



Shrinking options: climate change, displacement and security in the Lake Chad Basin

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Geography	Least developed countries; Africa; land-locked
Location	Lake Chad Basin (Nigeria and Niger)
Climate hazards	Slow-onset: unpredictable weather patterns, droughts, longer dry spells, extreme heat Rapid-onset: flooding and off-season shorter and more intensive rains
Vulnerable groups	Women, children, older people, disabled people
Response mechanism	Anticipatory: disaster risk reduction (early warning system at communal level, based on risk mapping climate conditions) Coping: adaptive agricultural practices, social cohesion training, promoting a market-driven agricultural system



Context

Lake Chad is located in Africa's Sahel, and is characterised as a closed basin within an arid to semi-arid region. Temperatures here have risen nearly 2°C since the 1960s. Lake Chad spans Cameroon, Chad, Niger and Nigeria. At least 40 million people live in this region, most of whom are dependent on the lake for livelihoods like fishing, farming and subsistence living.

Climate change effects such as reduced and erratic rainfall, coupled with high temperatures, are leading to high rates of lake water evaporation. This causes drought-like conditions and the lake to recede — at times — by as much as 90% over the past 50 years.¹ At the same time, population increase and dams and reservoirs built on the tributaries that feed the lake have also contributed to the lake's decline. This is impacting livelihoods in fishing, agriculture and livestock, that were once sustained by the lake.² 60% of the population use the lake's water for agriculture purposes.³ Importantly, the lake is not always in decline. Rainfall variability creates excessive rains that replenish the lake and cause flooding. However, it is the increasing variability of the lake's size, along with the frequency of extreme and intense weather events, caused by climate change, that render livelihoods insecure, increase natural resource conflicts and decrease the capacity to withstand climate shocks.

Countries studied for this research include Cameroon, Chad, Niger and Nigeria, with fieldwork in the Niamey and Diffa regions of Niger, and in Abuja and Maiduguri in Nigeria. Sub-national regions and villages were covered through fieldwork, and interviews of displaced persons were conducted from Niger (Arij, Zinder state and Komodougou river environs) and Nigeria (villages in Marte, Mafa, Dikwa, Kondugu, Masa, Damasak, N'Gala, Magumari, Benwe State, Adamawa State, Kukawa, Malamafatari, Kablewa).

Impacts

Climate shocks, conflict and competition for resources combine to hinder livelihoods and food security in the Lake Chad Basin (LCB), where agriculture is the main sector⁴ of the economy. Sahel temperatures increase 1.5 times faster than the global average,⁵ scorching the earth to dry and dusty conditions where seeds planted cannot take proper root. The Lake Chad Research Institute (LCRI) in Maiduguri, Nigeria has been studying the effects of climate change on the lake since 1976. It told research organisation Climate Refugees that a temperature increase of 1°C above 20°C, results in a 2% loss of crop yield. Several locations in the LCB have seen temperatures increase from 24 to 26°C.⁶ In Kanu, Nigeria, temperatures have stayed at 24°C for the past ten years.

Rainfall variability,⁷ predicted to decrease 11–13% in the next two decades, has led to conditions where seasonal crop planting and harvesting has become unpredictable.⁸ Crops are unable to take root and

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- 1 The European Space Agency (22 March 2019). Lake Chad's Shrinking Waters. https://www.esa.int/ESA_Multimedia/Images/2019/03/Lake_Chad_s_shrinking_waters
 - 2 Ross, W (31 March, 2018) Lake Chad: Can the vanishing lake be saved? BBC News. <https://www.bbc.com/news/world-africa-43500314>
 - 3 Mahmood, R, Jia, S and Zhu, W (2019) Analysis of climate variability, trends, and prediction in the most active parts of the Lake Chad basin, Africa. *Sci Rep* 9, 6317. <https://doi.org/10.1038/s41598-019-42811-9>
 - 4 Ibid.
 - 5 Climate Centre (14 November 2018) UN: Sahel Region One of the Most Vulnerable to Climate Change. <https://www.climatecentre.org/981/un-sahel-region-one-of-the-most-vulnerable-to-climate-change/>
 - 6 Tower, A (2017) Shrinking Options: The Nexus Between Climate Change, Displacement and Security in the Lake Chad Basin. Climate Refugees. (Stakeholder interview with Dr. Zakari Goji Silas Turaki, Director of Research, Lake Chad Research Institute (LCRI)) https://adobeindd.com/view/publications/bf1670bb-4562-402e-a6c2-ebb3298cf8e5/1/publication-web-resources/pdf/Shrinking_Options_The_Nexus_Between_Climate_Change_Displacement_and_Security_in_the_Lake_Chad_Basin.pdf
 - 7 Ibid.
 - 8 Mahmood, R., Jia, S. & Zhu, W. Analysis of climate variability, trends, and prediction in the most active parts of the Lake Chad basin, Africa. *Sci Rep* 9, 6317 (2019). <https://doi.org/10.1038/s41598-019-42811-9>



flourish when the expected rains do not come. Then, off-season rains — increasingly intense with monsoon-like conditions — cause fertile topsoil to wash away, taking with it essential soil nutrients. Seeds that have already been planted are also lost. This has been one contributing factor to successive years of failed harvests.⁹

With lake contraction, internal movement closer to the lake's shores has spurred competition over dwindling resources.¹⁰ At the same time, ongoing conflict from 2009 between the insurgent group Boko Haram and Nigeria spilled over into the region, impacting agricultural production.

Climate Refugees also interviewed 105 refugees and internally displaced persons (IDPs) across Niger and Nigeria displaced from villages surrounding the lake. All participants reported experiencing the impacts of climate change for an extended period. These included unpredictable weather patterns, droughts, longer dry spells, extreme heat, flooding and off-season shorter and more intensive rains, all of which had lasting impacts on the lake — a life source for all residents. Some spoke extensively of floods destroying crops and people initially moving to highlands to take cover, before eventually fleeing the region to seek refuge in cities, long before the start of the Boko Haram violence.

Others said lower crop yields from overgrazed land, a lack of rain and adverse climatic conditions forced them to move internally within their region in search of more arable land. Still, others said they had adapted to the changed climate by anticipating the path and timing of the lake's shrinking. Multiple participants reported a swell in mosquitoes and illnesses among family and community members, which they self-attributed to climate change.¹¹ Interestingly, the Intergovernmental Panel on Climate Change (IPCC), in its Fourth Assessment Report, noted that climate change had altered some disease vectors like mosquitoes.¹² Local experts said the data and field evidence indicate that climatic changes are forcing people to migrate.

Compounding risks/impacts created

LCB residents have been on the move for decades, moving southwards in search of more fertile soil for farming, and with lake shrinkage, closer to its shores for water access.¹³ Thus, while the start of the conflict in 2009 forced many out of the LCB, many were first displaced within the basin because of climate change.¹⁴ Refugees and IDPs also noted this internal displacement in numerous interviews, some reporting their first displacement as early as 1973.¹⁵ That displacement further destabilised populations already vulnerable from poverty, and brought them into closer contact with Boko Haram, eventually forcing their flight out of the region completely.¹⁶

Both LCRI and IDPs told us that as climate shocks deepened livelihood loss, many in this area totally abandoned farming and fishing, heading to urban centres for employment. LCRI also notes the difficulty of disentangling the connection between climate and conflict to determine the true extent to which climate

9 Tower, A (2017) Shrinking Options: The Nexus Between Climate Change, Displacement and Security in the Lake Chad Basin. Climate Refugees. (Stakeholder interview with Dr. Zakari Goji Silas Turaki, Director of Research, Lake Chad Research Institute (LCRI))

10 Adelphi (2019) 'Shoring Up Stability: Addressing Fragility Risks in the Lake Chad Basin.' <https://shoring-up-stability.org/wp-content/uploads/2019/06/Shoring-up-Stability.pdf>

11 Tower, A (2017) Shrinking Options: The Nexus Between Climate Change, Displacement and Security in the Lake Chad Basin. Climate Refugees. (Refugee, IDP interviews, Diffa Region, Niger and Maiduguri, Nigeria)

12 IPCC, Fourth Assessment Report. <https://www.ipcc.ch/assessment-report/ar4/>

13 Tower, A (2017) Shrinking Options: The Nexus Between Climate Change, Displacement and Security in the Lake Chad Basin. Climate Refugees. (Stakeholder interview with Dr. Zakari Goji Silas Turaki, Director of Research, Lake Chad Research Institute (LCRI))

14 Ibid.

15 Tower, A (2017) Shrinking Options: The Nexus Between Climate Change, Displacement and Security in the Lake Chad Basin. Climate Refugees. (Refugee, IDP interviews, Diffa Region, Niger and Maiduguri, Nigeria)

16 Ibid.



change has contributed to decreased agricultural cultivation. This is because, while decades of data on climate changes have been collected, those related specifically to climate-related displacement have not been collected as meticulously. Consequently, LCRI points to a significant loss of human capital, perhaps even millennia of Indigenous farming and cultivation knowledge. This reminds us that even devoid of conflict, climate shocks have caused agricultural losses in this region.

Refugees and IDPs interviewed said multiple internal displacements per year had caused their children to forego school. This is a highly underdeveloped region, with generally only one school.¹⁷ Climate change has therefore forced many displaced communities to choose between moving closer to the receding lake to access water, fish, trade and economic survival, and their own children's educational development.

Development indicators in the LCB are lower than the national averages of all four countries.¹⁸ As a result, fishermen and subsistence farmers have often felt marginalised by their governments, manifesting in underdevelopment, and exacerbated by the impacts of climate change. It is no coincidence then that Boko Haram has established itself in the LCB, capitalising on the neglected region as a base from which to attack, recruit and expand control.

Both the effects of climate change and the onset of recurring attacks by both warring parties have resulted in more than five million people becoming displaced¹⁹ throughout the region, both internally and across borders. According to the UN, 10.7 million people need humanitarian relief to survive.²⁰

The displacement of communities has sustained Indigenous cultural loss. The Indigenous ways of life of nomadic herdsman, their fisheries and trades, and traditional existence — all practised for thousands of years — have been lost or altered due to displacement and exile. LCRI told us the crops they research are inherited Indigenous 'land race' varieties, and before conflict rendered the region inaccessible, research was oral and hands-on with local farmers sharing their traditional ways of life.²¹

With increased populations in Nigerian cities like Maiduguri, which has 20 times²² more inhabitants than in the 1960s, increased demand for housing and resources such as water and arable land are creating local conflicts between farmers and pastoralists. A World Bank study²³ of the LCB found influxes of displaced communities have strained host resources and capacities such as water supply, education and health services in already vulnerable communities. This has resulted in increased tensions between displaced and host communities.

Vulnerabilities/impacts by compounding risks

Even before the conflict, disruption to education caused by climate displacement heightened the risk of exploitation and the recruitment of child combatants (boys). Not to mention kidnap and gender-based

17 Ibid.

18 World Bank, Lake Chad Basin Commission (2015) The Lake Chad Development and Climate Resilience Action Plan. <https://openknowledge.worldbank.org/bitstream/handle/10986/23793/MainOreport.pdf?sequence=1&isAllowed=y>

19 IOM Displacement Tracking Matrix (21 May 2021). Displacement Tracking Matrix: Lake Chad Basin. Monthly Dashboard 32. <https://displacement.iom.int/reports/west-and-central-africa-%E2%80%94-lake-chad-basin-crisis-monthly-dashboard-32-21-may-2021>

20 Ross, W, op cit.

21 Tower, A (2017) Shrinking Options: The Nexus Between Climate Change, Displacement and Security in the Lake Chad Basin. Climate Refugees. (Stakeholder interview with Dr. Zakari Goji Silas Turaki, Director of Research, Lake Chad Research Institute (LCRI))

22 Krinninger, T (7 December 2015) Lake Chad: Climate Change Fosters Terrorism *Deutsche Welle*. <https://www.dw.com/en/lake-chad-climate-change-fosters-terrorism/a-18899499>

23 World Bank, Lake Chad Basin Commission, op cit.

violence of girls, as seen in the abduction of school girls in Chibok, Nigeria.²⁴ In camp and urban contexts, education is lacking, undermining generations of children displaced by both climate and conflict.

Finding farmland that is safe and unclaimed by host communities is sometimes impossible, especially for women whose husbands have been killed, captured or recruited by the conflict. In non-displacement contexts, the impacts of livelihood loss are particularly acute for women and girls who have had to take up jobs outside the home for economic survival. Girls are forced to forego school to undertake lengthy travel in search of water and firewood, putting them increasingly at risk of gender-based violence during travel.

Displacement also disrupts family social cohesion, with numerous reports of domestic disturbances and gender-based violence in camps. Violence increases from frustration due to lack of food, improper food aid, and loss of identity, culture and known ways of life.²⁵ Disabled people and elderly communities with special needs are at high risk with provisions totally lacking or inadequate in displaced shelters, and in overcrowded cities like Maiduguri.²⁶ For men and boys, employment, livelihood and income-generating activities are almost non-existent. This leads to frustration, depression and other mental health challenges, as well as leaving them vulnerable to radicalised ideologies and recruitment by Boko Haram.²⁷

Adaptation measures

Climate adaptation is the key to survival and growth in the LCB, but access to the area has been limited by conflict. Several climate-adaptive strategies have been developed by LCRI. These include heat-resistant seeds, technological developments and vocational training for farmers. However, decades of underdevelopment and poverty are consistent barriers for farmers who cannot afford the climate-resilient seeds and adaptation measures. Communities have been coping by making multiple moves to the lake's shores, described as 'chasing the water'. When that too is insufficient, both men and women adapt by taking on new trades.²⁸

To adapt to increased temperatures, LCRI recommended farmers plant seeds by 15 November to ensure good crop yields. However, impoverished farmers sometimes delay planting, due to the high costs of seeds. LRCI notes that a one-week delay in planting results in a 30% loss in crop yield. It says climate adaptation efforts like heat-resistant seeds are stymied by extreme poverty and access issues caused by conflict-driven insecurity.

Working with local government, NGOs are piloting climate-adaptive demonstration farms to show planting, harvesting, weed management and innovative water conservation techniques. NGOs provide resilient seeds proven to be more adaptive to changed climates and are also linking communities to agricultural dealers who can sell farmers' excess harvests.²⁹ Farmers are encouraged to grow crops for daily use and future reserve, marketing excess for sale and thereby promoting a market-driven agricultural system. Adaptive strategies include: promoting crop rotation systems, limiting the use of chemicals, mulching systems that prevent water run-off, innovative sources of water conservation, and the collection and promotion of organic composting to offset the lack of organic material in the soil from overgrazing. Some NGOs integrate social cohesion training into agricultural livelihoods programming to educate, build and promote peaceful co-existence between displaced and host communities. Disaster risk reduction is also being

²⁴ Tower, A (2017) Shrinking Options: The Nexus Between Climate Change, Displacement and Security in the Lake Chad Basin. Climate Refugees. (Refugee, IDP interviews, Diffa Region, Niger and Maiduguri, Nigeria)

²⁵ Ibid.

²⁶ Ibid.

²⁷ Ibid.

²⁸ Ibid.

²⁹ Ibid.

integrated into climate agricultural adaptation with an early warning system at the communal level based on risk mappings of heavy rains, crop disease and other climate conditions.³⁰

Loss and damage beyond adaptation

Regardless of the possible cessation of conflict, populations have already sustained lifelong losses and damages. Millions of lives have been upended by both climate change and conflict. Lake Chad has receded to an extent where livelihood loss is almost permanent. Lake renewal is only possible if seasonal rains and optimal temperatures arrive when expected and are sustained over a long period. This has not happened in decades and we now know that global warming and climate change are unlikely to allow that to return.

At the same time, the significant underdevelopment of the population in this region renders them unable to adapt to new vocations. Cultural loss is significant and violates Indigenous, economic, social and cultural rights, while food insecurity is endemic.

Support needed in future

To help communities adapt to climate change, improve natural resource management and promote and provide access to new economic opportunities, various support is needed:

- To conduct climate fragility assessments of infrastructure, especially in growing urban and displaced centres like Maiduguri
- To conduct market assessments to tackle unemployment where lost livelihoods can be redirected. This is especially vital for displaced persons who want economic opportunities, training, and land tenure to self-sustain in their new living contexts
- For improved information, technological transfers and better climate information, especially for communities still surrounding the lake region
- For better preparation to respond to climate shocks, markets and scenarios that impact their lives
- Research support to develop best practices on climate adaptation measures that mitigate climate displacement
- To create links between humanitarian and development actors, who can work together to develop more flexible projects that assist communities most threatened by climate change
- To ensure climate adaptation is fully integrated into livelihood and early recovery programming
- Investment in strengthening peacebuilding initiatives by local civil society, such as social cohesion, community engagement and dialogue, as well as the creation of development-security links to prevent and counter violent extremism.

Lessons learned

While conflict poses significant restrictions to adaptation and access, the millions living in displacement can be helped. Stronger financing towards climate adaptation within the LCB — where access is not hindered by conflict — and adaptation and integration of displaced people within host communities, is essential for building resilience.

³⁰ Ibid.

Complex drivers of conflict, poor governance, poverty and climate change, are driving displacement in this region. Underdevelopment has weakened climate change adaptive capacity. LCRI-developed climate adaptive strategies such as training, farming demonstrations, tools, alternative crops and heat-resistant seeds are cost prohibitive to most farmers, so tackling poverty alongside climate resiliency is key. IDPs said they could not afford the technologically advanced seeds and alternative crops, and so replanted the same seeds year after year. While agricultural fertilisers are subject to government restrictions because of their potential use in improvised explosive devices by Boko Haram on farmland areas.

At least five NGOs interviewed have introduced adaptation programmes to address the impacts of climate change among displaced communities.³¹ These should be enhanced with further funding and support to increase resilience and rebuild livelihoods of displaced communities. With a large proportion of communities and displaced persons being agriculturally dependent, such programming should be scaled up to build resilience.

Adaptation efforts should also ensure that a rights-based approach is pursued that guarantees:

1. Equal access and non-discrimination in the selection of participants in climate adaptive programmes
2. Access to information and full participation of affected communities, especially marginalised groups, in planning, designing and decision making, and
3. That the economic, social and cultural rights of the affected communities should form the basis of the climate adaptive measures.

Synopsis

Climate shocks in the Lake Chad Basin have played a significant role in the displacement of over five million people in this region. While the regional conflict between these countries and the insurgent group Boko Haram that began in 2009 is the main driver of recent displacement, it is by no means the area's first instance of forced movement. Climate change and climate variability (manifesting in irregular rainfall, temperature rises and drought), along with poverty and underdevelopment, have caused livelihood loss here for over 45 years, deeply impacting subsistence farming, fishing and pastoral communities.

³¹ Ibid.