



CLIMATE-FRAGILITY RISK BRIEF

NORTH AFRICA & SAHEL

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Climate-Fragility Risk Brief: North Africa & Sahel

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The **climate diplomacy initiative** is a collaborative effort of the German Federal Foreign Office in partnership with adelphi. The initiative and this publication are supported by a grant from the German Federal Foreign Office.

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Published by:
adelphi research gGmbH
Alt-Moabit 91
10559 Berlin
Germany
www.adelphi.de

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Date: April 2020

Editorial responsibility: adelphi

Layout: Katarina Schulz, adelphi



Contents

| | |
|--|-----------|
| 1. INTRODUCTION | 4 |
| 2. CLIMATE CONTEXT | 6 |
| 3. REGIONAL RISKS AND RESILIENCE | 8 |
| 3.1. Farmer-herder conflicts | 10 |
| 3.2. Tensions related to climate-induced migration | 11 |
| 3.3. Conflict over water allocation | 11 |
| 3.4. Impacts on state capacity and the growth of armed opposition groups | 12 |
| 4. GLOBAL DEVELOPMENTS ON CLIMATE SECURITY | 13 |
| 5. NATIONAL AND REGIONAL DEVELOPMENTS | 13 |
| 6. ENTRY POINTS FOR ADDRESSING CLIMATE FRAGILITY RISKS | 14 |
| REFERENCES | 16 |
| ANNEX | 17 |

1. INTRODUCTION

Africa has been identified as the region where climate change is most likely to undermine security and trigger violent conflict (Scheffran, et al. 2019). This effect may be most pronounced in the Sahel, an area with a history of violent conflict and climate vulnerability, itself a result of the region's poverty, low levels of development and reliance on livelihoods, such as rainfed agriculture and migratory livestock herding, that are highly sensitive to droughts and floods.

This risk brief aims to provide a concise overview of peer-reviewed literature on the links between climate change and violent conflict in the Sahel, Sahara and North Africa (see section 8 for a list of references used). It makes no claim to be comprehensive but endeavours to provide a balanced view of the current state of knowledge as a way of triggering further debate.¹

The area under discussion is a huge swathe of land comprising all or part of 17 countries²: roughly 6,000 kilometres from west to east and 3,000 kilometres from north to south - from the Atlantic in the west to the Red Sea in the east to the Mediterranean in the north. It is politically, ethnically, linguistically, economically and climatologically highly diverse.

Whereas Sahelian countries all rank low on UNDP's 2018 Human Development Index, North African countries have generally higher levels of development. Levels of hunger and malnutrition reflect this distribution: all the Sahelian countries, with the exception of Senegal, are listed as being of serious concern on the 2017 Global Hunger Index, which is produced by the International Food Policy Research Institute. By contrast, hunger in most of the North African countries is of either low or moderate concern, with the exception of Libya, where data were insufficient (IFPRI, 2017). Meanwhile, an estimated 345 million people across the region lack access to electricity. Chad, South Sudan, Burkina Faso, Mauritania and Niger all have rural electrification rates of 5% or less (IEA, 2016).

The countries also have wildly different water 'budgets' in terms of the quantity of renewable freshwater resources found within their borders - from just 20 cubic metres per person in Egypt (where the vast majority of the country's water flows down the Nile from upstream countries) to more than 12,000 cubic metres of internal water resources per capita in Cameroon (World Bank, 2014).

However, what many countries in the region do have in common is the experience of violence and fragility, either within their own borders or among their direct neighbours. According to the Heidelberg Conflict Barometer (2018), every country in the region with the exception of Eritrea was experiencing a violent crisis of one sort or another in 2018. Five countries (Libya, Egypt, Sudan, Ethiopia and Nigeria)

¹ An early version of this brief was a desk-based literature review, supplemented by structured interviews. This provided the background paper for a one-day Regional Dialogue on Climate Security in North Africa and the Sahel, which was held on 29th November 2019 in Rabat, Morocco. High-level representatives from governments across the region, from international and regional organisations (including the 3S Initiative, the G5 Sahel, the Union du Maghreb Arabe (UMA), and the African Union) as well as from European partners, participated in this meeting. The discussions during that event informed the final version of this risk brief. The brief has also greatly benefitted from a review by Ms Barbara Bendandi of the UN Convention to Combat Desertification (UNCCD) and Dr Hammou Laamrani of the League of Arab States. Any errors of fact or emphasis remain the sole responsibility of the author.

² Groupings may vary, but for the purposes of this paper the region includes Morocco, Algeria, Tunisia, Libya and Egypt in the North African Maghreb, as well as the Sahelian and Sahara parts of Mauritania, Mali, Niger, Chad, Nigeria, Sudan, South Sudan, Eritrea, Ethiopia, Cameroon, Burkina Faso and Senegal.

met the threshold for full war, and another three met the threshold for limited war (South Sudan, Cameroon and Mali). The OECD lists every Sahelian country, with the exception of Senegal, as either fragile or extremely fragile, and categorises Libya and Tunisia as fragile (2018).

But the Sahel hasn't always been known for its poverty, regular famines and political instability. Until the twentieth century, the Sahel was largely self-sufficient in terms of food security and even exported part of its harvest (Descroix and Lambert, 2018). Part of the explanation for this precipitous fall in regional fortunes has been the intertwined impacts of a fluctuating climate and land degradation.³ As Descroix and Lambert (2016) argue, the devastating 25-year drought in the Sahel between 1968-1993 contributed to the partial destruction of essentially rural Sahelian societies. The reconstruction of these societies continues today.

³ The degradation of arable lands has been a major concern for livelihoods and food security in the Sahel. However, there is no overall consensus about the severity of land degradation in the region. Earth observation data suggest an overall increase in vegetation that can be confirmed by ground observations. However, it remains unclear if the observed positive trends provide an environmental improvement with positive effects on people's livelihoods (UNCCD, 2017).



2. CLIMATE CONTEXT

North Africa and the Sahel is made up of three distinct biomes - the Mediterranean, the Saharan and the Sudano-Sahelian, with correspondingly diverse climates. The Sahara is one of the world's driest and hottest regions, with annual rainfall of less than 100mm and average temperatures around 30 degrees centigrade. Meanwhile, the southern Sahel receives between 700mm and 1,000mm of rain per year. By contrast, parts of Tunisia receive 1,500mm per year and about 2,000 mm of precipitation per year fall in the Atlas mountains in Morocco, where skiing is possible in winter.

Climate fluctuations have shaped the region for millennia. During a much wetter period some 5,000 years ago, the area that is now covered by the Sahara was actually one of the first parts of Africa to be farmed (Benjaminsen, 2008). Meanwhile, the edge of the Sahara desert has, over the centuries, moved north and south in response to changes in average rainfall. However, human-produced greenhouse gas emissions are now forcing shifts in climate that are appearing far faster than any changes that have been observed in the geological record.

Over the last 50 to 100 years average temperatures in Africa increased by 0.5 degrees centigrade (IPCC, 2014). The climate that the region can expect in future depends, in large part, on the level of continuing emissions of greenhouse gases (GHG) and their complex interactions with the interlinked factors (land cover, pollution levels, tipping points and so on) that combine to determine average temperatures and precipitation levels.⁴

Temperatures in the region are predicted to rise faster than the global average (IPCC, 2014). Although there are differences between sub-regional models, under a high-emissions scenario the mean average temperature across Africa may rise by more than 2 degrees centigrade by the end of the twenty-first century, increasing heat stress on people, plants and livestock. Under such a scenario it is possible that some currently inhabited areas may become unable to support populations. Meanwhile, sea level rise and possible reductions in the flow of the Nile could have significant impacts on Egypt, in particular the area of the Nile Delta (Alda, 2014).

What this warming will mean for rainfall is less clear. Scenarios for North Africa suggest a likely reduction in rainfall along the Mediterranean, with especially steep drops possible in the Atlas mountains of Morocco (UNESCWA, 2017). However, on average, the total amount of precipitation in the Sahel stays largely constant across all climate models, though there is expected to be a significant increase in climatic variability, meaning more frequent droughts and heavy rainfall events (IPCC, 2014). Finally, an increase in evapotranspiration caused by higher temperatures could reduce the overall amount of water available for farming and livestock rearing. The IPCC notes that the impacts of climate change will be superimposed onto already water-stressed catchments. Nevertheless, the IPCC estimates that climate change will have a relatively modest impact on water scarcity when compared with some of the other powerful drivers of increased

⁴ The international community uses climate models, known as Representative Concentration Pathways (RCPs), to describe four different 21st century 'futures' depending on GHG emissions and atmospheric concentrations, air pollutant emissions and land-use. The RCPs include a stringent mitigation scenario (RCP2.6 - representing ambitious international action to mitigate climate change), two intermediate scenarios (RCP4.5 and RCP6.0) and one scenario with very high GHG emissions (RCP8.5 - in effect a business-as-usual scenario) (IPCC, 2014).

water demand, such as growing populations, rapidly expanding cities and spreading agricultural production (IPCC, 2014).

The region, and in particular the Sahel, is seen as highly vulnerable to the impacts of climate change as a result of its reliance on rainfed agriculture, decreasing land productivity, low levels of development, weak infrastructure, largely non-existent social safety nets and high exposure to natural disasters and economic shocks. Periodic droughts caused great hardship in the 1910s, the 1940s and between 1968 and 1993 (Descroix and Lambert, 2018). Serious floods have also been a major problem, striking Dakar in 2012, Ouagadougou in 2009, Bamako in 2013, and Niamey repeatedly (in 2004, 2010, 2012, 2013 and 2016) (Descroix and Lambert, 2018). Conflict and fragility in the region weakens countries' abilities to adapt to the impacts of climate change, potentially setting in motion a self-reinforcing conflict trap.

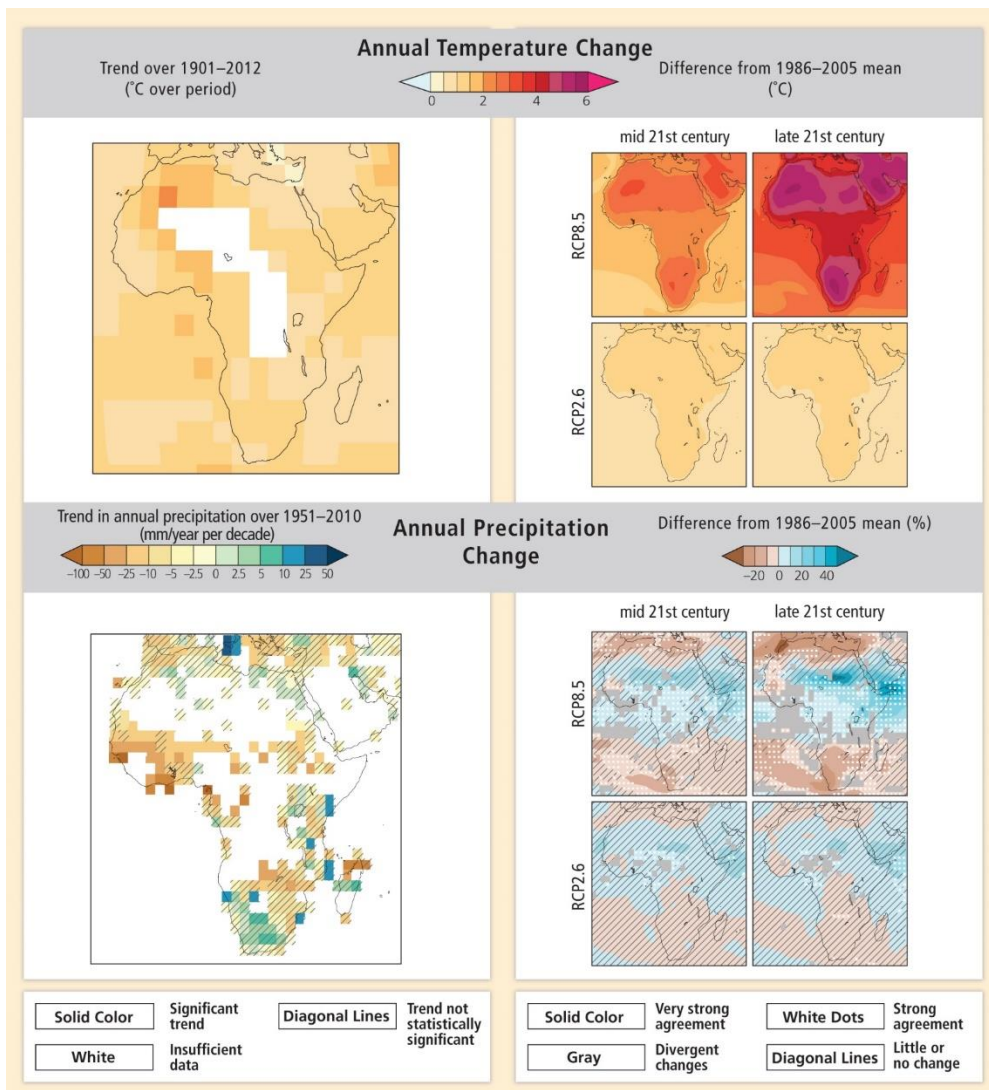


Figure 1: Projections for rainfall and temperature in Africa by 2050 and 2100 (IPCC, 2014)



3. REGIONAL RISKS AND RESILIENCE

As the IPCC notes, climate change and climate variability have the potential to exacerbate or multiply existing threats to human security including food, health, and economic instability. All of these issues are already of concern in the Sahel and North Africa and many of these are known drivers of conflict (IPCC, 2014).

Ruettinger et al. (2015) summarized the possible links between climate change and violent conflict in a report commissioned by the G7 countries. In the report they argued that climate change exacerbates seven distinct ‘risk clusters’: 1/. Local resource competition, 2/. Livelihood insecurity and migration, 3/. Extreme weather events and disasters, 4/. Volatile food prices and provision, 5/. Transboundary water management, 6/. Sea-level rise and coastal degradation, and 7/. Unintended effects of climate policies. These findings are replicated across much of the ‘grey literature’ in the form of policy reports and speeches that argue that climate change is a ‘threat multiplier’ that will make existing problems more intractable.

However, there is considerable academic debate about the extent to which climate change might trigger violent conflict. On the one hand, Hsiang and Burke (2014) examined 50 quantitative empirical studies and found “strong support for a causal association” between climate change and conflict at all scales and across all major regions of the world. Scheffran et al. (2019) argue that climate change, in conjunction with other drivers, can undermine human security and livelihoods of vulnerable communities through a variety of different pathways.

However, Buhaug et al. (2014) argue that such meta-analysis is not representative. Buhaug and his co-authors suggest that many of the studies are distorted by a version of the ‘spotlight effect’ where research sites are chosen on the basis of there being existing violent conflict as well as known climate vulnerability. Furthermore, they argue there is a lot of overlap among the studies which often assume singular, homogenous causes and tend to oversimplify the complex underpinnings of conflict. Adams et al. (2018) agree that there may be a bias in the results, noting that studies have tended to focus on a small number of cases where there has been conflict and pointing out that the same studies often struggle to explain peaceful outcomes that occur despite the impacts of climate change.

Brottem (2016) suggests that the debate has become a ‘dialogue of the deaf’ between modelers who argue that there is a robust relationship between climate anomalies and conflict and scholars who are sceptical of this assertion. But, as Scheffran et al. (2019) note, while sweeping generalizations may not be justified, the absence of a clear link does not mean there is no link. In fact, a 2017 review of 86 peer reviewed articles found that 48% of these concluded that climatic variables influence conflict, whereas 24% found they did not influence conflict and 28% had mixed results (Detges, 2017).

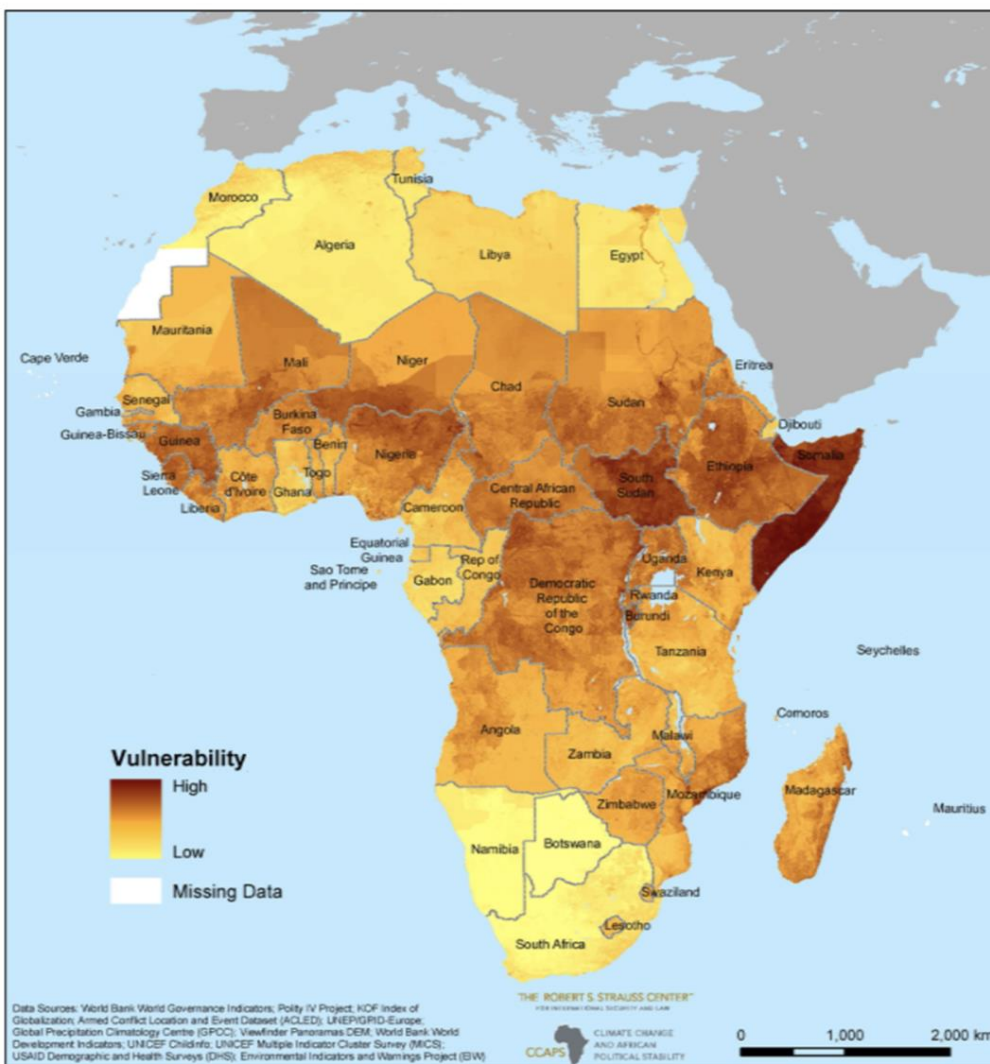


Figure 2: Map of composite climate vulnerability in Africa. Combining Indicators of Physical Exposure, Population Density, Household and Community Resilience, Governance, and Political Violence. Source: Busby et al. 2014 (Figure 6, p.6), reprinted with permission.

The Climate Change and African Political Stability Project (CCAPS) applied a composite climate-security vulnerability model, which combined indicators of physical exposure population density, levels of resilience, quality of governance and prevailing levels of political violence. Although such a layering of indicators cannot tell us much about the causal links, it suggests that the area most vulnerable to climate conflict ranges across the southern Sahel, with the risk of climate-related conflict falling towards North Africa, as the summary map (Figure 2) from the project shows (Busby et al., 2014).

In the case of North Africa and the Sahel, **four broad links between climate change and the possibility of violent conflict** emerge from the literature.

3.1. Farmer-herder conflicts

Historically the population of the Sahel was made up of semi-nomadic pastoralists, with some farmers practising agriculture where the soil and rain conditions permitted. Farmers and herders have a history of mostly peaceful cooperation over resources; these interactions were shaped by customary rules about resource access and traditional mechanisms for resolving disputes (Scheffran et al., 2019).

However, over the past few decades, rapid population growth has expanded the amount of land under agriculture, while climatic variability has shifted the routes herders use to take their livestock to find new pastures. In parts of Sahelian West Africa, the severe droughts of the 1970s and 1980s caused a southward shift of semi-nomadic herders, who moved to find pasture during the droughts that, in some cases, caused them to settle in areas where they had previously only spent part of the year (Brottem, 2016).

In essence, these farmer-herder conflicts are a result of a seasonal incompatibility between the two livelihoods. Such differences become particularly acute when farmers are attempting to harvest their crops after the rainy season without damage from passing livestock (Brottem, 2016). In the West African agro-pastoral zone, this is increasingly difficult because the period during which crops are maturing in fields while livestock are roaming in the same area has stretched to several months due to changes in both environmental conditions and livelihood strategies.

In many places, blocked access to pastures for herders and damage from livestock for farmers have become the norm, and tensions have risen, particularly where local institutions and jurisdictions are unable or unwilling to resolve the issues. These simmering latent conflicts are more likely to erupt into violent direct confrontation when one group perceives a lack of justice or respect from the other (Brottem, 2016).

Research in Burkina Faso showed that climate change and climate variability are negatively accelerating land degradation and reducing livestock health, while the frequency and severity of extreme climate events are simultaneously decreasing the livelihood security of farmers (Abroulaye et al., 2015). One way of looking at the problem is that the growth of farmer-pastoral conflicts is a maladaptive strategy from farmers and pastoralists to their deteriorating environment (Adamu and Umar, 2017). However, by focusing on temperature and rainfall as proxies for climate change, researchers may be overlooking the more complex environmental changes occurring in dryland sub-Saharan Africa that are related but not limited to climate change, such as the increase in livestock populations and the expanding footprint of agriculture (Brottem, 2016).

3.2. Tensions related to climate-induced migration

The second link is the potential impact of climate change on the forced or voluntary migration of people, either within or outside their own country, and the resulting likelihood of violent conflict in the places to which they go.

There is a history of mass population movements in response to climate variability throughout the Sahel and the Horn of Africa (Scheffran et al., 2019). Most research agrees that environmental factors do not work in isolation from many other powerful factors such as population growth, awareness of opportunities elsewhere and the means to travel. Rather, they contribute to pre-existing migration flows. Alda (2014) argues that young people in rural areas may be particularly vulnerable to climate change if it further reduces their livelihood options.

The ways in which environmentally forced migration may contribute to conflict is itself a source of much academic debate. A study of civil wars found that of 103 ethnic conflicts, 32 included violence between members of an ethnic minority resident in a particular region and recent migrants from other areas (Fearon and Laitin, 2003). A study that analysed 38 cases since the 1930s in which environmental factors played a role in triggering mass migration concluded that in 19 instances some form of conflict resulted (Reuveny, 2007).

Brzoska (2016) argues that the links between climate change, migration and conflict are complex and the empirical support for a strong relationship between migration and conflict link is weak. Benjaminsen (2008), on the other hand, argues that the droughts on 1970s and 1980s did play a role in the Tuareg rebellion in northern Mali but not by the typically cited mechanism of drought-induced scarcity. Instead, he argues that the droughts encouraged the migration of thousands of young men to Algeria and Libya, where they were exposed to revolutionary ideas. They were then further politicised and radicalised by a sense of political marginalization coupled with anger over the embezzlement of drought relief funds by government officials in Bamako.

3.3. Conflict over water allocation

The third area of possible conflict is related to changes in the availability of water. Water scarcity and competition in river basins is strongly associated with low-level conflict at a community level (Scheffran et al., 2019). In the case of Darfur, there is a robust correlation between the probability and intensity of violence and long-term changes in the availability of water and fertile land (De Juan, 2015).

There is considerable debate over the extent to which shrinking water resources can trigger international disputes (Petersen-Perlman, Veilleux, & Wolf, 2017), though the Nile has been the cause of significant tension among Egypt and its upstream neighbours in the past. Interestingly, periodic droughts in the Sahel have had cascading impacts on the broader hydrology of the region. For example, the 'grande sécheresse' of 1968 to 1993 resulted in an average reduction in rainfall of 25%-30%, but the major river basins experienced a drop in flow that was twice as large, with a reduction of 55% of the flow in the Senegal river basin and 60% in the Niger river basin, and a 90% drop in the size of Lake Chad (Decroix and Lambert, 2018). This implies that, in the future, even moderate drops in rainfall could have outsized impacts on the quantity of water flowing across borders, with potentially serious implications for the management and allocation of that water as well as the economies and the livelihoods of the people who rely upon it.

3.4. Impacts on state capacity and the growth of armed opposition groups

The fourth (frequently mentioned) link is the combined, cascading impacts that climate change-related scarcity and natural disasters could have on state capacity and legitimacy, which has historically been weak in much of the Sahel. Associated with that is the risk that livelihood insecurity in rural areas, driven in part by climate change's impacts on climate-sensitive livelihoods such as rain-fed agriculture, could increase the likelihood of young men being recruited into armed opposition groups such as Boko Haram for the opportunity to get a salary, food and an education (Scheffran et al., 2019).

Others argue that the droughts do not themselves adequately explain the jihadist movements. After all, the most serious drought (1968-1993) finished well before the jihadist movement started in the Lake Chad basin (Descroix and Lambert, 2018). On the contrary, Decroix and Lambert (2018) suggest that the impacts of climate change have been oversimplified and overstated. This, they argue, helps to mask the culpability of governments in creating the conditions of political marginalization and low development that are at the root of the multiple crises that traverse the region.

Ultimately, although climate change can be seen to create some of the conditions that contribute to tensions and low development, the links from there to violent conflict are not deterministic. There is a process through which a dispute can erupt into violence, and this is shaped by many factors, especially the general levels of conflict, the history of conflict in a particular society, the capability of institutions to manage or resolve conflicts, and the organisation of violence (Brzoska, 2016).



4. GLOBAL DEVELOPMENTS ON CLIMATE SECURITY

Ever since 2003, when a Pentagon report first highlighted the security implications of climate change, Africa in general and the Sahel in particular have often been cited as examples of regions where things could go wrong on this front. The Pentagon report led to a groundswell in policy-level and academic attention. This in turn created ‘policy space’ for the issue, which led to a series of debates at the UN Security Council. The issue was first debated in 2007 under the chair of the UK and has been raised several times since then (2011, 2013, 2018 and 2019).

Since 2015, language recognising the security impacts of climate change has been included in a dozen or more UN Security Council resolutions, including several directly related to the Sahel and North Africa: Resolution 2349 on the Lake Chad sub-region (March 2017), resolution 2429 on Sudan and South Sudan (July 2018), resolutions 2423 and 2480 on Mali (June 2018 and 2019 respectively). The fact that such mentions have entered into the legally binding resolutions of the UN Security Council as part of its chapter VI and chapter VII powers is, in part, a reflection of the priorities of several successive non-permanent members of the Security Council - namely Sweden, the Netherlands and now Germany - to promote international action on the security implications of climate change through the medium of the Council. Some members have pondered introducing a general resolution on climate security, but so far there is only a Presidential Statement from 2011 in which the Council “expresses its concern that possible adverse effects of climate change may, in the long run, aggravate certain existing threats to international peace and security” (S/PRST/2011/15).

Meanwhile, the same European countries have been active in developing new capacities within the United Nations to monitor climate security and advise on emerging threats. The Climate Security Mechanism is a three-way partnership between the UN Environment Programme, the UN Development Programme and the Department for Political and Peacebuilding Affairs. Set up in October 2018, it is a small unit of professionals who are supposed to act as a “funnel” and “filter” to ensure that important, actionable information on emerging security risks is brought to the action of decision-makers in the Security Council and beyond.

At the same time, there has been an emerging focus on environmental causes of forced migration and displacement caused by natural disasters. One example of this is the Platform on Disaster Displacement (previously the Nansen Initiative), which in 2015 managed to get more than 100 government delegations to agree on a protection agenda for people who are displaced by natural disasters. Another is the 2018 Global Compact on Safe, Orderly and Regular Migration, which recognized environmental degradation and climate change as structural factors that can force people to leave their homes and, sometimes, their countries of origin.

5. NATIONAL AND REGIONAL DEVELOPMENTS

Developments at the global level have been mirrored, to a degree, at the regional and national level. The Lake Chad Basin Commission was established in 1964 by Chad, Cameroon, Niger and Nigeria as an intergovernmental organisation to oversee water and natural resource use in the Lake Chad basin. Its mandate is to promote regional integration, peace and security.

In December 2014, Burkina Faso, Chad, Mali, Mauritania and Niger together established the G5 Sahel, an institutional framework for regional cooperation on

development policies and security matters. Based in Mauritania, its aim is to strengthen the bond between economic development and security and cooperate to tackle the jihadist threat. ECOWAS, meanwhile, is calling for increased coordination to address security and developmental challenges. In September 2018, it launched a Sahel Strategy with an integrated action plan of 31 proposed priority projects and a budget of USD\$4.75 billion.

More recent is the Sustainability, Stability and Security (3S) Initiative, an African intergovernmental initiative that was launched by Morocco and Senegal in November 2016 with the aim of addressing the underlying causes of instability in Africa, especially migration and conflict related to the degradation of natural resources, by promoting sustainable land management and offering economic opportunity in rural areas, thereby reducing incentives for migration within and from the continent. As the majority of jobs in Africa are based on land use, the 3S Initiative links the issue of youth unemployment to the availability of and access to natural resources.⁵

A further initiative to a similar end is the Alliance du Sahel, an international cooperation platform to enhance the stability and development of the Sahel region. Financing and coordinating more than 730 projects, the alliance focuses on six priority areas, including agriculture, rural development and food security as well as energy and climate.⁶

6. ENTRY POINTS FOR ADDRESSING CLIMATE FRAGILITY RISKS

North Africa and the Sahel is a region of great diversity, with significant challenges. It is also an area that is already changing fast. The drivers of this change include population growth, urbanisation, technological changes, political developments and environmental degradation. And while climate change may not be the single biggest factor affecting the evolving prospects of the region, it does, and will continue to, shape the entire region in profound and challenging ways. As such, climate change should be seen as a risk multiplier: it threatens to exacerbate existing conflicts and compound situations of fragility.

In June 2019 the German Federal Foreign Office organised a high-level meeting on climate change and security that issued “the Berlin Call for Action on Climate and Security”. This document called on the international community to pursue three main areas of “no regrets” action.

The first is to promote risk-informed planning to better understand how climate change may exacerbate divisions and cause tensions. The second is to enhance the capacity for action by strengthening the UN’s ability to act in the area of climate and security. And the third is to improve operational responses by bringing together climate, sustainable development, security and peacebuilding as related issues in all programmes.

⁵ <https://3s-initiative.org/en/about-us/>

⁶ <https://www.alliance-sahel.org/>

Building on the Berlin Call to Action, participants in the Regional Dialogue on Climate Security in North Africa and the Sahel suggested four areas for action that are particularly relevant for North Africa and the Sahel.

1. Regional and nationally relevant climate-fragility risk assessments need to be carried out to support and inform early warning systems.

Given the non-linear and complex relations between climate change and conflict, there is clearly a need for climate security assessments that are nationally and regionally specific. This can help to provide an extended knowledge base that could be linked to early warning systems and provide an invaluable starting point for action on the ground.

2. National, regional and international actors should be mandated and encouraged to address climate security threats in their own work.

This point recognises that climate security needs must be integrated into the mandates of international organisations, replicated across international and regional institutions on a structural level - as done at the UN through the Climate Security Mechanism - and acted on locally, through partners such as the 3S Initiative and others. Greater coherence of action across the various governments and international organisations operating in the region would help to address the complex interactions between climate change and fragility.

3. National, regional and international actors need to deliver integrated programmes that bring together security, climate action, sustainable development and peacebuilding.

Flexible and integrated responses to climate fragility are required at both the local and national levels. And all on-the-ground actions must be sure to connect the different elements that affect climate-fragility challenges. By bringing together climate, sustainable development, security and peacebuilding as related issues, integrated programmes can have a more durable impact.

4. National, regional and international actors must recognise that building resilience in the region requires a greater investment in capacity-building.

This point recognises that the implementation of such approaches requires increased capacity among local stakeholders and governments. Local and national action needs support from the international community. Financial resources play a central role in the hurdles that North African and Sahelian countries face in addressing climate-fragility risks. As a result of ongoing conflict, G5 Sahel countries still dedicate large parts of their budgets to defence expenditure, which severely hampers the capabilities of states and regional organisations to implement measures to improve human security. Greater emphasis should be placed on development and livelihood resilience.

REFERENCES

- Abroulaye, S., Savadogo, I., Abalo, K, and Nouhoun, Z. (2015) 'Climate Change: A Driver of Crop Farmers - Agro Pastoralists Conflicts in Burkina Faso' in *International Journal of Applied Science and Technology*, Vol. 5, No. 3, June 2015
- Adams, C., Ide. T., Barnett, J. and Detges, A. (2018) Sampling bias in climate and conflict research, in *Nature Climate Change*, Vol. 8 pages: 200-203
- Adamu, I. A. and Umar, A. (2017) The role of climatic and environmental change in farmers-pastoralists' conflicts in drylands of Nigeria and Niger Republic in *Journal of Global Resources*, Volume 5, July 2017, Pp:90-100
- Alda, Erik (2014) *Rising tempers, rising temperatures: A look at Climate Change, Migration and Conflict and the implications for youth in the Sahel*, World Bank
- Benjaminsen, T. A. (2008) 'Does Supply-Induced Scarcity Drive Violent Conflicts in the African Sahel? The Case of the Tuareg Rebellion in Northern Mali' In *Journal of Peace Research*, November 2008, Vol. 45, no. 6, pp. 819-836
- Brottem, L. (2016) Environmental Change and Farmer-Herder Conflict in Agro-Pastoral West Africa, in *Human Ecology*, September 2016
- Brzoska, M. (2016) 'Climate change, migration and violent conflict: vulnerabilities, pathways and adaptation strategies' in *Migration and Development*, Volume 5, pp: 190-200
- Buhaug, H. et al. (2014) 'One effect to rule them all? A comment on climate and conflict', in *Climatic Change*, Vol 127, pp: 391-397
- Bukari, K. N., Scheffran, J. and Sow, P. (2019) 'Real or Hyped? Linkages between environmental/ climate conflicts - the case of farmers and Fulani pastoralists in Ghana' in Behnsassi, M., Gupta, H. and Pollmann, O. (eds) *Human and Environmental Security in the Era of Global Risks: perspectives from Africa, Asia and the Pacific Islands*, Springer, pp. 161-186
- Busby, J. W., Smith, T. G., & Krishnan, N. (2014). Climate security vulnerability in Africa mapping 3.0. *Political Geography*, 43, 51-67
- De Juan, A. (2015) 'Long-term environmental change and geographical patterns of violence in Darfur, 2003-2005' in *Political Geography*, Vol. 45: pp. 22-33
- Detges, A. (2017) *Climate and conflict: Reviewing the statistical evidence: A summary for policymakers*. Climate Diplomacy Report, Berlin, Germany
- Fearon, James D and David D Laitin. (2003) 'Ethnicity, Insurgency, and Civil War.' *American political science review* 97(1):75-90
- IIK (2019) Heidelberg Conflict Barometer - 2018, Heidelberg Institute for International Conflict Research.
- IEA (2016) *Energy Access Outlook: From Poverty to Prosperity*, International Energy Agency
- IPCC (Intergovernmental Panel on Climate Change). (2014). *Climate change 2014: Impacts, adaptation and vulnerability* (Vol. 1). Cambridge, U.K.: Cambridge University Press
- OECD (2018) *States of Fragility - 2018*, Organization for Economic Cooperation and Development
- Petersen-Perlman, J. D., Veilleux, J. C. and Wolf A. T. (2017) 'International water conflict and cooperation: challenges and opportunities' in *Water International*, Vol. 42, Issue 2
- Rüttinger, L., Smith, D., Stang, G., Tänzler, D., & Vivekananda, J. (2015). *A new climate for peace: Taking action on climate and fragility risks*. Independent Report Commissioned by the G7 Members, adelphi, International Alert, Wilson Center, European Union Institute for Security Studies
- Scheffran, J., Link, M. P. and Schilling, K. (2019) 'Climate and Conflict in Africa', in *Oxford Research Encyclopaedia of Climate Science*
- UNCCD (2017) *Global Land Outlook*, United Nations Convention to Combat Desertification
- United Nations Economic and Social Commission for Western Asia (ESCWA) et al. 2017. *Arab Climate Change Assessment Report - Executive Summary*. Beirut, E/ESCWA/SDPD/2017/RICCAR/Summary
- Vivekananda, J., Wall, M. Sylvestre, F., Nagarajan C. (2019) *Shoring up Stability: Addressing Climate and Fragility Risks in the Lake Chad Basin*, adelphi

ANNEX: Selected Data on North Africa and the Sahel

| Country | HDI rank | Level of current conflict | Corruption perceptions index | States of fragility | Democracy index | Population without access to electricity (millions) | Population growth rate (2015-2020) | Renewable internal freshwater resources per capita m ³ | Freshwater withdrawal as % of available freshwater resources | Global Hunger Index | Prevalence of fatal and non-fatal violence |
|---------------------|-------------------------|---------------------------|------------------------------|---------------------|--|---|------------------------------------|---|--|--|--|
| | UNDP, 2018 ⁶ | IIK 2019 | TI, 2018 ⁷ | OECD ⁸ | Economist Intelligence Unit ⁹ | IEA, 2016 ¹⁰ | UNDP, 2018 ¹¹ | World Bank, 2014 ¹² | World Bank, 2014 ¹³ | International Food Policy Research Institute, 2017 ¹⁴ | WHO ¹⁵ |
| NORTH AFRICA | | | | | | | | | | | |
| MOROCCO | 123 | Violent crisis | 73 | | 4.99 hybrid regime | <1 | 1.3 | 848 | 49.04 | Moderate 10.2 | 2.5 |
| ALGERIA | 85 | Violent crisis | 105 | | 3.50 Authoritarian | - | 1.7 | 269 | 87.99 | Low 9.5 | 4.4 |
| TUNISIA | 95 | Violent crisis | 73 | | 6.41 flawed democracy | - | 1.1 | 379 | 94.01 | Low 7.4 | 1.8 |
| LIBYA | 108 | War | 170 | Fragile | 2.19 authoritarian | - | 1.3 | 110 | 1072 | No info | 2.6 |
| EGYPT | 115 | War | 105 | Fragile | 3.36 authoritarian | - | 1.9 | 20 | 159.85 | Moderate 14.7 | 5.1 |
| SAHEL | | | | | | | | | | | |
| MAURITANIA | 159 | Violent crisis | 144 | Fragile | 3.82 authoritarian | 3 | 2.7 | 102 | 15.86 | Serious 25.5 | 11.3 |
| MALI | 182 | Limited war | 120 | Extremely fragile | 5.41 hybrid regime | 11 | 3.0 | 3,543 | 5.82 | Alarming 35.5 | 11 |
| NIGER | 189 | Violent crisis | 114 | Fragile | 4.44 hybrid regime | 18 | 3.8 | 182 | 3.75 | Insufficient data | 10.3 |
| CHAD | 186 | Violent crisis | 165 | Extremely Fragile | 1.61 authoritarian | 13 | 3.0 | 1,098 | 2.44 | Insufficient data | 9.4 |
| NIGERIA | 157 | War | 144 | Fragile | 3.82 authoritarian | 175 | 2.6 | 1,253 | 5.83 | Serious 25.5 | 10.1 |
| SUDAN | 167 | War | 172 | Extremely fragile | 5.41 hybrid regime | 22 | 2.4 | 102 | 93.67 | Alarming 35.5 | 6.5 |
| SOUTH SUDAN | 187 | Limited war | 178 | Extremely fragile | 4.44 hybrid regime | 13 | 2.7 | 2,463 | 1.33 | Insufficient data | 4.8 |
| ERITREA | 179 | Non-violent crisis | 157 | Extremely fragile | 1.61 authoritarian | 4 | 2.3 | 934 | 10.11 | Insufficient data | 7.7 |
| ETHIOPIA | 173 | War | 114 | Extremely fragile | 3.82 authoritarian | 56 | 2.4 | 1,244 | 11.60 | Serious 32.3 | 8 |
| CAMEROON | 151 | Limited war | 152 | Fragile | 5.41 hybrid regime | 9 | 2.6 | 12,036 | 0.48 | Serious 22.1 | 11.7 |
| BURKINA FASO | 183 | Violent crisis | 78 | Fragile | 4.44 hybrid regime | 15 | 2.9 | 711 | 9.49 | Serious 27.6 | 9.8 |
| SENEGAL | 164 | Violent crisis | 67 | | 1.61 authoritarian | 6 | 2.8 | 1,820 | 7.23 | Moderate 18.4 | 7.9 |

⁶ http://hdr.undp.org/sites/default/files/2018_human_development_statistical_update.pdf (1-59: Very high human development; 60-112: High Human Development, 113-151 Medium Human Development, 152-189: Low Human Development)

⁷ <https://www.transparency.org/cpi2018>

⁸ <http://www.oecd.org/dac/conflict-fragility-resilience/listofstateoffragilityreports.htm>

⁹ <https://www.eiu.com/topic/democracy-index>

¹⁰ https://www.iea.org/publications/freepublications/publication/WE02017SpecialReport_EnergyAccessOutlook.pdf

¹¹ http://hdr.undp.org/sites/default/files/2018_human_development_statistical_update.pdf

¹² **Renewable internal freshwater resources per capita:** <https://data.worldbank.org/indicator/ER.H2O.INTR.PC>

¹³ **Level of water stress: Freshwater withdrawal as % of available freshwater resources:** <https://data.worldbank.org/indicator/ER.H2O.FWST.ZS>

¹⁴ <http://www.foodsecurityportal.org/countries>

¹⁵ http://gamapserver.who.int/gho/interactive_charts/violence_prevention/homicides/atlas.html