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PROFILE

Climate-Fragility Profile: Lake Chad Basin

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List of Abbreviations

AOGs	Armed opposition groups
JAS	Jama'atu Ahlis Sunnah Lida'awati Wal Jihad (People Committed to the Propagation of the Prophet's Teachings and Jihad – commonly known as Boko Haram)
AOGs	Armed opposition groups
CJTF	Civilian Joint Taskforce
DDRR	Disarmament, demobilisation, rehabilitation and reintegration
IDPs	Internally displaced persons
IMN	Islamic Movement of Nigeria
IPOB	Indigenous Peoples of Biafra
ISWA	Islamic State West Africa (Wilayat al Islamiyya Gharb Afriqiyyah)
LCB	Lake Chad Basin
LGA	Local government areas
MNJTF	Multi National Joint Task Force
UNSG	United Nations Secretary-General
VAWG	Violence against women and girls

Executive Summary

Climate change increasingly threatens the stability of states and societies. In the context of global security, it is best understood as a 'threat multiplier' that interacts with and compounds existing risks and pressures. When climate change converges and interacts with other environmental, economic, social, and political shocks and pressures, it can increase the likelihood of instability or conflict. This threat is particularly virulent in fragile and conflict-affected situations where governments and societal institutions already struggle to achieve security and equitable development. At the same time, conflicts and fragility often contribute to environmental degradation and undermine the ability to adapt to climate change, thus creating a vicious circle of increasing vulnerability and fragility. The complex and systemic risks that arise out of the interaction between climate change and other environmental, economic, social, and political pressures are what this profile calls **climate-fragility risks**.

This **Climate-Fragility profile is envisaged as a first component of a Climate-Fragility Risk Assessment process** – a process for actors working in contexts affected by climate and fragility risks to understand the linked nature of these risks and plan, design, implement and evaluate programmes to respond positively to these risks. It summarizes the key challenges the Lake Chad region is experiencing as a consequence of the interplay between climate change and fragility.

Socio-Economic and Political Context

The Lake Chad region is marked by **low socio-economic development indicators, low levels of education, high levels of poverty, low levels of national integration, historical government neglect and perceived and actual marginalisation**. The four countries of Cameroon, Chad, Niger and Nigeria that make up the Lake Chad Basin see some common political dynamics. Chad, Niger and Nigeria have experienced periods of military rule. Chad and Nigeria politics are shaped by oil exploration. Transitions from military rule to democracy have been seen in Niger and Nigeria. In all four countries, the region is seen as distant from the centre with politicians largely uninterested in its development.

Peace and Security Overview

The security situation has been **particularly volatile after the rise of Jama'atu Ahlis Sunnah Lida'awati Wal Jihad, commonly known as Boko Haram** in Nigeria in 2009 and the **resultant conflict**. This has seen it declare control over territory and spread to neighbouring countries, set off bombs including through 'suicide' bombers, forcibly recruit and kidnap and attacks against women and girls including sexual violence and forced marriage. A **complex dynamic now exists with a number of national military, armed opposition groups and vigilante groups all operating in the region**. This has consequences for **interplay between the movement of people, food security as well as traditional gender and governance roles**.

Climate Context

Lake Chad is located in the Sahel at the southernmost edge of the Sahara, but the lake itself is largely fed by precipitation further south in the humid tropics. This **unique geography has created an oasis in an otherwise largely arid region**. The Lake Chad basin covers a huge area, constituting more than 8% of the African continent, and features strong diversity in climate, from desert in the north to humid tropics in the South.

The impact of climate change is **far more complicated and uncertain than the evocation of a direct linkage between global warming and surface shrinkage** of the Lake insinuates. The crucial climate vulnerabilities do not derive from the Lake's shrinking, but from **significant uncertainties over variability** and, hence, future water availability – at the seasonal, inter-annual, and multi-decadal timescales. **More research** is needed to understand the variability of Lake Chad and the interaction between different forcing mechanisms.

Climate Fragility Risks

An understanding of the relationship between climate change and security is possible only through a rigorous exploration of the **complex interactions between different risk factors**, where climate change is understood as a variable that affects pre-existing economic, environmental, political and social pressures. This profile identifies three key climate-fragility risks:

- 1. Conflict and fragility increasing vulnerability:** The ongoing conflict has significantly undermined community resilience - including the ability of the population to adapt to climate change. This will impede any future interventions and efforts to address conflict and climate risks.
- 2. Natural resources conflicts:** Climate change may exacerbate conflicts over natural resources. Natural resources conflicts, in particular over land and water, often between different occupational groups, such as pastoralists and farmers, had decreased in the context of the ongoing conflict with armed opposition groups, but is seeing a recent resurgence.
- 3. Livelihood insecurity and recruitment into armed groups:** Recruitment into non-state armed opposition groups continues in the face of social and economic inequality, increasingly vulnerable livelihoods and a history of financial incentives offered by armed groups to join them. How climatic variability is and climate change will impact this dynamic is unclear and needs to be better understood.

Taking these climate-fragility risks together, they create a **self-enforcing feedback loop between increasing livelihood insecurity, climate change vulnerability, and conflict and fragility**. Conflict and fragility are decreasing the resilience of communities making them more vulnerable to climate change which at the same time is further undermining livelihoods and exacerbating the competition around scarcer natural resources. If not broken, this **vicious circle threatens to perpetuate the current crisis and take the region further down the path of conflict and fragility**.

Future conflict trajectories

Looking at possible future conflict trajectories, there are four trends that need to be taken into account:

- 1. The ability of armed opposition groups to adapt:** Armed opposition groups have shown that they are very resilient and able to change and adapt their identities, strategies, tactics and organisational structures.
- 2. The future of self-defence militias:** A number of self-defence militias have emerged as a reaction to armed opposition groups. The role they will play in future conflict and fragility dynamics is unclear, particularly regarding whether they are willing to demobilise and disarm once the threat of the armed opposition groups has diminished.
- 3. Increasing urbanisation and resettlement issues:** Movements of people have been primarily from rural areas to urban centres. A key challenge is that of providing

sustainable livelihoods in urban and semi-urban areas as well as of return and resettlement.

4. **The role of humanitarian aid and development cooperation:** A large part of the assistance to the region takes the form of humanitarian aid. Predictability and transparency of aid as well as a move towards better linkages to long-term development cooperation to address the root causes of the crisis will be critical.

Introduction

Climate change increasingly threatens the stability of states and societies. When climate change converges and interacts with other environmental, economic, social, and political shocks and pressures, it can increase the likelihood of instability or conflict. This threat is particularly virulent in fragile and conflict-affected situations where governments and societal institutions already struggle to achieve security and equitable development. At the same time, conflicts and fragility often contribute to environmental degradation and undermine the ability to adapt to climate change, thus creating a vicious circle of increasing vulnerability and fragility. The complex and systemic risks that arise out of the interaction between climate change and other environmental, economic, social, and political pressures are what this profile calls climate-fragility risks.

There is increasing awareness and understanding of the links between climate change and fragility. Climate change is widely accepted to be a ‘threat multiplier’: not a factor which causes conflicts in and of itself, but a factor which exacerbates existing risks and worsen already fragile situations, making it harder to promote peace, adaptation and sustainable development.

This Climate-Fragility profile is a component of a broader Climate-Fragility Risk Assessment process – a process for actors working in contexts affected by climate and fragility risks to understand the linked nature of these risks and plan, design, implement and evaluate programmes to respond positively to these risks. A better understanding of these risks will help in ensuring that i) existing climate change, resilience, and peacebuilding policies and interventions do not inadvertently exacerbate climate-fragility risks, and ii) future policies and interventions can better address climate-fragility risks and promote peaceful and sustainable development.

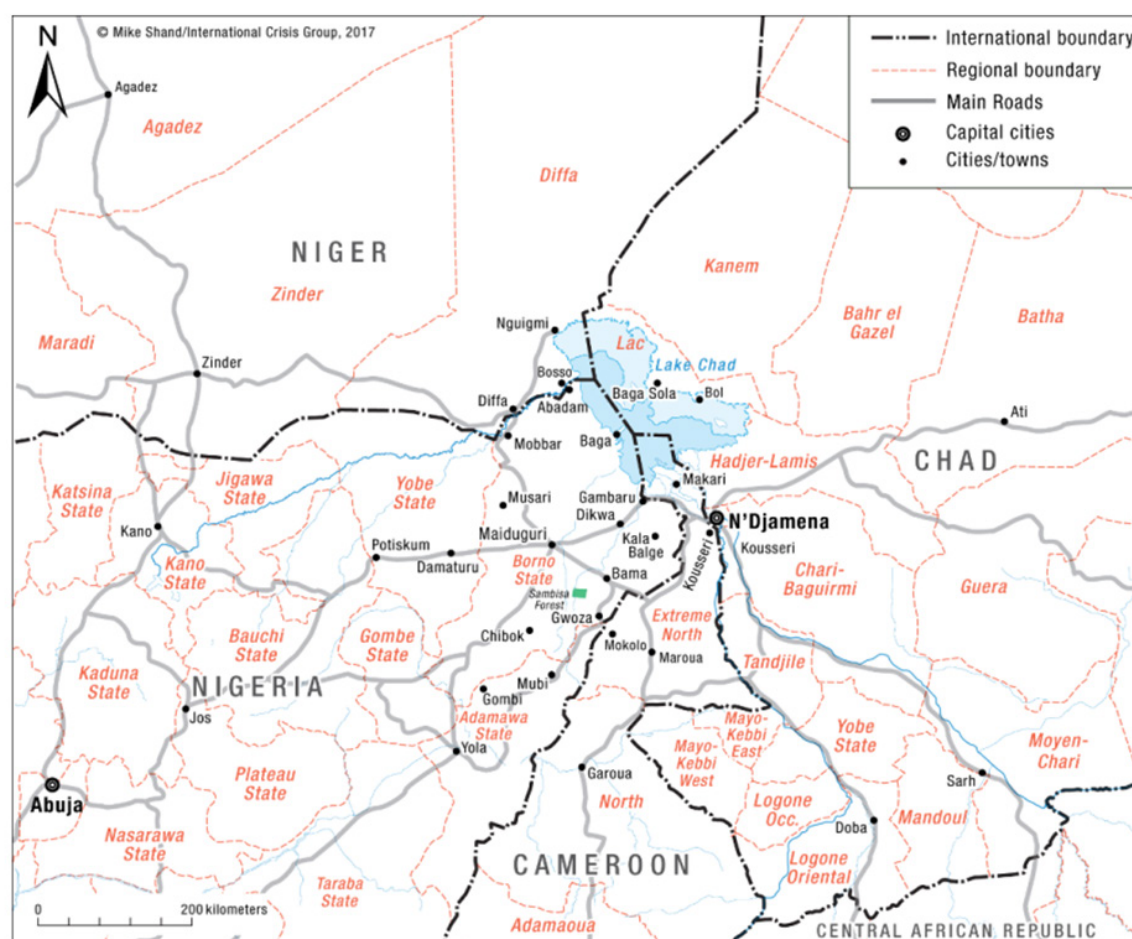
The first step in understanding these climate-fragility risks is a thorough understanding of the context and the ways in which fragility may be affected by climate variability and change. This profile gives an overview of the socio-economic development and political context (chapter 1), the current security situation (chapter 2), and climate context (chapter 3). Chapter 4 discusses how climate change might affect the security risks in the Lake Chad region and identifies three main climate-fragility risks. Chapter 5 sets out the next steps of the assessment process.

1 Socio-economic and political context

Political context

The four countries of Cameroon, Chad, Niger and Nigeria that make up the Lake Chad Basin see some common political dynamics. Chad, Niger and Nigeria have experienced periods of military rule. Chad and Nigeria politics are shaped by oil exploration. Transitions from military rule to democracy have been seen in Niger and Nigeria.

Figure 1: Map Lake Chad region



Source: ICG 2017b

Chad and Cameroon have presidents who have been in office for decades. Chad's current president, Idriss Déby, came to power in a military coup in 1990, overthrowing Hissène Habré who himself had come to power through military means before winning competitive presidential elections in 1996. He won his fifth term in April 2016. Meanwhile, Paul Biya has been the President of Cameroon since 1982, winning a new seven-year term in October 2011 in a vote rejected by both the opposition and civil society movements. The conflict in

the far north of Cameroon has reportedly strengthened his leadership while increasing the legitimacy of the country's armed forces.

In contrast, Nigeria, after a history of military coups and counter coups, will mark twenty years since the transition to democracy in 2019. Elections in 2015 saw a transition of power for the first time since 1999 with the incumbent president, Goodluck Jonathan, losing to the opposition's Muhammadu Buhari. In Niger, a military coup in 2010 took place in response to Tandja Mamadou's attempts to extend his presidency beyond the constitutional limit allowed. Over the next year, a one year transition plan was carried out, a new constitution drafted and elections, held in 2011, were judged as free and fair, bringing veteran opposition leader Mahamadou Issoufou to power. He won re-election in March 2016 in elections boycotted by supporters of his opponent, Hama Amadou, who had been jailed.

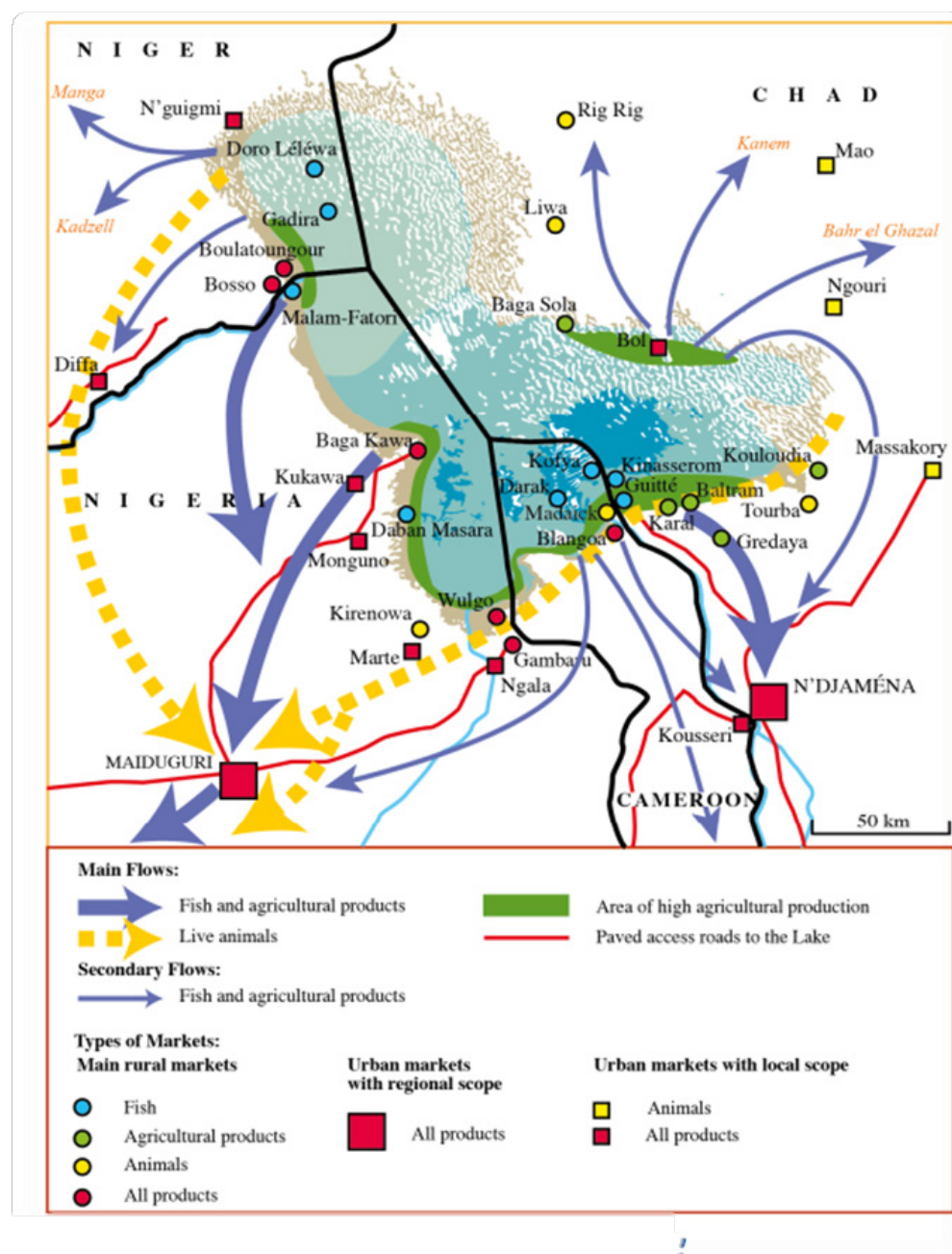
It is important to note, however, the limited sense of national identities that many in the Lake Chad region have with political institutions seen as distant from people's lives and relations across the region often having more salience than those with national capitals. Family and kinship groups straddle national borders and historically, people have migrated and traded freely across the region.

Social and economic context

The Lake Chad region is marked by low socio-economic development indicators, low levels of education, high levels of poverty, low levels of national integration, historical government neglect and perceived and actual marginalisation. Whereas 700,000 people lived around the Lake in 1976, today the area is home to approximately 2.2 million people, drawn there due to drought and poor livelihoods elsewhere, with this number set to reach 3 million in 2025, and with 49 million people in total living from its resources. In all four countries, the region is seen as distant from the centre with politicians largely uninterested in its development.

Despite this, before the conflict, there was thriving cross-border trade in agricultural produce, fish as well as other goods and commodities. Lake Chad acted as a trading hub offering economic opportunities and resources of which people living around the Lake took advantage despite the lack of national government's policies to support this. Indeed, many people in the region talk about a total absence of government presence and impact, including the lack of public services, and very low levels of trust towards central governments.

Figure 2: Flows of agricultural products from Lake Chad



Source: Magrin et al. 2015

This economic activity and attendant livelihoods have been seriously affected by the violent conflict. Not only are people unable to fish and farm due to levels of insecurity and the incidence of attacks but when they do so, often their crops are destroyed or harvested by armed opposition groups (AOGs). Military restrictions affect which crops they can plant, so that tall crops do not obscure the approach of fighters, when and where they can fish, whether they are able to transport their goods to markets and if markets are open. In Niger for example, emergency measures have restricted livelihood activities and restricted freedom of movement with vast areas now militarised and declared no-go zones for civilians further

compounding hunger and malnutrition and pushing people to adopt new, riskier coping strategies.

Market infrastructure has been destroyed by attacks in many places including on marketplaces and storage facilities which are now non-functional. The closure of banks and microfinance institutions has undermined savings mechanisms. Cross border trade in particular has been seriously affected due to the closure of borders. As a result, many in the region, whether displaced or not, are dependent on humanitarian aid.

In terms of social groupings, all countries are pluralistic in nature, consisting of many ethno-linguistic groups. However, while the peoples of Niger and Chad are predominantly Muslim, Cameroon has a Christian majority with a significant Muslim minority and Nigeria has roughly equal numbers of Christians and Muslims. The region has seen youth exclusion and marginalisation, particularly in employment, despite an increasingly youthful demographic.

Corruption is a significant factor in all countries, particularly Nigeria. Corruption in Nigeria remains endemic and systemic with the country experiencing the largest per annum illicit financial outflow on the African continent with an estimated US\$217.7bn illegally transferred out of Nigeria between 1970 and 2008. In recent years, lower oil prices have led elites to look for alternatives illicit revenue streams, most notably from defence and security budgets with their secretive nature matched by additional budget allocations for this sector providing increased opportunities for corruption.

2 Peace and Security Overview

The rise and containment of armed opposition groups

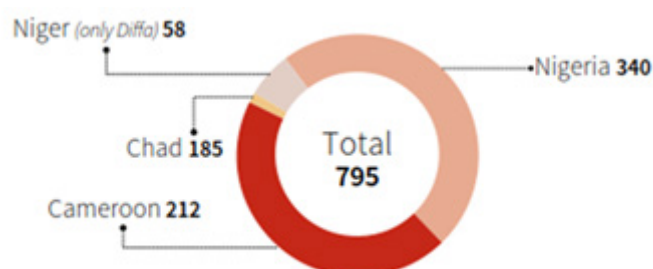
In 2002, Jama'atu Ahlis Sunnah Lida'awati Wal Jihad (JAS, translated as People Committed to the Propagation of the Prophet's Teachings and Jihad), commonly known as Boko Haram, noticeably emerged in Maiduguri, the capital of Borno state in northeast Nigeria under the aegis of its founder Muhammed Yusuf. Its evolution needs to be seen in light of a history of radical Islamic movements in the region which, while they took positions oppositional to the state, tended to be isolationist. The current situation represents both continuities as well as a break from this.

Originally protesting the corruption and inequality produced by state structures and calling for a return to a 'purer', more Islamic way of life, JAS's ideology, tactics and strategy have been constantly evolving. The group garnered substantial support among the population, disenchanted with Nigeria's fledgling democracy, in its early days.

The extra-judicial killing of Muhammed Yusuf and approximately 800 of his followers in 2009 by state security forces led to a temporary retreat from Maiduguri. JAS regrouped and returned to Maiduguri, becoming more violent and with this violence directed against civilians. The efforts of the Civilian Joint Taskforce (CJTF), a volunteer force of primary young people, working with the military, led to JAS being forced out of Maiduguri. JAS members went to Borno's rural areas and started to recruit and wage a campaign of targeted killings there, first against government workers, security personnel and Christians and Muslims that spoke out and resisted them, then the population at large. Over time, the group morphed into declaring control over territory and spread to neighbouring countries, setting off bombs including through 'suicide' bombers, forced recruitment and kidnapping and violence against women and girls (VAWG) including sexual violence and forced marriage.

Attacks have taken place in northern Cameroon since March 2014 and in southern Niger and western Chad since early 2015. Fighters move freely across national borders. They have some level of support from some local populations in all four countries although there is also a lot of anger directed against them due to continuing tactics of committing attacks against civilians.

Operations by the Multi National Joint Task Force (MNJTF), a force consisting of military personnel from Cameroon, Chad, Niger and Nigeria, together with local vigilante groups (i.e. community self-help militias) and the CJTF recovered the territory taken by JAS in 2014 and 2015. Always with different factions, the group split into at least two distinct groups: JAS headed by Abubakar Shekau and Wilayat al Islamiyya Gharb Afriqiyah (Islamic State West Africa or ISWA) headed by Abu Musab al-Barnawi in 2016 which are also referred to as armed opposition groups in this profile.

Figure 3: Number of Boko Haram-related incidents per country in 2016

Source: FAO 2017

Violence, human rights abuses and displacement

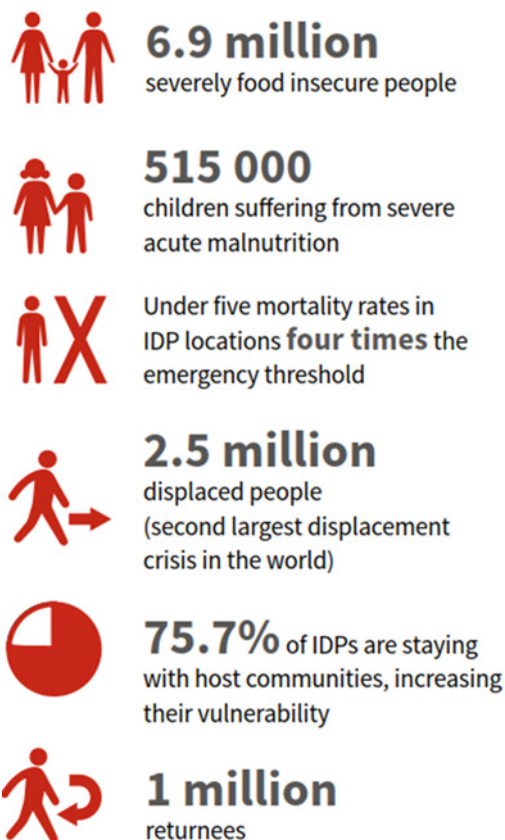
Between 1st June 2006 and 31st May 2016, almost a third of deaths recorded by Nigeria Watch occurred due to the conflict in the country's northeast between armed opposition groups, state security forces and community defence groups (Adams 2016). Given data is drawn from media sources and the Nigerian media do not report from rural areas that are inaccessible, the true number of conflict related deaths in the northeast could be more than twice the number recorded (Ibid.).

Civilian harm has been committed by all parties to the conflict. Approximately equal numbers of people were reported as killed by armed opposition groups and security forces (Ibid.). However, the military may have killed three times the numbers of civilians killed by JAS members between 2010 and 2012, due the numbers of extra judicial killings that took place during that time and as JAS mainly undertook strategic assassinations, particularly of community leaders and security personnel, especially police officers initially then soldiers later on, until the imposition of the state of emergency in 2013 (Ibid.). The Nigerian military have failed to protect communities from violence, committed civilian harm during the course of operations by directly targeted civilians, using torture and excessive force (Dietrich 2015). Armed opposition groups have conscripted or systematically executed men and boys, abducted, imprisoned, raped and forcibly married women and girls who have been made to participate in armed attacks, sometimes on their own towns and villages, and killed civilians and looted and burned property and crops (Amnesty International 2015). Meanwhile, the CJTF in particular has been implicated in extra-judicial killings, harassment of communities, sexual exploitation and abuse, recruitment and use of children and diversion of humanitarian aid. Vigilante groups, which include local hunters, are seen by communities to have committed fewer abuses but there is a lack of empirical research in this area.

Figure 4: Lake Chad Basin crisis in numbers

There has been massive displacement. People in areas that have seen attacks have fled their homes to their own or neighbouring local government areas (LGA)¹ headquarters, state capitals, different parts of their countries and to other countries. In Borno, the epicentre of the northeast conflict, the state controls only the LGA headquarters and 1-5 km radius surrounding this in the many LGAs with the area beyond this contested territory. Some parts of the region see fighting for territory and are completely inaccessible to humanitarian action.

There is also significant movement across borders. For example, since early 2015, Cameroon has summarily deported at least 100,000 Nigerians living in remote border areas, with soldiers using extreme physical violence in order to do so. At the same time, the army's aggressive screening of newly arriving Nigerians at the border has included torture and other rights violations and housing them in remote villages and settlements to which humanitarian actors are denied access (cf. Nagarajan and Matfess 2017).



Source: FAO 2017

Current conflict dynamics

Conflict between the Nigerian state, vigilante groups/ CJTF and armed opposition groups overlays, exacerbates and feeds off already existing dynamics (Ibid.). As well as creating new tensions within and between communities, it has also caused communities to come together against common threats. In all of these, the experiences of girls, women, boys and men have been very different.

In addition to the fighting between security forces, pro- government militias and armed opposition groups, conflict around natural resources between occupational groups such as farmers, pastoralists, fisher folk and hunters, has been exacerbated by decreases in the amount of arable land, planting of crops on grazing routes and areas, changing rainfall patterns affecting crop yields and cattle health, military restrictions, security concerns and scarcity of water given the numbers of IDPs that have come into an area.

Furthermore, although people of all religions have experienced the impact of violent conflict, relations between Christians and Muslims have become strained in some areas and in others, people have united across religious lines against what has been seen as a common

¹ Local government areas refer to sub-district administrative units in Nigeria which correspond to village or towns in terms of scale. They're more than towns though. LGAs have headquarter towns but also consist of large amounts of rural/ peri-urban areas.

enemy with Christians and Muslims jointly fighting armed opposition groups through joining vigilante groups.

Moreover, the conflict has led to increased ethnic and social tensions, partly due to the impact on the economy, in Cameroon (ICG 2016; ICG 2017a; ICG 2017b), increased local inter-communal tensions and exacerbated violence over access to resources in Niger, led to the emergence of new stigmatisation and rivalry over the control of economic activities and land ownership in Chad, and led to particular unhappiness with the position of Kanuri people, seen as making up the majority of armed opposition group members in Nigeria.

The conflict has also affected relations between IDPs and host communities. A concerted humanitarian response started scaling up years after the start of the violent conflict. During the time beforehand, host communities sheltered and provided assistance to those displaced from other locations. With time, this has given rise to some tensions as people have exhausted their own resources in order to host IDPs, leaving them and their families in vulnerable economic positions. In recent times, conflict in particular locations and between certain groups have been noticeable. Tensions are exacerbated in many cases by humanitarian assistance seen as only benefitting IDPs despite the impact of the violent conflict on everyone in the area.

Violent conflict has affected and changed gender roles in areas affected by violence in northeast Nigeria. Men of fighting age are often the first to flee insecure areas, deliberately targeted and killed by armed opposition groups, viewed with suspicion, arrested and detained by security agencies and involved in fighting (Mercy Corps 2016). As a result, women make up the vast majority of the adult population in many areas. Consequently, they have taken on new types of economic activities and decision-making roles. Even if present, men are no longer able to provide for families, forcing women to find ways of earning incomes, including through survival sex. There is concern from both women's and men's groups about women's economic empowerment leading to disrespect in the home and taking women away from domestic concerns (Nagarajan 2015).

Into this mix, there is growing dissatisfaction and frustration with many community leaders. In some areas, they had lost legitimacy and trust even before the violence, being viewed by community members as corrupt and politicised and with community conflict management systems significantly weakened (Isa and Allamin 2011; Ladbury 2012). These dynamics have been heightened by community leaders leaving the area during the insecurity and so being seen to have abandoned their people, inability to act decisively to stop violence and their involvement in diversion of humanitarian aid.

Finally, although large-scale disarmament, demobilisation, rehabilitation and reintegration (DDRR) processes are yet to start, tensions continue between families of presumed armed opposition group members and those harmed by violence, with widespread suspicion and mistrust in some communities as to who may be a sympathiser or member. Women and girls associated with AOGs often face marginalisation, discrimination and rejection by family and community members and are viewed with fear that they have been radicalised (International Alert/UNICEF 2016; Donli 2017). Although there is less stigma and discrimination related to being associated with vigilante groups, there are fears of the future trajectories of those involved in these groups, their propensity to be involved in violence and refusal to give up the power associated with fighting. In addition, to the ways in which they are perceived by the community, all those associated with armed groups have experienced and/ or taken part in violence, with the forms that these take manifesting very differently for women, girls, boys and men, and are likely to experience continued trauma.

Although this profile focuses on the situation in and around Lake Chad, it is important to place this analysis in light of the broader situation and conflict dynamics all four Lake Chad countries are experiencing. Cameroon has seen a recent escalation of conflict and violence in its northeast and southwest region, marked by violence against Anglophone activists by security forces, bomb blasts and the proclamation of the independence of Ambazonia by secessionist groups (ICG 2017c). In Chad, already hosting hundreds of thousands of refugees from conflicts in neighbouring Sudan and the Central African Republic, clashes between settled farmers and nomads over land use rights and access to water occur frequently in the north (Peace Insight 2015). Niger, with a history of conflict between the state and some of its Tuareg communities, has also, due to its geographical location, felt the spillover of conflict from neighbours Mali and Libya as well as Nigeria. New sites of conflict have manifested in Nigeria since its 2015 elections around the pro-secessionist mobilisation by and state reaction to the Indigenous Peoples of Biafra (IPOB) in the southeast and tensions around the killing of over 300 unarmed members of the Islamic Movement of Nigeria (IMN), a Shiite group, by the military, detention of their leader and protests ending in violence which add to pre-existing conflict around oil extraction in the Niger Delta, rural banditry and inter-communal violence.

3 Climate Context

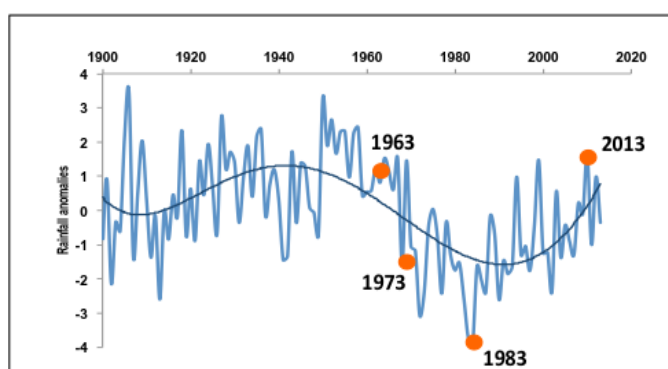
Lake Chad is located in the Sahel at the southernmost edge of the Sahara, but the lake itself is largely fed by precipitation further south in the humid tropics. This unique geography has created an oasis in an otherwise largely arid region.

The Lake Chad Basin (LCB) covers a huge area ($2.5 \cdot 10^6 \text{ km}^2$), constituting more than 8% of the African continent, and features strong diversity in climate, from desert in the north to humid tropics in the South. Any analysis of the climate situation in the basin therefore needs to differentiate between the lake's perimeter and more remote parts of the basin.

The present analysis focuses on the area in the broader vicinity of the lake, roughly drawing a perimeter of about 300 km around it. About 13 million people live in this perimeter (many of them in two large cities, the Chadian capital N'Djamena and Maiduguri in northeast Nigeria), including some 2 million settled on the Lake's shores.

The inhabited area covered by this perimeter around the Lake Chad is largely part of the Sahel, a region characterized by highly variable precipitation. A wet period during the 1950s and 1960s was followed by a devastating drought during the 1970s and 1980s. Since then, rainfall has been more abundant again during the past 20 years. Such broad statements about multi-decadal variation hide significant inter-annual variability (see graphic on rainfall anomalies below).

Figure 5: Rainfall anomalies



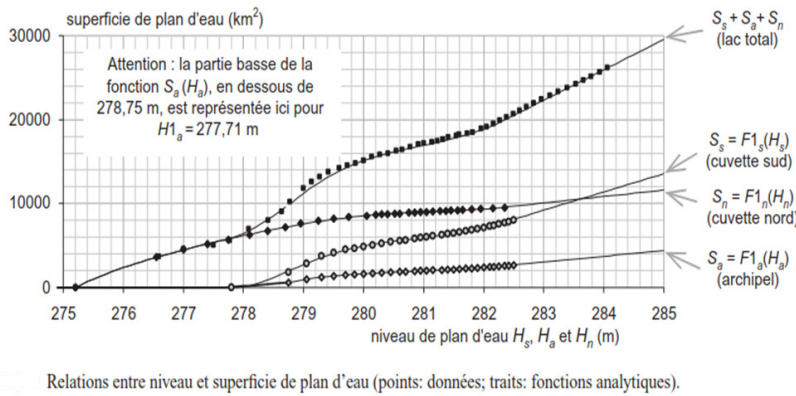
Moreover, inter-annual variability seems to be increasing, as is the contribution of extreme events to annual rain (see future climate impacts below). At the same time, temperatures are increasing at rates above the global average. These conditions and changes pose significant challenges for the region's inhabitants.

Past and current climate: a shrinking lake?

The surface area of Lake Chad is highly variable both intra- and inter-annually. Approximately 90% of the inflow stems from the Chari and Logone rivers which feed it from the South, draining more than 610,000 km² in Southern Chad and the Central African Republic as well as smaller areas in Cameroon and Western Sudan. With an average depth of only three meters, the average intra-annual variation of 1 meter translates into huge

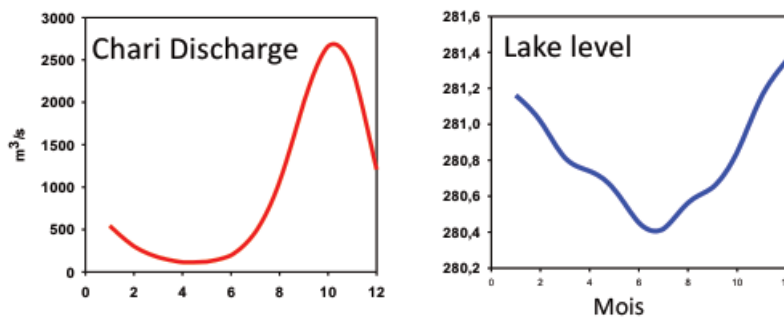
variations in surface area between summer and winter months (e.g. some 6,000 km² for 278m above sea level vs. almost 12,000 km² for 279m a.s.l., see figure below).

Figure 6: Lake elevation and surface area



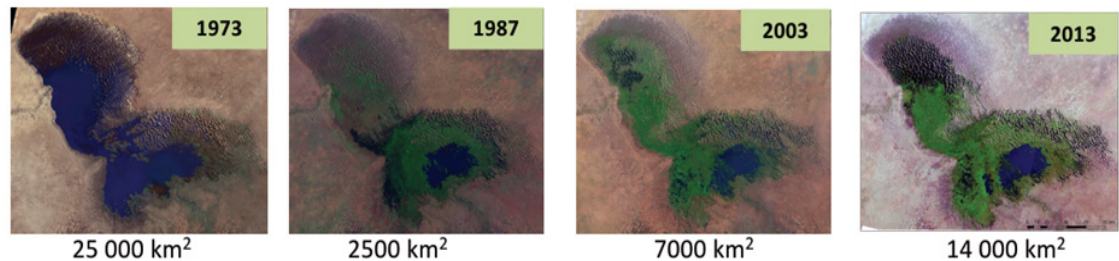
Source: Bader et al. 2011, p. 416

Figure 7: Intra-annual variation in inflows and Lake levels



Apart from this seasonal variation, the surface area of Lake Chad has varied very significantly inter-annually, during recent decades as well as throughout its history. This has given rise to repeated worries about its impending disappearance, with many reports focusing on its shrinkage from some 22,000 km² in 1963 to 2,500 km² in 1987. However, as the graphic below shows, that trend has meanwhile reversed, with the Lake reaching an extension of some 14,000 km² in 2013. Even larger fluctuations have occurred in the distant past when the Lake disappeared some 21,000 years ago during the last glacial maximum, and probably again in the 16th century (Maley 1981); but also extended to 350,000 km² surface during the climatic optimum (i.e. middle Holocene) 6,000 years ago.

Figure 8: Inter-annual variation in Lake levels



Source: U.S. Geological Survey 2018

Its shallowness means that Lake Chad is very sensitive to even small changes in the water balance. The primary driver for the inter-annual variability is rainfall fluctuations over the Chari-Logone basin. These are highly sensitive to the West African Monsoon whose response to global warming is currently uncertain (see below).

This description of the Lake’s variability can be seen to conflict with repeated reports in the international media that Lake Chad was threatened by disappearance due to anthropogenic climate change and increasing water abstraction (cf. Magrin 2016). The resonance that this claim received owes a lot to one scientific article from 2001 whose data and conclusions seem questionable (as they were based on limited observations especially regarding irrigation withdrawals), but whose message was boosted by evocative but arguably misleading NASA imagery (cf. Coe and Foley 2001; Magrin 2016: 211-212). In fact, irrigation withdrawals have so far played a fairly insignificant role for the Lake’s water balance, and the impact of climate change is far more complicated and uncertain than the evocation of a direct linkage between global warming and surface shrinkage insinuates. Part of the debate comes down to the question of what counts as surface of the Lake, much of which is covered by vegetation. Since there is water and aquatic life underneath, this is arguably part of the Lake, but imagery of the Lake often focuses on open water at the expense of the extensive marshlands (Magrin 2016: 208-209). Moreover, 1963 represents a questionable benchmark as that period saw the Lake’s greatest extension during the 20th century.

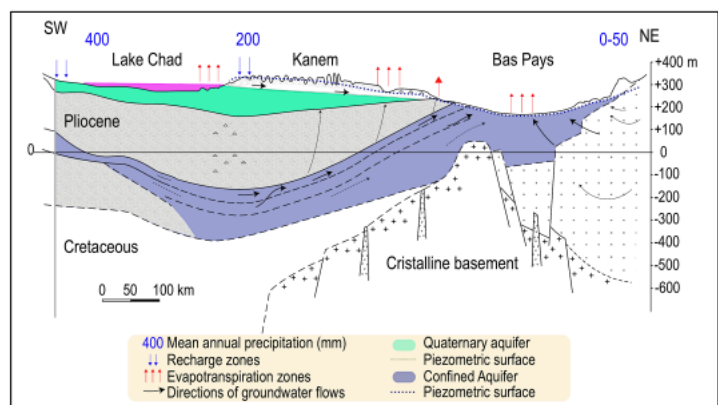
Since the drought of the 1970s and 1980s, the Lake has been divided into a Northern and Southern pool separated by a natural barrier that floods once the lake has reached a certain level. Whereas the Southern pool has always had open waters, its Northern counterpart is far more vulnerable. It

has completely dried up 12 times during the period 1975-1994, though it has not done so since (cf. Magrin 2016: 209).

The Lake is linked to a quaternary aquifer. The ‘chemical recycling’ that this linkage entails helps ensure that Lake Chad does not become saline.

Moreover, there is fossil aquifer deep below the basin that is not connected to the Lake. Its high-quality drinking water could be an important resource

Figure 9: Lake Chad groundwater system



Source: Bouchez 2015 adapted from Schneider and Wolff 1992

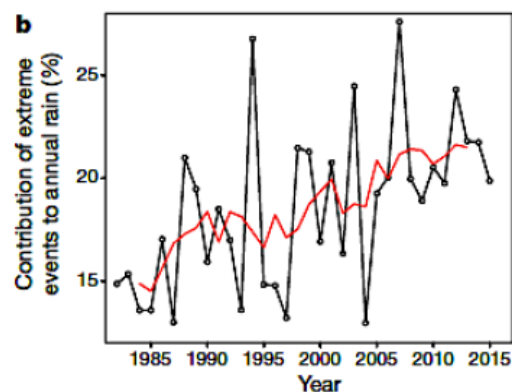
for the region. Given that it is finite and non-renewable, large-scale extraction should however only be pursued in the framework of knowledge-based governance mechanisms that ensures sustainability.

Future climate impacts

Global models predict a robust warming in the Sahel, above global warming averages. Apart from the direct effects on agriculture and human health, rising temperatures will increase evaporation and evapotranspiration. Global models are, however, quite uncertain regarding the effects of anthropogenic forcing on precipitation, with different mechanisms pointing to opposite directions. About 75% of the models forecast that precipitation will increase across most of the Sahel, including the areas around Lake Chad, but spreads on the amplitude of the change are large (Roehrig et al. 2013). This forecast would chime with historical records that warm periods have been associated with a greater Lake volume, but such correlations in the long run do not necessarily say much for the coming years and decades. From 1990 to 2007, the Central Sahel seems to have become progressively wetter (see figure below), but there is a high uncertainty if this trend will continue.

Figure 10: Contribution of extreme events to annual rain (%)

Several studies emphasize the inability of current models to correctly depict the main characteristics of the West African Monsoon as the key driver of precipitation in the area, meaning that current models cannot make reliable predictions about future rainfall (Roehrig et al. 2013). Whereas most models predict more rainfall coupled with higher inter-annual variability and extreme events, countervailing mechanisms such as a cooling of the Atlantic as a result of accelerated ice



sheet melting around Greenland might induce a large decrease of Sahel rainfall (DeFrance et al. 2017). The net effects are unclear at this point. However, there seems to be a trend towards increasing variability. Moreover, since 1990 extreme rainfall seems to become more intense and frequent, increasing flooding risks and making it harder to harvest the water.

Source: Taylor et al. 2017

Knowledge on the scale and timing of the multi-decadal variation of precipitation is also limited. The current wet period has seen less abundant rainfall than the last wet period half a century ago, and one important question is whether the next dry period will also be drier than the last (i.e., whether there is a downward trend, which possibly could be due to a decline in vegetation and related decline in re-evaporation) or not. Similarly, it is not clear when that next dry period will start. With respect to Lake Chad itself, a further layer of uncertainty comes from the different impact mechanisms of rainfall in the Sahel and the Lake perimeter under focus on the one, and rainfall in the tropical zones that the Chari-Logone basin drains on the other hand. Moreover, our understanding is constrained by the dearth of data in measuring the extent of the lake. With the last monitoring of the Chari-Logone discharge stopping in 2008, there has since been only one estimate of the Lake area extent, dating from a single month (April) in 2013 whose informative value is limited due to the strong (and changing) seasonality of the Lake.

In short, the crucial climate vulnerabilities do not derive from the lake's shrinking, but from significant uncertainties over variability and, hence, future water availability – at the seasonal, inter-annual, and multi-decadal timescales. More research is needed to understand the variability of Lake Chad and the interaction between different forcing mechanisms.

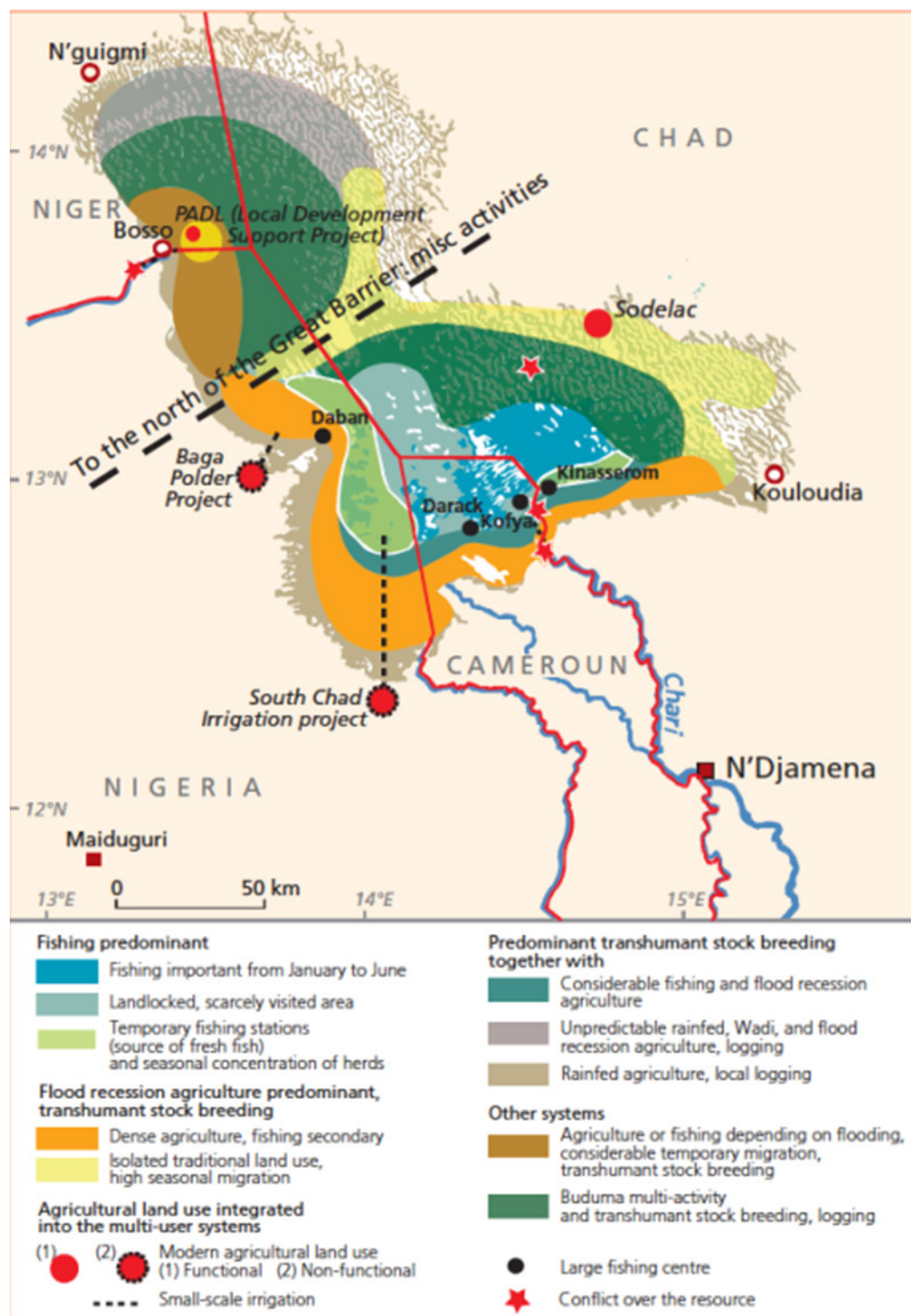
Sectoral impacts

Many of the lake's residents make their living by combining fishing, agriculture, livestock farming and trade (see map below). 90% of livelihoods are climate-sensitive, but people have switched between occupations in response to, among other factors, lake and climate variation for generations. Today, people will e.g. shift from flood recession agriculture to livestock farming and fishing when risks of early flooding seem high. Moreover, people migrate, especially around the Northern pool where flood variability is highest. Many of its inhabitants migrate to the Southern pool during flood recession.

Climate variability and change have strong implications for livelihoods. It is, however, the uncertainty about the future climate rather than the change in lake levels that poses the greatest challenges. Rather than constituting an unmitigated disaster, the lake's past shrinking had significant positive effects in opening up fertile land for recession crops and pasture, leading to net in-migration (Ngaressem et al. 2014; Magrin 2016: 210). However, other sectors have intermittently lost out, especially fishing and irrigated agriculture. Whereas greater annual fluctuation offers benefits in terms of the fertility of land for recession agriculture, uncertainty about variation entails significant livelihood risks. Moreover, it remains to be seen how this ecosystem can maintain a rapidly increasing population which has tripled over the past 40 years.

Climate variability and change has many impacts on the basin beyond its effect on lake levels and surface area, of course. For populations beyond the lake's immediate vicinity, rainfall variability may have even stronger implications than for those able to follow the shoreline. Moreover, the inhabitants of the entire perimeter are indirectly affected through the food security and employment opportunities that are connected to the lake and its resources, e.g. through trade and value chains linking the lake resources to markets.

Figure 11: Multifunctional spaces of Lake Chad



Source: Raimond and Rangé 2015

4 Climate-Fragility Risks

Climate change is best understood as a 'threat multiplier' that interacts with and compounds existing risks and pressures in a given context, and can increase the likelihood of instability or violent conflict. An understanding of the relationship between climate change and security is possible only through a rigorous exploration of the complex interactions between different risk factors, where climate change is understood as a variable that affects pre-existing economic, environmental, political and social pressures. Drawing on the analysis of conflict drivers and dynamics in chapter 2 and 3 and past, current and future climate changes in chapter 4, this chapter explores how climate change impacts and interacts with conflict and fragility in the Lake Chad region.

Conflict and fragility increasing vulnerability

As a result of the conflict the resilience including the ability of the population to adapt to climate change has been reduced significantly.

First, population groups have been faced with increasing restrictions to access natural resources and livelihoods such as fishing grounds and agricultural land by different conflict actors. While shifting livelihoods has been a strategy to cope with climate and weather variability in the past, this strategy is less and less viable when access to land and water is restricted. At the same time, increasing variability of rainfall and shifting seasonal patterns have made traditional livelihood practices less viable. For example, local farmers have described how their traditional shifts between different agricultural practices depending on the rain are not able to cope with the weather extremes and variability of the past years. The strategies of the military are exacerbating these challenges for example by restricting or destroying high growing crops such as maize and clearing forests as part of their counterinsurgency campaigns.

Second, the massive displacement and movements of people have rendered large population groups extremely vulnerable. They are largely lacking the basis for their livelihoods in particular access to natural resources for example land for subsistence agriculture and are often dependent on humanitarian aid for their survival. Many displaced populations have been displaced multiple times and their ability to cope with future pressures is very low since their (financial) resources are depleted by displacement. In the receiving areas, pressure on natural resources is leading to increasing competition between host communities and displaced populations and the degradation of natural resources for example deforestation driven by fire wood consumption for cooking. This is reducing the resilience of displaced populations and host communities.

A particularly vulnerable group are trapped populations that have not been able to flee and have no access to humanitarian aid as they are in geographically inaccessible parts of Lake Chad. This is for example the case for the small islands on the lake that have been used as retreating areas by armed opposition groups.

Third, the conflict has negatively impacted a key asset of resilient communities: social cohesion within communities and the relationships between different population groups as well as between population groups and the government. Mistrust and suspicion has been sown within and between communities for example between Muslims and Christians as well as individuals and groups that are perceived as being part or supporters of armed opposition groups. This has negative impacts on the cooperation within and across communities leaving them less resilient against shocks and pressures. At the same time, traditional governance

structures have been ruptured by the conflict as traditional leaders have been killed, moved away or lost trust leaving a power vacuum and weakened community leadership.

Fourth, the already strained relationship between different population groups and the government has been further deteriorated. The indiscriminate military interventions by state security institutions and human rights abuses have created further distrust. This will impede any future intervention and efforts to address conflict and climate risks.

Natural resources conflicts

Climate change will further increase the pressure on natural resources such as land and water. This might exacerbate a type of conflict that had somewhat decreased in the context of the ongoing conflict with armed opposition groups, but has seen a recent resurgence: conflicts around natural resources in particular land and water, often between different occupational groups, such as pastoralists and farmers. As the conflict with armed opposition groups decreases, people will be able to return to their livelihoods and conflicts around natural resources might in turn increase. These kinds of natural resource conflicts also play a role in tensions between host communities and displaced population groups as displaced population groups can increase the competition over scarcer resources. This competition can turn into conflict, in particular in the context of ruptured community relationships and dysfunctional traditional governance mechanisms.

As climate change is changing the availability and access to natural resources, it creates new winners and losers. Against the background of the political economy of the conflict, in particular the trend of conflict actors to seek rents and profiteer also by controlling access to natural resources, and long standing marginalisation and exclusion, these changes in access and availability of natural resources pose a significant conflict risk.

Livelihood insecurity and recruitment

There have been reports and studies exploring the links between climate change, livelihood insecurity and the vulnerability of population groups, in particular young men, to recruitment by non-state armed groups. The hypothesis is that climate change increases livelihood insecurity and takes away economic perspectives. Non-state armed groups can exploit this economic insecurity and the lack of perspectives by providing economic incentives and alternative livelihoods. It is unclear at this point, if this hypothesis holds true for the Lake Chad region. However, what can be substantiated is that recruitment is happening in the context of social and economic inequality and changing livelihoods and a history of financial incentives offered by armed groups to join them. This is particularly the case for young men that see traditional routes to adulthood and livelihood security blocked for example by not being able to economically afford marriage and the role marriage and children play in becoming an accepted adult male in the community.

Future trajectories

Taking these climate-fragility risks together, they create a self-enforcing feedback loop between increasing livelihood insecurity, climate change vulnerability, and conflict and fragility. Conflict and fragility are decreasing the resilience of communities making them more vulnerable to climate change which at the same time is further undermining livelihoods and exacerbating the competition around scarcer natural resources. If not broken, this vicious circle threatens to perpetuate the current crisis and take the region further down the path of conflict and fragility.

Looking at possible future conflict trajectories, there are four trends that need to be taken into account:

1. **The ability of armed groups to adapt:** Armed opposition groups have shown that they are very resilient and able to change and adapt their identities, strategies, tactics and organisational structures.
2. **The future of self-defence militias:** A number of self-defence militias have emerged as a reaction to armed opposition groups. The role they will play in future conflict and fragility dynamics is unclear, particularly regarding whether they are willing to demobilise and disarm once the threat of the armed opposition groups has diminished.
3. **Increasing urbanisation and resettlement issues:** Movements of people have been primarily from rural areas to urban centres. A key challenge is that of providing sustainable livelihoods in urban and semi-urban areas as well as of return and resettlement.
4. **The role of humanitarian aid and development cooperation:** A large part of the assistance to the region takes the form of humanitarian aid. Predictability and transparency of aid as well as a move towards better linkages to long-term development cooperation to address the root causes of the crisis will be critical.

5 Climate-Fragility Assessment Process

With international attention, political action and humanitarian and development funding for the Lake Chad region increasing, there is a window of opportunity to ensure that these actions have sufficient ownership, address the complexity of the climate-fragility risks in the short, middle and long-term, and avoid unintended negative impacts. However, despite the significant role climate change plays in shaping the risk landscape, there is as yet no detailed analysis or process which explicitly takes account of the role climate change plays in either risk or shaping appropriate responses. This results in disconnected national and international policies, strategies and programmes.

In response to this, and following-up on the recommendations of the G7 commissioned report *A New Climate For Peace* and the conclusions drawn by the G7 working group under the Japanese presidency, a G7 commissioned integrated risk assessment process of the Lake Chad region has started to:

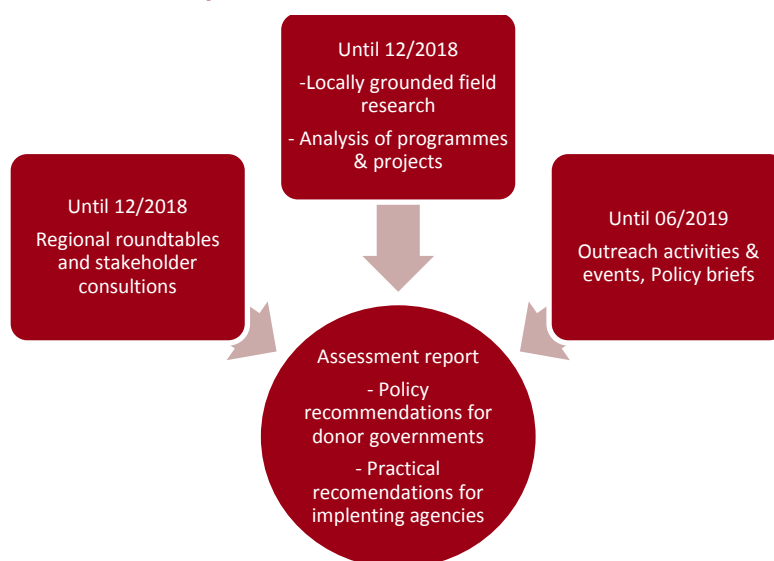
- i. Identify linked risks and resilience dimensions
- ii. Develop substantive policy recommendations for foreign policy makers on entry points for intervention in the region, and effective modes of engagement.

The assessment process will particularly aim at promoting a coherent process of engagement which adequately takes account of the climate-fragility risks and opportunities within the region. It will capitalize on the numerous other linked processes and initiatives relating to the region. It is envisaged that the findings of this proposed assessment can support or inform the processes such as those flagged in the UNSG's report on the situation in Lake Chad, (e.g. the Consultative Group on Prevention and Stabilization), and bi-lateral and multilateral activities such as the Oslo humanitarian funding process and planned World Bank funding.

Following this profile, the next step of the Climate-Fragility Risk Assessment process will be field research and surveys in Chad, Niger and Nigeria during the course of 2018. This locally grounded research will provide much needed primary data on the links between climate and fragility risks in the Lake Chad region and a comprehensive analysis on the impacts of climate and environment on the security situation. In addition, past, current and future policies, strategies, initiatives and programs will be analysed regarding their ability to address compound climate-fragility risks.

Three regional roundtables will be organised as part of the Climate-Fragility Risk Assessment process to facilitate exchange and build partnerships between different policy levels, actors and institutions in the region. At the same time outreach events and communication activities, such as podcasts, blogs as well as traditional dissemination products, will be used to share lessons learned, raise awareness and to ensure that the assessment process is participatory and accessible for all. Within the project period, policy briefs will provide recommendations and entry points to donor governments and other actors, based on the findings of the assessment and consultations.

Figure 12: Assessment process



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