



Chad

The following climate factsheet summarizes available information on the climate of Chad, climate change and impacts of these changes on humanitarian activities in country. Each of the factsheets were written as a compilation of information from peer-reviewed academic papers, government publications, and INGO documentation.

1. Climate overview

Average temperature: Temperature range between 27°C and 32°C in the majority of the country - except for the high-altitude region in the North with temperature below 21°C.

Average annual rainfall: Rainfall varies strongly in space with an increasing gradient from north to south. The desert north which covers 47% of the territory, annual average rainfall does not exceed 100mm. The central Sahel, with annual rainfall average between 100 mm and 800 mm, it presents significant contrasts between the arid northern part and the south characterized by rainfall of between 800 and 1200 mm/year (figure 1b).

Short overview

Chad's climate ranges from desert to semi-arid in the north and centre to tropical savannah in the south. The climate is influenced by the West African Monsoon, which brings large interannual variability in wet-season rainfall and contributes to recurring droughts and floods. The rainfall season is from May to October with rainfall totals up to 150 mm per month. The dry season lasts between November to March and very little to no rainfall falls during this season (figure 1c). The average temperature varies between 21°C in January and 31°C in May (figure 1c). The El Niño Southern Oscillation (ENSO) creates irregular periodic variation in the temperature as well as sea surface temperature, thus influencing year-to-year variability and extreme weather events such as heatwaves, droughts, and floods. Drier than normal rainfall during July to September is generally associated with the El Niño (warm) phase of ENSO.

The diverse and varied geography of Chad means that it is exposed to a broad array of environmental hazards (hydrometeorological as well as geophysical) which are directly impacted and exacerbated by the impacts of climate change across the country. Ranked 5 out of 191 countries by the 2022 Inform Risk Index (DRMKC, 2022), Chad is one of the higher hazard risk countries in the world exposed to floods, droughts and epidemics

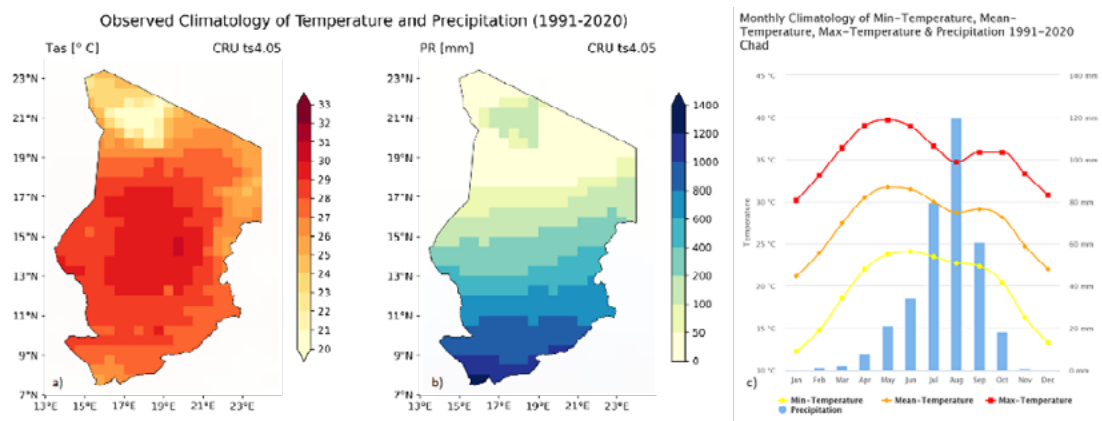


Figure 1. Observed Climatology of mean Temperature (a), annual mean total precipitation (b) and monthly climatology (c) over 1991-2020. (Adapted from World Bank, 2022)

1.1 Climate Change in Chad

Historical climate change

Temperature

- The mean annual temperature over Chad have increased at a rate of approximately 0.2°-0.3°C/decade since 1961 to 2015 (Gutiérrez *et al.*, 2021)
- The frequency and intensity of hot extremes have increased and cold extremes have decreased (Seneviratne *et al.*, 2021)

Projected climate change

- Mean temperature over the region are projected to rise until 2050 by at least 2.5°-3.5°C for a high greenhouse gas concentration scenario (SSP5-85) and 1.5°-2.5°C for low greenhouse gas concentration scenario (SSP2-4.5) (Gutiérrez *et al.*, 2021).
- Maximum and minimum temperature will increase, and **heat waves will intensify in duration and peak temperatures** for every increase in global warming levels above the pre-industrial values. In line with rising mean annual temperatures, the annual number of very hot days (days with daily maximum temperature above 35 °C) is projected to rise and with high certainty (Gutiérrez *et al.*, 2021; Ranasinghe *et al.*, 2021; Seneviratne *et al.*, 2021).

Precipitation

Overall, no clear trend in rainfall due to high year to year natural variability. Rainfall variability has increased, with wetter and drier periods, with severe droughts between 1950 and 1980s and 2005, 2008, 2010 and 2012 (USAID, 2012).

- Mid-century estimates (2040-2060) of annual precipitation changes over Somalia under a low emission scenario (SSP2-4.5) and high emissions scenario (SSP5-8.5) is projected to increase around 30-50%, with enhanced interannual variability (Gutiérrez *et al.*, 2021)
- The frequency and intensity of heavy precipitation events are projected to increase with potential effects in flooding and soil erosion (Seneviratne *et al.*, 2021)

2. Priorities of the Movement and climate change

2.1 Scale up climate-smart DRR, early action and preparedness: DRR portrait

Existing Hazard	Projected Risks
Drought	
<p>Increases droughts and desertification in the northern part of Chad have important consequences on livestock and agriculture (World Bank, 2021).</p> <p>Droughts and the current water management systems impact the Lake Chad, which could disappear in the next 20 years (World Bank, 2021).</p>	<p>Droughts (and heatwaves) are a high risk in the country, meaning that they are expected to occur on average every 5 years. Therefore, it is expected that project will take into account the impact of drought in all phases of the project, in particular its effect on personnel and stakeholders (ThinkHazard, n/a).</p> <p>Improved management of livestock, fisheries, agriculture and water is necessary to increase the sustainability of these livelihoods (World Bank, 2021).</p>
Flood	
<p>The Government has requested international interventions regarding floods in the recent years; 2012, 2019, 2020, 2021 (IFRC, 2022). Flood risk are qualified of high in the South of the country, meaning that 'life-threatening river floods are expected to occur at least once in the next 10 years' (ThinkHazard, n/a).</p>	<p>Climate change is foreseen to worsen flood (World Bank, 2021). Therefore, it is recommended to take long-term flood hazard into account in programming (Think Hazard, n/a).</p>
Epidemics	
<p>Epidemics have been the most prevalent risk in the country in average for 1980-2020, with diseases such as malaria, cholera, measles and meningitis (World Bank, 2021)</p> <p>In the recent years, the Government has requested international interventions support to epidemics of cholera (2001, 2006, 2011 and 2017) and meningitis (2011) (IFRC, 2022).</p>	<p>Endemic diseases are expected to be aggravated with the increase of extreme events. Improvement in medical care and early warning system would enhance the management of these risks. (World Bank, 2021).</p>

It is essential to note that many of these hazards are interrelated and produced compound risks to the same areas and communities. In addition, risk must be understood as the interplay between hazard risk, exposure, and vulnerability which make certain communities, individuals, and sectors more impacted by the hazards. All project design should consider the risk mentioned above and the compounding risks they represent.

Disaster Risk Management Strategies

[Stratégie nationale de Réduction des Risques de Catastrophes \(RRC\) et plan d'action du Tchad \(2020\)](#) has been validated in 2020 (DERNARD, 2020) following a DRR capacity assessment by CADRI in 2015 (Republic of Chad, 2015).

[Vision 2030 The Chad we want](#) (2017). This document to provide a global vision of development in Chad. It will be renewed to cover a longer period of time. One of its goals targets climate change and designate disaster preparedness as a key element to achieve this objective. It also lists climate risk, including climate-induced displacements.

[Plan cadre des Nations Unies d'assistance au développement \(UNDAF\) 2017-2021](#) (2021). This document offers an overview of the assistance provided by the UN in the country, which includes a mainstreamed approach on climate change and DRR.

Disaster Risk Management Law and Policies

- National Action Plan for Capacity-building for Disaster Risk Reduction, Preparedness and Emergency Response (2015–2021)
- Action Plan to Implement the National Climate Services Framework (2016–2020)
- National Disaster Risk Reduction Strategy and Action Plan of Chad
- National Disaster Risk Management Strategy and Action Plan of Chad (2020)
- National Policy on Land Use, Urban Planning and Housing (2017)
- National Land-use Plan (2019)

2.2 Reduce health impacts of climate change

Increased frequency of heatwaves, floods, droughts and storms due to climate change affects human health and nutrition in Chad. With the rise in temperatures, mortality and morbidity from vector-borne diseases such as malaria will likely increase (Republic of Chad, 2022). Whereas rising temperature could decrease the risk of malaria, infection risks could increase in some areas due to flooding (Tomalka *et al.*, 2020). Flooding also results in an increase in the cases of water-borne diseases such as cholera and diarrhoea (Republic of Chad, 2022). For example, in 2017, several people were killed by a Cholera outbreak in Chad (OCHA, 2018). In addition, temperature rises and a decrease in humidity will increase the cases of meningitis, especially in southern Chad's 'meningitis belt' (Republic of Chad, 2022; Tomalka *et al.*, 2020).

Droughts, temperature rises, and floods will also disrupt agricultural productivity and add to the food insecurity and malnutrition challenges which are leading health issues in Chad (Republic of Chad, 2022). Chad has very high levels of malnutrition (CIAT *et al.*, 2021). The level of stunting among children is very high compared to the rest of the region at 37.8% (WFP, 2022). The World Food Programme (WFP) also estimates that over 2.1 million people in Chad are food insecure (WFP, 2022). These numbers will likely increase due to climate change.

The temperature in Chad will also rise significantly and increase heat-related mortality as much as three-fold by 2080 (Tomalka *et al.*, 2020). Heat waves will affect more infants, older people and those with pre-existing conditions and disabilities, such as diabetes and heart disease (WHO, 2018). Additionally, climate change is projected to create future challenges in health care access, high mortality rates and low life expectancy in the country (Republic of Chad, 2022).

2.3 Sustainable water: resources management, infrastructure and access

Water, Sanitation and Hygiene

Frequent and more intense droughts have reduced water levels in rivers and lakes in Chad. The reduction of Lake Chad volumes due to droughts and rainfall declines (by up to 95%) is visible and has become a symbol of climate change impacts in the country (Papa *et al.*, 2022; Pham-Duc *et al.*, 2020). Several rivers and lakes in Chad (such as Lake Fitri, which dried up completely) have also been impacted by droughts (Republic of Chad, 2022). With the increasing droughts, water per capita is expected to decline by 75% by 2080, largely driven by population growth (Tomalka *et al.*, 2020; Republic of Chad, 2022). However, droughts, over water abstraction and environmental degradation also contribute to water shortages (Ahmed & Wiese, 2019; UNEP, 2018). With only 46.2% of the population having access to basic water services, droughts will likely slow down or prevent the realization of universal water access in Chad (Joint Monitoring Programme (JMP), 2020).

Most people in rural and urban areas depend on groundwater supplies abstracted through boreholes and large-diameter wells (Republic of Chad, 2022; Duc Pham *et al.*, 2020). Higher temperatures and decreased rainfall will cause these already susceptible water sources to either reduce or dry up (Republic of Chad, 2022). Floods also cause contamination of shallow aquifers due to the combined impact of rapid urbanization and inadequate sanitation facilities (World Bank, 2019). In Chad, 64% of the population still practices open defecation and the condition of sanitation facilities, especially pit latrines in urban areas, is very poor (JMP, 2020; Republic of Chad, 2022). The risk of contamination of surface and groundwater during floods is very high under these conditions (Republic of Chad, 2022).

2.4 Enable climate resilient livelihoods and economic security

Conflict and the presence of non-state armed groups in Chad has had deep, long-lasting effects on economic security (Nagarajan *et al.* 2018). It is difficult to ascertain the relative effects of the many stressors in the region as compared to the insecurity. Rainfall variability experienced in Chad adds to the existing pressures by straining agricultural and agropastoral systems. More recent studies have highlighted the negative role of increased temperatures on agricultural productivity in the region, assessing that heat stress on crops may have a stronger negative impact on yields than changes in rainfall (Sultan *et al.*, 2013).

Frequent droughts due to climate change will damage agriculture, a key livelihood source in Chad, in several ways including shrinking areas of production of cash crops, contributing to increases in pests and diseases, reduction in livestock pasture, and decline in crop yields (Republic of Chad, 2022). Agriculture (crops and livestock) accounts for 23% of Chad's GDP (FAO, n.d.) and employs 77% of the labour force (CIAT *et al.*, 2021). In this scenario, dependence on rainfed subsistence farming increases the susceptibility of crop damages in the event of droughts. Increased frequency of dry days, delayed rainfall onset, shorter rainy seasons, and higher temperatures due to changes in climate will lead to between 10-25% decline in yields of major crops (Republic of Chad, 2022). Major crops include millet, sorghum, groundnuts, maize, beans and rice (Tomalka *et al.*, 2020). However, cash crops, such as cotton, will also be affected (*ibid*, 2020).

Both temperature increases and variable rainfall make harvest rates low and unpredictable; and, therefore, require the local population to stabilize household incomes in other ways – notably through labour migration and day labour (Maastricht Graduate School of Governance (MGSoG) 2017). Consumption is stabilized through regional and international food markets, with households purchasing imported staple foods. Therefore, food price and availability in Chad is not only affected by local production, but also regional and global production, as well as stressors which disturb markets, such as conflict within the region (FAO 2016).

A major impact of climate change in Chad relates to food insecurity: 38.4 per cent of the population is below the international poverty line, and the country as a whole is categorized by the World Health Organization (WHO) as a “low-income food-deficit country” (WHO n.d.). It is one of the world's most food insecure countries: 40 per cent of children aged under five suffer stunting and low height connected to malnutrition (World Food Programme (WFP) n.d.); and, in 2020, an estimated 6.4 million people were in need of humanitarian assistance (OCHA 2020). Recently, metrics of food insecurity have increased, as severe insect and pest invasions as well as floods have destroyed agricultural production, leading to widespread and severe food insecurity with long-term health implications. In 2019, for instance, the number of children with acute malnutrition jumped by 59 per cent compared to the previous year, notably due to low agricultural yields caused by droughts and pests (FAO 2019). These hazards are expected to intensify and become more frequent under climate change.

A decline in water quality and quantity and destruction of fish breeding grounds in Lake Chad and other rivers is expected to affect the livelihoods of people who depend on fisheries and generally on the lake ecosystem (Republic of Chad, 2022). In addition, Lake Chad is a significant source of food security and livelihood in the region (World Bank, 2018). Therefore, climatic stressors on the lake directly affect incomes, food, and livelihoods. Lastly, livelihoods will be impacted by the devastation of human settlements and economic sites, especially in urban areas, due to the projected increase in extreme precipitation and subsequent flooding (Tomalka *et al.*, 2020).

2.5 Address climate displacement and protection

Current and future displacement challenges

While migration in and through Chad has occurred for generations due to a variety of reasons, Chad has had increasing numbers of IDPs in recent years due to both conflict and the threat of it. Disasters, intercommunal violence, and conflict in the Lake Chad basin were the main causes of internal displacement in Chad in 2021. The country had 367,000 IDPs at the end of 2021, with the vast majority (392,000) caused by conflict (IDMC, 2022). Seasonal rains and floods accounted for the remaining IDPs (24,000) (IDMC, 2022).

Both migration and immobility must be addressed as climate change and conflict continue to intersect. While Chadians move due to conflict as well as slow- and sudden-onset extreme events, people also find themselves unable to move as a response to the impacts of climate change. Conflict reduces people's ability to move freely when rains fail to emerge or in instances of flooding, illustrating the need to consider in situ displacement as well as those on the move. For example, torrential rains in 2020 flooded many areas where refugees and IDPs lived; however, as they had already been displaced from their homes there were few options left (UNHCR 2020).

Potential needs for migrants and displaced people

Migration in Chad is increasingly gendered, with most migrants being male in search of economic opportunities. A study commissioned by the International Organization for Migration (IOM) found that 84.4% of those surveyed between 2018-2020 were men, averaging 30 years old. The vast majority were traveling increasing distances from their homes and families to fish, farm, or find other livelihoods (American University *et al.* 2021).

Protection

The impacts of climate change, including migration and immobility, will continue to fuel instability in the Lake Chad Basin – unless these impacts are addressed (Adelphi 2019, Granguillhome *et al.* 2021). The reduction of size of Lake Chad in the 1970s and 1980s reduced water access to the local population, requiring increasing numbers of people and animals to congregate around the lake's smaller perimeters. This, in combination with insecurity in neighbouring countries, has put significant pressure on the areas closest to the lake, which are now the most frequent sites of violence and conflict (ACTED 2020). This finding relates to broader findings that climate change will significantly contribute to global instability in the coming decade, in many cases exacerbating already fragile settings (Adelphi, 2022). As in other countries in the region, climate change is considered to have a multiplying effect (Moran *et al.* 2018) on the underlying stresses in Chad, including long-standing political instability, stagnant growth, increasing inequality and conflict (Duc Pham *et al.* 2020). Sustainable livelihoods are one important way to address both reduced agricultural or pastoral livelihoods options due to climate change as well as to provide options besides joining armed or terrorist groups for money (Adelphi, 2019).

The shortening of the rainy season has increased conflict between pastoralists and farmers. For example, many pastoralists leave prematurely in search of dry season grazing grounds in the wetlands of Yaéré-Naga, along the river Chari. This migration has fuelled conflict both en route and while returning as pastoralists' animals destroy still-growing crops or ones about to be harvested. In recent years, conflicts between farmers and pastoralists have resulted in fifteen thousand deaths (Nagarajan *et al.*, 2018).

Around the world, people in detention frequently have heightened vulnerability to natural disasters due to: spatial marginalization resulting from prison locations on hazard-prone land and/or isolation from emergency evacuation services; limited to no connections to social networks, which are crucial aspects to hazard resilience; and political marginalization, including lack of policies and services to prevent disaster impacts on imprisoned populations (Gaillard and Navizet 2012). These existing vulnerabilities, coupled with more frequent and intense disasters due to climate change, may leave prison populations in especially precarious positions to hazards such as extreme heat, flooding and sandstorms.

2.6. Policy

Relevant information from the [Nationally Determined Contribution \(NDC\) \(2021\)](#)

Emission target: 19,3% of reduction by 2030 with international assistance, which includes a budget of 6,7 billion USD (645 millions per year). This will focus largely on **energy**, and including carbon capture and waste management but not agriculture – although it is the sector emitting the most in Chad (95% of GHG emissions).

Area of focus on Adaptation: Water, Agriculture, Livestock breeding, Fishing, Risk Management. Gender and urban planning as cross cutting to adaptation and mitigation.

Inclusion of DRR: Yes, it is one of the adaptation priorities

National Designated Entity: Ministry of Environment, Fishery and Sustainable Development, Direction de l'Education Environnementale et de la lutte Contre les Changements Climatiques (DEELCC)

Relevant information from the National Adaptation Plan (2022)

Area of focus on Adaptation: Agriculture and livestock; Environment and forestry; Water, hygiene and sanitation; Renewable energy; Gender and social protection; Education and communication; Management of risks and extreme weather events, infrastructure and land-use planning, housing and urban development; Aquaculture and fishery resources

Inclusion of DRR: Yes, one of the priorities. It includes climate insurance, early warning systems, community awareness on climate risk, management of new climate-related natural disasters based on risk zone maps, implementation of risk-sensitive and participatory land-use planning, regulation of urbanisation and construction.

Key stakeholders: National High-level Committee for the Environment and the Ministry of Environment, Fisheries and Sustainable Development.

The NAP also includes a detailed list of stakeholders and projects among which African Development Bank, World Bank, Central African States Development Bank and the Arab Bank for Economic Development in Africa, Islamic Development Bank, bilateral cooperation (Germany, France, Canada, Swiss, EU, Japan, UK, Sweden, USA), European Community Humanitarian Office (ECHO), WFP, UNDP, UNHCR, UNICEF,

Other National Policies on Climate

- **National Environmental Policy** (2017). This document aims to fight environmental degradation which includes disaster and climate change as factor of degradation.
- **National Climate Change Strategy** (2017). This document highlights the following priorities for 2030; Strengthen the resilience of agro-sylvopastoral, fishery and urban systems; Promote climate change mitigation actions; **Prevent and manage extreme climate phenomena and risks**; **Build the capacity of actors and institutions to combat climate change**; strengthen the instruments and capacities to mobilize climate financing. It also includes data on losses and damages encountered in Chad.
- Legal instruments focusing on the Great Green Wall, Biodiversity, Desertification exist in Chad but there is **no national legal framework on climate change** (Republic of Chad, 2022). The **Constitution of Chad mentions climate change** and environmental protection. (Republic of Chad, 2022).

Climate finance

National Societies can explore options for accessing climate funds, such as the [GEF's Small Grants Programme](#) or the [FFEM's Small Scale Initiatives Program](#). Other funding from bilateral donors, national climate funds, or multilateral climate funds like Adaptation Fund, CREWS, or GCCA+ could be explored (Climate Centre, 2022a). National societies cannot directly apply for climate finance from the [Green Climate Fund \(GCF\)](#), but they can be an implementing partner for an accredited entity (Climate centre, 2022a).

Engaging in national climate adaptation planning is vital for accessing climate finance.

Additional Resources

Climate Centre. (2022a). Factsheet on Climate Finance. <https://www.climatecentre.org/wp-content/uploads/Fact-Sheet-on-Climate-Finance.pdf>

Climate Centre. (2022b). Entry points for National Societies on Climate Finance partnerships. <https://www.climatecentre.org/wp-content/uploads/Entry-Points-for-Climate-Finance-Partnerships.pdf>

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