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# Cameroon Seasonal Monitor

*WFP Cameroon, December 2023 update (January 2024)*



# Highlights

## Rainfall patterns

December 2023 was the effective beginning of the dry season throughout the country. Regions in the southern part of the country were the most rainy this month compared to those in the northern part where the month was entirely dry. Compared to December 2022 or 2021, this month was particularly deficient across all regions of the country. Rainfall deficits were over 80% everywhere.

## Rainfall Monthly Forecast: January 2024

During January 2024, rainfall is expected to be similar to normal in the northern regions (Far North, North and Adamawa). All the regions located in the southern part of the country could experience high deficit rainfall, especially in the South-West, East, and part of the South regions. In these regions rainfall deficit will range from 40% to 60%, and could exceed 60% in some divisions: Ndian and Kupe-Manenguba (South-West), Kadei and Boumba et Ngoko (East).

## Flood/Drought Preparedness: Far-North region

With the onset of the dry season, the various watersheds of the Logone and Chari rivers, which cross the entire Far North region down to Lake Chad, recorded cumulative rainfall deficits of over 80% this month compared to December 2022. In contrast to the situation observed at the same period last year, water levels in the riverbanks of these various rivers appear to have fallen sharply, particularly in the section of the Chari river bordering Cameroon and Chad. The data show that Kousseri, Goulfey, Makary, Fotokol, Hilé-Halifa, Blangoua and Darrak subdivisions in the Logone et Chari division suffered from wet soil surface conditions that were unfavorable to vegetation activity, thus threatening the livelihoods of local populations. It will therefore be necessary to closely monitor the situation in over the coming months, given the length of the dry season there (~9 months).

## Extreme rainfall and soil wetness

The end of the rainy season this month led to an increase in dry spells. Their duration almost doubled this month compared to December 2022, particularly in the South-West, Littoral and part of the South regions. The low total rainfall recorded in the North-West, South-West and West was well below normal. As a result, these regions appear to have suffered from low to moderate drought this month.

### Disclaimer:

All climate content within this bulletin is based upon the most recently available remote sensing data. As the climate phenomena is a dynamic situation, current and future realities may differ from what is depicted in this document.

### Data Sources:

**Rainfall:** CHIRPS (Climate Hazards Group InfraRed Precipitation with Station data) gridded rainfall dataset produced by the Climate Hazards Group at 0.05x0.05° grids

**Land Surface Temperature (LST):** MODIS daily Land-surface Temperature at 1km grids

**Enhanced Vegetation Index (EVI):** MODIS 16-Day Enhanced Vegetation Index (EVI) at 250 km grids

**Rainfall Seasonal Forecast:** National Meteorological Department

### Data Processing:

Google Earth Engine, ArcGIS, QGIS

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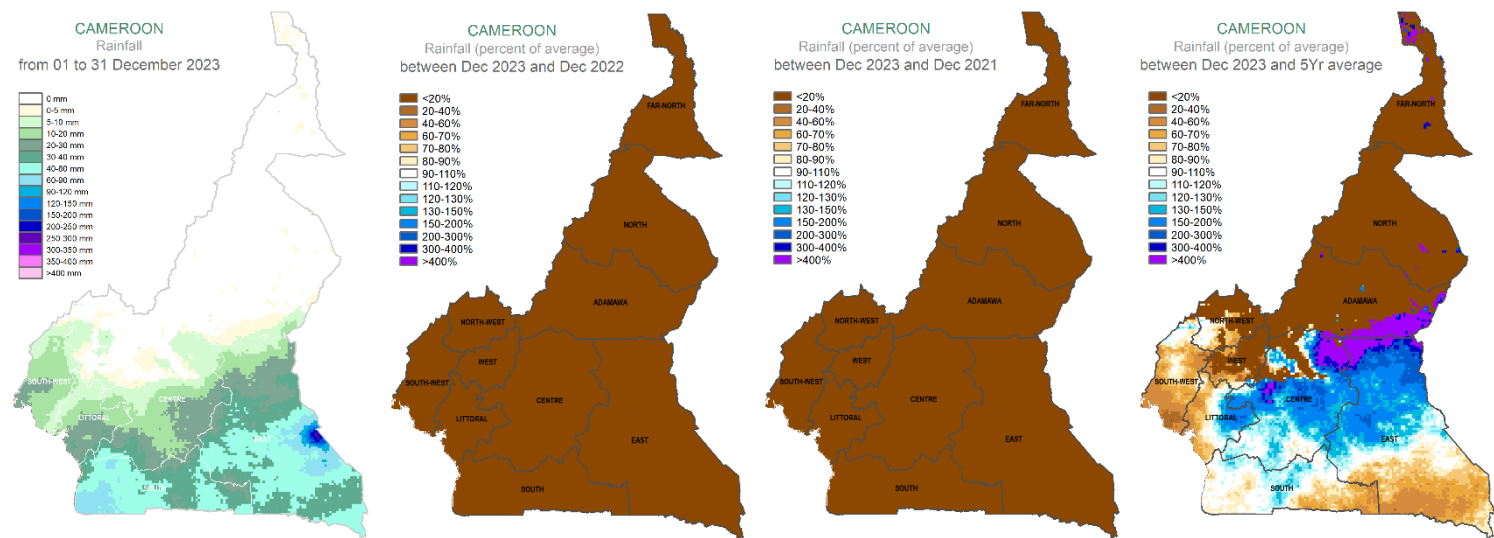
### Photo Credits:

**Cover:** @ WFP/Jordan Onana

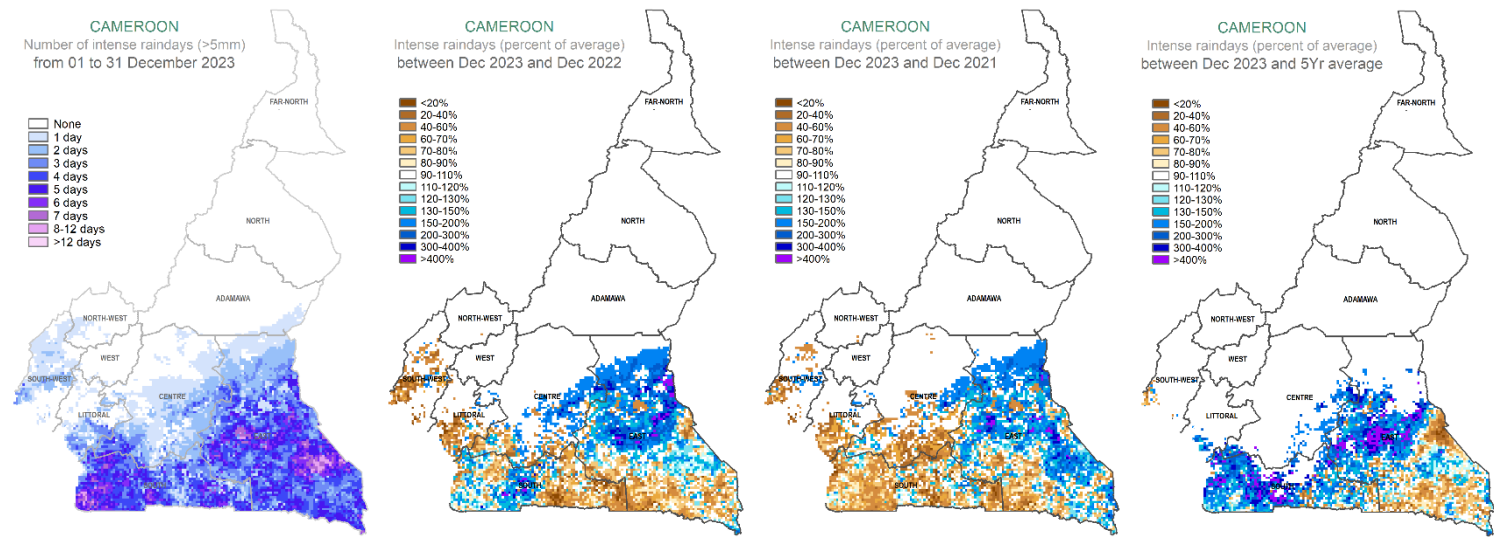
# **COUNTRY OVERVIEW**



# 1. Rainfall patterns



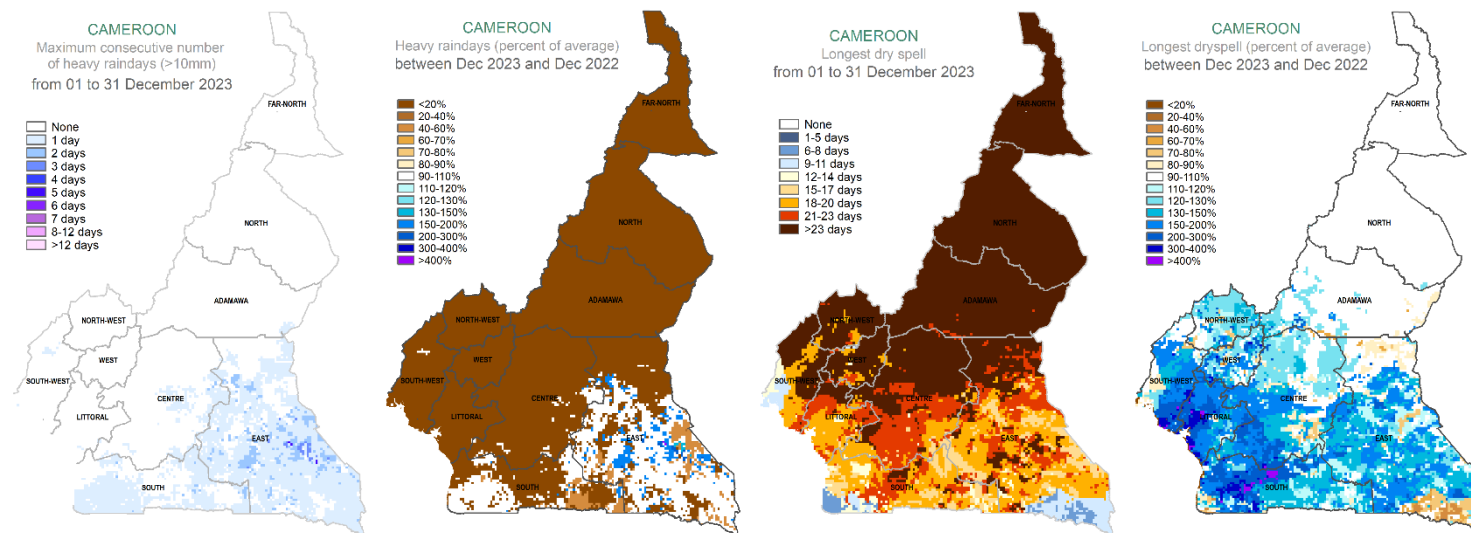
**Fig 1:** Rainfall variability in December 2023 and anomalies



**Fig 2:** Intense rainfall days (>5 mm) variability in December 2023 and anomalies

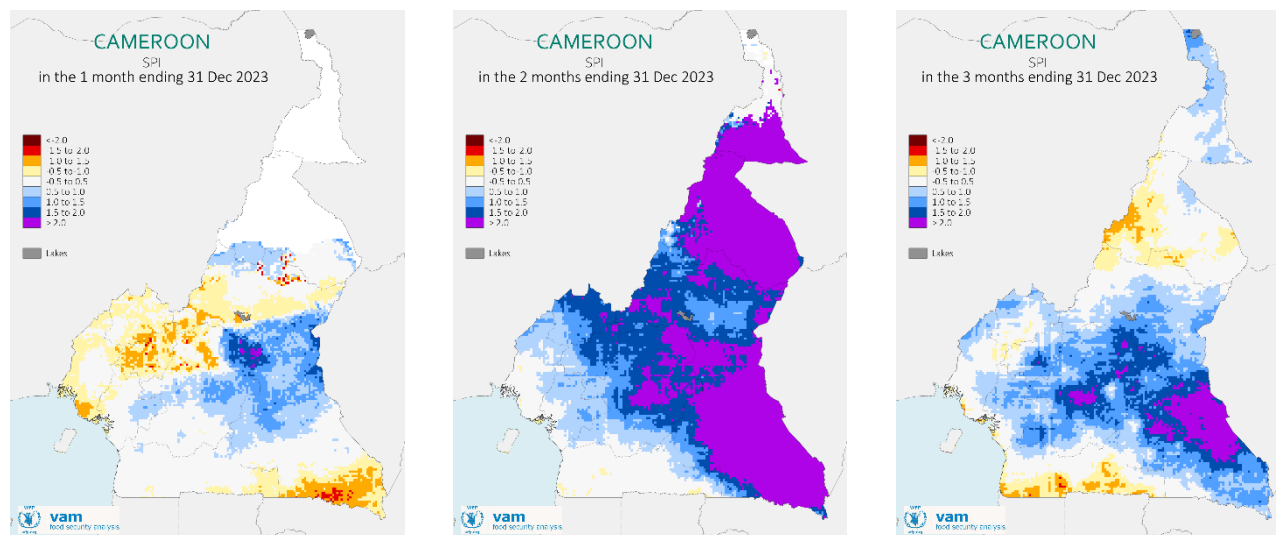
December 2023 was the effective beginning of the dry season throughout the country, with rainfall totals of less than 60 mm recorded over most of the country. Regions in the southern part of the country were the most rainy this month, in contrast to those in the northern part where the month was entirely dry. Precipitation in the South and East regions was mainly the result of occasional intense rains (>5mm/d), which occurred mainly in the first decade of the month. Compared to December 2022 or 2021, this month was particularly deficient across all regions of the country. Rainfall deficits this month were over 80% everywhere, suggesting a month of very lower rainfall amount.

## 2. Rainfall extremes



**Fig 3:** Longest wet spell in December 2023 and anomaly

**Fig 4:** Longest dry spell in December 2023 and anomaly

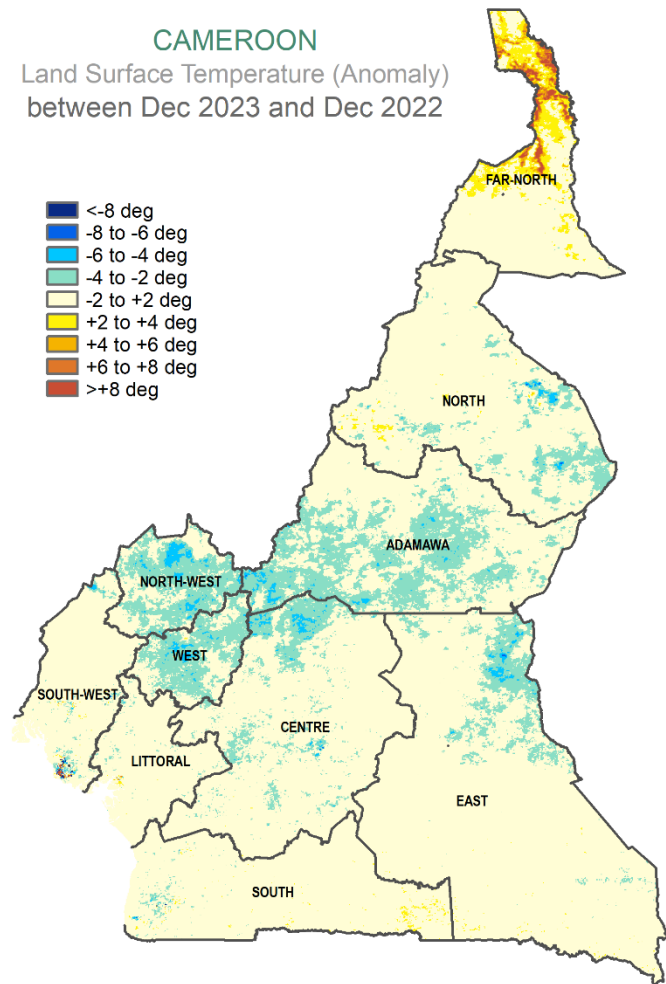


**Fig 5:** Standardized Precipitation Index (SPI) for December 2023, November-December 2023 and October-December 2023

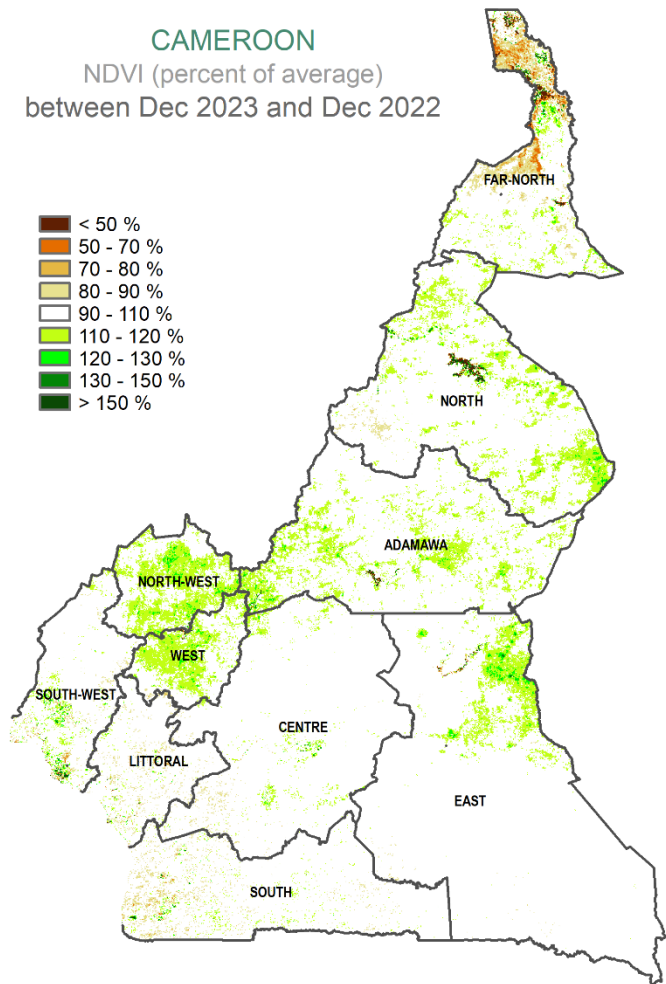
The interruption of rain from the first dekad of the month in the Adamawa, North and Far North regions, and from the second dekad of the month in the other regions, led to an increase in dry spells. It would appear that their duration almost doubled this month compared to December 2022, particularly in the South-West, Littoral and part of the South.

Nevertheless, the lack of rain in the northern part of the country does not appear to have caused drought compared to the normal (30-year average). This suggests that the situation in this part of the country was common during the month. On the contrary, the low total rainfall recorded this month in the North-West, South-West and West was well below normal. As a result, these regions appear to have suffered from low to moderate drought this month.

### 3. Soil & Vegetation conditions



**Fig 6:** Land Surface Temperature anomaly in December 2023







**Fig 7:** Vegetation activity anomaly in December 2023






The lack of rainfall this month in the North, Adamawa, North-West and West regions in particular does not seem to have had a negative impact on vegetation activity. Indeed, these regions benefited from soils with surface temperatures 2°C to 6°C lower in some locations than in December 2022. These cooler soils suggest better moisture conditions, which could explain why vegetation activity was higher this month than in December 2022. As in the previous month, Mayo Sava and Logone et Chari are the two divisions in the Far North to have recorded a deterioration in vegetation activity of up to 50% locally compared to December 2022, due to warmer soils. The subdivisions most affected are: Mora, Waza, Kousseri, Goulfey, Makary, Fotokol, Hilé-Halifa, Blangoua and Darrak.

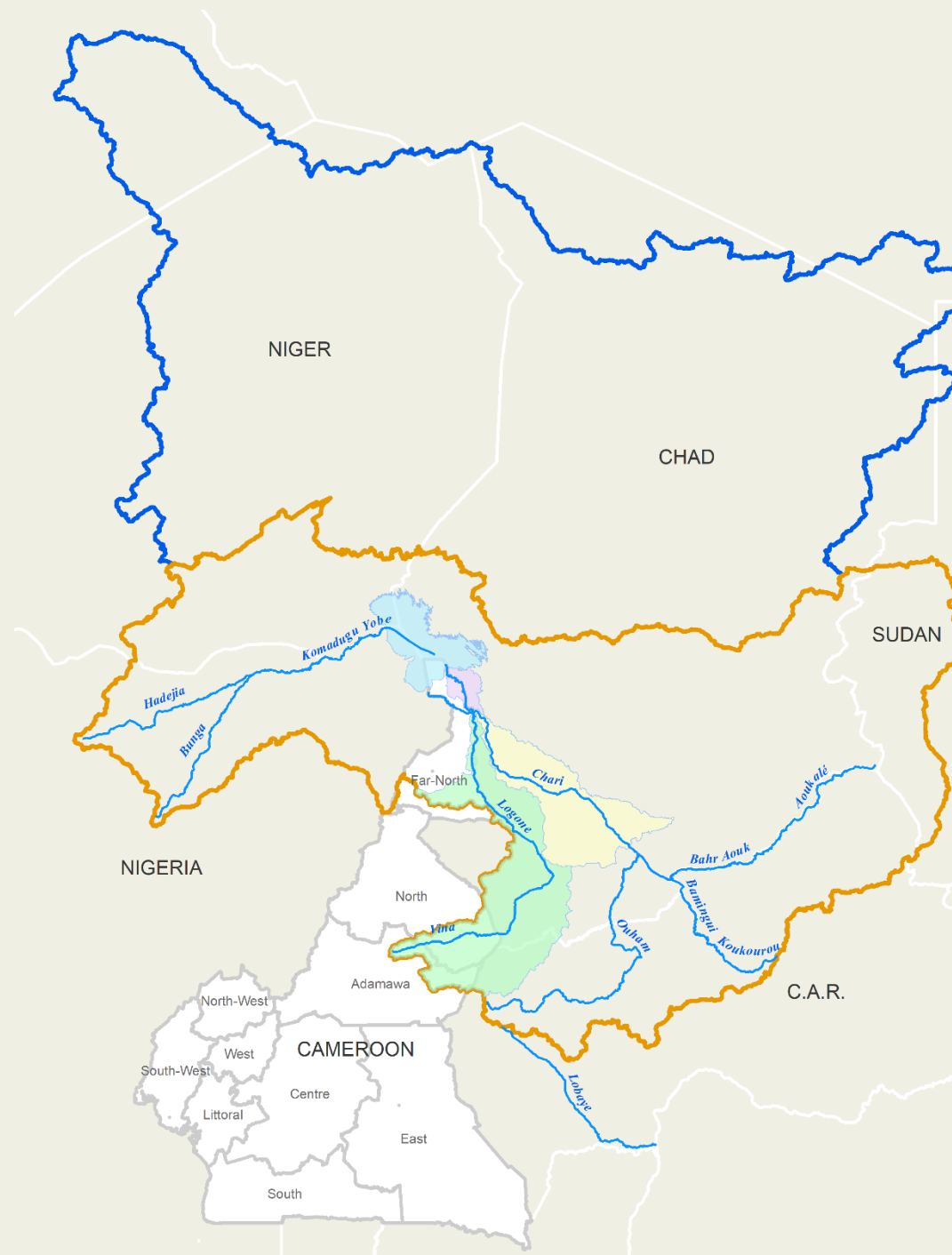
# Focus

## AREA OF INTEREST

-  Lake Chad
-  Logone et Chari river watershed
-  Chari river watershed
-  Logone river watershed

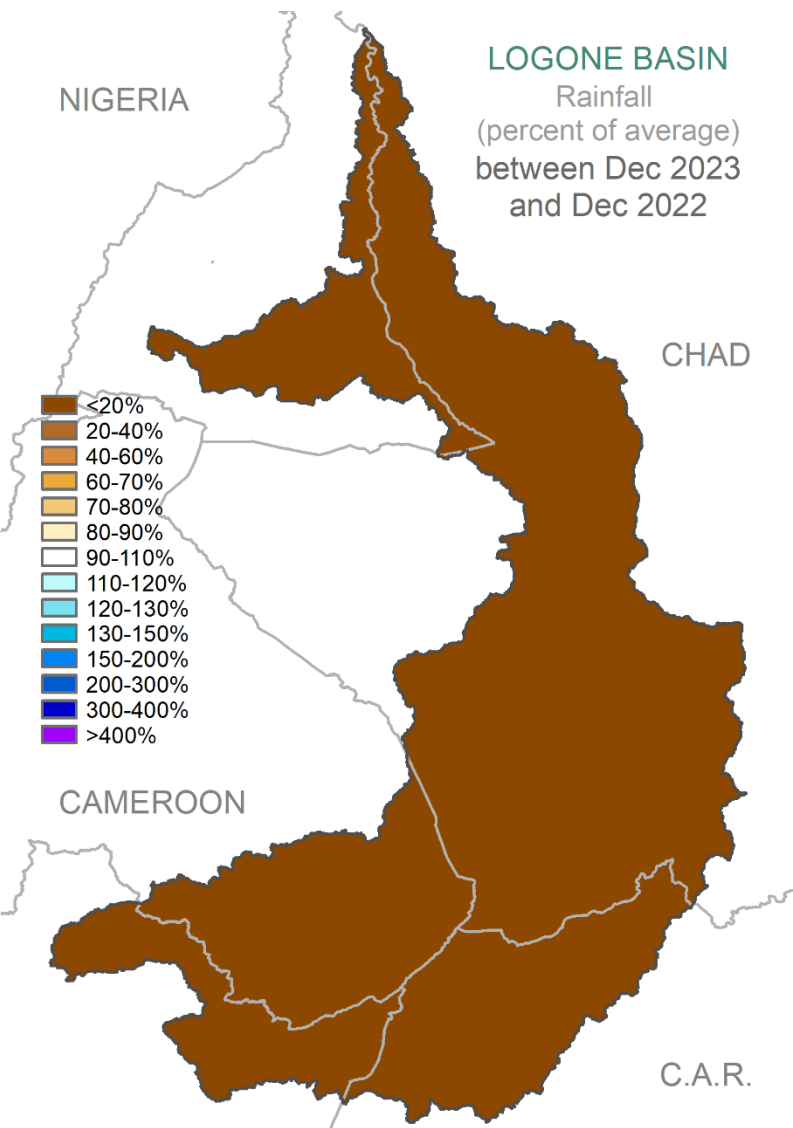
## DELIMITATIONS IN THE LAC CHAD BASIN

-  Lac Chad basin
-  Conventional basin
-  Cameroon regional boundaries
-  International boundaries
-  Rivers

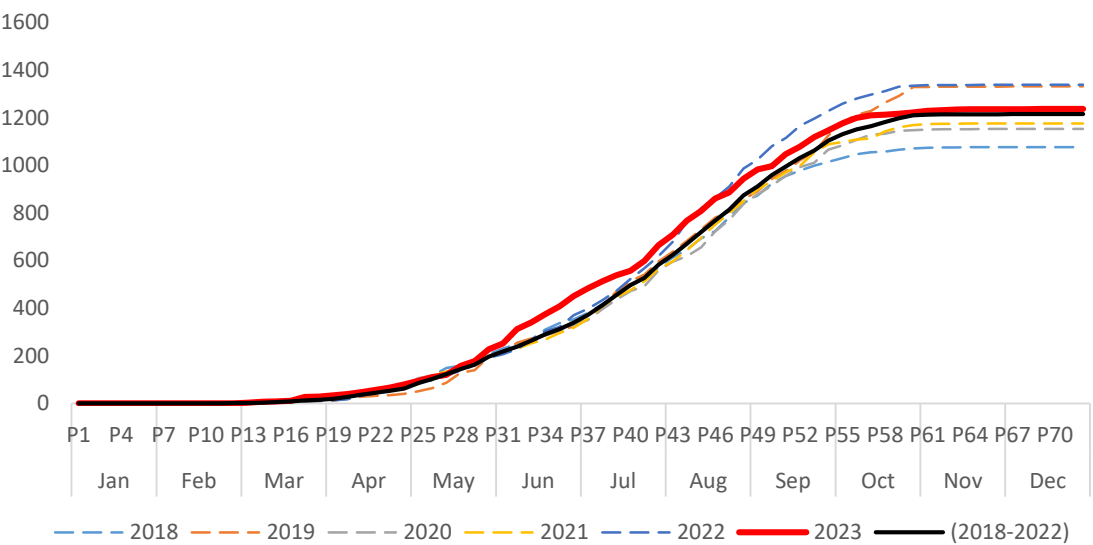




# 1. Logone river watershed



**Fig 8:** Rainfall anomaly in December 2023



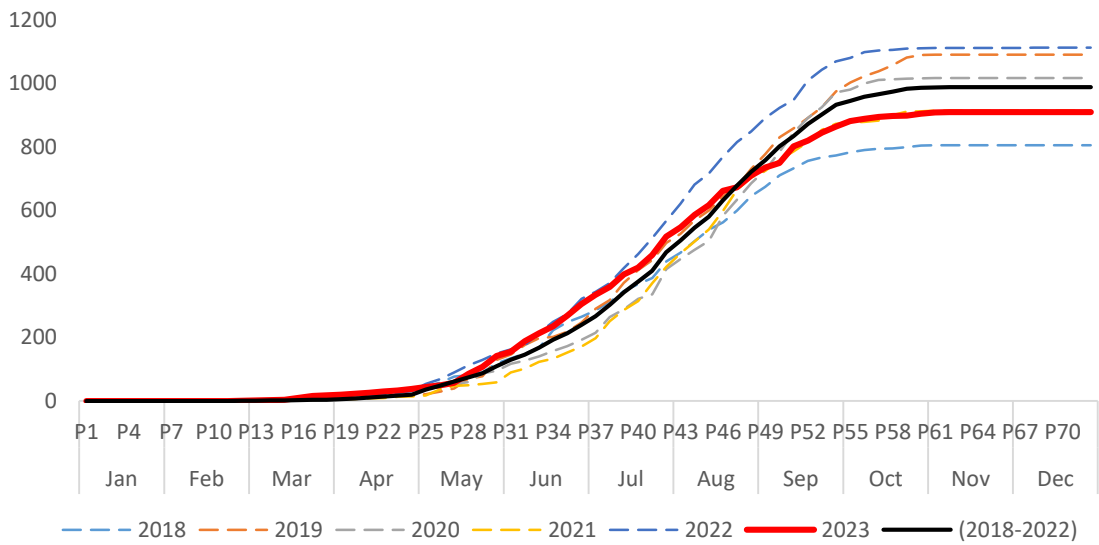
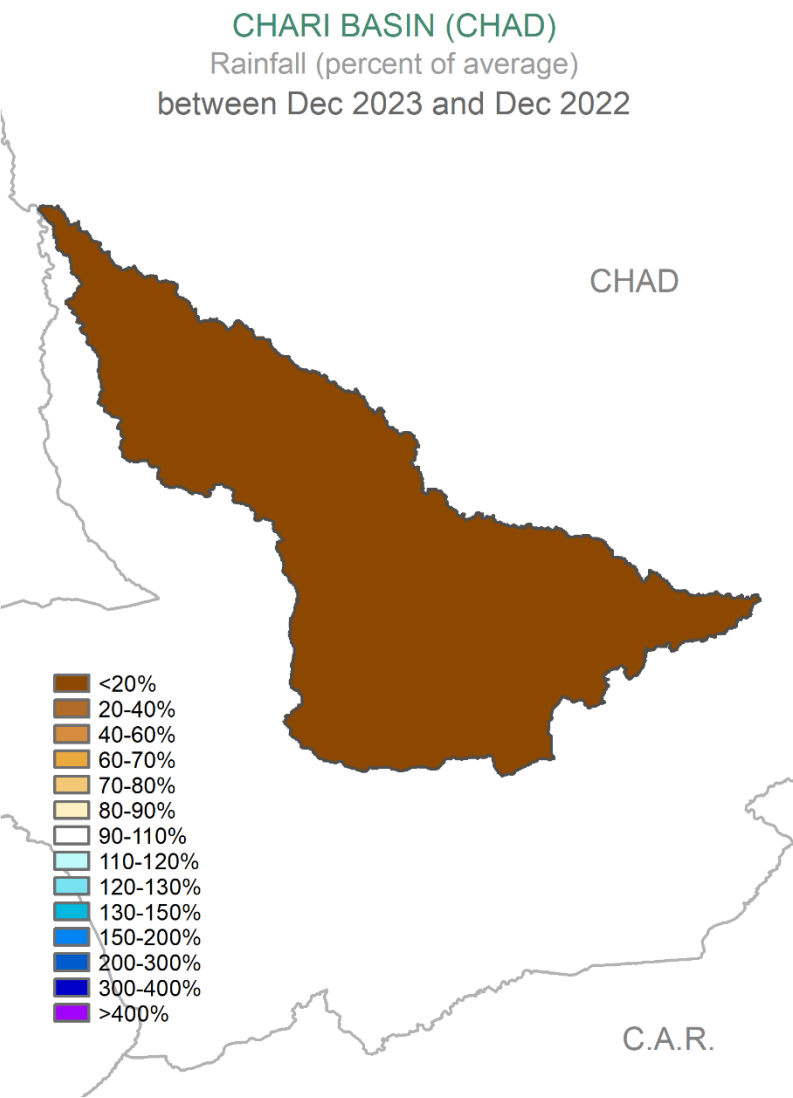
**Fig 9:** Progression of the rainy season from January to December 2023

The Logone River watershed covers 3 countries (Cameroon, Chad and the Central African Republic). In Cameroon, its upstream section covers the Mayo-Rey division in the North and part of the Vina and Mbere divisions in Adamawa. Its downstream section covers several Far North divisions, including Mayo-Danay and Logone et Chari.

This month, cumulative rainfall was particularly low throughout the Logone river watershed, compared to December 2022. In fact, rainfall deficit exceeded 80% this month. For the entire year, the rainy season was affected by the more or less significant rainfall deficits recorded from July to October 2023, resulting in a progression of the rainy season similar to that of dry years. These years seem to be characterized by lower cumulative rainfall from July until the end of the year in this watershed.



## 2. Chari river watershed



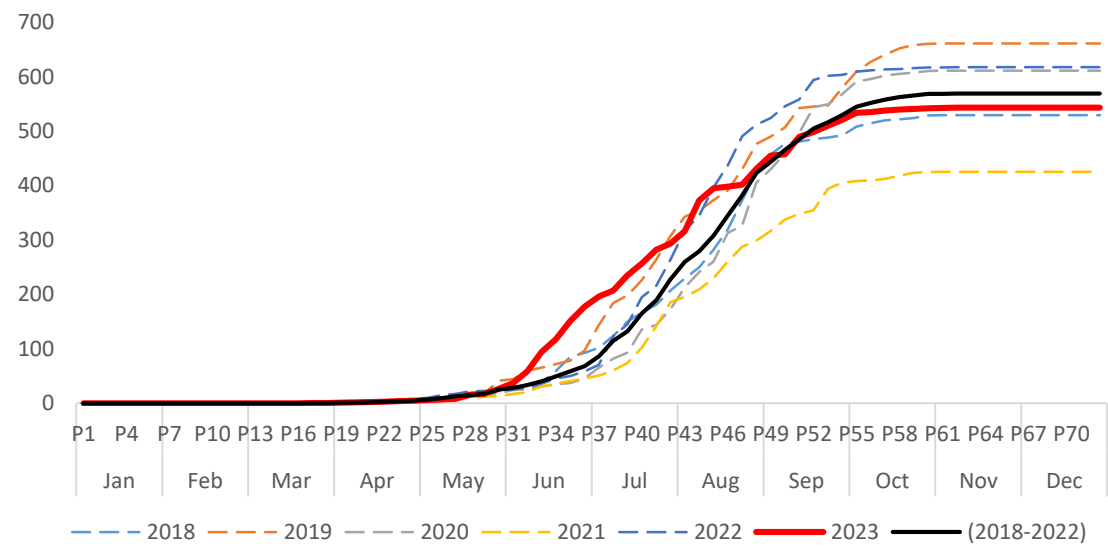
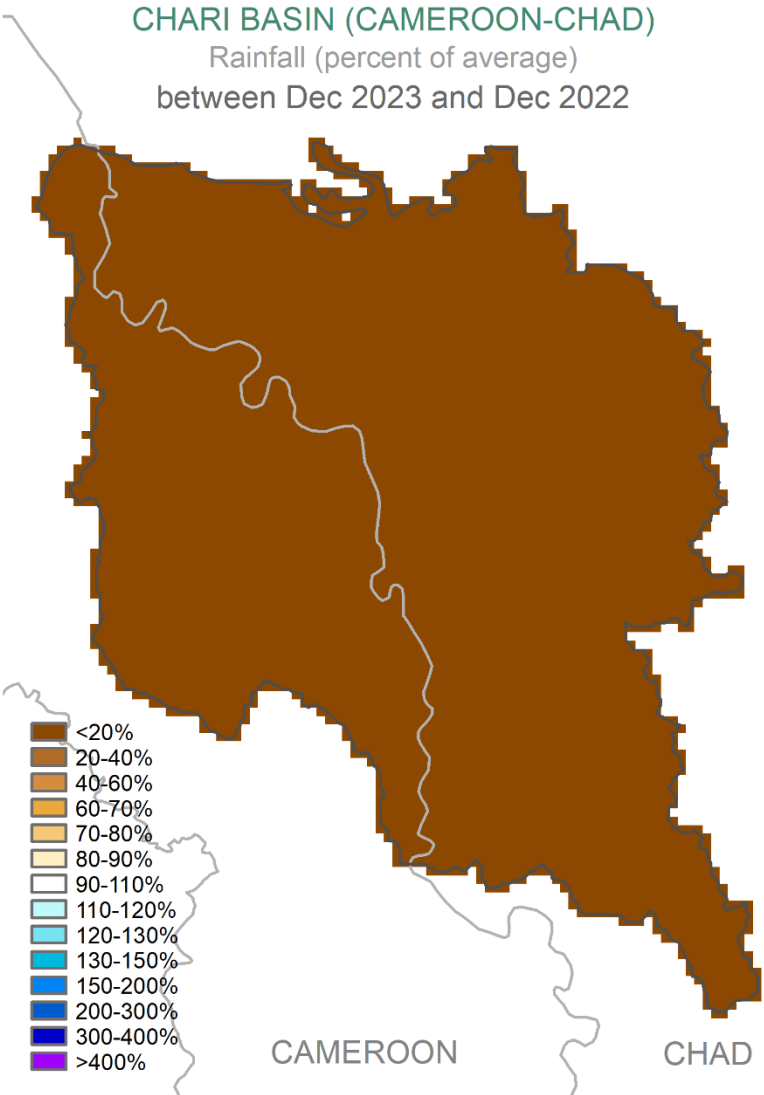
**Fig 11:** Progression of the rainy season from January to December 2023

*The entire watershed of the Chari River is located in Chad, but its outlet is the town of Kousseri in the Logone et Chari division in Cameroon. This is where the Chari River meets the Logone River.*

The Chari river watershed (Chad section) also recorded a significant rainfall deficit (> 80%) this month, compared to December 2022. In this basin, the rainy season was severely disrupted by relatively large rainfall deficits that occurred consecutively from July 2023 onwards. This had a negative impact on the progress of the rainy season, which then presented similarities with that of 2021, which had been a particularly deficient year over the last five years. In this basin, the 2023 rainy season was one of the most deficient since 2018.

**Fig 10:** Rainfall anomaly in December 2023

### 3. Chari river watershed



**Fig 13:** Progression of the rainy season from January to December 2023

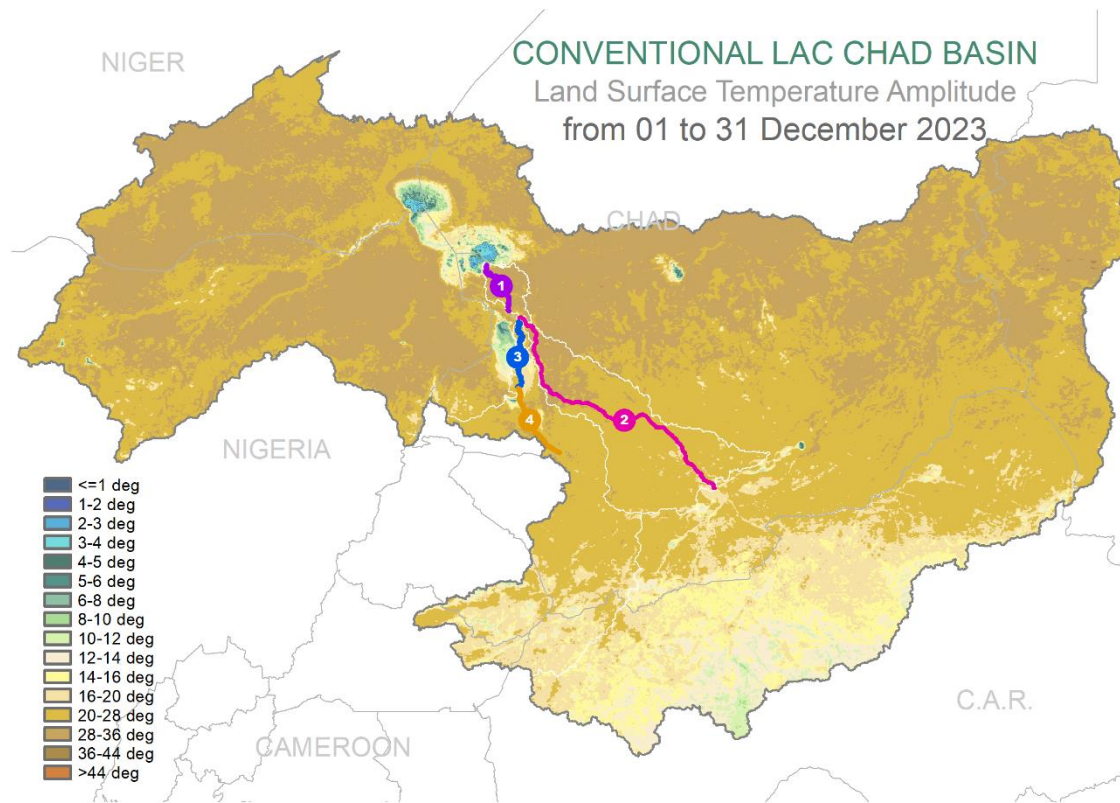
*The Chari-Logone river watershed covers Cameroon and Chad. In Cameroon, it covers the Goulfey, Blangoua and Darak subdivisions in the Logone et Chari division, which are closest to Lake Chad.*

As with the two previous watersheds, the Chari river watershed (Cameroon-Chad section) also recorded very high cumulative rainfall deficits this month, compared to December 2022. In this basin, the rains seem to have stopped at the end of September, given the progression of the rainy season. The rainy season was adversely affected by a significant deficit, particularly in August 2023. All in all, the cumulative annual rainfall recorded in this basin was similar to that recorded in 2018, which was a slightly deficit year compared to the average for the last five years.

**Fig 12:** Rainfall anomaly in December 2023

# **RIVER WATER MONITORING**

# 1. Distribution of soil wetness status



**Fig 14:** Soil wetness distribution in the Lake Chad basin in December 2023. The colored lines are different sections of the Logone and Chari rivers according to their location: **1**=section of the Chari bordering Cameroon and Chad; **2**=section of the Chari belonging to Chad; **3**=section of the Logone bordering the two countries between the Zina and Kousséri subdivisions in the Logone et Chari division (Cameroon); **4**=section of the Logone bordering the two countries along the Mayo-Danay division (Cameroon).

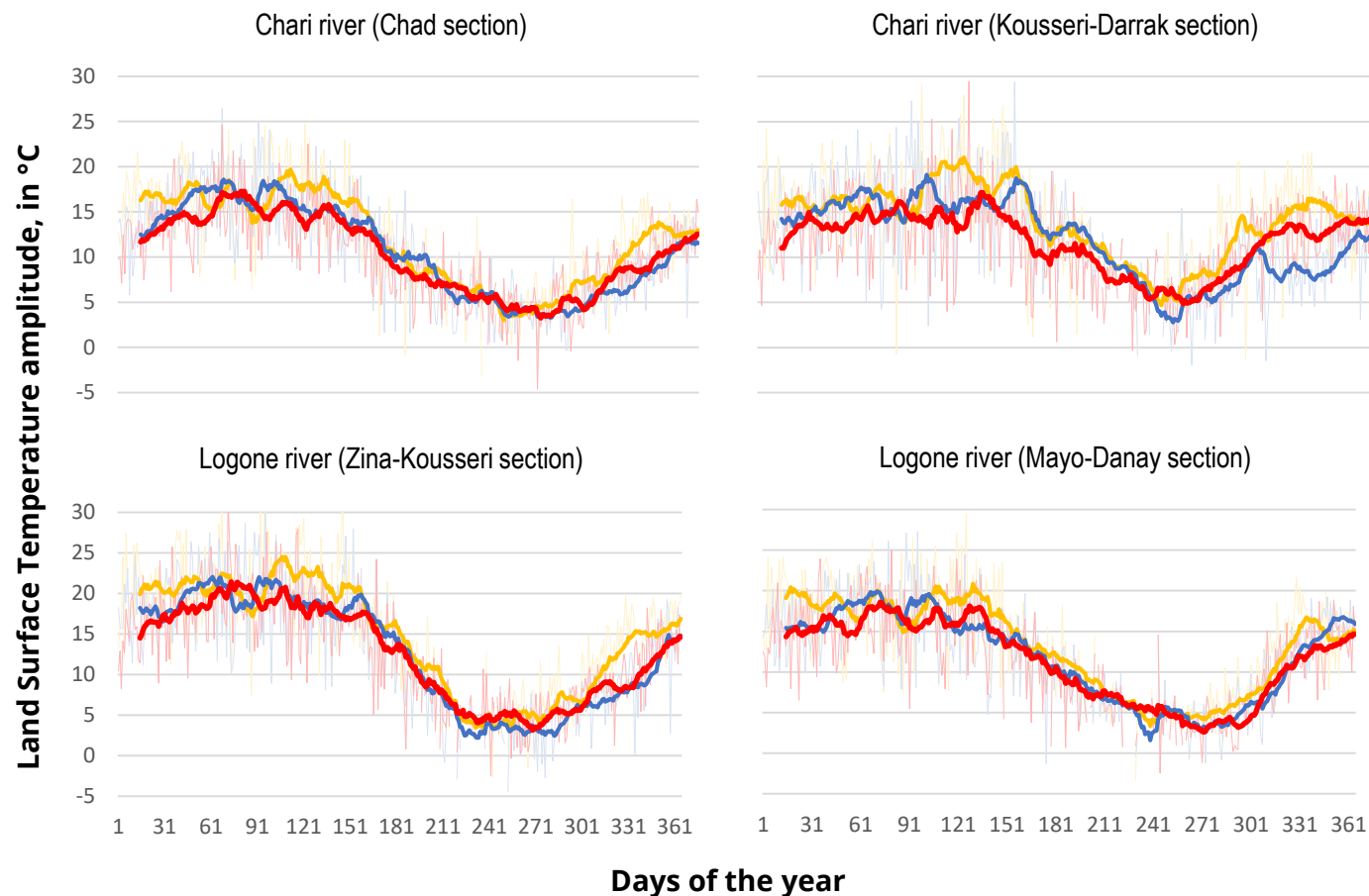
Abnormal soil wetness or open water can be detected through the use of thermal images from MODIS satellites, specifically the difference between the daytime and the nighttime land surface temperature. Low values of this thermal day-night difference are associated with wetter soil or open water, while high values indicate dry soil.

This month, thermal conditions at the soil surface within the Lake Chad watershed suggest drier soils with higher surface temperatures. These warmer thermal conditions are consistent with the end of the rains and the start of the dry season. Thus, most of the watershed appears to have been marked by drier

soils, with the exception of the areas around the main lakes and floodplains. It is in these areas where soil surface temperatures suggest the presence of open water or wetter soils, compared with the rest of the watershed.



## 2. Soil wetness status along rivers

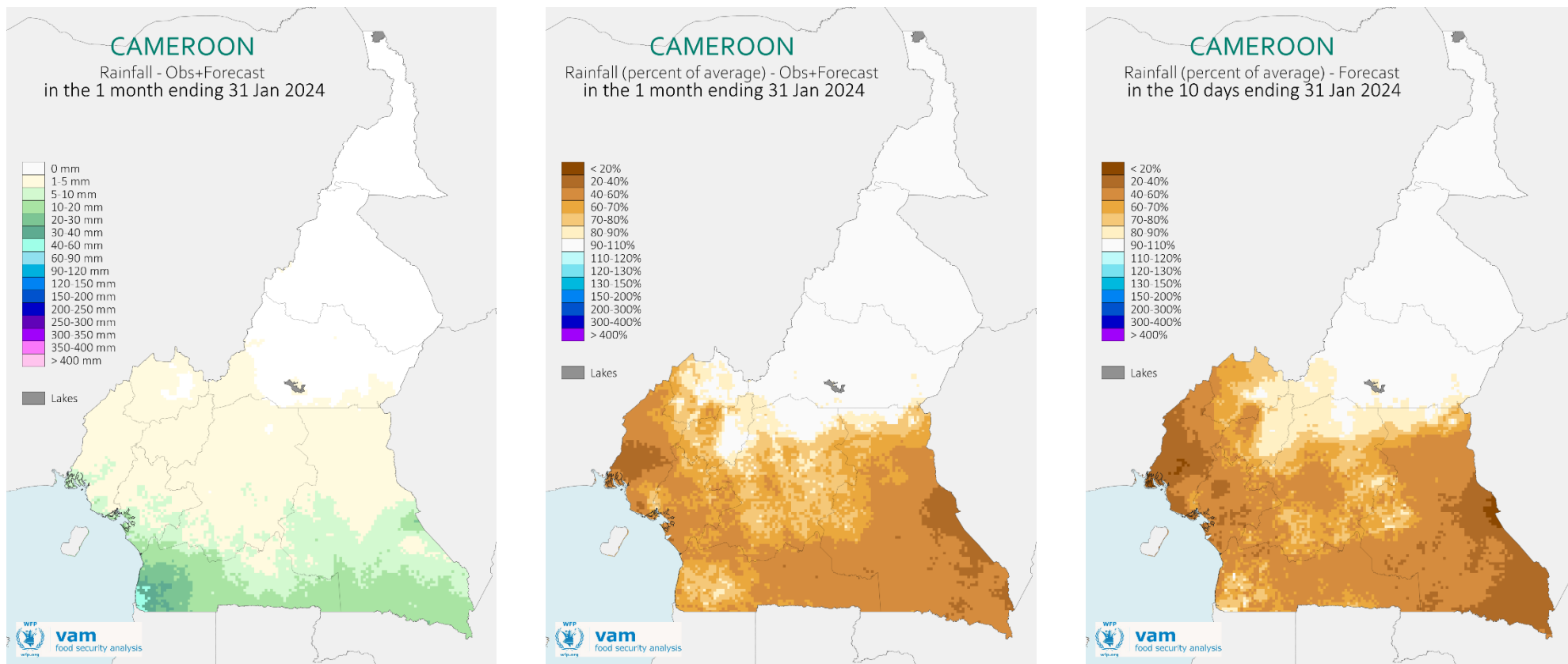


**Fig 15:** Progression of soil wetness inside the riverbank of different sections of the Logone and Chari rivers from January to December 2023. **The bold lines correspond to the 15-days moving average, eliminating daily variability and highlighting the trend for the different years: 2021 (orange color); 2022 (blue color) and 2023 (red color).**

With regard to soil wetness conditions inside the riverbanks of the Chari and Logone rivers, monitoring of the daily thermal amplitude throughout the year makes it possible to identify the periods of the year when soil wetness appears to be highest, corresponding to the presence of water at the surface in the various sections of the rivers identified. These are sections of the Chari and Logone rivers, where surface water levels dry up seasonally. Figure 15 compares the evolution of daily temperature amplitude in 2021, 2022 and 2023 in each of the river sections selected.

Given the higher soil surface temperatures that prevailed this month, and the significant rainfall deficit recorded across the various watersheds of the Logone and Chari rivers, soil wetness in the riverbanks of these two rivers fell sharply throughout the month. This suggests a significant reduction in open water, particularly in the section of the Chari river bordering Cameroon and Chad. Indeed, thermal conditions in the riverbank of this section of the river this month were similar to the situation observed in December 2021.

# Short Term Forecast: January 2024



**Fig 16:** Rainfall forecasts for Cameroon for the month of January 2024.

Short range forecasts provide estimates of rainfall for January 2024. Rainfall is expected to be similar to normal in the northern regions (Far North, North and Adamawa). All the regions located in the southern part of the country could experience high deficit rainfall., especially in the South-West, East, and part of the South regions. In these regions rainfall deficit will range from 40% to 60%, and could exceed 60% locally in some divisions like Ndian and Kupe-Manenguba (South-West), Kadei and Boumba et Ngoko (East). If these forecasts are realized, the northern regions will experience a second consecutive month without any precipitation, which will have a negative impact on the livelihoods of the population locally (agriculture and livestock).

