

## Climate Profiles of Countries in Southern Africa: Mozambique

Dr Meghan Bailey, Senior Technical Advisor, Red Cross Red Crescent Climate Centre  
Dorothy Heinrich, Technical Advisor, Red Cross Red Crescent Climate Centre  
Andrew Kruczkiewicz, Technical Advisor, Red Cross Red Crescent Climate Centre

The following climate factsheet<sup>6</sup> provides an overview of the climate of Mozambique, one of ten countries of interest for the Finnish Red Cross Food Security Study, 'Interventions to improve food security in a changing climate in Southern Africa'. Each of the factsheets were written as a compilation of information from peer-reviewed academic papers, government publications, and INGO documentation, and are also available in one compiled document.

### *1. What is the general climate of Mozambique, and what are its climate zones?*

Mozambique has a wide range of sub-climates, ranging from tropical/subtropical in the central and northern regions of the country to arid steppes in the southern interior of the country which includes a small region of near desert climates ([Penvenne and Sheldon 2020](#), [USAID 2018](#)). The climate on its coastline is strongly influenced by the currents and monsoon of the Indian Ocean, particularly in the northeastern region of the country. Mozambique also lies in the Intertropical Convergence Zone (ITCZ) and therefore receives the effect of its migrations ([Sheldon 2020](#)). Elevation is also a driver of climate, particularly in the north and west of the country ([Sheldon 2020](#), [FAO-Aquasat 2019](#)).

The hottest temperatures and highest humidity are found in the Zambezi valley, where average daily temperatures in the 30°Cs are common as well as on the coastline in Cabo Delgado, Nampula, Zambezia and Sofala ([FAO-Aquasat 2019](#)). Cool temperatures are found in the mountains in the western region as well as in the south where average maximum temperatures are of 30°C, and average minimum temperatures around 19°C ([FAO-Aquasat 2019](#)). Total precipitation for the country averages 1,032 mm annually. However, this is highly heterogeneous throughout the country. Precipitation is highest in the north and central regions, reaching between 1,000 and 2,000 mm on average annually. Along the coast, annual rainfall averages between 800 and 1,000 mm, decreasing inland where it can be as low as 400 mm along the border with South Africa and Zimbabwe ([FAO-Aquasat 2019](#)).

#### *1.1 How does precipitation vary throughout the year?*

---

<sup>6</sup> Suggested citation: RCRC (Red Cross Climate Centre) (2021) Climate Profiles of Countries in Southern Africa: Mozambique. The Hague: RCRC.

Seasonal precipitation in Mozambique can be divided into the rainy season in the austral summer and the dry season in the winter. The rainy season in Mozambique begins in November and can last until April or May. Most of the precipitation falls in these winter months, with peaks in January and February. Come the end of the rainy season, relative humidity falls and the dry summer begins. Precipitation is rare from June to August (see figure 1).

### 1.2 How does temperature vary throughout the year?

The period between October and March is generally the warmest. Temperatures dip at the end of the rainy season, and June and July are the coolest months of the year.

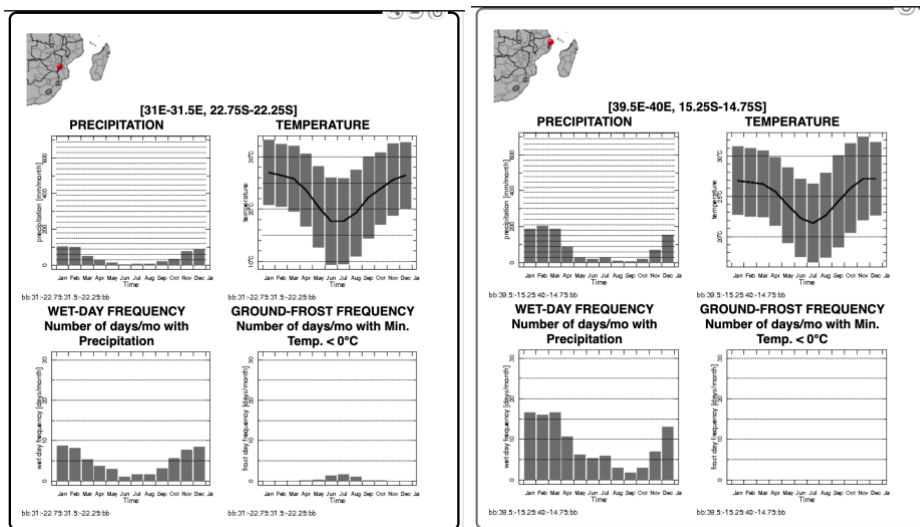


Figure 1. Climate Statistics for western highlands (1a) and northeastern coastal areas (1b) of Mozambique

### 2. What types of extreme weather and climate does Mozambique experience?

Mozambique is the third most exposed country to multiple hydrometeorological hazards in Africa ([UNISDR 2009](#)). Since 1977, floods, droughts, and cyclones have occurred in Mozambique, sometimes in the same year ([IFRC 2020a](#)).

- From January to March, there is a risk of tropical cyclones. An average of 3-4 tropical cyclones impact Mozambique annually, causing significant impacts to lives, livelihoods, and infrastructure. For example, in 2019, cyclone Dineo destroyed approximately 30,000 hectares of crops in Mozambique and displaced over 100,000 people in southern areas ([USAID 2018](#), [Zambeian 2017](#)). Most recently, in March and April 2019, cyclones Idai and Kenneth left over 2.2 million people in need of urgent assistance and killed hundreds

([OCHA 2019](#)). The impacts of Idai and Kenneth are long lasting; in their 6th operations update of September 2020, the IFRC calculated that their response efforts had assisted over 407,372 people, and recovery efforts were on-going ([IFRC 2020b](#)).

- Along with flooding caused by cyclones and other high precipitation events, Mozambique is also vulnerable to weather that occurs in neighbouring countries which causes flooding downstream in the nine major river systems which drain in Mozambique. In particular, the central and southern regions of the country are more prone to severe floods ([Mozambique 2003](#)). Floods generally occur in the region's rainy season, with peak risk in January and February. For instance, in February and March 2000, the country saw its worst flood period in 50 years, caused by high precipitation through these cross-boundary river catchments, an event which killed over 800 people and displaced 540'000 ([World Bank 2010](#)). Between 2000 to 2015, floods affected over 4.6 million people, caused 1204 deaths and damaged over one million houses ([República de Moçambique 2015](#)).
- Droughts are the country's most frequent disaster, contributing to an estimated 4,000 deaths between 1980 and 2000 ([World Bank 2010](#)). These are especially common in the centre and south of the country where the return periods of officially declared droughts occur 4/10 years in the central region and 7/10 years in the south ([World Bank 2010](#)). Droughts in Mozambique can be long lasting, regularly spanning three to four year periods ([Mozambique 2003](#)). Floods can compound the impacts of drought years, notably on agricultural production. For instance, in the NDC, it is reported that droughts and floods in 2012-2013 caused a yield loss of over 216 745 ha ([República de Moçambique 2015](#)).
- El Nino and La Nina impact Mozambique, increasing risk of floods (in La Nina years) and droughts (in El Nino years). Floods linked to El Nino occurred in 1972-1973, 1982-1983, 1991-1992 and 1994-1995, with drought conditions in 2000 can be linked to La Nina ([Mozambique 2003](#)).

### *3. What are current and projected impacts of climate change in Mozambique?*

The impacts of climate change on Mozambique are thought to manifest in changes in precipitation patterns, higher temperatures, and increased strength and frequency of cyclones ([UNDP n.d.](#), [Mozambique 2003](#)).

#### **3.1 Observed Changes**

- Average temperatures in Mozambique increased between 1.5 and 2°C from 1961 and 2010. This trend is reported in the Government of Mozambique's First Communication to the UNFCCC and its NDC. Geographically, the northern region and the coastal areas experienced the most significant changes of approximately 1.6°C.

- On average, precipitation has declined slightly since the 1960s, an average of 2.5 mm per month every decade ([World Bank 2020](#)). However, the number of days with heavy rainfall events have also increased by approximately 25 days a year ([World Bank 2020](#)). From the 2000-2014 period, the Zambezi valley and the coast received lower average annual precipitation compared to 1981-1999. In their NDC, the government of Mozambique notes that the frequency of flooding is also increasing ([República de Moçambique 2015](#)).
- The number of tropical cyclones impacting Mozambique have increased since the 1960s ([República de Moçambique 2015](#)). Additionally, we can note that sea level rise poses a threat to Mozambique's infrastructure and agricultural sector ([República de Moçambique 2015](#)).

### 3.2 Projected Changes

Many trends highlighted in section 3.1 are projected to continue in the future.

- Temperatures are projected to increase between 1.5°C and 3°C between 2046 and 2065 ([República de Moçambique 2015](#)). Additionally, the number of hot days (10% higher than average) are projected to increase between 17 and 35% by 2060 and the frequency of cold days decrease ([World Bank 2020](#)).
- The intensity and frequency of extreme precipitation events is projected to increase throughout the century, in particular in the dry season of June and July ([Mozambique 2003](#), [World Bank 2020](#)).
- Droughts in the central and southern regions will likely increase in frequency and intensity, and more floods may be experienced during the rainy season. It is difficult to project any statistically significant changes in rainfall total, however delayed onset and offset dates of the rainy season may be more frequent, particularly in the north ([FAO-Aquastat 2019](#), [República de Moçambique 2015](#)). Projections (if they are verified) of lower precipitation in other countries in Southern Africa, particularly in Zimbabwe and Zambia, will also impact river flows in Mozambique, and stress water resources ([Mozambique 2003](#)).

## References

- FAO-AQUASAT. (2016). Country profile – Mozambique. <http://www.fao.org/3/i9805en/i9805EN.pdf>
- IFRC. (2020)a. All Mozambique Emergencies. *Go*. <https://go.ifrc.org/emergencies/all?country=120>
- IFRC. (2020)b. Mozambique: Tropical Cyclones Idai and Kenneth - Emergency Appeal n° MDRMZ014 Operation Update n° 6. <https://reliefweb.int/report/mozambique/mozambique-tropical-cyclones-idai-and-kenneth-emergency-appeal-n-mdrmz014-3>
- Mozambique. (2003). Mozambique Initial National Communication Under UN Framework Convention on Climate Change. <https://unfccc.int/sites/default/files/resource/Mozambique%20INC.pdf>
- OCHA. (2019). Cyclones Idai and Kenneth <https://www.unocha.org/southern-and-eastern-africa-rosea/cyclones-idai-and-kenneth>. <https://www.unocha.org/southern-and-eastern-africa-rosea/cyclones-idai-and-kenneth>
- Penvenne, J. M. & Sheldon, K. E. (2020). Mozambique. *Encyclopædia Britannica*. <https://www.britannica.com/place/Mozambique>
- República de Moçambique. (Intended Nationally Determined Contribution (INDC) of Mozambique to the United Nations Framework Convention on Climate Change (UNFCCC)
- UNDP. (n.d). Coping with Drought and Climate Change (CwDCC) in Mozambique. *Climate Change Adaptation*. <https://www.adaptation-undp.org/projects/sccf-cwdcc-mozambique>
- UNISDR (2009) Global Assessment Report on Disaster Risk Reduction. United Nations, Geneva, Switzerland. <https://www.preventionweb.net/english/hyogo/gar/report/index.php?id=9413>
- USAID. (2018) Climate Risk Profile - Mozambique. [https://www.climatelinks.org/sites/default/files/asset/document/2018\\_USAID-ATLAS-Project\\_Climate-Risk-Profile-Mozambique.pdf](https://www.climatelinks.org/sites/default/files/asset/document/2018_USAID-ATLAS-Project_Climate-Risk-Profile-Mozambique.pdf)
- World Bank (2020). Mozambique. *Climate Knowledge Portal*. <https://climateknowledgeportal.worldbank.org/country/mozambique/climate-data-historical>
- World Bank. (2010). Economics of Adaptation to Climate Change: Mozambique. <https://openknowledge.worldbank.org/bitstream/handle/10986/12748/702640v10ESW0P0IC000EACC0Mozambique.pdf?sequence=1&isAllowed=y>
- Zambeian. (2017). Cyclone Dineo: at least 55 injured, over 100 000 displaced in Mozambique. <https://zambeian.com/cyclone-dineo-at-least-55-injured-over-100-000-displaced-in-mozambique/>