



Afghanistan

The following climate factsheet summarizes available information on the climate of Afghanistan, 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

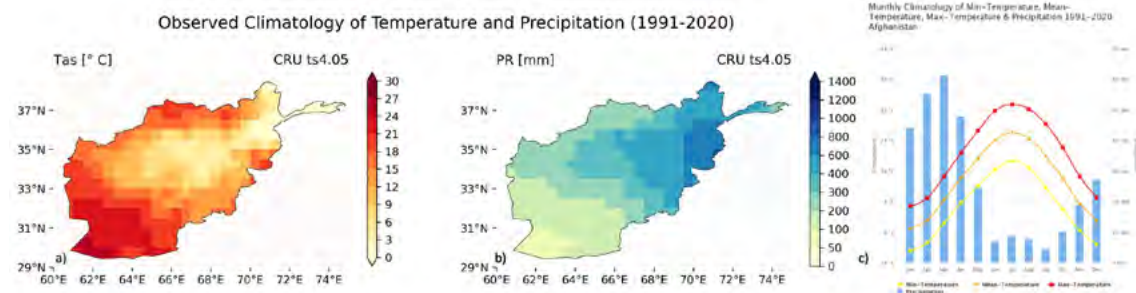
Average temperature: Afghanistan has a seasonal climate with the lowest temperatures occurring in January when temperatures can dip below freezing, and highest temperatures occurring in July, with temperatures topping 30°C.

Average temperature: 317.85 mm of rain falls on average across Afghanistan, but rainfall is highly variable, with the eastern portion of the country receiving more rainfall than the west and south.

Main driver of climate variability: 1 - El Nino Southern Oscillation ENSO, 2 - Indian Ocean Dipole IOD

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)

Short overview



Afghanistan is a landlocked country located in central Asia. Large mountain ranges run through the country, creating 5 distinct agro-climatic zones including the mountainous North-East with the highest average rainfall and 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 has considerable climate variation, and governed by seasonality and topography and is influenced by the El Niño Southern Oscillation (ENSO) and the Indian Ocean Dipole (IOD). The majority of rainfall occurs from January to April. 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. During an El Niño year the expected changes include warmer temperatures and increased rain or snowfall, particularly in the north and north-eastern parts of the country, while La Niña is associated with below-average rainfall (CCKP, 2022).

The diverse and varied geography of Afghanistan 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. Afghanistan is one of the most vulnerable countries to climate change, ranking number 3 out of 191 countries by the 2022 Inform Risk Index (DRMKC, 2022), Afghanistan is one of the higher hazard risk countries in the world. The country is exposed to flooding, flash floods, landslides, droughts, extreme wind, heatwaves, earthquakes and complex emergencies.

1.1 Climate Change in Afghanistan

Historical Climate change

Projected climate change

Temperature

- | | |
|---|---|
| <ul style="list-style-type: none"> ▪ The mean annual temperature over Afghanistan have increased. The central and southwestern have warmed faster than the rest of the country. ▪ The frequency and intensity of hot extremes have increased, and cold extremes have decreased. | <ul style="list-style-type: none"> ▪ Mean temperatures over the region are projected to rise until 2050 by at least 2°-3°C for a high greenhouse gas concentration scenario (SSP5-85) and 1.5°-2°C for low greenhouse gas concentration scenario (SSP2-4.5). ▪ 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, especially in June – August and with high certainty. |
|---|---|

Precipitation

- | | |
|---|--|
| <ul style="list-style-type: none"> ▪ 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 these changes lie within the range of natural variability (CCKP, 2022) ▪ The frequency and magnitude of extreme precipitation events has increased. | <ul style="list-style-type: none"> ▪ Mid-century estimates (2040-2060) of annual precipitation changes over AFGHANISTAN under a low (SSP2-4.5) or high (SSP5-8.5) emission scenario indicate no significant change in precipitation. ▪ The frequency and intensity of heavy precipitation events are projected to increase with potential impacts on floods and landslides |
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2. Priorities of the Movement and climate change

Note: that constraints linked to sanctions and suspension of development funding and restrictions on working directly with the Taliban may impact on proposed solutions.

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

Existing Hydrometeorological Hazard	Projected Risks
Floods	
<p>Flooding in Afghanistan occurs frequently, on average 10 times a year (CCKP, 2022). In the mountainous areas, rainfall and flooding can also cause devastating landslides. There are various types of floods in Afghanistan: riverine as a result of heavy rainfall upstream or rapid and early snowmelt in the spring season, flash flooding as a result of heavy rainfall and glacial lake outburst floods in the mountainous regions (World Bank Group & Asian Development Bank, 2020).</p> <p>During the past 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) (likely), rather than an increase in heavy rainfall events (no evidence) (NEPA, 2017; NEPA & UNEP, 2016). More than 100,000 people are displaced every year due to flooding events (Ginnetti & Lavell, 2015). Heavy rainfall can cause flash flooding and erosion in hilly and mountainous areas, and the relevant months of occurrence are March to September (Aich <i>et al.</i>, 2017).</p>	<p>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).</p>



Existing Hydrometeorological Hazard

Projected Risks

Drought

Droughts in Afghanistan are recurrent and have severe implications for food production and socio-economic stability. There are different forms of drought in Afghanistan: meteorological, associated with a precipitation deficit, and hydrological which relates to a deficit in surface and subsurface water flow. Combined with water and land management, these may result in agricultural drought.

Prolonged, multi-year droughts (2-3 years) have occurred in 15-year cycles on average with notable events in 1963–1964; 1966–1967; 1970–1972; 1998–2006 and are strongly (but not solely) linked to La Nina climatic events (Aliyar *et al.*, 2022; NEPA, 2017). These events have affected almost 10 million people, resulting in displacement mainly from the west and north-west towards urban areas (Přívára & Přívarová, 2019).

Except for the Hindu Kush, 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 severely increasing (Aich *et al.*, 2017). Global analysis of drought changes under different future climate scenarios suggest that extreme drought may occur twice to three times as often by the 2050s in Afghanistan (Naumann *et al.*, 2018).

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

The Disaster Management Strategy (2014-2017) was a step taken towards focusing efforts to institutional mainstreaming of DRM, capacity development, knowledge management and key activities for DRM. However, the situation is complicated and as a High Intensity Conflict (HIC) country, Afghanistan poses a particularly difficult case for DRR. 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 through the acknowledgement of different levels of conflict across the country, sufficient time allocated to implementation of DRR programming and the availability of funding. The Asian Development Bank (n.d.) outlines the intentions of the country to move towards establishing a national meteorology centre and flood forecast and warning centre systems. This will be in addition to a national emergency fund that will support DRR activities across the country (ADB, n.d.).



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

Increased incidence of drought, higher temperatures, extreme rainfall, and floods will increase the risks of vector-borne and water-borne diseases in Afghanistan (World Bank (WB) and Asian Development Bank (ADB), 2021).

Vector-borne diseases such as 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 (World Bank and ADB, 2021). Urban populations are more at risk under these conditions due to the urban heat 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 (World Bank & 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 (Anwar *et al.*, 2019). In addition to poor health, hygiene and sanitation services, flooding and drought increase the risks of water-borne 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 instance of climate change related flooding and drought conditions increase (Přivara & Přivarová, 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 and access more broadly.



In conjunction with the impacts of climate change, the persistence of armed conflict in Afghanistan has a significant 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) in Afghanistan, and therefore, health care systems will be overwhelmed as climate related health challenges increase in prevalence and scope (National Statistics and Information Authority (NSIA), 2021)

2.3 Sustainable water: resources management, infrastructure and access

Water, Sanitation and Hygiene

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 Group, 2018). In addition, droughts and higher temperatures are drying up an ancient hand-dug system of tunnels (Kaerezes) that traditionally supplied water to the 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 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, Power 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, 2020). 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, 2020). 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 an electricity supply network (World Bank Group, 2018). Further, infrastructure damage is likely due to damage 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 aging 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 a heavy reliance of the overwhelming majority of the population (80 per cent) 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).

Droughts, higher temperatures and other climatic stressors will impact livelihoods in Afghanistan due to a combination of high poverty rates (above 54 percent of the population) and heavy reliance (80 percent of the population) on the country's natural resource base (IFRC & Climate Centre, 2021).

The agricultural sector is the most important livelihood source in Afghanistan, employing 42.5% of the population and contributing 25.8% of the GDP (NSIA, 2021). Yet, rainfall declines, droughts, and temperature increases are anticipated to cause water shortages for irrigated and rainfed agriculture that will lead to crop failures (USAID, 2016; World Bank & ADB, 2021). Agricultural irrigation of smallholder farmer households depends on the predictability and reliability of the rainfall regime and 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 percent in Afghanistan (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; World Bank & ADB, 2021).

Declines in yields in major crops may push farmers to grow poppy, a cash crop that is more heat-resistant and requires less water (GFDRR & World Bank, 2018). 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 (World Food Programme (WFP), 2017).

R



ising 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 (World Bank & 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 (such as deforestation and poor land management) and other 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 between 1999 and 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 in 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). In 2021 more than 723,000 people were internally displaced due to fighting between the Taliban and government forces (IDMC 2022). 25,000 people were displaced due to disasters in 2021, including 16,000 people due to flooding in 14 provinces (*ibid.*). 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 (Spink, 2020; 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 (Naumann *et al.*, 2018).
- Climate changes reduces displaced population's options when they return, as the viability of agriculture-based livelihoods is becoming more and more limited. 60-80% 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 pose health threats to IDPs, who often lack adequate shelter, clean water, and medical services (UNHCR 2021).



Potential needs for 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, 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 with 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 recognises the severe threat that climate change poses Afghans, natural resources, and the environment.

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 (M. W. Iqbal *et al.*, 2018) and clashes over land rights between Hazara (farmers) and Kuchi (nomadic pastoralist) ethnic groups in Hazarajat (Přívára & 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 organisations 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 – and more than two-thirds of the victims were children (UNMAS, 2022). Mine clearing began after the Soviet Union conflict in Afghanistan, 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 (UNMAS, 2022). 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 for 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 [National Determined Contribution \(NDC\) \(2016\)](#)

Emission target: 13,6% 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'.

National Designated Entity: National Designated Entity: National Environment Protection Agency of Afghanistan

Key Stakeholders: UN Environment, GEF



Other National Policies on Climate

- [National Adaptation Programme of Action and National](#) (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 does not yet have submitted a National Adaptation Plan.
- [Afghanistan voluntary national review](#) (2021). Climate risk reduction hold 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 directly apply 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 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

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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