



Chad

This climate fact sheet summarizes the available information on the climate of Chad and the impact of climate change on humanitarian activities in-country. Each fact sheet in the series was written using information from peer-reviewed academic papers, government publications, and other documentation from international non-governmental organizations.

1. Climate overview

Average temperature: Seasonal temperatures vary considerably with temperatures ranging from 20–27°C in winter and between 27–35°C in summer. The high altitude region in the north has an average temperature of below 21°C.

Average annual rainfall: Rainfall varies significantly across the country with an increasing gradient from north to south. In the desert north, which covers 47 per cent of the territory, annual average rainfall does not exceed 100mm. The central Sahel, with an annual average rainfall of 100–800mm, presents a significant contrast to the arid north, while southern Chad is characterized by rainfall of 800–1200mm/year.

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, while also contributing to recurring droughts and floods. The rainy season is from May to October with rainfall totals up to 150mm per month. The dry season lasts from November to March and very little to no rainfall falls during this season. The average temperature varies between 21°C in January and 31°C in May. 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 droughts, floods and heatwaves. Lower than average rainfall during July to September is generally associated with the El Niño (warm) phase of ENSO.

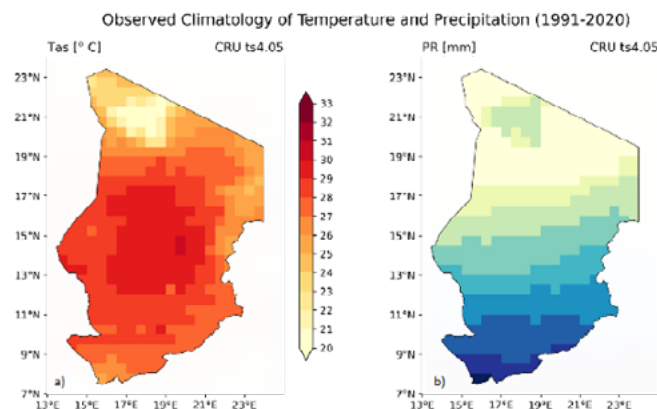


Figure 1. Observed climatology of (left to right) mean temperature and annual mean total 1991–2020. (Adapted from World Bank, 2021).

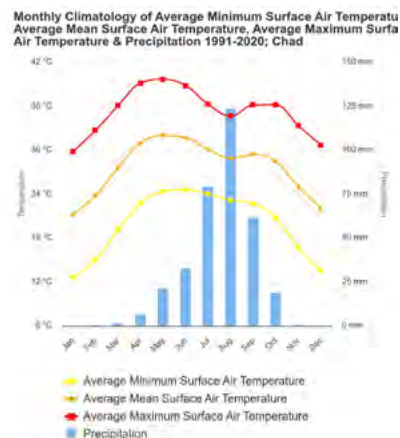


Figure 2: Observed average monthly climatology 1991-2020 (from World Bank, 2021).

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. Chad is one of the most vulnerable countries to humanitarian crises and disasters, ranked fifth out of 190 countries in the 2023 Inform Risk Index (DRMKC, 2023).

1.1 Climate change in Chad

Historical climate change

Temperature

- The mean annual temperature over Chad has increased at a rate of approximately 0.2–0.3°C/decade in 1961–2015 (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 temperatures over the region are projected to rise until 2050 by at least 2.5–3.5°C for a high greenhouse gas concentration scenario (SSP5–8.5) and by 1.5–2.5°C for a low greenhouse gas concentration scenario (SSP2–4.5) (Gutiérrez *et al.*, 2021).
- Maximum and minimum temperature will increase, and heatwaves 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, there is no clear trend in rainfall due to high year-to-year natural variability. Rainfall variability has increased, with wetter and drier periods and severe droughts between 1950s and 1980s as well as in 2005, 2008, 2010, 2012, 2017 and 2020 (World Bank, 2021).

- Mid-century (2040–2059) estimates of annual precipitation changes over Chad under a low emission scenario (SSP2–4.5) and high emissions scenario (SSP5–8.5) suggest that it is projected to increase by around 30–50 per cent, with enhanced interannual variability (Gutiérrez *et al.*, 2021; World Bank, 2021a).
- 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 Red Cross Red Crescent Movement under climate change

2.1 Scale up climate-smart disaster risk reduction (DRR), early action and preparedness

Existing hazard	Projected risks
Droughts	
<p>Increased droughts and desertification in the northern part of Chad decrease available fertile land, negatively impacting livestock and agriculture (UNDP, 2023).</p> <p>Droughts and the country’s current water management systems impact 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 five years.</p> <p>Therefore, it is essential that all project design takes into account the impact of drought in particular, especially its effect on personnel and stakeholders (ThinkHazard!, n.d.)</p> <p>Improved management of livestock, fisheries, agriculture and water is necessary to increase the sustainability of these livelihoods (World Bank, 2021). Plans and policies promoting the mitigation of the desertification of arable land and adaptation to more extreme floods and droughts include elevated water tanks, irrigation development and groundwater abstraction (UNDP, 2023).</p>
Floods	
<p>The Government has requested international interventions regarding floods in recent years: 2012, 2019, 2020, 2021 (IFRC, 2022). Flood risk is qualified as ‘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.d.).</p>	<p>Ongoing climate change is likely to worsen the risk of floods (World Bank, 2021). Therefore, long-term flood hazards should be taken into account in programming (Think Hazard!, n.d.).</p>
Epidemics	
<p>Epidemics have been the most prevalent risk in the country on average for 1980–2020, with diseases such as cholera, malaria, measles and meningitis (World Bank, 2021).</p> <p>In the recent years, the Government has requested international interventions to support epidemics of cholera (2001, 2006, 2011 and 2017) and meningitis (2011) (IFRC, 2022).</p>	<p>Endemic diseases (vector-borne, waterborne and respiratory) are expected to be aggravated with the increase of extreme events such as flooding and heatwaves. Improvements in medical care as well as the introduction of an 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 produce 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 individuals, communities and sectors more impacted by the hazards. All project design should take such compounding risks into account.

Disaster risk management strategies

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

[Vision 2030: The Chad we want](#) (2017). This document – published by the Ministry of the Economy and Development Planning – provides a vision of development across Chad. It identifies disaster preparedness as key to achieving the Vision's objectives of continued development, and highlights climate-induced displacement among the top climate change-related risks facing the country.

[Plan Cadre des Nations Unies l'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

- In Chad's [National Adaptation Plan](#), published in 2022 with the support of UNEP, the following development strategies and plans are noted for risk management, infrastructure and land-use planning:
 - 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

The increased frequency and intensity of droughts, floods and heatwaves due to climate change will continue to affect human health and nutrition in Chad. Rising temperatures, climate variability and increasing frequency of extreme weather event such as flooding are likely to have implications for vector-borne, waterborne and respiratory diseases (Tomalka *et al.*, 2020). Rising temperatures will cause decreased humidity, and these conditions could reduce the risk of malaria in some regions, while increasing the risk of meningitis, particularly along the southern 'meningitis belt' (Republic of Chad, 2022; Tomalka *et al.*, 2020). Flooding also results in an increase in the cases of waterborne diseases such as cholera and diarrhoea (Republic of Chad, 2022). In 2017, for example, over 1,000 cases and 80 deaths were reported during a cholera outbreak in Chad (OCHA, 2018).

Temperature rises, droughts and floods will also disrupt agricultural productivity and add to the food insecurity and malnutrition challenges which are already 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 per cent (WFP, 2022). The World Food Programme (WFP) estimate that 3.4 million people in the country will be acutely food insecure during the 2024 lean season, the highest recorded

level (WFP, 2024). Alongside soaring food prices and disruption to trade routes due to ongoing conflict in Sudan, climate shocks have accelerated this trend and will likely increase.

The temperature in Chad will also increase heat-related mortality as much as threefold by 2080, from approximately four to 12 deaths per 100,000 people annually (Tomalka *et al.*, 2020). The increasing risk of heatwaves will have a greater impact on infants, older people and those with pre-existing conditions, such as diabetes and heart disease (WHO, 2018). Overall, climate change is projected to create future challenges in access to healthcare, high mortality rates and low life-expectancy across the country (Republic of Chad, 2022).

2.3 Ensure sustainable water supplies

Water, Sanitation and Hygiene (WASH)

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

Most people in rural and urban areas depend on groundwater supplies abstracted through boreholes and large-diameter wells (Republic of Chad, 2022; Pham-Duc *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 the contamination of shallow aquifers due to the combined impact of rapid urbanization and inadequate sanitation facilities (World Bank, 2019). In Chad, 64 per cent 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 (NSAGs) in Chad has had deep, long-lasting effects on economic security (Nagarajan *et al.* 2018). In recent years, new rebel groups have formed, and existing groups such as the Front for Change and Concord in Chad have broken ceasefire agreements (HRW, 2024; Ramadane, 2023). Following bloody crackdowns of protests demanding a return from the military-led government to civilian rule in 2022, the presidential elections in May 2024 were marked by violence, with Human Rights Watch (HRW) reporting multiple deaths (HRW, 2024a). As a region, the prevalence of conflict and the severity of climate change in the Lake Chad Basin has caused substantial livelihood insecurity in Chad (Ehiane & Moyo, 2022). 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, reducing livestock pasture, and declining crop yields (Republic of Chad, 2022). Agriculture (crops and livestock) accounts for 23 per cent of Chad's GDP (FAO, n.d.) and employs 77 per cent of the labour force (CIAT *et al.*, 2021). In this scenario, a dependence on rainfed subsistence farming increases the susceptibility to crop damage in the event of droughts. The increased frequency of dry days, delayed onset of rainfall, shorter rainy seasons, and higher temperatures due to changes in climate will lead to a 10–25 per cent decline in yields of major food crops (Republic of Chad, 2022), including beans, groundnuts, maize, millet, rice and sorghum (Tomalka *et al.*, 2020). However, cash crops, such as cotton, will also be affected (*ibid*).

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 (MGSOG, 2017). Consumption is stabilized through regional and international food markets, with households purchasing imported staple foods. Therefore, the price and availability of food 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 (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 the destruction of fish breeding grounds in Lake Chad and other rivers is expected to affect the livelihoods of people who depend on fisheries and on the lake ecosystem generally (Republic of Chad, 2022). Lake Chad is a significant source of food security and livelihoods in the region. Therefore, climatic stressors on the Lake directly affect incomes, food and livelihoods (World Bank, 2018). Human settlements and economic sites will also be impacted by the projected increase in extreme precipitation and subsequent flooding, particularly in urban areas, similarly affecting livelihoods (Tomalka *et al.*, 2020).

2.4 Address climate displacement and protection

Current and future displacement challenges

Migration in and through Chad has occurred for generations due to the cultural prevalence of nomadic transhumance, and Chad's geographical positioning as a landlocked country that shares its borders with five countries with which vital trade links have been established (IOM, 2022). In recent years, however, Chad has had increasing numbers of internally displaced persons (IDPs) due to disasters, intercommunal violence and conflict in the Lake Chad Basin. The country had approximately 538,000 IDPs at the end of 2023, with a 48 per cent increase in conflict displacements compared to 2022 (IDMC, 2024; 2024a). The vast majority (452,000) of IDPs were caused by conflict, while heavy seasonal rains and flooding account for the remaining IDPs (86,000) (IDMC, 2024). The majority of these IDPs reside in southern Chad's Lac province near Lake Chad. This area is particularly vulnerable to both climate change and ongoing hostilities and conflict involving NSAGs (IOM, 2022).

Both migration and immobility must be addressed as climate change and conflict continue to intersect. Conflict reduces people's ability to move freely when rains fail or in instances of flooding, illustrating the need to consider in situ displacement as well as those on the move. In 2020, for example, record rainfall flooded many areas where refugees and IDPs lived (IOM, 2022). This exacerbated an existing humanitarian crisis caused by people fleeing conflicts in neighbouring countries Sudan and the Central African Republic, as well as internal conflicts involving NSAGs and the ongoing insurgency in the Chad Basin by Boko Haram (UNHCR, 2020a). The flooding complicated the delivery of aid and destroyed shelters, worsening precarious levels of food and water security (UNHCR, 2020). As of 2024, Chad hosts the largest number of refugees in Africa per capita, with the civil war in Sudan and continued unprecedented torrential rains and flooding being major contributing factors (UNHCR, 2024; IOM, 2023).

Potential needs of 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 per cent of those who migrated between 2018–2020 were men, averaging 30 years old (American University *et al.*, 2021). The vast majority were travelling 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 the 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 perimeter. 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 observation 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 stressors in Chad, including long-standing political instability, stagnant growth, increasing inequality and conflict (Pham-Duc *et al.*, 2020). Sustainable livelihoods are one important way to address reduced agricultural or pastoral livelihood options due to climate change and provide options besides joining NSAGs 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 Chari River. This migration has fuelled conflict both en route and while returning as pastoralists’ animals destroy still-growing crops or those that are about to be harvested. In recent years, conflict between farmers and pastoralists has increased and resulted in numerous fatal clashes (Nagarajan *et al.*, 2018; Krätli & Toulmin, 2020).

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 & 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: A 19.3 per cent reduction by 2030 with international assistance, which includes a budget of 6.7 billion US dollars (645 million US dollars 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 per cent of greenhouse gas 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; WASH; 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 urbanization 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 which includes: African Development Bank, World Bank, Development Bank of the Central African States, Arab Bank for Economic Development in Africa, Islamic Development Bank, bilateral cooperation (Germany, France, Canada, Switzerland, 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 factors of degradation.
- [National Climate Change Strategy \(2017\)](#). This document highlights the following priorities for 2030: strengthening the resilience of agro-sylvo-pastoral, fishery and urban systems; promoting climate change mitigation actions; preventing and managing extreme climate phenomena and risks; building the capacity of actors and institutions to combat climate change; and strengthening the instruments and capacities to mobilize climate financing. It also includes data on loss and damage encountered in Chad.
- Legal instruments focusing on the Great Green Wall, biodiversity and desertification exist in Chad but there is no national legal framework on climate change (Republic of Chad, 2022). Yet, 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 the Adaptation Fund, CREWS, or GCCA+ could be explored (Climate Centre, 2022a). National Societies cannot apply directly 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*. Red Cross Red Crescent Climate Centre. <https://www.climatecentre.org/wp-content/uploads/Fact-Sheet-on-Climate-Finance.pdf>

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