



Climate Change & *Security* in Africa

Clear Risks, Nuanced Impacts

GMACCC Paper n°1 | December 2014



GLOBAL MILITARY
ADVISORY COUNCIL ON
CLIMATE CHANGE

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- ***The Earth's climate is warming faster than previously expected, and African countries are among the most vulnerable to climate change.*** Due to reliance on climate-sensitive activities like agriculture and fishing, Africa is projected to experience substantial losses in food production by as early as 2050. Many parts of Africa now face a number of security challenges concurrently—such as food and water stress, disease outbreaks, contests over state power, and conflict in some regions—that, when combined with more frequent climate hazards, could overwhelm governments' capacity to meet the basic needs of their people.
- ***Academic studies generally agree that there is no link between climate patterns and civil war. But studies have established a clear link between climate patterns and other types of violence within states.*** These studies show that climatic events themselves are not the cause of conflict, but can be a trigger or accelerator of conflict. Climate change may thus influence conflict by increasing the frequency and intensity of climate hazards that change the operating environment and, with it, the opportunities and grievances that influence conflict.
- ***The operating environment influences the timing and locations of violence.*** This is often based on conflict actors' calculations to maximize strategic gain. Studies using a variety of methods and data have found that violence is more likely in excessively wet and excessively dry conditions, but different types of violence tend to occur in each of these extremes. In dry periods, conflict most often involves government and rebel forces, while in wetter periods communal militias are more active.
- ***Understanding the environmental dimensions of conflicts can improve policy responses.*** Potential climate-conflict links can be examined through at least two mechanisms—climate-driven seasonal variations and climate-related disasters over time. In the cases highlighted here, climate-related factors impact conflict in an indirect and somewhat predictable way, tied to the shifting seasons. Interventions can thus target the locations and times where climate factors accelerate or amplify a particular conflict. These interventions target the points where climate factors increase opportunities for conflict, thereby reducing specific actors' ability to take advantage of such changes in the operating environment.
- ***Because climate change does not impact conflict directly, policy responses can potentially prevent the adverse impact that climate change has on security outcomes like conflict.*** Government policies on food distribution, migration, land and water use, natural resource management, adaptation aid distribution, and any number of other issues impact how their populations experience climate change and thus the grievances that conflict actors may leverage to drive conflict.
- ***Further research is needed to understand the nuanced pathways between climate change and conflict, climate change and migration, and climate change and terrorism.*** This research should focus in particular on new forms of conflict short of war in the 21st century.



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By Moran, Mulugetta & Raleigh

DECEMBER 2014

The Fifth Assessment Report of the Intergovernmental Panel on Climate Change finds that the Earth's climate is warming, and warming faster than expected previously.¹ The report also finds that there is 95% scientific certainty that human activity has been the dominant cause of the observed warming since the mid-20th century. This has major implications for human society at large, but more particularly for African societies that rely on climate-sensitive activities such as agriculture and fishing for their livelihoods. For these communities, the slightest of changes can affect wellbeing and resource productivity, which in turn place a strain on their social and cultural institutions. In the *Politics of Climate Change*, Anthony Giddens argues that under any scenario of the future, climate change is likely to be a transformative issue.² It will affect domestic resources and politics as well as the geopolitics of energy, food, and flows of capital and people, which will call for a significant degree of human ingenuity and cooperation.

There is ongoing debate in academic and policy communities about links between climate variability (and change) and social and political instability in Africa. Some argue that climate change feeds into existing ethnic, resource, and interstate tensions, sometimes leading to, or

contributing to, open violence and civil conflict. Indeed, security analysts have been raising alarm for some time now that a changing climate threatens food and water security, resources, and coastal populations, and could increase migration and raise tensions. In short, climate change serves as a stress multiplier that could strain governance capacity and societal resilience in fragile states, and therefore it needs to be taken as an important component of future development planning and conflict prevention strategies.

Even before the emergence of climate change as a public policy concern, African countries have been grappling with a range of security challenges that now interact with climate change. Challenges such as food and water stress, contests over state power, and conflict in certain regions have characterized Africa's geopolitical landscape for several decades. Regarding food security, for example, famines in the Horn of Africa have been recorded as far back as 253BC with more than forty mass mortality famines known to have affected Ethiopia in the past thousand years.³ The 'great Ethiopian famine' of 1888-92 is said to have cost the lives of one-third of the population of Ethiopia.⁴ Further,

agricultural livelihoods have evolved in manners that have created additional stress on security. For example, farmers, households, and communities historically stored surplus crops in anticipation of poor rainfall, but this traditional strategy for mitigating the risk of drought was undermined by the advent of cash crops. It is therefore important to recognize that policies, governance, and systems management are important drivers of success or system failures.

Migration as a coping mechanism to escape livelihood insecurity and political instability has long been visible in the African political landscape. In 2013, there were 3.3 million refugees and asylum-seekers and 7.6 million Internally Displaced Persons (IDPs) in Africa, an increase of about 600,000 over the previous year.⁵ Rapid movement of large groups of people not

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only impacts the people who are on the move but can also compromise the security and stability of recipient countries and whole regions. Other than conflict, the main factor causing the movement of people in Africa is a need for economic security. Migration

can thus also empower people and create new opportunities for people and states alike (for example in the form of remittances).

Africa is changing in profound ways. Its population is growing and has become more mobile, its economy is evolving, and the health of its environmental resources is declining in many areas. The scale of resource use across the continent could lead to environmental stress, which will be amplified by population growth and lifestyle changes related to urbanization. Africa's population is predicted to double to just under 2 billion by 2050—growing from the current 15% to 22% of the global total.⁶ Furthermore, Africa is undergoing a rapid rate of urbanization, and by 2030 roughly 50% of the population will live in urban areas—growing to 60% by 2050.⁷ These changes in demography and lifestyle underscore that more resources will be required to meet growing demand.

And yet, climate change is likely to create constraints on resources and new challenges for food and human security. Africa is expected to see a rise in average temperature that will be higher than the global average, and annual rainfall is projected to decrease throughout most of the region, with a possible exception of eastern Africa. Less rain would have serious implications for sub-Saharan agriculture, 75% of which is rain-fed. At the current rate of temperature increase, global average temperatures will have increased 1.5°C by 2050.⁸ Average predicted production losses by 2050 for

African crops are: maize 22%, sorghum 17%, millet 17%, groundnut 18%, and cassava 8%. Hence, in the absence of major interventions in capacity enhancements and adaptation measures, warming by as little as 1.5°C threatens food production in Africa significantly.

The question is to what extent can these impacts on livelihood systems affect the stability of African states? Many parts of Africa now face a number of security factors concurrently that, combined with more frequent natural disasters and increases in diseases such as malaria, threaten to overwhelm the capacity of governments to meet the basic needs of their people. These lead to conditions of instability and

state fragility and, under certain circumstances, may well contribute to the emergence, spread, or longevity of conflict. This is the chain of events that leads risk analysts in the security community to describe climate change as a “threat multiplier,” meaning that it has the potential to exacerbate other drivers of insecurity.

This brief examines conflict as one of the many potential security concerns that intersect with climate change. It starts with the premise that devising a response to the complex intersection of climate change and conflict requires a nuanced understanding of just how climate change is and isn't related to conflict.



Climate Change & Conflict

African states are some of the most vulnerable to climate change and are believed to be most at risk of increased violence due to climate stresses and shocks.¹⁰ Yet despite the attention and research into environmental insecurity in the past twenty years, it has proven exceedingly difficult to confirm likely security outcomes of climate change at the level of certainty that is needed to develop policy responses to these security concerns.

Why has analysis of climate-conflict links proven so difficult? This is the case for at least two reasons: First, studies have returned contradictory findings on the relationship between global climatic patterns and “violence” broadly defined.¹¹ This is possibly due to the difficulty of finding relationships that hold across continents or countries

“Local-level conflict and environmental data can assist in making informed assessments of the links between environmental patterns and violence.”

that have very particular violence profiles. Many of the links between climate and conflict suggest temporal and geographic patterns that are rooted in particular contexts and environments. This is also due to the difficulty of finding relationships that hold across the varied types of conflict. Recent studies on climate-conflict links suggest that, while climate

change is not linked to an all-encompassing concept of “conflict,” climate patterns *are* linked to various *types* of conflict.

Second, demonstrating a relationship between climate and conflict requires local-level, time-varying information on the range of instabilities that impact this relationship. Yet these data are often unavailable or difficult to acquire.

And yet, policy and military agencies are already grappling with the impacts of these security challenges and needing to develop responses based on the best-known information despite uncertainties.

What we know thus far

Several studies have sought to capture how climate patterns influence interstate war and civil war. The collective findings of these studies are inconclusive, with most suggesting no direct climate link between climate patterns and *interstate war* or *civil war*.

The conclusions are quite different, however, for the relationship between climate patterns and *other types of violence within states*. Studies using local conflict and environmental data find that both excessively dry and excessively wet conditions lead to increased violence.¹² Importantly, though, different types of violent groups tend to operate in each of these

conditions. In dry periods, rebels are more likely to increase violence. In wetter periods, smaller, communal groups who largely engage in raiding are likely to increase violence. This means that, even within a single region, if it experiences fluctuations between very wet and very dry conditions, it can also experience dramatic shifts in the level and type of violence it sees, as well as the actors engaged in that violence. The logic for these patterns is the following: rebels and government troops require dry conditions and suitable, usable infrastructure to traverse large areas, solicit food during harvest seasons, and remain healthy outside of the malaria season. In contrast, small, communal (often pastoralist) groups engage in most of their raiding and migration during wet periods when they can raid with the benefit of high cover, provide for stolen animals, and sustain herds from one water area to another. The rainy season is a high-activity and high-interaction period for these groups, whether violent or not.

This is not to suggest that the climate encouraged increased action, but that groups take advantage of environmental conditions to benefit the goals of the organization. In periods of increasing climate stresses, several changes may occur to the types, duration, and patterns of violence within states.

What is unlikely is that climate change alone—i.e. direct changes in rainfall

Climate Patterns

At the local scale, climate is a function of small scale, confined physical processes, the non-local responses to large-scale climate phenomena such as the El Niño-Southern Oscillation (ENSO) and the influence of changes to the global radiation balance as exemplified by the addition of greenhouse gases.²⁰ Local physical processes include orographic uplift and land-atmosphere couplings. Together with local weather systems, these processes control the net transport of heat, moisture, and momentum into a region that help determine the dynamics of a local climate. Modes of large-scale climate variability help determine the characteristics of local weather systems.

In association with temperature, rainfall primarily determines the amount of water available for crops, portable use, and a range of industrial activities. However, rainfall varies over scales of tens of meters and seconds while temperature varies much less both spatially and temporally. Rainfall also has a complex interannual variability and sharp gradient, meaning that the change from excessively wet to dry can take place over a small area. Even in rainfall-abundant areas, temporal variation can severely affect water supply, both from river runoff and rainfall.²¹

Thus the problems of rain-fed agriculture in tropical areas prone to water scarcity are due to the high intensity and spatial and temporal variability in rainfall, rather than low cumulative volumes of rainfall.²² The percentage of variation from average rainfall levels ranges from 20-40% and increases with seasonal rainfall averages. The result is a high risk of meteorological drought and intra-season dry spells. While many academic and policy discussions focus on meteorological droughts, the likelihood of droughts is once every 10 years.²³ On the other hand, the occurrence of dry spells—short periods of 2-4 weeks without rainfall—far exceeds the occurrence of droughts.

High spatial variability, coupled with poor distribution of rain gauges, means that there are few continuous measurements of rainfall for much of Africa, making the uniform tracking of short but recurrent dry spells difficult. Meteorologists and climatologists often therefore rely on indirect measures of rainfall from satellite data that use indirect measures of rainfall. New, more fine-grained temporal and spatial measures are thus necessary to capture the rainfall variations in communities at risk •

and temperature—will affect violence. More likely is that changes in environmental patterns will alter local and regional politics around water, land, and adaptation financing. In those scenarios, communities that can influence government policies and processes will benefit from resource politics, while other communities will change their livelihoods, suffer from high vulnerability, and may—in extreme scenarios—engage in local violence.

Testing climate-conflict links

One goal of this brief is to highlight how local-level conflict and environmental data can assist researchers and policymakers in making informed assessments of the

links between environmental patterns and violence. This brief also explores how difficult it is to bridge between physical and political phenomena, and it offers ways to parse the problem of designing policy responses to such a complex set of intertwined issues. It does so by observing three ongoing conflicts across Africa: Darfur, Mali, and South Sudan. Each conflict is occurring in impoverished states, with governance capacity constraints, and subject to environmental shifts and disasters.

By discussing several recent conflicts and their patterns, environmental problems, seasons, and vulnerability, this brief intends to display empirically supported examples that

explore where climate change is and isn't related to conflict. It demonstrates how conflict has occurred in conjunction with particular disasters and expected seasonal variation.

The case of Darfur

Conflict events have been increasing in Sudan over the last decade due to higher than average conflict rates across Darfur. Almost 385,000 people were displaced in the first half of 2014, adding to the nearly 2 million IDPs in Darfur at the end of 2013.¹³ The conflicts in Darfur have involved two main parties: the government's Rapid Support Forces (RSF) and the Darfur Joint Resistance Forces. Of particular note is the increased violence against civilians by such political

militias in Darfur. RSF forces, led by commander Mohamed 'Hemeti' Hamdan, have been actively targeting civilians and battling opposition in Darfur. RSF have been accused of beating and torturing civilians. In response to the increased violence in Darfur, the Darfur Joint Resistance Forces formed to align several opposition groups.¹⁴

Despite Darfur being labelled an 'environmental conflict' from 2004-2007, climate patterns in the region have been remarkably stable for the last 30 years. However, during the 1970s and early 1980s, there was a significant break in climate patterns in Sudan and across the Sahel and East Africa, which ultimately decreased the average rainfall in Darfur by upwards of 20%. Temperature is also reported to have increased by 1 degree Celsius in this region over the same time period.¹⁵ Overall, present climate patterns exhibit a

late summer flooding but generally stable rainfall.

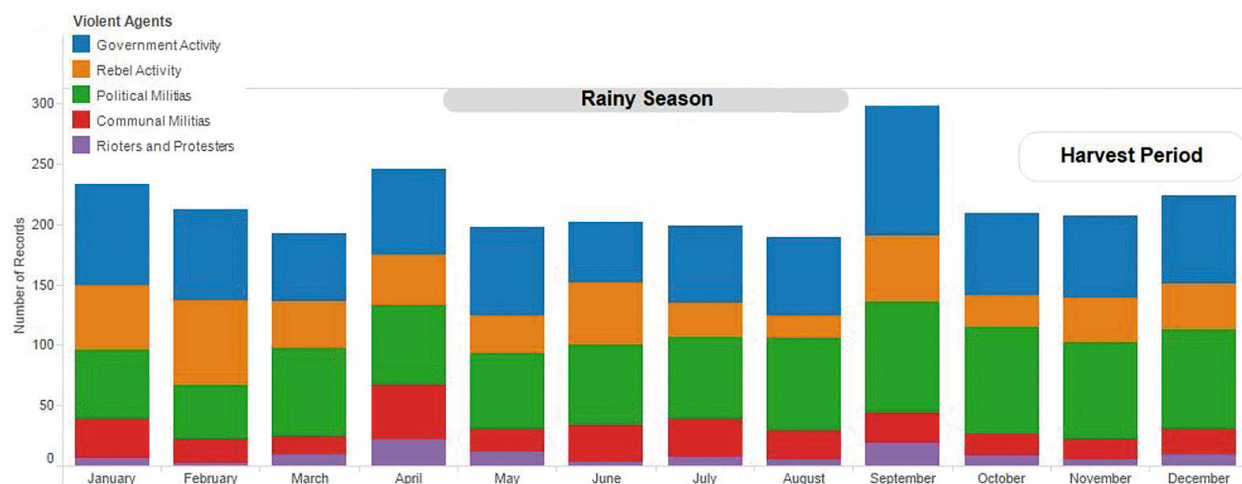
As displayed in Figure 1A, Darfur conflict is highest overall at the end of the rainy season, and highest for government forces and rebels during the transition from rainy to dry seasons. However, the yearly breakdown in Figure 1B does not suggest a particularly strong pattern to Darfur conflict overall and certainly no variation in conflict directly attributable to extreme weather events like floods during this time period.

These two ways of examining potential climate-conflict links—through climate-driven seasonal variations and through climate-related disasters over time—show that, in Darfur, climate-related factors impact conflict in an indirect and somewhat predictable way, tied to the shifting seasons. Violence is thus more likely

in the excessively wet rainy seasons and the transition to the dry season. This is consistent with global findings that violence is more likely in excessively wet and excessively dry conditions. By impacting the operating environment, climate-related changes thus *indirectly* impact conflict in Darfur by changing the opportunity structure for conflict actors. The transition to the dry season makes it easier for the main conflict actors in Darfur—government and rebel forces—to move and supply now well-provisioned troops, and it also brings roaming pastoralists into contact with conflict actors, making them inadvertent targets for violence.

This increasing violence against pastoralists highlights an important dimension of the climate-conflict links in Darfur that moves in the opposite direction from that which is often studied by

Figure 1A \ Darfur Violent Events



There are two graphs for each case example. Figure A shows the distribution of violence throughout the year by month (i.e. conflict events are summed by the month in which they occurred over the full set of years for which such detailed conflict data are available, 1997-2013). This measure indicates whether there is a clear 'seasonal' trend for different types of political violence.

All conflict data cited here are from the Armed Conflict Location and Event Data (ACLED) project, www.acleddata.com. ACLED tracks the actions of opposition groups, governments, and militias across Africa, specifying the exact location and date of conflict events from 1997 to present, with real-time data updated monthly for all of Africa and weekly for 30 high-risk states.

conflict scholars: In Darfur, it is not only that resources may impact conflict, as posited by conflict scholars, but also that conflict may cause further resource stress. In Darfur, the conflict is impacting the population's ability to adapt to a changing climate, undermining the implementation of traditional pastoralist coping mechanisms and adoption of new adaptation mechanisms. Because the Darfur area is excessively arid, roaming areas for pastoral or semi-pastoral livelihoods are key to resilience and adaptation to a changing climate. However, increased violence and attacks on civilians make these nomadic populations increasing targets for violence, as conflict actors in Darfur have increasingly used violence against civilians as a tactic in the ongoing conflict. The conflict has thus further reduced the population's ability to implement adaptation approaches and traditional coping mechanisms.

The case of Mali

Mali's conflict began in December 2012 when a military mutiny, a coup, and an ongoing insurgency in northern Mali co-occurred. The Malian north has long hosted Tuareg insurgents who contend—with reason—that the southern-dominated government has actively marginalized northern populations and failed to live up to several peace agreements.

The conflict groups in northern Mali include an Islamist, Algerian-supported organization of Al-Qaeda, which created a Sahel-based group called the Movement for Oneness and Jihad in West Africa (MUJAO) to complement its northern African activities. A splinter of the National Movement for the Liberation of Azawad (MNLA) Tuareg group resulted

in Ansar Dine, a northern-based, Islamist ally of the foreign Islamist organizations. These groups did not—at any time—note a 'grievance' or environmentally based

“In addition to increasing opportunities for conflict events, climate-related changes also contribute to grievances that can potentially fuel conflict.”

agenda for violence, and they did not manage to recruit any northern supporters to their cause due to excessive violence against local populations.

As in Sudan, climate-related factors impact conflict in Mali in a fairly predictable, though indirect, way, with conflict levels and conflict actor patterns showing regular seasonal fluctuations. Unlike Sudan, however, most conflict occurs in the dry season, with almost double conflict rates during that time, due to the largely rebel-

Figure 1B \ Darfur Disasters

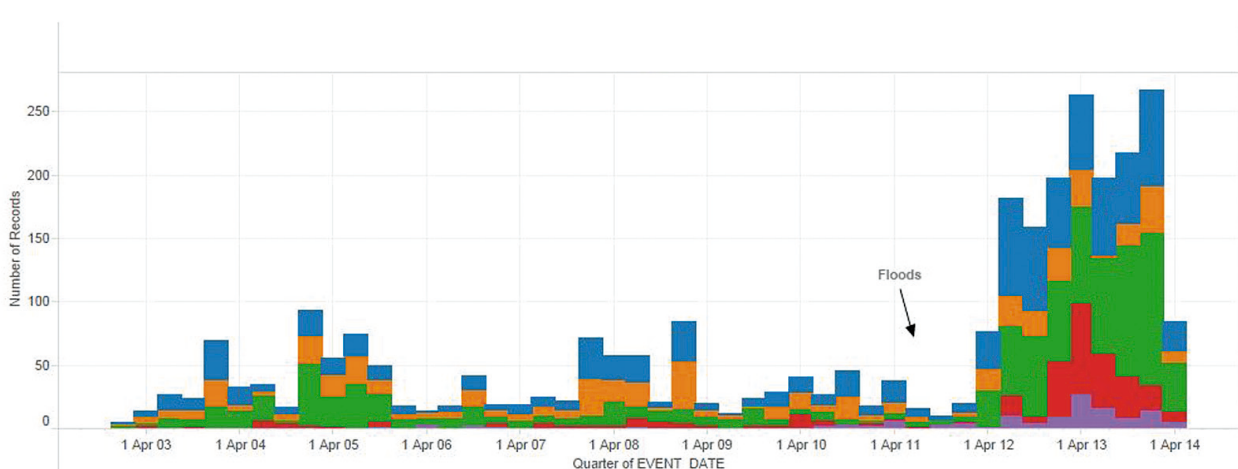


Figure B shows the distribution of conflict events in recent years, with the occurrence of natural disasters noted. This indicates whether specific natural disasters are associated with increases or decreases in conflict.

based conflict profile of Mali (see Figure 2A). This may be because rebel troops, which are typically much larger than communal militias, require dry conditions and suitable infrastructure to move their large numbers. The communal violence that does occur in Mali increases during the rainy season when herds are healthy and pastoral contests are more likely to lead to significant returns (see Figure 2A). The environment during the rainy season also provides communal militias with cover during raiding and allows raiders greater access to food and water to maintain stolen herds.

Also consistent with the data on Sudan, the conflict pattern for Mali over time does not show sensitivity to specific disaster events like floods (see Figure 2B).

This shows that, as was the case with Sudan, the impact of climate-related factors in Mali is an *indirect* one that operates through conflict actors' decision-making calculus, weighing costs and opportunities for action at

particular times. The climate impacts in Mali are thus seen in conflict actors' responses to seasonal shifts rather than one-off disaster events.

In addition to increasing *opportunities* for conflict events, climate-related changes also contribute to *grievances* that can potentially fuel conflict. In Mali, conditions in the excessively arid north and the regularly flood-prone south are exacerbated by government inattention to addressing these challenges in both regions, government dismissal of northern problems in particular, poor government capacity overall, and limited distribution capabilities of public goods. Thus, any climate and livelihood challenges experienced in under-developed and under-populated areas of the country are rarely addressed by national government institutions.

The case of South Sudan

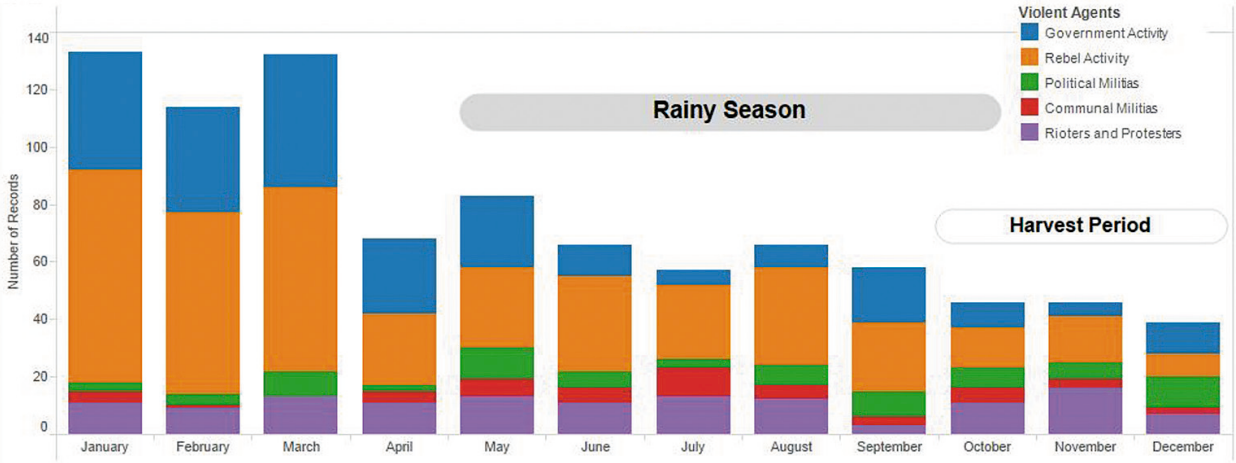
South Sudan's security situation at the national level has improved at some points

in 2014. Nevertheless, these periodic national trends mask marked variation in the dynamics and direction of violence in several key areas.

First, the share of violence that has directly targeted civilians since December 2013 in South Sudan is extremely high in absolute terms, and it contributes to considerable mass displacement and humanitarian suffering. Fighting in Malakal, Fashoda, Leer, and Duk continue to obstruct humanitarian aid and any active climate change adaptation there. Displaced populations are also particularly vulnerable to security threats, with reports of militias in Maban attacking camps in competition over resources. The rainy season exacerbates already-difficult IDP conditions and may at times displace people into Sudan.

Second, despite an overall decrease in the total number of conflict events recently, there has been a marked increase of activity by communal militias. This has been largely to safeguard their territories in Greater

Figure 2A \ Mali Violent Events



Upper Nile State, indicating increasing insecurity and a lack of rule of law as communities opt to arm themselves. In Jonglei, the Duk youth militia continues to request support from the government as well as fend off opposition forces.

Confidence in the UN is dwindling after the government seized a shipment of munitions being transported to UNMISS Ghanaian forces. The seizure sparked anti-UN protests in Wau, Juba, Yambio, and Rumbek. In response, the government restricted UN shipments, which include humanitarian supplies. This gives rise to legitimizing potential attacks against civilian aid workers.



A rising xenophobic sentiment against East Africans in South Sudan also needs to be noted. In Jonglei, accusations of Eritrea supplying weapons to the Sudan People's Liberation Army (SPLA)-In Opposition have led to intimidation of Eritrean nationals living in the region. For example, during the fighting at the

military barracks, East African civilians were targeted and killed.

In the past six months, conflict events have been highest in Jonglei, although Central Equatoria witnessed the highest rates of fatalities. Upper Nile has also seen particularly high rates of conflict, while in Abyei,

tensions between Sudan and South Sudan over control of the region have escalated. Increased violence between Misseriya and Dinka Ngok has resulted in dozens of fatalities there in recent months as well.

The Misseriya have accused the SPLA of supporting the Dinka Ngok. Likewise, the

Figure 2B \ Mali Disasters

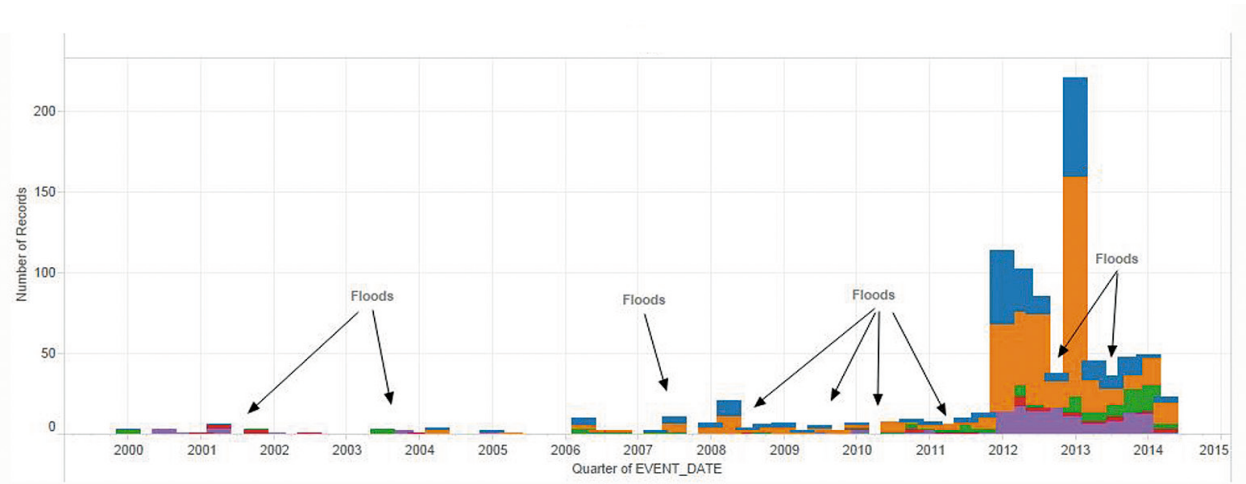
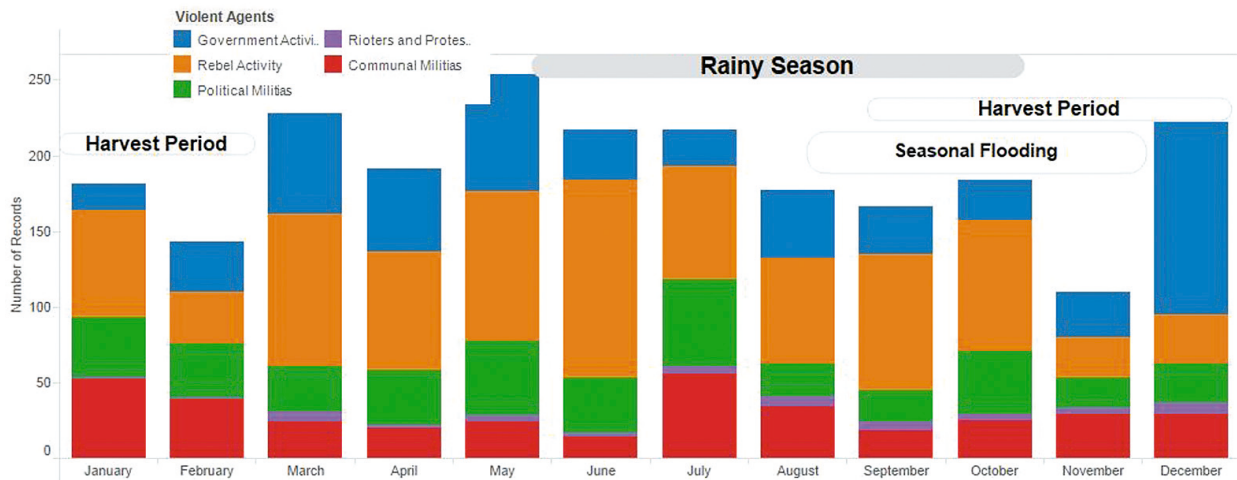


Figure 3A \ South Sudan Violent Events



Misseriya have also accused the UN of taking the side of South Sudan in the Abyei conflict. In response to both sides increasing troops in Abyei illegally, Sudan and South Sudan agreed on the reactivation of joint forces in Abyei.¹⁶

As shown in Figure 3A, though conflict in South Sudan is high throughout the year, conflict rates are highest in the dry season. Government conflict engagement is highest in the dry season and is particularly high leading into the rainy season. As in Mali, communal conflict is highest during the rainy season when communal groups have the greatest opportunity for raiding under high cover and the most to gain with well-fed herds to steal.

As in Sudan and Mali, the conflict pattern for South Sudan over time does not show sensitivity to specific disaster events like floods (see Figure 3B).

Perhaps the greatest climate-conflict challenge in South Sudan is that the

intensity of the conflict makes adaptation to climate change difficult and stalls the use of traditional coping mechanisms.

What the climate-conflict evidence tells us

Each of the cases examined here elucidates important nuances that offer lessons for understanding the relationship between conflict and climate—and for developing responses. These lessons are the following:

1. The environment influences the timing and locations of violence. This is often based on conflict actors' calculations to maximize strategic gain.
2. Studies using a variety of methods and data have found that violence is more likely in excessively wet and excessively dry conditions, but different types of violence tend to occur in each of these extremes. In dry periods, conflict most often involves

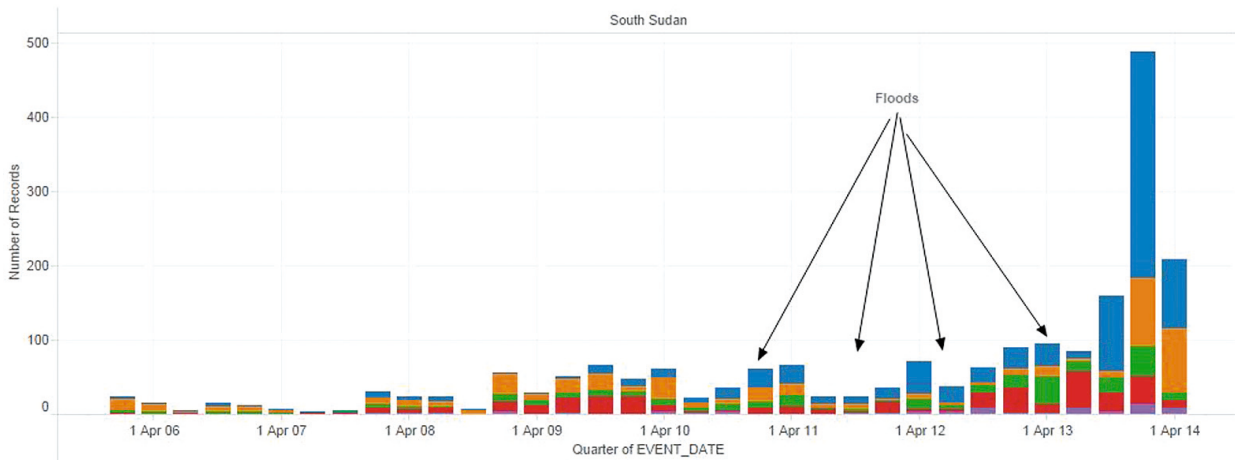
government and rebel forces, while in wetter periods communal militias are more active. Climate change may thus influence conflict by increasing the frequency and intensity of climate hazards that change the operating environment.

3. Large-scale conflicts—such as those occurring in Mali and the Sudans—are due to powerful groups contesting national power arrangements. In such circumstances, conflicts rarely display or conform to any environmental signals. But climate factors have influenced population

“These patterns underscore that climatic events are not a cause of conflict, but can be an important and persistent trigger or accelerator of conflict.”

security during these conflicts in two ways. First, climate factors change the operating environment and thus the grievances and opportunities that shape the conflict. Second, when climate-related disasters

Figure 3B \ South Sudan Disasters



(e.g. droughts) occur during such a conflict, the combination of forces can severely restrict adaptation options for vulnerable communities. Hence, civilians often suffer from excessive deprivation, as the conflict prevents them from engaging in typical coping mechanisms for environmental disasters.

These patterns underscore that climatic events are not a *cause* of conflict, but can be an important and persistent *trigger* or *accelerator* of conflict. Most conflict occurs without any climate influence, but virtually all conflict, once started, is influenced by the operating environment. The critical potential influence of climate change on conflict

is through its impact on the frequency and intensity of climate hazards, which change the operating environment for conflict actors and, with it, the opportunities and grievances that influence their decisions. Hence climate is an indirect and subjective influence on conflict.



Applying this evidence in new policy responses

The relationship between climate patterns and conflict is a nuanced one, with climate factors sometimes spurring new conflict but more often exacerbating ongoing conflicts. For conflicts driven by something

“Because climate change does not impact conflict directly, government responses can potentially prevent the adverse impact that climate change has on security outcomes like conflict.”

more than climate hazards—as in those conflicts over state power arrangements in Sudan, Mali, and South Sudan—national and international responses naturally focus on mitigating the broader conflict between the government and rebel groups. The question, then, is how does an understanding of the environmental dimensions of these conflicts impact potential new responses?

First, responses can also consider the predictable seasonal variations in levels of conflict and activity by certain actors. Interventions can target the locations and times where climate factors are known to amplify the conflict in that location. In the case of Darfur, this is during the transition from the rainy to dry seasons; and in Mali, this is increased rebel activity in the late dry season and increased communal militia activity in the rainy season. Such intervention tactics target the points where climate factors increase *opportunities* for

conflict, seeking to reduce specific actors’ ability to take advantage of such changes in the environment.

The impact of such climate factors on opportunities for conflict becomes more stark when we consider how climate hazards are expected to increase in the near term. As climate change increases temperatures and decreases annual precipitation

in places like the Western Sahel,¹⁷ this could lengthen the dry season that is Mali’s most active conflict environment, creating only more opportunity for the rebel and government conflict that dominates the Malian conflict landscape. Likewise, as climate change increases precipitation on other parts of the continent, as is projected for parts of east Africa,¹⁸ this could increase the length of the rainy season, which is problematic in areas known to have their highest levels of conflict during their rainy seasons.

There is a second rationale for climate-specific responses to conflict. Conflict responses must focus not only on the timing and targets of conflict, but also the pathways from climate impacts to these security outcomes. Because climate change does not impact conflict directly, government responses can potentially prevent the adverse impact that climate change has on security

outcomes like conflict. By managing food distribution networks, import tariffs, migration policy, land and water use regulations, natural resource management, adaptation aid distribution, and any number of other policies, governments can influence how their populations experience climate change and thus the grievances and opportunities that conflict actors may leverage to drive conflict.

Further Research Needed

Climate change, conflict and governance

At its core, the intersection of climate change and security is a governance challenge. Governance is critical to mediating the impact of climate change on population security, and a government's failure to do so brings into sharp relief the lack of government capacity to address public needs and ensure its population's security. This fuels grievances that could spark conflict and undermine both government and social stability. And yet there simply are not yet definitive findings about the most effective intervention points to disrupt potential pathways between climate-related grievances and conflict. Further research to understand the climate-related *grievances* that may drive conflict would explore:

- **Livelihood impacts of concurrent climate and conflict stressors on high-risk populations**

Populations that are likely to experience the worst effects from climate change are often the poorest and most marginalized in society. Their limited political influence and economic standing exacerbate their struggles. Due to their often-small demographic size and positions within geographic peripheries of a state, collective action to redress severe hardship is difficult and unlikely. And yet, these marginalized populations that are hardest hit by climate change impacts are also those that are often hardest hit by concurrent violence in areas where there is high violence against civilians.

- **Population responses to resource stress**

Research has not yet answered why populations that are most impacted by climate change and that are thus theorized to be most prone to violence in fact have among the lowest conflict rates of any segment of society. The cases cited here illustrate a broader finding that empirical evidence does not support the oft-heard assertion that those *most impacted* by climate change are *most likely* to channel those

grievances into conflict. What does this tell us about population's responses to resource stress and conflict?

- **Pathways from climate change impacts to conflict**

Resource scarcity, competition, and uncertainty anchor presumed relationships about the environment and group-level violence. Yet existing studies on all three insecurities suggest that each has its own distinct pattern of normalcy and shocks, and that people already actively adapt to these known patterns.¹⁹ There is thus not yet a testable theory explaining why climate change impacts would drive people to abandon these known patterns of adaptation to instead compete through conflict.

Climate change and migration

The issue of climate change as a cause for migration has gained considerable currency in global climate negotiations and has entered the policy agenda of many countries. Yet, little evidence-based research exists to inform sound decision-making and better preparedness to address humanitarian responses linked with migration due to environmental change. Further research on potential links between climate change and migration would thus explore:

- **Drivers of migration**

Migration can result from a combination of various “push” and “pull” factors. It is thus critical to assess the extent to which an environmental change or climatic factor is the primary driver—or simply one of many drivers—of migration. More evidence-based research is needed to characterize the *push factors* in areas of origin (e.g., livelihood insecurity, environmental hazards, conflict, and demographic pressures that drive people out of a location), the *pull factors* in areas of destination (e.g., demand for labor or population aging that draw people to a new location), and the combination of these factors. Research building a migration inventory—that sheds

light on locally specific reasons for displacement or voluntary migration—would help inform a variety of policy responses.

- **Nature and character of migration**
Understanding whether migration is forced or voluntary is critical to developing policy responses and building institutions to meet public needs. In some situations, such as extreme events, people may have little choice but to move, and in other events where environmental change is gradual, movement is more likely to be voluntary and linked to other economic, social, and political factors. In the latter's case, longer-term protection and social integration may be required, which will have resource implications.
- **Composition of human migration**
Who moves and who stays matters to climate adaptation. In cases of slow environmental change, those with resources and social networks tend to move independently. The most marginalized and vulnerable sections of society, such as elderly single women and young children, may not have the resources to move and may actually be forced to stay during a disaster. The effect of different forms of migration on adaptation is not well understood, and research could build case studies to support evidence-based policies at humanitarian and national institutions.
- **Location of migration**
There is currently little research into why northern and southern Africa experience different patterns of migration. Research would be beneficial to explore why there seems to be less climate-related migration in Africa south of the Equator.
- **Implications for recipient communities**
Settlements, displacement, and mass movement of people fleeing conflict, droughts, and floods to an already resource-stressed area may deplete that area of resources. Further research is needed to understand the responses of host communities to the influx of new settlers. Similar analysis should assess

attitudes to trans-continental migration and the situation along the North African littoral.

- **Levels of protection**
People displaced by climate-related disasters and conflict face different protection challenges relating to, for example, food, shelter, water, healthcare, and sexual and gender-based violence. Those displaced by slow environmental change may not receive the same level of attention and protection as refugees and persons displaced due to conflict and sudden-onset disasters. Research into the role of policies and institutions for a variety of protection regimes and financing could inform preparedness to address a variety of human security concerns.

Climate change and terrorism

Likewise, researchers and policymakers have increasingly considered whether climate change and terrorism are related, yet evidence-based findings are not conclusive. Further research on potential links between climate change and terrorism would explore:

- **Weakening of state institutions**
There is some anecdotal evidence that the pressure caused by climate change may lead to competition for resources, placing additional burdens on economies and societies. For weak government institutions that do not have the capacity to meet this challenge, this leads to the further erosion of governance institutions and increased social tensions that enable terrorist activity and other forms of violence to become the norm. Further, the weakening of state institutions or lack of effective governance may contribute to widespread misuse and overuse of natural resources and environmental degradation.
- **Terrorism and mal-adaptation**
Adapting to climate change is critical for social stability and community cohesion. However, in areas where there is a high frequency of conflict, terrorism, and insurgency activity, the opportunity to implement planned adaptation activities may not be

possible. Further research on these potential links is needed.

Sources of expertise and data for further research

A number of academic institutions are producing research and datasets available for public download and use:

- Armed Conflict Location and Events Data Project: www.acleddata.com
- Institute for Security Studies: www.issafrica.org
- Social Conflict Analysis Database, www.scaddata.com
- UN University for Peace, Africa Programme: www.africa-upeace.org
- University College London, Department of Science, Technology, Engineering, and Public Policy: www.ucl.ac.uk/steapp/research
- University of Cape Town, Climate System Analysis Group: <http://cip.csag.uct.ac.za/webclient2/app>
- University of Texas at Austin, Robert Strauss Center for International Security and Law, Climate Change and African Political Stability Program: www.strausscenter.org/ccaps

A number of national and multilateral institutions likewise make research and data available:

- Intergovernmental Panel on Climate Change: www.ipcc.ch
- South Africa Council for Scientific and Industrial Research: www.csir.co.za
- UN Development Programme, Climate Community: www.undpcc.org
- UN Economic Commission for Africa, African Climate Policy Centre: www.uneca.org/acpc
- UN Environment Programme, Climate Change: www.unep.org/climatechange

- UN Environment Programme, Division of Early Warning and Assessment-Africa: www.unep.org/dewa/africa
- UN Environment Programme, Millennium Ecosystem Assessment: www.unep.org/maweb
- UN Habitat, Climate Change: <http://unhabitat.org/urban-themes/climate-change>
- UN Population Fund, Demographic Exploration for Climate Adaptation: www.unfpa.org/pds/climate

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