de-facto CPR management. Second, we review a UN Department of Peace Operations’ policy document on how PKOs manage transhumance-related conflict (Hyman, Mpyisi-White and Donati 2020). Like missions’ press releases, this policy documents enables more precise description of PKOs’ activities on the ground.

## **Build**

The UN has authorized its multidimensional PKOs to deliver “Quick Impact Projects” (QIPs), acknowledging how increasing access to essential services like drinking water is critical to achieving positive peace. QIPs are small development projects meant to sustain service provision in areas that remain inaccessible to humanitarian actors due to security reasons (United Nations 2022). For example, the UN Mission in South Sudan (UNMISS) helped clear vegetation around and construct a solar-powered water system for three communities in a conflict-prone area of Juba (United Nations 2017). The UN Department of Peace Operations instructs multidimensional PKOs to use QIPs as a tool for building public confidence in the mission. Civilians may be more likely to provide peacekeepers with actionable information on activities of armed groups after peacekeepers have made a physical investment in their community’s well-being.

Our argument identifies another pathway through which QIPs may promote peace specifically in the conflict-affected settings experiencing climate change: by ensuring congruence between local conditions and the rules CPR institutions specify. Recall that CPR institutions are less effective when they specify rules about access and management which do not match the ecological and social characteristics of the CPR system. Climatic variability can throw CPR institutions out of alignment with local conditions, such that appropriators are less likely to cooperatively manage the CPR. And in settings where the rule of law is extremely weak, these disputes are likely to escalate to violence. But QIPs can help reduce the misalignment between local conditions and access rules, ultimately reducing the risk of intercommunal violence. Let us consider an example of this process using a case from UNAMID.

Increased rainfall variability resulting from climate change is occurring alongside rising levels of agropastoral conflict in the Darfur region of Sudan. Pastoral groups in Darfur migrate southwards during the dry season, when the Sahara overtakes grazing lands in Northern Darfur. This southward migration has been occurring earlier in the year as climate change has increased the variability of rainfall in Darfur. Thus, the historic arrangements dictating pastoralists' access to agricultural lands for grazing in Southern Darfur are no longer congruent with local ecological conditions: pastoralists must depart their ancestral lands to graze livestock on shared lands in the south earlier than before due to increased climatic variability. This early migration results in pastoralists' livestock destroying agricultural communities' crops, exacerbates competition for arable land and water, increases intercommunal disputes, and, in some cases, heightens the risk of intercommunal violence. In some areas, violence between and farmers has displaced hundreds.

To help relieve the pressure on grazing and water resources, peacekeepers attached to the African Union-United Nations Hybrid Operation in Darfur (UNAMID) used QIP funding to restore over 100 *rihoods*, natural catchments for rainwater that transhumant herders use during the dry season (Report C, Table A1). Local leaders reported the mission's rihood restoration project reduced the number of incidents of crop destruction, provided better grazing lands to herders, and

improved relations between farming and herding communities. In the Abu-Naeema village—a hotspot for farmer-herder conflict—approximately 500 households who fled during previous bouts of intercommunal violence returned after completing the rihood project. One community leader in Abu-Naeema remarked that no major security incidents had occurred since the rihoods’ completion and that most minor disputes were quickly and peacefully resolved (Hyman, Mpyisi-White and Donati 2020).

## **Patrol**

Local patrolling is an essential part of UN peacekeeping, as it enables mission personnel to monitor countless peacebuilding processes such as the implementation of ceasefire agreements (Doyle and Sambanis 2006; Fortna 2008), elections (Smidt 2020), and the activities armed groups (Fjelde and Smidt 2022). Indeed, contemporary UN PKOs now equip their personnel with geospatial technologies to enhance the information-gathering capacity of local patrols. In recent years, these local patrols commonly focus on observing interactions between communities in the commons, as the violent escalation of intercommunal disputes regarding resource access have become more prominent (Nomikos 2022).

Our argument suggests that UN PKOs’ local patrolling may reduce climate-related intercommunal violence by strengthening several of Ostrom’s design principles. First, the information UN peacekeepers collect while on patrol can help sustain the monitoring of CPRs throughout climate shocks, enabling appropriators to maintain clearly defined boundaries. Recall that climate change can dramatically reshape the physical and social boundaries of a CPR, requiring appropriators to demarcate new boundaries. Generating the information required to demarcate these new boundaries and subsequently monitoring compliance with them may be too costly for appropriators in conflict-affected settings, where government and local resources are limited. Contemporary UN PKOs can help appropriators overcome this barrier by monitoring how a CPR’s boundaries and

use changes. A key example of this process is when UN peacekeepers facilitate the demarcation of transhumant pastoralists' migration routes.

Transhumance differs from other forms of nomadic migration because it occurs along pre-established routes that pastoralists have used historically. Demarcating these routes is critical for ensuring cooperation between farmers and herders in the commons, e.g., by specifying where herders may graze their cattle on agricultural lands or where herders may allow their cattle to drink shared water resources. Traditionally, government and local authorities have organized meetings where representatives from farming and herding communities would work to demarcate migration routes prior to the onset of the migration season. However, persistent insecurity and corresponding declines in state authority have interrupted this practice, exacerbating existing uncertainty about transhumance migration in the Sudano-Sahel that climate change has induced over the last decade.

The missions in our sample commonly report tasking their personnel with demarcating transhumant pastoralists' migration routes, utilizing information gathered through the frequent patrolling. MINUSCA partnered with representatives from other UN agencies to provide a detailed map of the infrastructure pastoralists rely on (e.g., shared water catchments) during their seasonal migration along the Chad-Central African Republic border (Hyman, Mpyisi-White and Donati 2020), following long-range patrols along migratory corridors (Report E, Table A1). UNAMID personnel began working to demarcate pastoralists' migration routes and infrastructures as early as 2010, when they mapped the locations of shared water pools and reservoirs along migration routes in Darfur (Report A, Table A1). Following persistent tensions between farmers and herders the Mopti region in 2015, MINUSMA funded a QIP to support the demarcation of roads for seasonal cattle migration in 15 of Mopti's *communes* to prevent further conflicts from arising (Report D, Table A1).

Additionally, UN peacekeepers' frequent patrolling can strengthen Ostrom's fifth and sixth design principles—graduated sanctions and accessible mechanisms for conflict resolution—to help ensure disputes between CPR users do not escalate to violence. Disputes over shared grazing lands in the Sudano-Sahel typically escalate to violence due to the lack of accessible and effective venues

for dispute resolution. Indeed, one early UNAMID report attributes an uptick in intercommunal violence in Darfur to the inaccessibility of “traditional conflict-reconciliation practices” regarding “resource-management mechanisms” (Report A, p. 4, Table A1). Absent access to effective mechanisms for conflict resolution, reprisal killings for violating arrangements pertaining to the use of shared grazing lands are common (Report B, Table A1). When UN peacekeepers are present in hotspots for farmer-herder conflict, they may directly deter this extrajudicial violence or make its onset less likely by lowering the barriers to accessing the institutions used to resolve farmer-herder conflicts.

For example, peacekeepers attached to UNMISS frequently patrol through known hotspots for farmer-herder conflict to prevent the violent escalation of disputes concerning shared resources (United Nations Mission in South Sudan 2017). South Sudan’s state of Eastern Equatoria experienced an uptick of intercommunal violence in early 2022, as the early arrival of pastoralists onto agricultural lands led to crop destruction, looting, and a series of reprisal killings. UNMISS stepped up patrols in the state in response, with the immediate goal of physically deterring additional violence. Moreover, UNMISS systematically embedded its Civil Affairs Officers in these patrols to facilitate dialogue about peaceful dispute resolution. Similar responses by UNMISS—whereby increased local patrolling is intended to deter extrajudicial violence related to resource conflicts and restore appropriators access to local conflict resolution mechanisms—are credited with reducing tensions between farmers and herders (Report H, Table A1).

MINUSMA similarly relies on frequent local patrolling to promote the peaceful resolution of disputes between farmers and herders, by strengthening Ostrom’s design principles on graduated sanctions and conflict resolution mechanisms. In late 2022, MINUSMA established a temporary operating base in Ogossogou, a village where tensions between farmers and herders have frequently escalated to violence. Establishing this temporary operating base allowed for more frequent patrolling around Ogossogou, triggering a series of changes regarding the sharing of resources between farmers and herders. Initially, the temporary operating base enabled MINUSMA

personnel to work with regional partners in supporting intercommunal dialogues mediation and reconciliation efforts. As a result of these intercommunal dialogues, the use of graduated sanctions for violating rules regarding shared grazing lands returned, e.g., cattle raided during earlier reprisal attacks were returned. The reported aggregate effect of these activities was the peaceful resumption of nearby agricultural and pastoral activities, suggesting that MINUSMA's presence strengthened CPR governance (Report I, Table [A1](#)).

## **Mediate**

Many contemporary UN PKOs are mandated to reduce intercommunal conflict by supporting existing or constructing new venues for dispute resolution. For example, UN police officers deployed with MINUSCA in the Central African Republic have collaborated closely with the national police to address issues related to gender-based violence. In one case, UN personnel conducted educational sessions on gender violence in schools in Bangui, aiming to raise awareness, foster a culture of respect and equality among youth, and ultimately build trust between the community and law enforcement ([United Nations Peacekeeping 2024](#)).

Our argument suggests that UN peacekeepers' capacities for mediation can reduce climate-related intercommunal violence by strengthening Ostrom's third, fifth, sixth, and seventh design principles: collective choice arrangements, graduated sanctions, conflict resolution mechanisms, and minimal recognition of rights to organize.

First, the UN PKOs in our sample support the extension of mobile courts to areas experiencing heightened tensions over shared natural resources. These mobile courts may reduce intercommunal violence resulting from tensions over shared grazing lands, as we describe below, by increasing the availability of conflict resolution mechanisms. For example, intercommunal conflict is common along the border of Warrap and Western Bahr El Ghazal, two South Sudanese states where the seasonal migration of cattle heightens tensions between farmers and herders who share land and water resources. These tensions often escalate to violence, partly because persistent insecurity

and long-term demographic changes have made historical mechanisms for conflict resolution inaccessible. In response, UNMISS began logistically supporting the deployment of a Joint Special Mobile Court in hotspots of agropastoral conflict across Warrap and Western Bahr El Ghazal (Report H, Table A1). One specific function of this mobile court is to respond to and resolve conflicts between farmers and herders when formal venues for conflict resolution are overburdened and informal venues for conflict resolution are ill-equipped to handle the complexity of incoming (United Nations Mission in South Sudan 2024b). The Joint Special Mobile Court UNMISS supported in Western Bahr El Ghazal in 2021 adjudicated 24 cases involving disputes between farmers and herders over shared resources. One local leader reported that deployment of these mobile courts “definitely improved the security situation,” referring to a cooling of tensions between farmers and herders in two communities in Warrap state (United Nations Mission in South Sudan 2023). One other testimony stresses how the deployment of mobile courts “reduced criminality and promoted ownership as well as trust among people who are impacted by seasonal cattle migration” (United Nations Mission in South Sudan 2022).

Second, the UN PKOs in our sample facilitate intercommunal dialogues between farmers and herders, with the goal of negotiating new agreements for the shared use of water resources and grazing lands among key stakeholders. Indeed, the UN PKOs in our sample frequently organize pre- and post-migration conferences. The resulting intercommunal meetings take place before and after the transhumance season, with the explicit goals of enabling farmers and herders (1) to mutually establish ground rules for the migration season (e.g., arrangements for sharing resources) and (2) to reflect and revise as needed those ground rules in preparation for the next transhumance season. Such dialogues may reduce intercommunal violence from disputes over shared resources by strengthening collective choice arrangements.

For example, UNAMID organized four dialogue forums in West Darfur in November 2017, bringing together farmers and herders from the villages Tonvoka, Terbibba, Nuri, and Birkilab (Report F, Table A1). Over 650 people attended these forums, including women and youth groups:

stakeholders historically excluded from decision-making about farmer-herder relations. Participants used these forums to make explicit how farmers and herders were to use shared resources during the transhumance season. Farmers were reminded to cultivate crops away from water points that herders' livestock rely on, while herders were reminded to graze their cattle on non-agricultural lands. Additionally, these forums produced recommendations for mitigating farmer-herder tensions that UNAMID and its government partners could implement, such as the demarcation of transhumance routes and construction of critical infrastructure for managing shared resources (e.g., additional water points). The mission organized subsequent forums as the migration season got underway in early 2018, resulting in the cooling of intercommunal tensions (Report G, Table A1).

Third, the UN PKOs in our sample play an instrumental role in harmonizing higher-level policies about transhumance migration and farmer-herder relations with local mechanisms for monitoring resource use, ensuring the use of graduated sanctions for rule violations, and resolving conflict. In other words, when UN PKOs assist in the alignment of local, regional, and national practices for managing CPRs, they may preempt intercommunal violence by reinforcing CPR appropriators' rights to self-organize. A compelling example of this process is the Marial Bai Agreement ([United Nations Mission in South Sudan 2016](#); [Planetary Security Initiative 2024](#); [Adie et al. 2021](#)).

Conflicts between farmers and herders regarding the use of shared resources are common in the South Sudanese states of Gagrial, Tonj, and Wau. Traditional leaders and government officials from these three states began convening in 2014 to identify strategies for reducing farmer-herder conflict, resulting in the ratification of the Marial Bai Agreement. The agreement sets forth various rules for governing the use of shared resources during the transhumance season, such as procedures for pastoralists to move livestock through and establish camps near agricultural settlements, compensation prices for damaged crops and livestock to avoid reprisal killings, and guidelines outlining when herders are to arrive on shared grazing lands at the beginning of the dry season.

UNMISS played a critical role in supporting the implementation of the Marial Bai agreement, in two ways. First, UNMISS worked to disseminate the agreement to communities across South



Sudan where conflict between farmers and herders is common during the migration season. For example, UNMISS’s Civil Affair Division distributed over 200 copies of the agreement at a community forum in Tonj County in 2018, to “create awareness to the pastoralists communities about [the agreement], ahead of migration” (United Nations Mission in South Sudan 2018). Forum attendees—predominantly, cattle camp leaders—reported having a better understanding of the agreement as a result, particularly procedures to be implemented with host communities (e.g., about shared resource use) prior to the migration season. Second, UNMISS continuously works to facilitate dialogues enabling stakeholders from across South Sudan can participate in updating the terms of the Marial Bai Agreement. One such dialogue took place in Western Bahr el-Ghazal in 2024, during which representatives from the communities hosting pastoralists called attention to poor enforcement of provisions in the agreement about compensating farmers for damage caused by migrating livestock and its disproportionate effect on women (United Nations Mission in South Sudan 2024a).

## **Discussion & Conclusion**

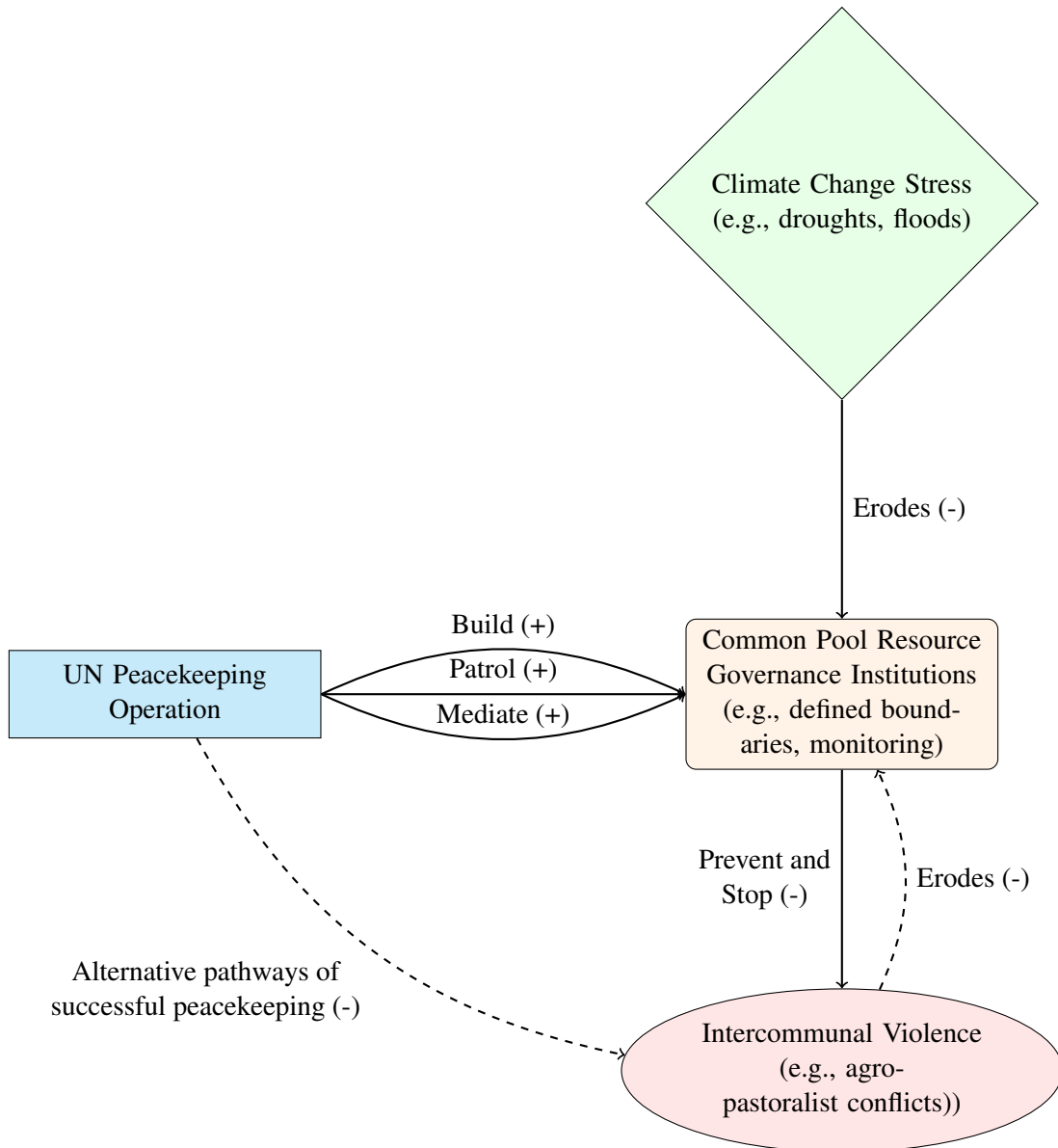
Our analysis lays out how UN PKOs can disrupt the negative feedback loop between climate change, governance, and intercommunal violence in conflict affected settings, a dynamic we illustrate in Figure 2. We begin by highlighting how climate change can disrupt the institutions underpinning effective CPR management. Without these institutions, groups that depend on CPRs like shared grazing lands have weaker incentives to cooperatively resolve disputes over resource access and use. Weak incentives for cooperation heighten the risk that intercommunal disputes over shared resources in conflict-affected settings escalate to violence. Thus, interventions capable of strengthening existing or constructing new institutions for CPR management in conflict-affected settings are needed to dampen the effect of climate change on intercommunal violence. We describe how multidimensional UN PKOs can address this need, drawing on evidence from four

operations in the Sudano-Sahelian zone that leverage their capacities for building infrastructure, deploying frequent local patrols, and mediating disputes to mitigate intercommunal violence related to conflict over shared grazing resources.

We should emphasize the descriptive and exploratory nature of our analysis. The evidence we review reports declines in the risk of intercommunal violence in areas where UN PKOs engage in de-facto CPR management. However, these reports are insufficient to conclude that UN PKOs cause reductions in climate-related intercommunal violence. Moreover, multidimensional UN PKOs' strategies to resolve disputes related to shared resources do not always succeed. For example, while some evidence suggests UNMISS's activities in spreading awareness about the Marial Bai Agreement has reduced farmer-herder conflict ([Adie et al. 2021](#)), a group of landowners impacted by the early arrival of pastoralists' livestock in Western Bahr el-Ghazal refused to sign a revised copy of the agreement in 2020 ([United Nations Mission in South Sudan 2020](#)).

Multidimensional UN PKOs face significant challenges in peacefully resolving local disputes about shared resources in areas simultaneously impacted by conflict and climate change. For one, these disputes can become intractable when they are linked to regional or national struggles for power ([Hansen 2024](#)). UN PKOs' commitment to impartiality may limit their ability to address the grievances elites use to instigate intercommunal violence ([Nomikos and Villa 2022](#)). Similarly, multidimensional UN PKOs may not be perceived as impartial actors by groups disputing access to shared resources. Recent work criticizes the state-centric nature of multidimensional UN PKOs ([Autesserre 2010, 2014](#); [Howard 2019](#)). It is possible these critiques extend to UN PKOs' work on natural resource management. If political elites actively link local resource disputes to broader power struggles, and if UN PKOs are perceived to favor certain actors in those struggles, then the actions UN PKOs undertake locally to strengthen CPR management may violate Ostrom's seventh design principle, minimal recognition of rights to organize.

The above limitations notwithstanding, our analysis contributes to the practice and study of peacebuilding in the context of global climate change. Only recently have international organi-



**Figure 2:** The relationship between climate change stress, common pool resource governance institutions, intercommunal violence, and UN peacekeeping operations.

zations begun address the challenges of sustaining climate adaptation and mitigation in conflict-affected settings. Current policies, such as the Relief Recovery and Peace Act resulting from the 28th Council of Parties of the United Nations Framework for the Convention on Climate Change, focus on closing funding gaps for conflict-sensitive climate programs (COP 28 2020). Yet how this funding will be applied remains unclear, in part because we have not fully conceptualized how conflict mitigation itself can be adapted to reduce climate vulnerability and increase resilience (Abrahams and Ober 2024). Extant research suggests that programs can simultaneously address climate and conflict risks when they focus on strengthening local governance structures (Ide 2017; Ide et al. 2021; Johnson, Rodríguez and Hoyos 2021; Johnson, Ide and Cruz 2023; Kurtz and El-samahi 2023). Our study demonstrates how UN PKOs work towards this goal, providing some rationale for why some experts believe UN PKOs can moderate the effect of climate change on conflict (Mach et al. 2019).

Generating additional evidence about UN PKOs' contributions to climate-sensitive conflict mitigation will be challenging. As Figure 2, demonstrates, there are many nodes on the causal chain linking the deployment of UN PKOs to reductions in climate vulnerability and related violence. One important step is to compile more granular data on where and when UN PKOs deploy the kinds of activities this article highlights. For example, existing datasets use publicly available deployment maps to track where UN peacekeeping troops, police, and military observers are deployed (Cil et al. 2019; Hunnicutt and Nomikos 2020a). These datasets could additionally track which local contingents of UN peacekeepers have the capacity required to deploy the activities we describe above, such as units of engineers who can assist with constructing infrastructure.

In sum, this study provides a foundation for future research on the intersection of climate change, natural resource governance, and international peacekeeping. By demonstrating that UN peacekeepers already engage in activities that support CPR management, we open new avenues for studying the role of international organizations in climate adaptation. As climate change continues

to reshape conflict dynamics worldwide, developing strategies to integrate environmental governance and peacebuilding will be essential for maintaining peace and stability in fragile regions.

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## Appendices

“Peacebuilding in the Commons: UN Peacekeeping as a Climate Change Adaptation Strategy”

### A Referenced United Nations Peacekeeping Reports

**Table A1:** Report List

Report Label	UN Document Number	Publication Date	Mission
A	<a href="#">S/2010/382</a>	Jul-2010	UNAMID
B	<a href="#">S/2010/543</a>	Oct-2010	UNAMID
C	<a href="#">S/2015/141</a>	Feb-2015	UNAMID
D	<a href="#">S/2015/1030</a>	Dec-2015	MINUSMA
E	<a href="#">S/2017/94</a>	Feb-2017	MINUSCA
F	<a href="#">S/2017/1113</a>	Dec-2017	UNAMID
G	<a href="#">S/2018/154</a>	Feb-2018	UNAMID
H	<a href="#">S/2021/172</a>	Feb-2021	UNMISS
I	<a href="#">S/2021/1117</a>	Jan-2022	MINUSMA