

## Climate Profiles of Countries in Southern Africa: Angola

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>1</sup> provides an overview of the climate of Angola, 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 Angola, and what are its climate zones?*

The climate of Angola is generally tropical to subtropical with the southern and central regions of the country driest. More specifically, Angola's climate can be divided into four major zones ([UNDP n.d.](#), [Sawe, 2019](#)). Dry and semi-desert arid lowlands stretch along the coast, from bordering Namibia to the capital city of Luanda. These rise up inland to a plateau inland which rise and culminate in large escarpments. Towards the east and southeast of this lies the planalto, a region of dry savanna. Finally, in the northern region lies the country's rainforest (Huntley 2019). The plateau and escarpments zones are described as Temperate Mesothermal, with the northern part deemed Tropical Wet Savanna (Huntley 2019).

Angola's climate is influenced by a variety of factors. These include the wide geographic expanse of the country (almost from the Equator to Tropic of Capricorn) which impact the amount of solar radiation and therefore temperature and convective patterns. Climate is also influenced by the high topographic variation (Huntley, 2019: 26). As well, Angola lies in the path of the ITCZ that moves southwards across the country in the summer and north in the winter; in some years, two high pressure belts (the South Atlantic Anticyclone and the Botswana Anticyclone) block the ITCZ in the winter, stopping cloud formation before retreating in the summer ([Quagrain et al. 2019](#), Huntley 2019). Finally, an anomaly in the region's climate can be found in the existence of the Benguela Current; in Angola, the impacts of this include heavy fog in the winter and a precipitation gradient which increases from South to North and West to East (Huntley 2019).

---

<sup>1</sup> Suggested citation: RCRC (Red Cross Climate Centre) (2021) Climate Profiles of Countries in Southern Africa: Angola. The Hague: RCRC.

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

Precipitation patterns of Angola are strongly seasonal. Generally, the rainy season runs from September to April, where precipitation often falls in heavy rain events. The length of this season depends on the region, however. In the north and central plateau, the rainy season can last eight months, from September to April, while in the south, the rainy season begins in November and ends in March. The rainy season is shortest on the northern coast where it is only from February to April. Barely any precipitation is seen on the desertic southern coast (Sawe 2019). Additionally, variability in the rainy season is very high. In Luanda, for example, the most rainy months are March and April but precipitation for these months can vary between 0 and 400 mm (Angola 2012). The winter and dry season runs from June to September. Average precipitation is very low, and in many parts of the country, almost zero. For example, between 1961 and 2000, only 4.5% of precipitation in Luanda fell between May and October, and 0% in June and July (Angola 2012).

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

September to April is the austral summer, known locally as the Cacimbo (Sawe 2019), and highest temperatures are seen here. June to September are the country's cooler months where temperatures can reach their lowest in July and August (Angola 2012). This is also the period where the Botswana Anticyclone creates strong winds to blow from east to west bringing with them dust storms and can have significant impacts on grasslands and crops (Huntley 2019).

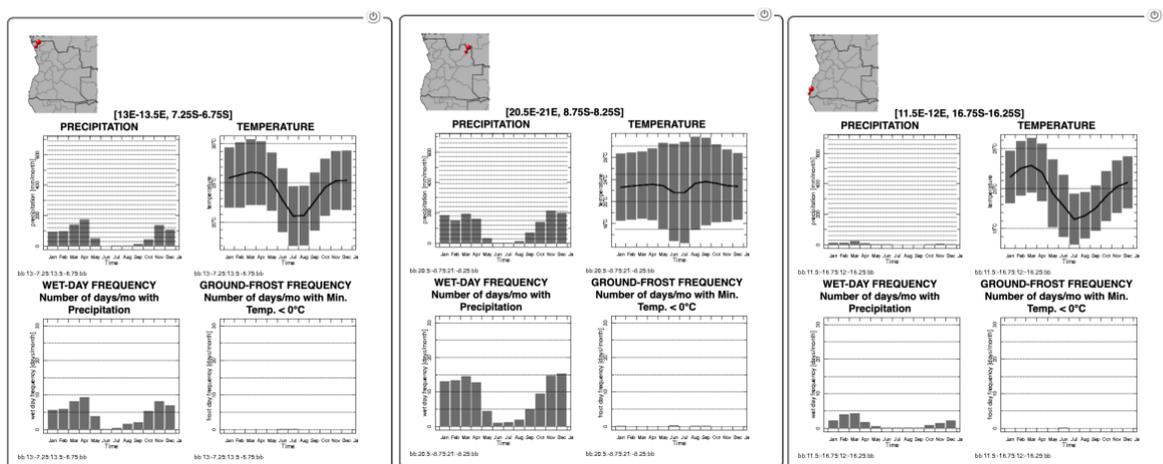


Figure 1. Climate Statistics for north western (1a), north eastern (1b) and south western (1c) Angola

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

Angola experiences floods and droughts, which sometimes occur simultaneously. It is possible that droughts may act as a longer term stressor with floods acting as a shock. Since 1977, at least

21 emergency response programs for Angola have been implemented for flooding and food insecurity, as well as political violence and epidemics ([IFRC 2020](#)).

- There are more than 47 rivers and five major watersheds in Angola, all of which are at risk of flooding, particularly in the rainy season ([Angola 2012](#)). The low-lying floodplains that run north-south in the eastern part of the country are particularly at risk. Cunene Province in south-eastern Angola has been particularly flood-prone in recent years ([Angola 2012](#)). In December 2009, the long duration of extreme rainfall led to flooding, which subsequently displaced over 60 people ([Floodlist 2009](#)).
- Annually, over 35% of the country's total crop area is exposed to drought, making Angola the second most exposed country on the UNISDR list (UNISDR [2009](#): 46). Dry spells are common, and more widespread droughts can span multiple years. One of the worst droughts in the last 30 years occurred in 2013, causing widespread food insecurity, and health and sanitation issues which led to humanitarian relief efforts, including a \$14.3 M appeal for drought response ([Carvalho et al 2017](#)).
- ENSO has an impact on Angola's climate, in particular in the eastern areas of the country. In the eastern areas, during El Nino years, there is increased chance of below average rainfall, while during La Nina years, there is increased chance of above average rainfall (Lenssen et al. 2020).

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

#### **3.1 Observed Changes**

- Temperatures are increasing across Southern Africa, with a particularly strong signal in Angola ([Carvalho et al. 2019](#)). On average throughout the country, surface temperatures have risen by 1.5°C between 1970 and 2006. More specifically, the observed increases vary across Angola, with an increase of 0.2-1.0°C between 1970 and 2004 on the coasts and northern region of Angola, and a more significant increase of 1.0°-2°C in the central and eastern regions ([Angola 2012](#)). However, this is an estimate with a substantial amount of uncertainty.

#### **3.2 Projected Changes**

- Maximum temperatures will likely increase, with mean anomalies between 2.9 (RPC 4.5) and 4.9 (RCP 8.5), and an average increase of 0.4°C every ten years but acknowledging variation across the country. By the end of the century, average temperatures will likely increase between 3.0 and 4.0°C in the central and eastern regions, and by slightly less in

the north and at the coasts (Angola 2012). Additionally, coastal areas will likely have a lower increase of maximum temperatures than the rest of the country.

- Models show limited consensus about future precipitation trends in the country. However, Carvalho et al. (2019) find that average annual precipitation may increase between 2.6 and 4% by the end of the century, compared to the reference period of 1958 to 1974. On average across the country, a decrease of 2% of precipitation by 2100 is expected, stronger in the southern region and in the dry season. Additionally, models project a decrease of precipitation, around 2mm/decade in the southern region, and an increase of 2mm/decade in the coasts and central region.
- Under RCP 8.5, precipitation is projected to see the greatest decrease between April and October in the period 2071–2100, drying out the dry season even more. In the central coast region of the country, precipitation is projected to slightly increase, diverging from trends in the rest of the country. Some models indicate a higher frequency and magnitude of drought conditions on the country scale (Carvalho et al. 2019, Angola 2012).

## References

Huntley, Brian J. "Angola in outline: physiography, climate and patterns of biodiversity." In Biodiversity of Angola, pp. 15-42. Springer, Cham, 2019.

Lenssen, N.J., Goddard, L. and Mason, S., 2020. Seasonal Forecast Skill of ENSO Teleconnection Maps. *Weather and Forecasting*, 35(6), pp.2387-2406.

Carvalho, S. C. P., Santos, F. D., & Pulquério, M. (2017). Climate change scenarios for Angola: an analysis of precipitation and temperature projections using four RCMs. *International Journal of Climatology*, 37(8), 3398-3412.

UNDP. (2020). Angola. *Climate Change Adaptation*. <https://www.adaptation-undp.org/explore/middle-africa/angola>

Sawe, B. E. (2019). The Climate of Angola. *World Atlas*. <https://www.worldatlas.com/articles/what-type-of-climate-does-angola-have.html>

Floodlist. (2019). Angola – Homes Destroyed and Families Displaced After Heavy Rain in South. <https://floodlist.com/africa/angola-floods-cunene-december-2019>

Angola. (2012). Angola's Initial National Communication to the United Nations Framework Convention on Climate Change. <https://unfccc.int/sites/default/files/resource/agonc1.pdf>

IFRC. (2020). All Angola Emergencies. *Go*. <https://go.ifrc.org/emergencies/all?country=120>

Quagraine, K. A., Hewitson, B., Jack, C., Pinto, I., & Lennard, C. (2019). A methodological approach to assess the co-behavior of climate processes over southern Africa. *Journal of Climate*, 32(9), 2483-2495.