Climate Centre

Climate fact sheet | 2024

Afghanistan

This climate fact sheet summarizes the available information on the climate of Afghanistan 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: Afghanistan has a seasonal climate with considerable temperature and precipitation variation. Temperatures also vary greatly by altitude. Lowest temperatures are in January, when they can drop below freezing with the average minimum temperature of -5.5°C, and highest in July when the average maximum is 33.5°C. In the southern regions during summer months, temperatures reach 45°C and more, while in the mountainous regions temperatures drop below -40°C in winter.

Average rainfall: On average, 337mm of rain falls across Afghanistan each year. But, precipitation varies considerably with topography, with the south-western arid region typically experiencing less than 150mm of precipitation each year, and the north-eastern mountain range experiencing more than 1,000mm.

Main drivers of climate variability: 1. El Niño–Southern Oscillation (ENSO); 2. Indian Ocean Dipole (IOD).

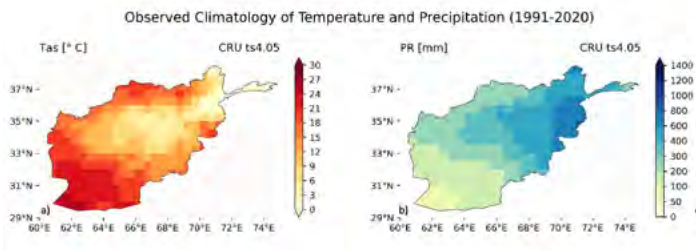

Figure 1. Observed mean temperature (a) and annual mean total precipitation (b) between 1991 and 2020 (Adapted from the Climate Change Knowledge Portal, World Bank)

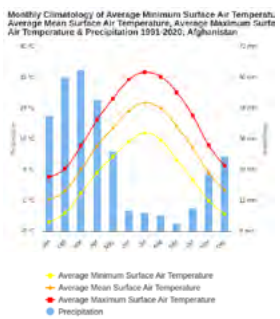

Figure 2: Average mean, minimum and maximum air temperature and precipitation per month between 1991 and2020. (Climate Change Knowledge Portal, World Bank).

Short overview

Afghanistan is a landlocked country located in Central Asia. Its mountain ranges create five distinct agro-climatic zones, including the mountainous north-east with the highest average precipitation; the northern plains with moderate temperatures and rainfall; the central and eastern highlands, which are rangelands with moderate rainfall; and the southern plateau which experiences high temperatures and little rainfall (Aich *et al.,* 2017).

Afghanistan sees considerable climate variation influenced by seasonality and topography and is affected by ENSO and the IOD. Most rainfall occurs from January to April. ENSO influences year-to-year variability and extreme weather events such as heatwaves, droughts and floods. During an El Niño year, expected changes include warmer temperatures and increased rain or snowfall, particularly in the north and north-east, while La Niña is associated with below-average rainfall (World Bank, 2021).

The diverse and varied geography of Afghanistan means that it is exposed to an array of environmental hazards (hydrometeorological as well as geophysical) which are exacerbated by climate change across the country. Afghanistan is one of the most vulnerable countries to climate change, ranked third out of 191 countries by the 2022 Inform Risk Index (DRMKC, 2022). The country is exposed to flooding including flash floods along with landslides, droughts, high winds, heatwaves and earthquakes – it generally suffers a complex emergency.

1.1 Climate change in Afghanistan

Historical climate change	Projected climate change
Temperature	
▪ The mean annual temperature over Afghanistan has increased. The central and south-western regions have warmed faster than the rest of the country. ▪ The frequency and intensity of hot extremes has increased, while cold extremes have decreased.	▪ Mean temperatures over the region are projected to rise until 2050 by at least 2°C for a high greenhouse gas concentration scenario (SSP5–8.5) and at least 1.5°C for low greenhouse gas concentration scenario (SSP2–4.5). ▪ Maximum and minimum temperature will increase, and heatwaves will intensify in duration and peak temperatures with global warming. The number of days with a daily maximum temperature above 35°C is projected to rise, especially from June to August, with high certainty (World Bank, 2021).
Precipitation	
▪ Within Afghanistan, precipitation trends have varied by region, with few statistically significant changes. In the west, there have been slight reductions in annual mean precipitation, but within the range of natural variability (World Bank, 2021). ▪ The frequency and magnitude of extreme precipitation events have increased.	▪ Mid-century estimates (2040–2060) of annual precipitation under a low- (SSP2–4.5) or high-emissions scenario (SSP5–8.5) indicate no significant change. ▪ The frequency and intensity of heavy precipitation events are projected to increase, potentially intensifying floods and landslides (World Bank, 2021).

2. Priorities of the Red Cross Red Crescent Movement under climate change

The UN, EU, UK and US have imposed sanction regimes on Afghanistan, which may impact proposed solutions. UN sanctions were initially imposed in 1999 in response to actions of the Taliban. Current sanctions include asset freezes, travel bans and an arms embargo (GS, 2023).

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

Existing hydrometeorological hazard	Projected risks
Floods	
Flooding in Afghanistan occurs on average ten times a year (World Bank, 2021). In the mountainous areas, rainfall and flooding can also cause devastating landslides. There are different types of flooding: riverine floods resulting from heavy rainfall upstream, rapid and early snowmelt in the spring season; flash flooding from heavy rainfall; and glacial lake outbursts in the mountainous regions (World Bank Group & Asian Development Bank, 2021). In recent decades, more frequent and intense flooding, landslides and other rainfall-related hazards have been reported. It appears this increase is linked to rising temperatures (leading to earlier spring snowmelt) and drought conditions (leading to harder, impermeable soils), rather than an increase in heavy rainfall events (NEPA, 2017; NEPA & UNEP, 2016). More than 100,000 people are displaced every year due to flooding (Ginnetti & Lavell, 2015). Heavy rainfall can cause flash flooding and erosion in hilly and mountainous areas, especially from March to September (Aich *et al.,* 2017).	The World Bank's Global Facility for Disaster Risk Reduction projects that climate change will lead to an increase in flood risk in the future (World Bank, 2017).
Droughts	
Droughts in Afghanistan are frequent and have severe implications for food production and socioeconomic stability. There are different forms of drought: meteorological – associated with a precipitation deficit, and hydrological – from a deficit in surface and sub-surface water flow. Combined with poor water and land management, these may result in agricultural drought. Prolonged droughts over 2–3 years have occurred in 15-year cycles on average, with notable events in 1963–1964, 1966–1967, 1970–1972, and 1998–2006; they are strongly, but not solely, linked to La Niñas (Aliyar *et al.,* 2022; NEPA, 2017). These events have affected almost 10 million people, resulting in displacement, mainly from the rural west and north-west to urban areas (Přívara & Přívarová, 2019).	Except for the Hindu Kush mountain range, significant drying trends are projected across Afghanistan for all global emissions scenarios (primarily driven by increasing evaporation as a result of higher temperatures). Especially in southern Afghanistan, drought intensity is increasing rapidly (Aich *et al.,* 2017). Global analysis of drought changes under different future climate scenarios suggest that extreme drought may occur up to three times as often by the 2050s (Naumann *et al.,* 2018).

It is important to note that many of these hazards are interrelated and produce compound risks in the same areas and communities. In addition, risk must be understood as the interplay between hazard, exposure and vulnerability which makes certain individuals, communities and sectors more impacted by the hazards. All project design should take such compounding risks into account.

Disaster risk management strategies

The 2014–2017 disaster management strategy was a step towards institutionalizing and mainstreaming DRM, capacity development and knowledge management. However, the situation is complicated; and, as a high intensity conflict (HIC) country, Afghanistan is a particularly difficult disaster risk reduction (DRR) case. Mena & Hilhorst (2021) argue that early Afghan DRR projects were hazard-oriented and focused on mitigation infrastructure. The authors describe how DRR has been made possible by accounting for different levels of conflict across the country, with appropriate and adjusted timelines and funding. Recommendations for further DRR planning in Afghanistan include building local understanding of how natural disasters interact with conflict, strengthening inter-agency coordination, improving integration of DRR with actions that minimize conflict and to integrate lessons from the DRR community into climate change adaptation ambitions (Mena & Hilhorst, 2021).

Disaster risk management law and policies

National Disaster Management Law (2012) has the aim of regulating activities related to response, preparedness and risk reduction for natural and manmade disasters. The Afghanistan National Disaster Management Authority (ANDMA) and the National Disaster Management Commission were established because of the law to take responsibility for the enactment of DRR at the local and national levels.

Afghanistan Strategic National Action Plan (SNAP) for DRR (2011). The integration of climate risk and climate change adaptation in DRR is at the centre of this policy. It also includes early warning systems.

2.2 Reduce health impacts of climate change

The increased incidence of drought, higher temperatures, extreme rainfall and floods will increase the risks of vector-borne and waterborne diseases in Afghanistan (WB & ADB, 2021).

Vector-borne diseases such Crimean–Congo haemorrhagic fever are endemic to Afghanistan (Niazi *et al.,* 2019; WHO, 2022a). However, cases of dengue fever have been reported in the country since 2021 (WHO, 2022b). Increased temperatures and rainfall provide optimal breeding grounds for the vectors associated with these diseases, such as mosquitoes (Masood *et al.,* 2022). Higher temperatures will also increase the risks of heat-related illnesses and deaths (WB & ADB, 2021). Urban populations are more at risk under these conditions due to the urban heat island effect (Im *et al.,* 2017). In contrast, colder temperatures are expected to facilitate the spread of leishmaniasis – another vector-borne disease growing in prevalence in Afghanistan (Adegboye *et al.,* 2019). Similarly, floods will increase the risks of injuries and mortalities (WB & GFDRR, 2017).

Climate change-induced flooding and drought will have marked impacts on water and sanitation services in Afghanistan as well as increasing risks related to food insecurity and resultant malnutrition (USAID, 2016). On one hand, floods can cause water contamination and, on the other, droughts reduce water availability and quality for hygiene and sanitation services. In addition to poor health, hygiene and sanitation services, flooding and drought increase the risks of waterborne diseases including diarrhoea (IFRC, 2019; Wasiq *et al.,* 2020). Afghanistan already has one of the highest rates of under-five diarrhoeal deaths globally, and the risks associated with the disease prevalence will likely increase as the incidence of climate change-related floods and droughts increases (Přívara & Přívarová, 2019; Wasiq *et al.,* 2020). One-third of Afghanistan's 30 million people are acutely and severely food insecure, while 25 per cent of children are severely undernourished and 40 per cent of children are stunted – a sign of chronic malnutrition (UNICEF, n.d.; USAID, 2016). These patterns are expected to increase in prevalence and number under extreme flooding and drought conditions, which impact food and crop production as well as access more broadly.

In conjunction with the impacts of climate change, the persistence of armed conflict in Afghanistan has a signficant impact on livelihoods and poverty rates. Together, these factors mutually impact challenges related to mental health in the country (Kavaler, 2020). Yet, there are few health centres (2,736) across the whole of Afghanistan, and healthcare systems risk becoming overwhelmed as climate-related health challenges increase in prevalence and scope (NSIA, 2021).

2.3 Ensure sustainable water supplies

Water, Sanitation and Hygiene (WASH)

Frequent droughts and higher temperatures will negatively affect the quantity and quality of water supplies (World Bank, 2018).

Afghanistan generally has poor water and sanitation services. There are high groundwater contamination rates from geogenic contaminants (fluoride, boron and uranium) and pathogenic contaminants from the untreated wastewater and sanitation systems (USAID, 2021; WHO, 2022b). The projected increase in frequency and intensity of droughts and increases in average temperatures due to climate change will lead to increased evaporation, depleting water reserves and exacerbating drinking water shortages as early as 2025, especially in the most arid regions of Afghanistan (World Bank, 2018). In addition, droughts and higher temperatures are drying up an ancient hand-dug system of tunnels (*Karezes*) that traditionally supplied water to local communities, which creates additional challenges for water and sanitation (Macpherson *et al.,* 2017).

Higher temperatures are causing rapid melting of glaciers commonly found in the Kabul and Amu Darya river basins, decreasing base flow and removing the natural buffer to droughts (Maharjan *et al.,* 2018; USAID, 2021). In the short-term, (uncertain) projections and observations suggest that river flows will stay stable or even slightly increase – yet depending on the rate of global warming and glacial melt, river flows will reduce drastically in the mid-century (Huss & Hock, 2018).

Infrastructure and electricity

Changes in hydrology of Afghanistan's rivers may alter hydropower generation. There is little information available about access to energy in Afghanistan, but reports suggest that before 2016, only around 40 per cent of the population had access to electricity, and only 30 per cent received this from the grid (USAID, 2016; World Bank Group & Asian Development Bank, 2021. Hydropower, both small-scale and larger scale, provides up to 80 per cent of energy supply (USAID, 2016). Historically, meteorological drought drastically reduced hydropower production across Afghanistan, and the projected increased occurrence and intensity of drought conditions will likely jeopardize local electricity access (World Bank Group & Asian Development Bank, 2021). Furthermore, changing river flow regimes may change peak flow, and therefore peak energy generation.

On a local scale, changes in the occurrence of hazards such as thunderstorms and heavy rainfall may damage energy infrastructure. Thunderstorms during the winter and spring frequently destroy or disrupt key nodes of the electricity supply network (World Bank, 2018). Further, damage to infrastructure is likely due to impacts from flooding, avalanches and other extreme weather events (USAID, 2016). The severely limited investment capacity for public infrastructure will likely result in low adaptive capacity, and ageing infrastructure may not be able to withstand future changes in climate shocks and stresses.

2.4 Enable climate-resilient livelihoods and economic security

The impacts of climate change on livelihoods are a major concern in Afghanistan due to the combined factors of a high poverty rate (upwards of 54 per cent of the population) and the heavy reliance of Afghans (up to 80 per cent of the population) on the natural resource base of the country (IFRC & Climate Centre, 2021). Eighty per cent of the freshwater resources originate from the Hindu Kush mountains, and 98 per cent of water consumption goes towards agriculture and livestock (FAO, 2012). Unequal distribution of water resources across regions, limited (damaged) storage infrastructure and a growing population are all causes of increasing water stress in the country (IFRC & Climate Centre, 2021).

The agricultural sector is the most important livelihood source in Afghanistan, employing 42.5 per cent of the population and contributing 25.8 per cent of the GDP (NSIA, 2021). Yet, rainfall declines, droughts, and increases in temperature are anticipated to cause water shortages for irrigated and rainfed agriculture that will lead to crop failures (USAID, 2016; WB & ADB, 2021). The agricultural irrigation of smallholders' farms depends on the predictability and reliability of the rainfall regime along with groundwater and surface water resources. However, these are increasingly unpredictable and under pressure due to climate change (Sediqi *et al.,* 2019). In years of severe water scarcity for example, studies have shown that the area of irrigated land reduces by up to 30 per cent across the country (Shahriar Pervez *et al.,* 2014).

Frequent and more intense droughts lead to yield declines in major crops, such as wheat, due to high sensitivity to water shortages and high temperatures (USAID, 2016; WB & ADB, 2021). Research suggests that local water scarcity drives increased poppy production, and the opium industry is a major source of income for armed groups in the country (Parenti, 2015; WFP, 2017). In this way, crop declines might contribute to the rise of illicit economies or the potential for recruitment into insurgent groups as farming communities seek alternative livelihood options in areas where conventional agricultural practices are becoming less viable (WFP, 2017).

Rising temperatures in early spring will lengthen the growing season, but water scarcity will limit crop growth later in the season (Mendelsohn, 2014; World Bank, 2021). However, the gains of a longer growing season will be outweighed by the increasing occurrence of plant pests and diseases (WB & GFDRR, 2017). In addition, more frequent and intense heatwaves (predominantly impacting fruit, vegetables and potato growth), hail, thunder and lightning accompanying extreme rainfall frequently cause extensive (over 20 per cent) agricultural losses (NEPA, 2017).

Higher temperatures, reduced soil moisture and intense rainfall events will intensify land degradation and soil erosion caused by human-induced (e.g., deforestation and poor land management) as well as natural factors (NEPA, 2017). Consequently, arable land will decline significantly, especially in the northern and southern regions. In this context, climate change will also affect the livestock sector through loss of range land (due to land degradation and desertification), heat stress on herders and livestock, and changes in grazing potential following habitat and vegetation cover change (NEPA, 2017). The severe droughts in 1999–2004 led to a loss of over 50 per cent of the pastureland and about 3 million livestock, leading to humanitarian aid for nearly one million people (World Bank Group, 2018). Therefore, livestock production will be affected with resultant consequences for incomes and livelihoods (USAID, 2016).

2.5 Address climate displacement and protection

Current and future displacement challenges

Afghanistan is one of the leading countries for internal displacement due to decades of both conflict and climate shocks, and has one of the largest refugee populations globally, with 2.6 million registered Afghan refugees, mainly in Iran and Pakistan (UNHCR, 2022). Since the Taliban took control in August 2021 and foreign forces left the country, the number of conflict-related displacements reduced from 723,000 in 2021 to 32,000 in 2022 and more than 4.6 million people went back home between January 2021 and April 2022 (IDMC, 2023). In 2021, 25,000 people were displaced due to disasters including 16,000 people due to flooding in 14 provinces (IDMC, 2022). According to the International Organization for Migration, one-third of the population in Afghanistan have migrated or been displaced since 2012 due to climate and conflict (USAID, 2016).

- Acute events such as flooding are the most common drivers of displacement in Afghanistan, with more than 100,000 people displaced every year due to flooding events (Ginnetti & Lavell, 2015). However, in contrast to other hazards such as drought, displacement from flooding is usually short-term rather than permanent.
- Droughts have affected almost 10 million people, resulting in displacement mainly from the west and north-west towards urban areas (*ibid*). There are projected increases in drought across the country, with the exception of the Hindu Kush mountains (Naumann *et al.,* 2018).
- Climate change reduces displaced people's options when they return, as the viability of agriculture-based livelihoods is becoming more and more limited. Up to 60–80 per cent of Afghanistan's population makes their living from agriculture (NUPI/SIPRI, 2022), which is projected to experience ongoing challenges and decline in production.
- Increasing temperatures, with more hot days and nights, will continue to pose health threats to internally displaced persons (IDPs), who often lack adequate shelter, clean water and medical services (UNHCR, 2021).

Potential needs of migrants and displaced people

Displaced women and female-headed households are particularly vulnerable as they are likely to have had fewer assets to begin with; many women working in agriculture, for example, are unpaid and are less likely than men to own land (NUPI/SIPRI, 2022). Now, due to the Taliban's takeover, women and girls have increasingly limited agency and rights in the country (HRW, 2022). In periods of drought and severe food insecurity, rates of child marriage grow (NUPI/SIPRI, 2022), meaning that girls are especially in need of protection.

Migration law and policies

- National Policy on Internally Displaced Persons (2013). The policy seeks to establish the institutional responsibilities towards IDPs and their rights, and includes the need to minimize and address displacement related to natural hazards.
- Comprehensive Migration Policy (CMP) (2019). The CMP includes some policy responses to address the impacts of climate change, displacement and migration.
- Afghan National Peace and Development Framework (ANPDF-II) (2019). The Framework covers 2021–25 and recognizes the severe threat that climate change poses to Afghans and their natural resources.

Protection

Land degradation and natural resource conflicts are a major concern in Afghanistan (Nett & Rüttinger, 2016; Nordqvist & Krampe, 2018; Price, 2019). Reports suggest that the growing frequency of drought and the degradation of natural resources increases tension and violence over increasingly scarce natural resources. Examples include local inter-communal tensions over irrigation water, especially in drought periods (Iqbal *et al.,* 2018) and clashes over land rights between *Hazara* (farmers) and *Kuchi* (nomadic pastoralist) ethnic groups in Hazarajat (Přívara & Přívarová, 2019). These localized tensions may be exploited by armed groups to further escalate conflict.

Decades of conflict have severely constrained disaster preparedness and disaster prevention infrastructure, limiting the coping capacity to existing hazards (Mena *et al.,* 2019). This may be further worsened by the projected changes in hazard exposure across Afghanistan. Furthermore, the conflict has contributed to degradation, pollution and damage to the natural environment – which may increase vulnerability to hazards such as flooding and drought even further.

Research warns of the increasing vulnerability of prison facilities to natural hazards and the lack of emergency and disaster reduction plans in places of detention, with consequences such as panic and unrest during hazard events, and violations of basic rights and safety concerns for inmates and staff during climate-related shocks (Penal Reform International, 2021). In Afghanistan, major hazards affecting places of detention are flooding, extreme temperature events, landslides and storms. The increasing intensity and frequency of these hazards adds to existing vulnerability. Reports by monitoring organizations mention challenges such as contaminated and scarce food and water, restrictions to medical care, and even the use of exposure to extreme temperatures as a method of abuse (ARC Foundation & Garden Court Chambers, 2019; Integrity Watch Afghanistan, 2017). These vulnerabilities will likely be further challenges as temperatures rise and rainfall and river flow patterns change.

Weapons contamination

Afghanistan is one of the most weapons contaminated areas in the world. The United Nations Mine Action Service (UNMAS) estimates that, since 1989, landmines and explosive remnants of war have killed or injured about 40,850 people – and more than two-thirds of the victims were children (UNMAS, 2022). Mine clearing began after the Soviet Union conflict in Afghanistan of 1979–1989, and has continued so far. The conflict in the last years has increased contamination again. Currently, UNMAS estimates that 3,939 hazards remain, threatening about 1,529 communities (*ibid*). Weapon contamination threatens local communities' safety, limits returnee settlement and limits or delays construction of new critical infrastructure. Although evidence from Afghanistan itself is limited, international research warns of potential displacement of mines during severe flooding, moving them to other areas. Light anti-personnel mines can sometimes float and travel long distances in flood waters (Hagen & Teufert, 2009).

2.6 Policy

Relevant information from the Nationally Determined Contribution (NDC) (2016)

Emission target: A 13.6 per cent reduction in greenhouse gas emissions by 2030, with a focus on energy, natural resource management, agriculture, waste management and mining

Area of focus on adaptation: DRR, mainstreaming climate change, livelihood, energy, capacity building, awareness raising, agriculture, land and water management, food security. However, the NDC does not include concrete adaptation measures

Inclusion of DRR: Yes, it is one of the adaptation priorities: 'reducing vulnerability of the country and its population through enhancement of adaptive capacity and resilience, and deployment of disaster risk reduction approaches'

Next review of the NDC: No information available

National designated entity: National Environment Protection Agency of Afghanistan

Key stakeholders: UNEP, GEF

Other national policies on climate

- National Adaptation Programme of Action (NAPA, 2009) This is the guiding document on climate adaptation priorities in Afghanistan. It includes: i) human health; ii) water resources and renewable energy; iii) agriculture and food security; iv) animal husbandry, grazing and rangelands; v) forests and biodiversity; vi) natural disaster preparedness and infrastructure; and vii) capacity building. The adaptation measures address protection of the natural resource base and agricultural livelihoods from drought and flooding impacts. Afghanistan has not yet submitted a National Adaptation Plan.
- Afghanistan Voluntary National Review (2021). Climate risk reduction holds an important place in this report on the progress of Afghanistan regarding the Sustainable Development Goals (SDGs). It mentions the vulnerabilities of the country.
- Climate change has been mainstreamed in a few environmental policies including: Afghanistan National Renewable Energy Policy (ANREP), National Water and Natural Resource Management Priority Programme, National Environmental Action Plan (NEAP), National Comprehensive Agriculture Production and Market Development Programme, Energy for Rural Development (ERDA), National Biodiversity Strategy and Action Plan (NBSAP) (Islamic Republic of Afghanistan, 2016).

Climate finance

There is currently only one Green Climate Fund project in Afghanistan focusing on mitigation (in addition to readiness activities) (GCF, 2022). National Societies cannot apply directly for climate finance from the GCF, but they can be an implementing partner for an accredited entity (Climate Centre, 2022a).

National Societies can explore options for accessing climate funds through smaller 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).

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

Additional resources

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