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Zambia's Historic Rainfall

Historic Rainfall Summary from 1981/82 to 2023/24

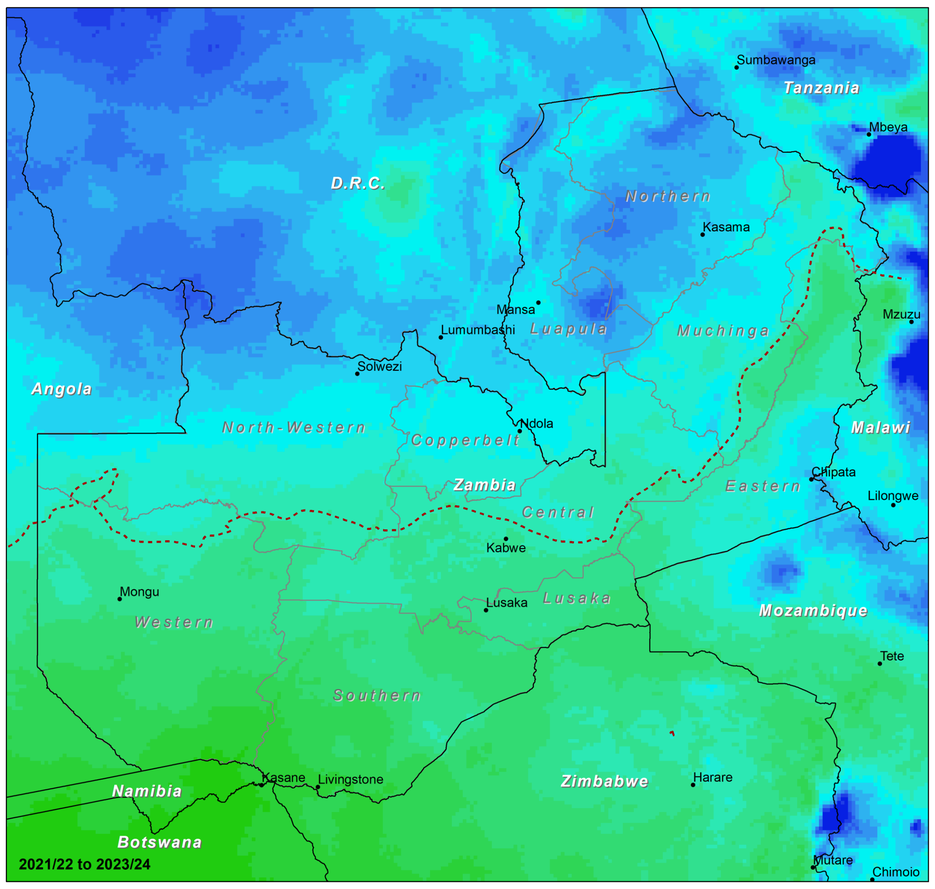
SASSCAL
Southern African Science Service Centre for Climate Change and Adaptive Land Management

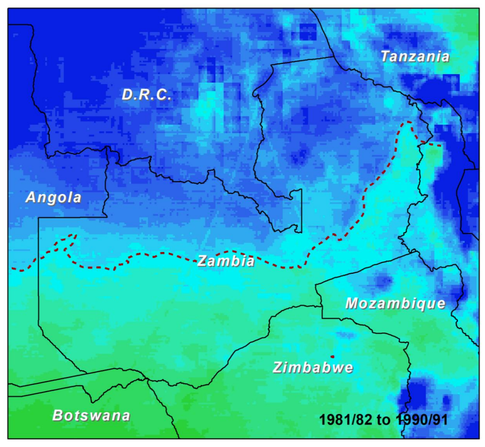
In February 2024, Zambia declared a National Disaster, as an El Niño induced drought devastated the national food production and threatened food security in 84 out of 116 districts.

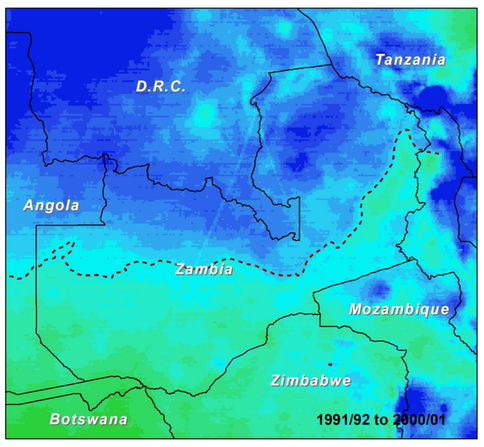
More than 1 million subsistence farmers, dependent on rain-fed agriculture, were affected. Humanitarian action identified 5.5 million people in need in January 2025.

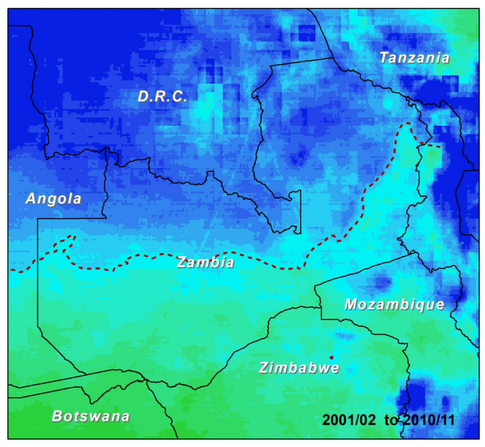
Zambia and Zimbabwe also share the largest man-made dam in the world, the Kariba dam, with a total capacity of 180 km³ and that generates a total 6,400 gigawatt-hours per annum. In particular Zambia is highly reliant on this water resource for hydropower generation. In 2024, load shedding measures had to be implemented in Zambia, detrimentally affecting the country's economy.

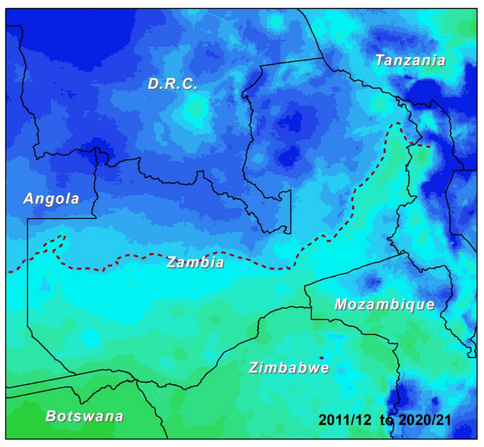
The analysis of the historic rainfall for Zambia, from the 1981/82 rainfall year, suggests a drier spell from 2020/21.











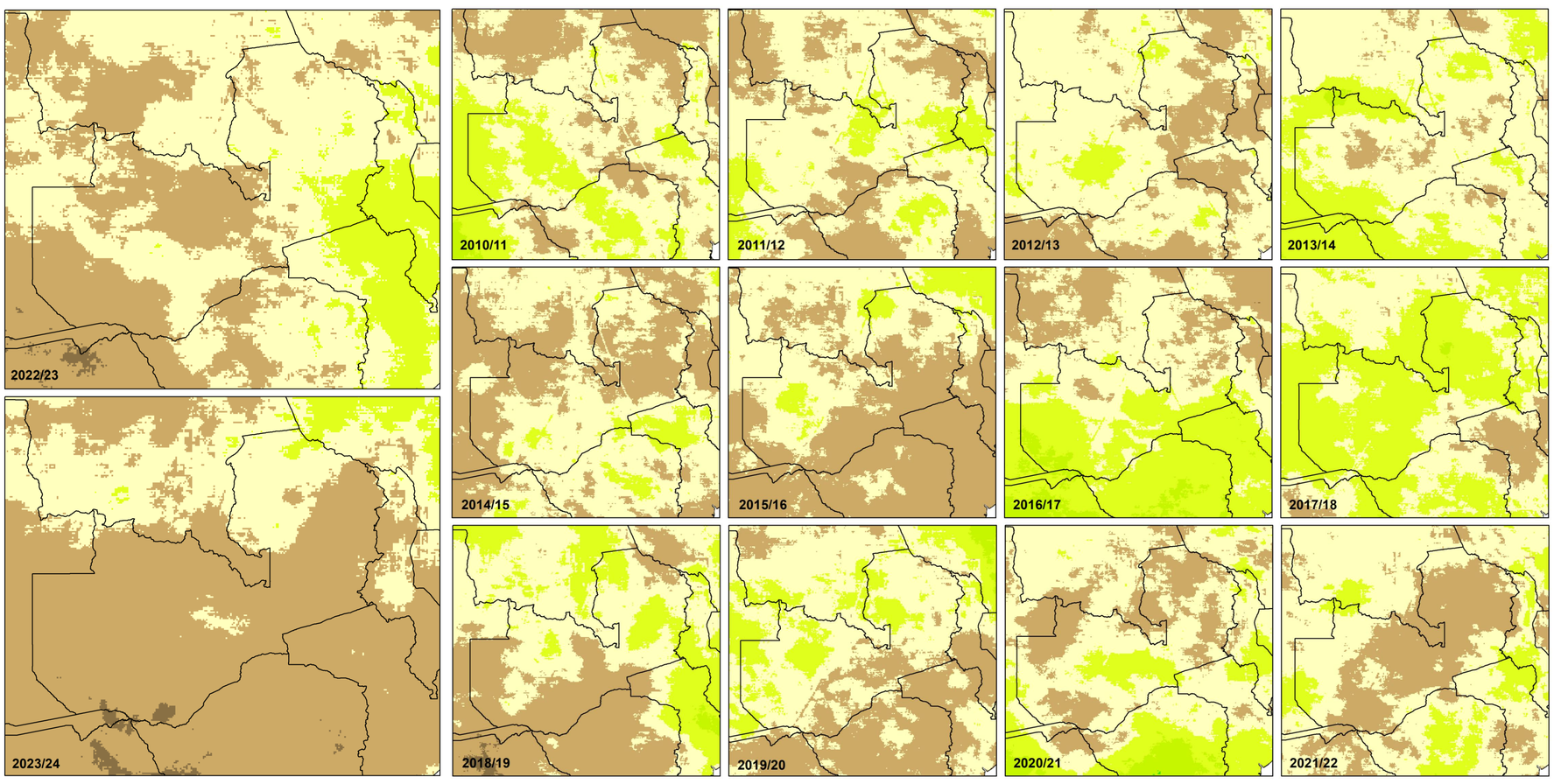
1,000 mm Isohyet

Average Annual Rainfall (mm)

- below 400 mm
- 400 - 500
- 500 - 600
- 600 - 700
- 700 - 800
- 800 - 900
- 900 - 1,000
- 1,000 - 1,100
- 1,100 - 1,200
- 1,200 - 1,300
- 1,300 - 1,400
- 1,400 - 1,500
- more than 1,500

The 1,000 mm average annual historic rainfall isohyet, as derived from the average rainfall from the 1981/82 to the 2022/23 rainfall year, was introduced to compare the rainfall of the past four decades to each other, but to also compare the past three drier years in Zambia, to the average annual rainfall.

While prior decades have shown small deviations from the 1,000 mm average annual historic isohyet, the past three-year average annual rainfall has shown a considerable shift of decrease in a northerly direction.

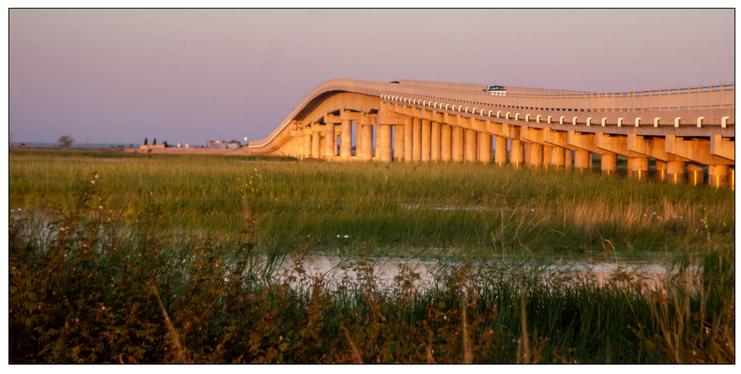


% Annual Average from Historic

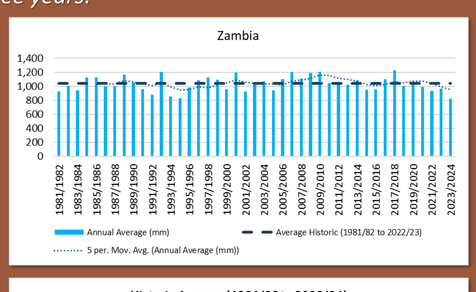
- more than 50 % less than normal
- 50 to 90 % less
- normal
- 10 to 50 % more
- 50 to 100 % more
- 100 to 200 % more

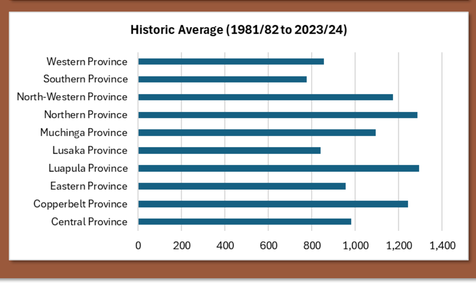
CHIRPS 3.0 satellite-based precipitation data provides a historic record of 43 years, starting in January 1981. This high-resolution data provides temporal and spatial insight into the rainfall trends and variability.

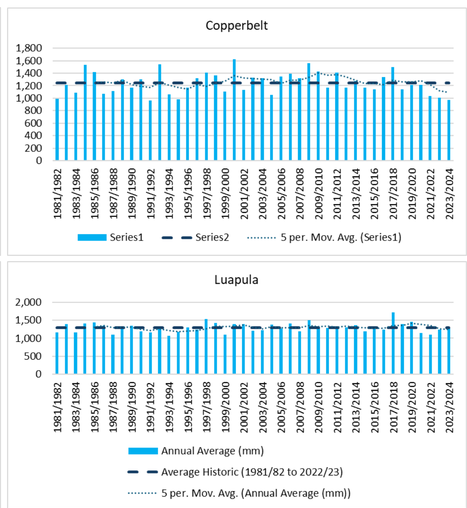
The maps depicting the percentage of the annual total rainfall deviation from the historic annual average suggest a highly variable rainfall.
Since the 2010/11 rainfall year, only one rainfall year has brought above average rainfall for almost the whole of Zambia.
In particular the past three rainfall years have seen below average rainfall in large parts of the country.

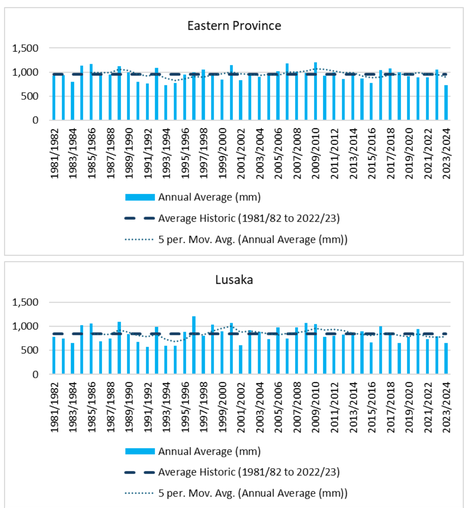


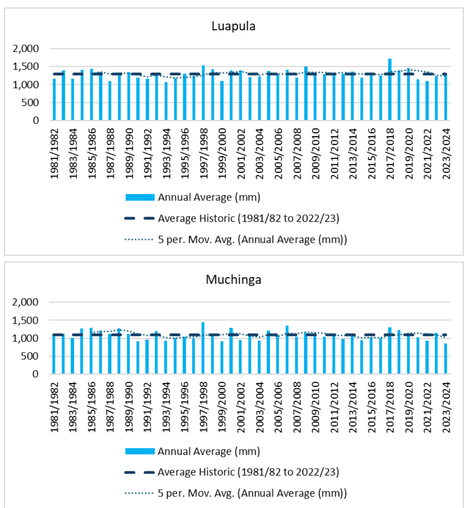
On average, the graph of Zambia's average annual rainfall for the past 42 years suggests, that Zambia has had four consecutive below average rainfall years in the past four years.
Particularly Copperbelt, Southern and Western province have experienced a below normal average annual rainfall for three years.

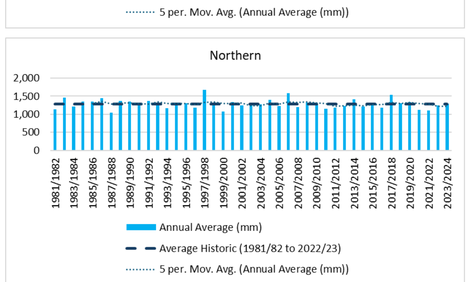


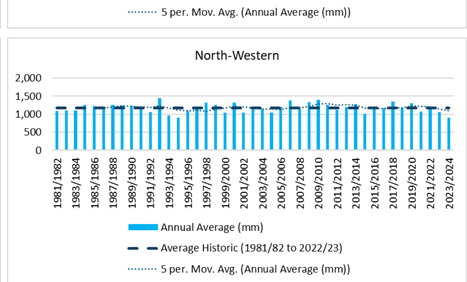


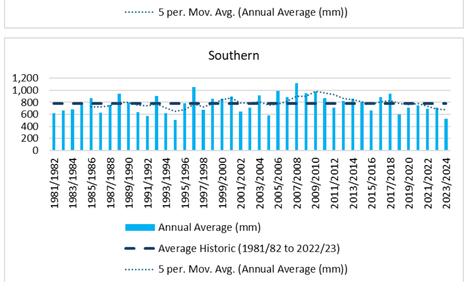


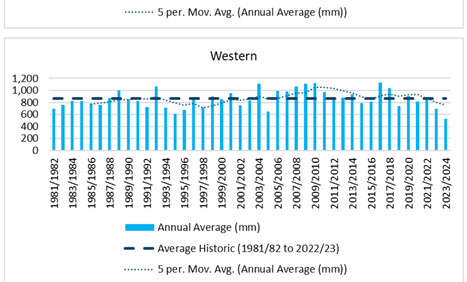


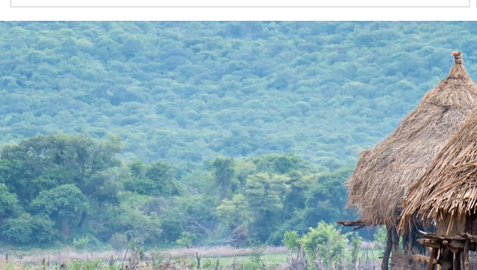


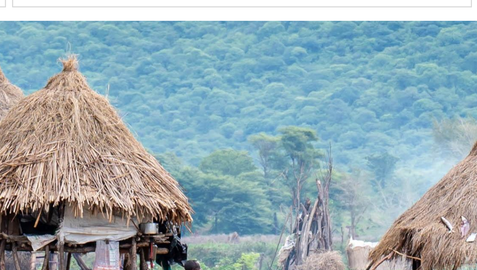


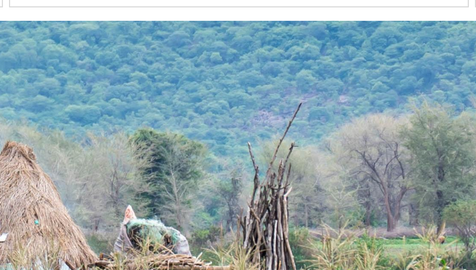


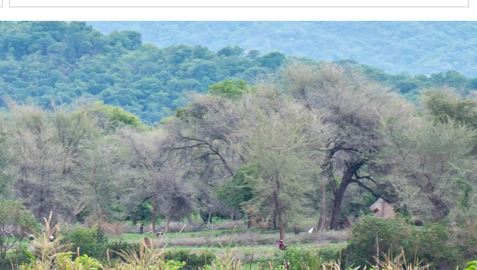












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Data can be downloaded on the SASSCAL Data and Information Portal DATA.SASSCAL.ORG/

Data Source: CHC Chirps 3.0 Precipitation data