

# WEATHERING RISK

## Context matters

A review of the evidence of how social, economic, and other variables influence the relationship between climate and security



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# Executive Summary

The effects of climate change play out very differently in various contexts. Depending on the prevailing social, economic, and political conditions, as well as other key influential factors, some places and communities are more or less likely to see their security and living conditions severely affected by adverse climatic conditions.

The vulnerability of people and societies to extreme climatic events and changes is an important factor to consider in this context – economies relying heavily on rain-fed agriculture or pastoralism, for example, are more sensitive to climate change, and climate-related crises are more likely under such conditions. So are the resources that people and governments can mobilise in the wake of – or in preparation for – climatic shocks. People with assets and economic alternatives (e.g., to rain-fed agriculture), as well as governments that provide quality services and have effective contingency measures in place, generally fare better, both in terms of climate resilience and political stability.

Deep-rooted social inequalities and divides, on the other hand, make both people and societies more susceptible to climate-induced crises and security risks. Likewise, politically marginalised groups are not only more vulnerable to the effects of climate change, as they hold no influence over the institutions and mechanisms that are supposed to protect and support them, but they are also more likely to hold political grievances and resentment that can be exploited by extremist groups.

The relevance of these factors for the climate-security nexus becomes evident when looking at the growing empirical literature that study their effects. Reviewing more than 150 studies published over the past 23 years, we identify key social, political, legal, economic, environmental, demographic, and military-strategic factors that shape climate-security dynamics in different contexts across the globe. We further highlight a number of empirical results to inform a nuanced perspective on the connection between climatic stress and human security.

Based on our review, we make the following recommendations for addressing the security implications of climate change:

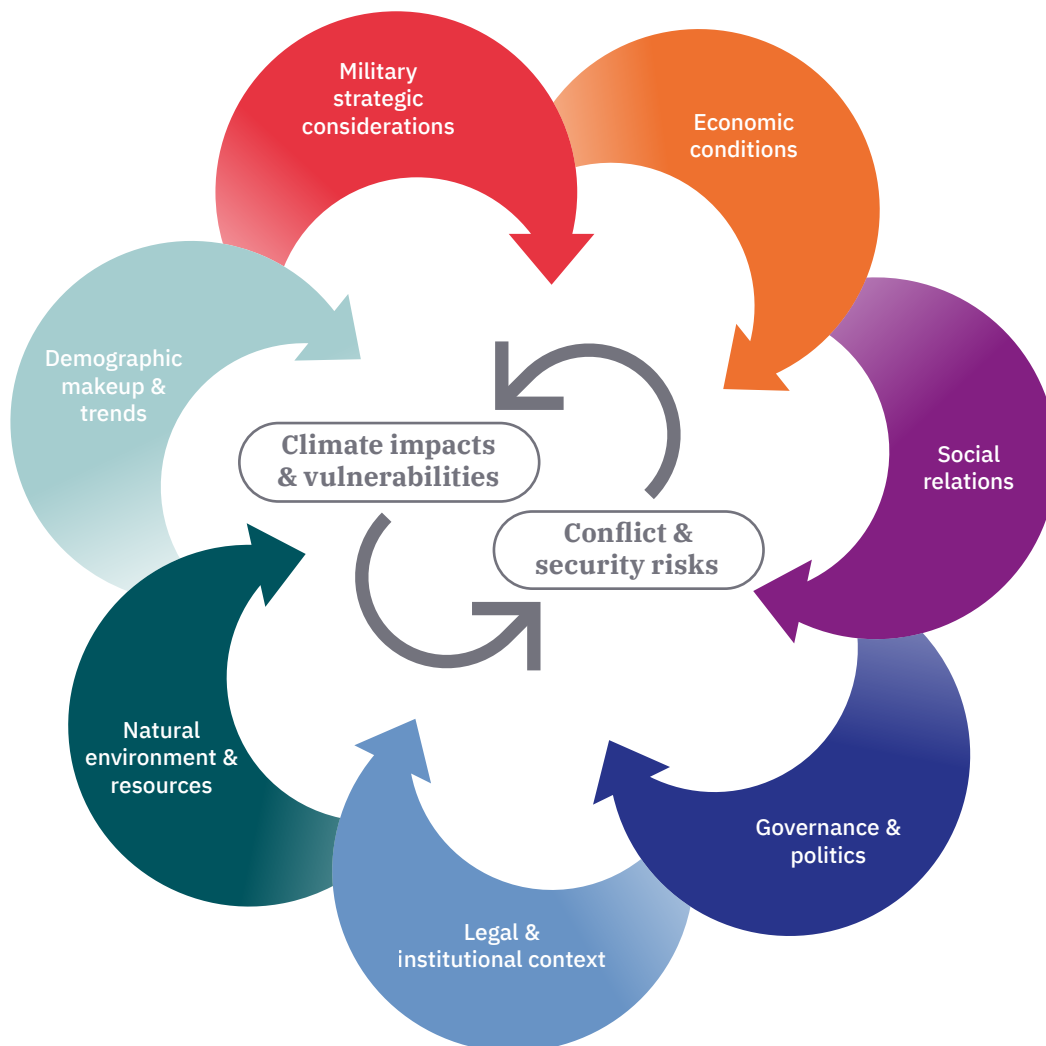
- There are many ways for safeguarding peace and stability from climate impacts, beyond climate mitigation. Levers in different sectors need to be pulled in combination to minimise the security risks that climate change entails.
- Prevention of climate-related security risks must emphasise the most vulnerable and marginalised communities in terms of economic opportunities, social status, access to services, and influence on political processes. Investing in the agency, capacity, and safety of these communities will go a long way in making societies more resilient and stable overall.
- Effective, inclusive, and coherent institutional mechanisms are key for managing security challenges in connection with climate change, degraded environments, and maladaptive responses. Investing in such mechanisms is crucial as climatic conditions are deteriorating in many places – and will continue to do so for a considerable time, even if climate mitigation efforts become much more ambitious.
- Climate change adaptation has an important role to play in the prevention of climate-related security risks. Particular emphasis must be placed on climate adaptation in fragile countries and in contexts where prevailing social challenges are most likely to be exacerbated by climate change.
- Climate finance will need to scale up and become more aware of its social impact – and hence responsibility – in receiving areas. This will require context- and conflict-sensitive approaches to avoid backdraft – that is, situations where risk reduction measures inadvertently aggravate social and environmental vulnerabilities.
- Lastly, and more generally, discussions on climate and security need to evolve and overcome dichotomous thinking. The connection between climate and security is not a matter of “yes” or “no”, but rather of “where” and “under what conditions”. Moving forward, discussions need to emphasise the interaction between social and environmental drivers of fragility and pay more attention to locally led research and expertise from around the world.

# Introduction

Discussions on the connection between climate change and security have come a long way. A good part of the expert community is moving on from debating whether there is a link at all between climate and security to considering in more nuanced ways when and how climate and security issues interact and affect each other. This shift comes as evidence grows that the effects of climate shocks play out very differently in various contexts. Where they emerge, climate impacts on human and national security are conditioned by a range of prevailing social, economic, and political conditions, as well as other key influential factors.

This paper takes stock of the past 23 years of empirical research into the many factors that shape and moderate the relationship between climate and security. It builds on an assessment of some 150 research articles, reports, and working papers, which was conducted within the framework of 'CASCADES', a project under the European Union's Horizon 2020 research and innovation programme, as well as of the German Federal Foreign Office-funded project 'Climate, Peace and Security'. Reviewing this body of literature, we identify factors of vulnerability to the effects of climate change and to their potential security

## Context factors shape climate-security dynamics



implications. We further highlight a number of empirical results to inform a more nuanced perspective on the connection between climatic stress and human security. We conclude with some recommendations for reducing climate-related security risks.

## Pathways and scope conditions

When climatic shocks like droughts or heavy rainfall affect conflict and fragility, they rarely do so directly. Links between climate and security are usually indirect and involve different pathways like the degradation of climate-sensitive natural resources (e.g., pastures, arable land, and fishing grounds) and the loss of livelihoods that depend on these resources; disputes over access to these resources; displacement of people and animosity towards migrants; food insecurity and food price hikes that lead to political tensions; grievances related to poor disaster response and management by responsible agencies and organisations; or unintended consequences of climate and environmental policies, to give some examples (Detges et al. 2020; Rüttinger et al. 2015).

These pathways will only manifest under specific circumstances. Depending on prevailing conditions, people will be more or less vulnerable to the impacts of climate change and to their possible knock-on effects on livelihoods, conflict, and displacement. For example, the adverse effects of droughts or tropical storms can be attenuated by social protection systems and insurance. Tensions over access to land or water – even if exacerbated by climatic shocks – can be dealt with by functioning mechanisms for conflict de-escalation. Climate-induced food price spikes are unlikely to trigger widespread social turmoil where effective policies are in place to cushion the effect of price hikes on households. Also, the potential effects on the risk of violence and armed conflict are moderated by existing grievances and the degree and ease with which these are leveraged by political elites and armed groups (Buhaug 2016; Detges et al. 2020; Gilmore 2017; Mach et al. 2019; Scheffran et al. 2019).

What matters ultimately is the vulnerability (or resilience) of affected communities and societies, the potential for conflicts to escalate, or the ability of people to reach agreements and find equitable solutions to climate-related challenges. Based on our review of empirical studies, we identify several economic, social, political, legal, environmental, demographic, and military-strategic context factors that are relevant to consider when dealing with climate-related security risks.

That said, our review can only cast light on factors that are discussed in the empirical literature. Other important context factors may have been omitted in this review, due to lack of data or attention by experts, or simply because they are hard to observe (and measure) in empirical studies. A general message can nevertheless be distilled from our review: when dealing with the security implications of climate change, context matters a great deal. The different facets of this finding are illustrated in the following sections.

# Economic context

 Conditions related to the economic context in which a climatic shock occurs feature prominently in the studies we reviewed for this paper (50 in total). A large part of them (39) underline the relevance of **economic assets and opportunities**, and how those enable people, communities, and states to withstand extreme climatic conditions. All else being equal, countries with a higher level of economic development have more resources to prepare for, adapt to, and recover from disasters and difficult climatic conditions (Jones et al. 2017). Financial resources allow farmers to invest in irrigation systems and other forms of farming technologies and inputs, while also allowing people to relocate more easily when living conditions become too difficult where they currently live (Castells-Quintana et al. 2018). At the same time, economically resilient communities may also be less inclined to support armed groups – lack of means and economic perspectives among young people being a potential driver of recruitment into such groups (Seter 2016).

For example, Salehyan and Hendrix (2014) find that the effect of water availability on conflict risk in a country varies depending on average incomes (i.e., GDP per capita). Similar observations using macro-economic indicators are made by Bosetti et al. (2021), Wischnath and Buhaug (2014a, 2014b) and Dell et al. (2012), who study conflicts in connection with temperature and food production shocks, or by Cervellati et al. (2011) and Slettebak (2013), who study the interaction of climatic shocks, disasters, and conflict risk with health and education levels. Uexkull et al. (2016) and McGuirk and Burke (2020) show how the intensity of night time light emissions (a proxy measure for economic development) moderates the relationship between local droughts, crop prices, and conflict events. Sneyd et al. (2013) find that food price hikes are more often connected to violent urban protests across Africa when unemployment rates are high.

**“Climate-related natural disasters can increase the risk of riots and politically motivated violence, but the effect hinges on levels of development.” SLETTEBAK (2013)**

Similarly, at the household level, a number of studies show how economic assets (e.g., cropland and livestock) attenuate the adverse effect of climatic shocks on incomes, livelihoods, and food security (Arouri et al. 2015; Dercon and Christiaensen 2011; Kurosaki 2015). Access to insurance and credit is also important, as credits help households smooth their consumption and improve their resilience to natural hazards (Arouri et al. 2015; McDermott et al. 2014; Wineman et al. 2017).

 Climatic shocks and pressures will also have a very different effect depending on whether affected people pursue more or less **climate-sensitive economic activities**. This concerns not only the economic effect of climatic shocks and pressures (Henderson et al. 2017; Juan and Hänze 2021; Wineman et al. 2017), but also their possible knock-on effects on conflict and displacement. Studying climate-conflict linkages in Sub-Saharan Africa, Almer et al. (2017) observe a higher risk of drought-related violence in areas with a higher share of cropland. Dube and Vargas (2013) show that coffee-producing municipalities in Colombia are more likely to experience violence in connection with coffee price shocks. Gawande et al. (2017) observe that districts in India with greater mining activity are less likely to experience violent conflict in connection with drought-related vegetation loss, as mining offers alternative income-earning opportunities that do not depend on local vegetation conditions.

**“ [...] for segments of the population that are particularly vulnerable to natural forces because of their dependence on agriculture, drought does significantly increase the likelihood of sustained conflict.”**  
UEXKULL ET AL. (2016)

Similar results can be found in studies looking at social groups. Uexkull et al. (2016) find that communal groups that predominantly live in rain-fed farming areas are more likely than other groups to be involved in violent conflicts when droughts hit. Likewise, Maystadt et al. (2014) find that conflict in connection with temperature anomalies in Sudan is more prevalent in areas with pastoralist and agro-pastoralist groups, whose livelihoods are particularly vulnerable to such anomalies.


 Lastly, climate impacts on incomes, livelihoods, and food security – and thus their possible knock-on effects on conflict and displacement – are also moderated by **access to markets and trade relationships**. For example, countries that import more agricultural products seem more resilient to the impacts of local weather shocks on domestic agricultural production (Garcia-Verdu et al. 2022).

However, dependence on imports, especially cereals, can make a country more vulnerable to the effects of global price spikes in the wake of droughts, wars, and other shocks in major food-producing regions. For example, Verpoorten et al. (2013) find that Sub-Saharan African countries that spend a higher share of their GDP on food imports are more likely to experience food insecurity with rising global food prices. Berman and Couttenier (2015) show that conflicts in connection with income shocks, such as changes in the global demand of locally produced agricultural commodities, are less likely in regions that are more remote from seaports – and arguably less dependent on international trade.



# Social context

Social groups' pre-existing characteristics, including their relations with other groups, can play an important role in determining the security outcomes of climatic shocks. For example, a disaster's disruptive impact on resource access can aggravate existing grievances and tensions between groups. Similarly, social groups that have historically been marginalised are more vulnerable and less able to adapt to the adverse effects of climate change (Birkmann et al. 2022).

 15 of our reviewed studies touch on social factors, of which nine delve into the theme of **social inequalities** and show how higher levels of inequality (or perceived inequality) increase the risk of conflict arising from a climatic or income shock. These papers measure inequality in terms of income disparity (Buhaug et al. 2011), land distribution (Hidalgo et al. 2010), and agricultural productivity (Vesco et al. 2021). For example, Hidalgo et al. (2010) find that land invasions in the wake of rainfall shocks are twice as frequent in Brazilian municipalities with a highly unequal distribution of land as compared to municipalities with more equitable access to land.

Gender aspects play a role here as well, with women often being differently affected by climatic shocks due to social and cultural norms regarding their household roles and generally lower access to and control of assets (Goh 2012). In Mali, the effect of gender norms on women's roles in resource management and decision-making are evident, yet women are crucial to family livelihoods and peacebuilding (Nagarajan et al. 2022). Empirical evidence is also visible in parts of Malawi, where temperature shocks more severely affect the welfare and food consumption of households in which women are managing the household's cultivated land (Asfaw and Maggio 2018).

**“ [...] adverse economic shocks, instrumented by rainfall, cause the rural poor to occupy large landholdings. Moreover, in highly unequal municipalities, negative income shocks cause twice as many land invasions as in municipalities with average land inequality.”**

HIDALGO ET AL. (2010)



Another group of studies in our review (6) explore the **strength of social relations and cohesion** between and within social groups, and how it affects the livelihood and security outcomes of climatic shocks. In general, societies with a stronger sense of community are more likely to have more developed community-based support mechanisms that can increase their capacity to cope with shocks (McNamara and Buggy 2017; Ngin et al. 2020). Evidence of this is visible in the United States, where rural communities with stronger social bonds are able to restore and stabilise community food security more quickly than other communities in the immediate aftermath of an extreme weather event (Christ and Niles 2018).

However, some papers also show how climate-related conflicts can escalate along social and family structures. Across Africa, Moscona et al. (2020) provide evidence that disputes in connection with rainfall shocks are more likely to escalate in societies with segmentary lineage relationships (i.e., strong allegiances to distant relatives), because of a higher potential for mobilising and involving fellow members in disputes. Similarly, people in Kenya who have fled a drought are more likely to support the use of violence if their family has previously been a victim of violence itself (Linke et al. 2018a).

# Political context

Political factors have a strong influence on how societies cope with climatic shocks, and whether or not conflicts emerge from them. Their importance as a conditioning factor is reflected in 44 studies covered in this review.



Political factors determine how much space people are allowed to express grievances and resolve disputes that could arise when climatic shocks disrupt livelihoods. An important factor in this regard is people's level of **political freedoms and inclusion**, as indicated by 31 of the reviewed studies.

Evidence of the effects of political regimes, and in particular the level of democracy, is mixed in the climate-conflict literature. On the one hand, democratic regimes tend to allow citizens more participation in decision-making processes and offer avenues for peaceful dispute resolution, thus strengthening people's resilience and averting the potential risk of social unrest. Support for the moderating role of political systems is found in a number of empirical studies in Africa, which show that democratic states have a lower risk of experiencing violence in connection with temperature and food price shocks (Eberle et al. 2020; Jones et al. 2017). However, there are also findings pointing in the opposite direction: Hendrix and Haggard (2015), for example, find that food price shocks trigger more urban unrest in democracies, because leaders tend to favour rural areas, which often harbour a larger voter base, and thus invest less in shielding urban citizens against shocks. Moreover, the authors argue that democracies offer more open spaces to express dissatisfaction through, for example, protests. By contrast, authoritarian leaders might be inclined to invest relatively more into satisfying (and controlling) urban populations to protect themselves from forms of popular unrest that most directly threaten them.

“ [...] large negative deviations in rainfall from the historical norm are associated with a higher risk of organized violence between societal groups. There is some evidence that political exclusion plays a role in mediating this relationship: the effect of intra-annual rainfall shortages on the risk of communal conflict is amplified in regions inhabited by politically excluded ethno-nationalist groups.”  
FJELDE AND UEXKULL (2012)

In many cases, an unequal distribution of power along ethnic, religious, and other lines is not only associated with higher levels of climate vulnerability for those who are marginalised, but also a higher risk for the escalation of social conflicts in the wake of climatic shocks. Marginalised groups are less likely to receive support or have access to necessary resources for coping with climatic pressures, which, in times of climatic stress, is a strong source of grievances (Raleigh 2010). Evidence for this is widespread in the empirical literature, particularly with regards to droughts (Buhaug et al. 2021; Detges 2017; Fjelde and Uexkull 2012; Uexkull et al. 2016) and food production shocks (Buhaug et al. 2015). For example, in Sub-Saharan Africa, Fjelde and Uexkull (2012) conclude that areas inhabited by politically excluded ethnic groups are much more likely to see communal conflicts in times of drought than other areas. Likewise, Detges (2017) shows that drought-affected people who perceive their ethnic group as being politically discriminated against are more likely to support political violence than other drought-affected people.

Closely related to this, another set of studies emphasise the role of corruption among public authorities. In Mali, for example, rent-seeking behaviour of government officials and pastoralist community leaders has been identified as an important driver of land-related violence (Benjaminsen et al. 2012). Eberle et al. (2020) further show that areas with low levels of political corruption have a lower risk of conflict in the event of a heat shock than areas with high levels of corruption.



Links between climate and security are further shaped by the **capacity of governance actors and structures** to provide for and protect people. For example, Jones et al. (2017) show that higher levels of government expenditure – an indicator of a state’s bureaucratic competency and efficiency – reduce the risk of food insecurity in connection with difficult climatic conditions. Other studies look at how well-equipped governing bodies and institutions are to mitigate price shocks, resolve disputes, and foster dialogue in the wake of climatic shocks (McGuirk and Burke 2020). For example, Linke et al. (2015) estimate that the aggravating effect of droughts on people’s attitudes towards violence in Kenya is attenuated in areas where there are functioning informal mechanisms for inter-community dialogue and conflict de-escalation.



Other studies reviewed for this paper highlight the importance of **public services, infrastructures, and government support** in helping affected people withstand difficult climatic conditions, strengthening state-citizens relations, and making them more resistant to crises. Lee (2018) finds that roads and electrical and water infrastructure tend to be better in places inhabited by groups that support the sitting government. As such, service and infrastructure provision indicate not only an area’s technical ability to withstand and recover from climatic shocks but also the level of attention and care given to the people living there. Lacking infrastructure, services, or aid can thus be a source of grievances, especially during difficult times (e.g., severe droughts) when they are most needed (Cao et al. 2022; Carlin et al. 2014). Across Sub-Saharan Africa, Detges (2016) finds that areas suffering from both extreme drought conditions and poorly developed road infrastructure experience a higher risk of violent conflict than drought-affected areas with better road networks. Similarly, Döring (2020) finds that higher night time light emissions – an indicator of infrastructure provision and hence of state presence – decrease the effect of water scarcity on the risk of violence.

“ [...] access to key infrastructures that help populations to cope with drought and prevent violence attenuate the effect of drought on the risk of conflict incidence.” DETGES (2016)

Similar effects are also observed for public insurance schemes and aid, which reflect the government’s capacity and commitment to protect citizens in the aftermath of a natural disaster. Fetzer (2020) finds that the presence of social safety nets attenuates conflict risks arising from negative rainfall shocks in Indian districts. Meanwhile, Wood and Wright (2016) discuss how aid can attenuate post-disaster grievances and help prevent dissent.



Connected to the above, pre-existing **state-citizen relations** and trust in governing and arbitrating bodies moderate the relationship between environmental and security challenges. Societies that are already suffering from political grievances and distrust are more likely to engage in social unrest in the event of a shock, as seen during the ‘food riots’ in Bangladesh and India in 2007 and 2008 (Heslin 2021). Looking at different African countries, Detges (2017) finds that people who do not trust their head of state and concurrently suffer from extreme droughts have a slightly higher risk of supporting political violence than drought-affected people who do trust their head of state. Similarly, Petrova (2022) finds that flood-affected areas across the African continent have a higher risk of experiencing communal conflict if public trust in local government councils and courts – i.e., actors who can act as arbitrators in disputes – is low.



# Legal and institutional context



A small but nonetheless significant number of our reviewed studies (10) have looked at the legal context that conditions how (climate-related) resource scarcity can affect conflict or cooperation. Eight of these studies investigate the moderating roles of formal and informal **mechanisms for regulating the use of natural resources**, especially those pertaining to land tenure and access rights. There is evidence of this in Kenya. For example, Linke et al. (2018b) find that both statutory and customary mechanisms for allocating and managing natural resources reduce the risk of drought-related violence.

Similarly, Di Falco et al. (2020) find that severe droughts in Ethiopia are less likely to raise the risk of land disputes for farm households with secure land tenure as compared to farm households lacking proper land certification. On the other hand, Guardado (2018) finds that decreases in the value of coffee production in Peru and Colombia are associated with an increase in guerrilla attacks in districts where individual land ownership prevails, as compared to other land tenure types.



[...] farm households that have been certified are significantly less likely to experience land disputes triggered by water scarcity than farm households without land certification.”


DI FALCO ET AL. (2020)




Legal context factors also matter at the international level, particularly in the form of **international treaties** that govern how shared natural resources such as transboundary rivers are managed. As shown by Tir and Stinnett (2012), if a transboundary river basin experiences severe water scarcity, a fully institutionalised river treaty can sensibly reduce the risk of a militarised dispute among the riparian countries. That said, the risk of such a militarised dispute is generally low to begin with.

# Environmental context

The effect of extreme weather events and hence their propensity to threaten security is also moderated by local topography and prevailing climatic conditions (e.g., average temperature, general level of humidity/aridity, seasonality of rainfalls). We find empirical evidence of this in 18 of our reviewed studies.

 A number of reviewed studies (11) look specifically at the degree of **physical exposure and sensitivity** of populations to climate extremes. For example, populations living in hot regions or low-lying coastal areas are naturally more exposed to and severely impacted by extreme temperatures and storm events than those living in cooler or more inland areas (Bakkensen and Barrage 2018; Garcia-Verdu et al. 2022). In Kenya, for example, households living in lowland and highland regions are exposed to different sets of climatic conditions, which affects their livelihoods and living conditions, particularly in terms of agricultural production and food consumption (Wineman et al. 2017).

 Eight of our reviewed studies emphasise the role of **natural resources** (e.g., water, land) and their accessibility to people. For example, people living close to large river bodies are less dependent on rainfall for their daily water use as compared to those without a river in proximity. As such, 'riverine' populations can be deemed less sensitive to meteorological drought and thus also less vulnerable to its possible knock-on effects on livelihoods and security (Landis et al. 2017). Conversely, people with very limited or compromised resources to begin with (e.g., in arid regions or regions affected by pollution and resource degradation) are likely to be more severely impacted by climate-induced resource depletion.

“ Mitigating roles are found for water availability, either through the proximity to a major river or the presence of alluvial soil [...]. The importance of water availability is not surprising, in particular in lowland areas, where shocks on the limited amount of water have been reported to generate conflicts about property rights and competition between pastoralists and farmers.”  
MAYSTADT ET AL. (2014)

Evidence for this is found in many parts of Sub-Saharan Africa. For example, in the Niger River Basin, acute rainfall shortages are associated with higher conflict risks for communities living further away from the Niger river (Landis et al. 2017). Maystadt et al. (2014) find that pastoralist areas in Sudan that are located close to major rivers experience fewer conflict events under extreme temperature conditions than areas further away from rivers. Likewise, they find that pastoralist areas dominated by alluvial soils (i.e., fertile soils suitable for pasture and cultivation) experience less violence when hit by difficult climatic conditions than comparable areas with fewer alluvial soils.

# Demographic context



People's exposure and vulnerability to climate-security risks are to some extent shaped by demographic context factors. In particular, **population size and density** are highlighted by eleven of our reviewed studies. Densely populated areas often imply greater demand and pressure on local natural resources, thus creating a fertile ground for increased competition and conflict in the wake of climatic shocks that alter resource availability (Berman et al. 2021; Döring 2020). However, high population densities sometimes also have a pacifying effect. Some studies suggest that dense populations could reduce the risk of conflict in the aftermath of rainfall shocks and other hazards, owing to, for example, a stronger state presence and capacity to suppress violence (Slettebak 2012; van Weezel 2019).



A similar 'resource demand and pressure' effect could also be linked to **urbanisation**. Almer et al. (2017) find that the risk of drought-related riots is higher in areas closer to urban centres, due to higher demand and competition on water resources, as well as greater potential to form large riot-inducing crowds in urban areas. Meanwhile, McGuirk and Burke (2020) find that higher consumer prices are more often associated with conflicts in urban than in rural areas, possibly because of the wider prevalence of goods in urban areas that can be violently appropriated.



[...] the effect of groundwater access on communal conflict increases with higher values for population density. [...] these findings suggest that water management becomes even more important in regions with rising population and increased urbanization.”  
DÖRING (2020)




Moving beyond population size and density, nine of our reviewed studies highlight how a **population's composition**, particularly in terms of ethnicity and occupation, acts as a moderating factor with regard to climate-security risks. For example, Eberle et al. (2020) find that areas in Africa with mixed farmer-herder settlements are more likely to experience farmer-herder conflicts in connection with rising temperatures. Similarly, in the context of the Syrian civil war, Ash and Obradovich (2020) find that drought-induced in-migration of Sunni Arabs was more likely to be associated with protests in Sunni Arab settlements compared to Kurdish settlements, possibly as migrants were seen by the host population as potential allies against the state.

The role of ethnic fractionalisation – i.e., the number and relative size of different ethnic groups in a geographic area – in moderating climate-security risks is further emphasised in studies by Schleussner et al. (2016), Couttenier and Soubeyran (2014), and Almer et al. (2017). However, it is not always clear here whether it is actually the ethnic composition of the population that matters or rather the fact that ethnic groups might have particular (power) relations and opportunities for political mobilisation depending on their relative sizes. Also, as pointed out by Bhavnani and Miodownik (2009) and Posner (2004), ethnicity and the ethnic composition of the population do not necessarily have an influence on politics and conflict dynamics, unless they are embedded in a context that is conducive to their politicisation. The precise role of ethnic fractionalisation in the climate-security nexus certainly merits further enquiry.



## Military-strategic context

A final group of factors that warrant attention in the climate-security literature are those that enable or prevent conflict actors to initiate violence and those that affect the timing, location, and targets of attacks. These military and strategic factors are covered by twelve of our reviewed studies.


 Out of these studies, five emphasise the reasons why conflict actors choose to attack **specific locations** in the context of an ongoing dispute. Some of them look at difficult terrain that offers tactical advantages for guerrilla warfare. Mountainous terrains, for example, have been found to correlate with the incidence of drought-related conflicts (Couttenier and Soubeyran 2014). Areas located close to primary roads have also been associated with a higher risk of drought-related violence due to ease of accessibility and greater benefits afforded to armed groups for capturing such infrastructure (Harari and La Ferrara 2018; Landis et al. 2017).

Similarly, areas that are primarily used for cultivation have been found to be targeted more often by rebel groups for resource appropriation in times of food insecurity (Rezaedaryakenari et al. 2020). Moreover, areas that are suitable for multiple (sometimes competing) uses, such as fringes between rangelands and farmlands that are suitable for both herding and farming, can become privileged targets in disputes over access to climate-sensitive resources (Eberle et al. 2020).


**“ [...] agro-cultivated districts are more likely to experience violence against civilians because these areas provide greater utility for forcible appropriation by rebels for the acquisition of food. When aggregate food supply shrinks, these geographic regions become priority targets of rebels for resource mobilization.”**  
REZAEDARYAKENARI ET AL. (2020)

A similar logic also applies to social, economic, and other factors that explain why **specific groups are targeted** in climate- and resource-related conflicts. For example, McGuirk and Burke (2020) find that food price hikes raise the risk for farmers to experience violence or theft, due to higher benefits for armed groups when violently

appropriating resources from food producers. In Darfur, Olsson and Siba (2013) find that villages that have the following two characteristics are more often attacked than others: (1) the presence of resources that can be appropriated, and (2) a larger population of Fur, Masalit or Zaghawa – groups that are often associated with the rebellion in Darfur and are thus targeted by pro-government militias.

 Four of our reviewed studies also point to how **past and ongoing violence** can drive up conflict risks. For example, Koren and Bagozzi (2017) investigate how the presence of conflicts can affect the decision of armed groups to use violence to forcibly appropriate agricultural resources in Africa. In times of peace, the authors find that cropland areas reduce the risk of violence, as both civilians and conflict actors strive to cooperate to ensure that agricultural resources remain accessible to all. However, in the context of ongoing violence, when food access is constrained, the authors find that cropland is associated with more violent events, as armed groups resort to force to secure immediate access.

A similar effect is observed for **proximate violence**. Buhaug and Gleditsch (2008) find that conflict is more likely to occur in the neighbourhood of ongoing conflicts, particularly when there are ethnic ties across borders. This effect is also visible for conflicts in connection with natural disasters (Omelicheva 2011) and food insecurity (Jones et al. 2017).

 Lastly, the risk of climate-related violence is also amplified when armed groups have **access to financial resources** that help them sustain their military activities. Evidence for this can be found in parts of India that are facing Maoist insurgencies: Vanden Eynde (2018) finds that, in the event of a dry weather shock, the number of rebel attacks against security forces increases when local output of coal and iron mines is sufficiently large to fund insurgent activities.

# Recommendations

The effects of climate change play out very differently in different contexts. Depending on social, economic, and political conditions, as well as other key influential factors discussed in this paper, some places and communities are more or less likely to see their security and living conditions severely affected by adverse climatic conditions. From this, we can draw a number of recommendations for addressing the security implications of climate change:

- There are many distinct and at times complex impact chains linking climatic shocks and pressures to different security risks. These chains are moderated by several factors related to adaptation, livelihoods, social protection and equity mechanisms, political voice and possibilities of legal redress, as well as conflict management and resolution institutions. This implies that **there are many entry points for safeguarding peace and stability from climate impacts, beyond climate mitigation**. These levers work over different time-frames and should be combined to minimise the security risks that climate change entails.
- Prevention of climate-security risks must emphasise the most vulnerable and marginalised communities in terms of economic opportunities, social status, access to services, and influence on political processes. As shown in the studies reviewed for this paper, these communities bear the brunt of climatic pressures and are also most vulnerable to violence, repression, and opportunism by elites and armed groups. **Investing in the agency, capacity, and safety of the vulnerable and marginalised communities** will go a long way in making societies more resilient and stable overall.
- **Effective, inclusive, and coherent institutional mechanisms** are key for managing security challenges in connection with climate change, degraded environments, and maladaptive responses. This is supported by a growing number of studies emphasising the influence of social, political, and legal factors on the connection between climate and conflict risks. Investing in such mechanisms is crucial as climatic conditions are deteriorating in many places – and will continue to do so for a considerable time, even if climate mitigation efforts become much more ambitious.
- Climate change adaptation has an important role to play in the prevention of climate-related security risks. Considering the many ways in which exposure and vulnerability to the effects of climate change also affect security and peace, **climate change adaptation needs to be at the centre of risk reduction strategies**. Particular emphasis must be placed on climate adaptation in fragile countries and in contexts where prevailing social challenges are most likely to be exacerbated by climate change. Whereas these contexts have so far been relatively marginalised in terms of access to climate finance, they are important for peace and stability. The peace dividends of adaptation need to loom larger in climate finance allocation decisions.
- Climate finance will need to scale up and become more aware of its social impact – and hence responsibility – in receiving areas. This will require context- and conflict-sensitive approaches to avoid backdraft – i.e., situations where risk reduction measures inadvertently aggravate some of the vulnerability conditions discussed in this paper: for instance, by increasing social inequalities, straining state-citizen relations, or leading to incoherent rules and regulations. Instead, **climate policies should aim to be peace-positive**, i.e., they should seek to reduce social marginalisation at the same time as they address the climate crisis and its effects.
- Lastly, and more generally, discussions on climate and security need to evolve. Far too often they are framed in binary terms and circle around questions like “Does climate change lead to more conflict or not?”. But the reality is more complex. Climate and security risks can interact in various ways – or not at all – depending on context factors. There is no single answer to the above question, nor is it even helpful to discuss it in such broad-brush terms, if the goal is to inform sensible responses to distinct and situation-specific challenges. Moving forward, **discussions need to emphasise the interaction between social and environmental drivers of fragility and the distinct ways in which they materialise in different contexts and for different communities**. Investing in locally led research and amplifying the voices of local experts from around the world will be most helpful in this regard.

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