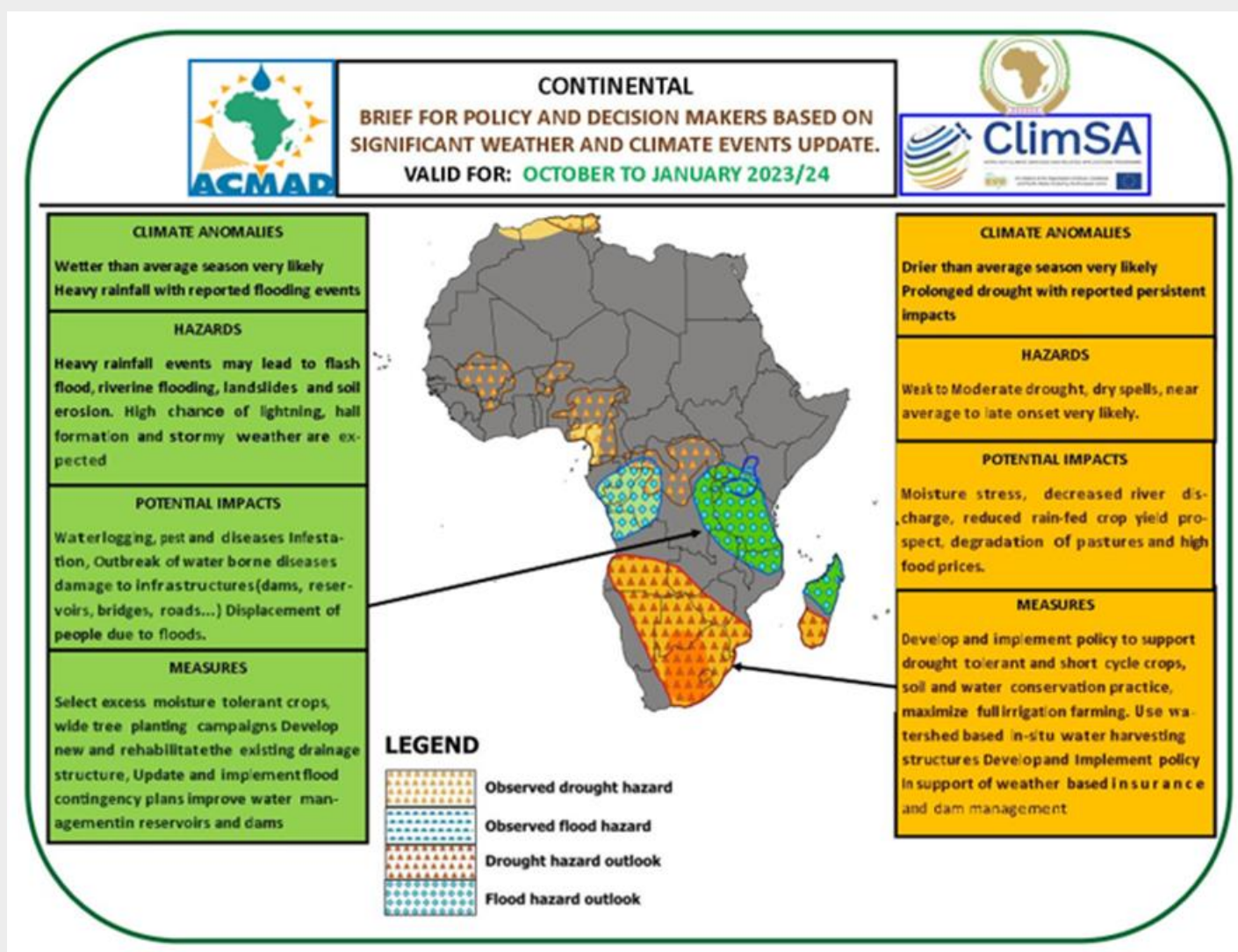


Climate Services for Disaster Risk Reduction in Africa

DROUGHT SERVICE AND SEASONAL CLIMATE FORECAST.

ISSUED: 20 October 2023

Selected Significant Weather and Climate events 'updates: Valid for
October 2023 to January 2024



DROUGHT SERVICE AND SEASONAL CLIMATE FORECAST

BULLETIN No.9, 2023

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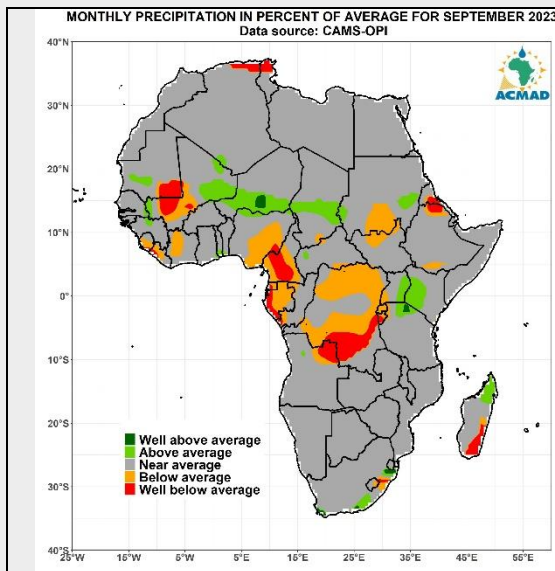
HIGHLIGHTS

Performance of the past season and impacts.

- ✚ In Libya, 5,300 Lives were Lost in the Derna Floods and many more people following the landfall of Storm Daniel on 10 September (Floodlist, 20 Sept 2023).
- ✚ In Algeria, 8 people have died following a flash flood that swept through an area in the northwestern of the country (Floodlist, 4 Sept 2023).
- ✚ Research indicates that climate change made a storm of this magnitude up to 50 times more likely and contributed to a 50% increase in rainfall (RICHARD, 20 SEPT 2023).
- ✚ In South Africa, Consecutive days of heavy rain have caused widespread flooding in the Western Cape Province of the country, hundreds of people have evacuated from flooded homes and many roads have been closed (Floodlist 26 SEPTEMBER 2023).
- ✚ In Cameroon, 30 people died following heavy rain in the city of Yaoundé triggered floods and Mudslides in Mbankolo 30 Dead After Floods and Mudslides in Mbankolo District (Floodlist 10 OCT 2023).
- ✚ In Algeria, at least 34 people have died following several wildfires reported across the northeastern region of Algeria (IFRC,7 August 2023).

OUTLOOK SEPTEMBER-OCTOBER-NOVEMBRE AND NOVEMBER-DECEMBER, JANUARY 2024 SEASONS

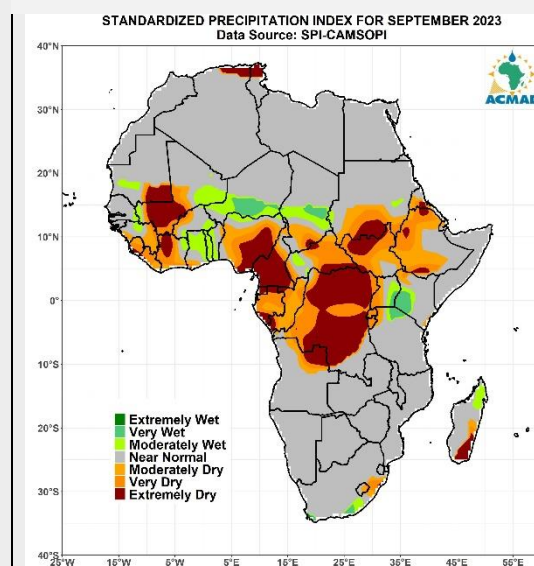
- ✚ The Equatorial Sea surface temperatures (SSTs) have been above average conditions across most of the Pacific Ocean from July to September 2023. During the October 2023 to January 2024 period, ENSO is favoured in moderate El Nino phase.
- ✚ Above average SSTs were observed over the Tropical North Atlantic (TNA) during January to September 2023. Most model outputs and expert judgments favour persistence of above average conditions during the evolution of the seasons (October 2023 to January 2024).
- ✚ Above average SSTs characterized the North Atlantic Tropical (NAT) during April to September 2023. During the coming months, October 2023 to January 2024 above average SSTs is expected to persist.
- ✚ Near to above average SSTs characterized the South Atlantic Tropical (SAT) from February to September 2023. These conditions are expected to remain near normal during the coming seasons.
- ✚ The SSTs over the Tropical South Atlantic (TSA) have been near average during January to September 2023. Model outputs and our expert judgment favour persistence of these conditions during the coming seasons (OND 2023 and NDJ 2023-24).
- ✚ Sea Surface Temperatures in the Western Tropical Indian Ocean (WTIO) and South-Eastern Tropical Indian Ocean (SETIO) have been near average during February to September 2023. Model outputs and our expert assessments are in favour near to above average condition for the coming four months.

I. REVIEW OF DROUGHT INDICATORS: Precipitation, SPI, Soil Moisture, NDVI and Water Level**1.1 PRECIPITATION IN PERCENT OF AVERAGE**

Above to well above average precipitation was observed over southwest and east Mali, central Tchad, the Western part of Kenya and the eastern part of Uganda, and North Mali

Below to well below average precipitation was observed over north Algeria, Tunisia, Sierra Leone, Liberia, most parts of south Mali, most of west Cote d'Ivoire, east Nigeria, most of Cameroon, Gabon, most of DRC, parts of South Sudan and southeast Madagascar.

Figure 2: Precipitation in per cent of the average for September 2023 (Data source: https://iridl.ldeo.columbia.edu/SOURCES/.NOAA/.NCEP/.CPC/.CAMS_OPI/.v0208/.mean/.prcp)

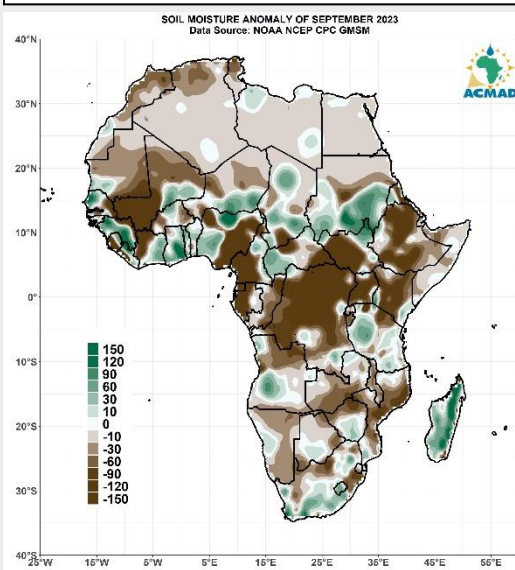
1.2. STANDARDIZED PRECIPITATION INDEX (SPI)

During September 2023, the SPI index shows a dry to extremely dry situation over north Algeria, Tunisia, Guinea, Sierra Leone, Liberia, Cote d'Ivoire, south Mali, westmost Burkina Faso, Nigeria, Cameroon, Eq Guinea, Gabon, south Tchad, Central Africa Republic, south Sudan, whole South Sudan, western Uganda, DRC, Congo Rep, Burundi, Rwanda, northernmost Angola, southwestern Madagascar.

Wet to extremely wet conditions were recorded over part of eastern Mali, Ghana, Togo, west Benin, part of central Africa Republic, est Uganda, west Kenya and northern Madagascar.

Figure 3: Standardized precipitation index for September 2023. Green corresponds to wet, grey to near-normal SPI conditions, and orange, brown and dark brown indicate very dry to extremely dry conditions. http://iridl.ldeo.columbia.edu/SOURCES/.NOAA/.NCEP/.CPC/.CAMS_OPI/.v0208/.mean/.prcp/

1.3. SOIL MOISTURE ANOMALY

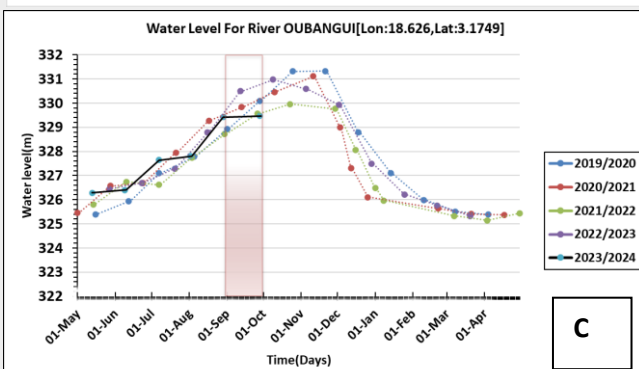
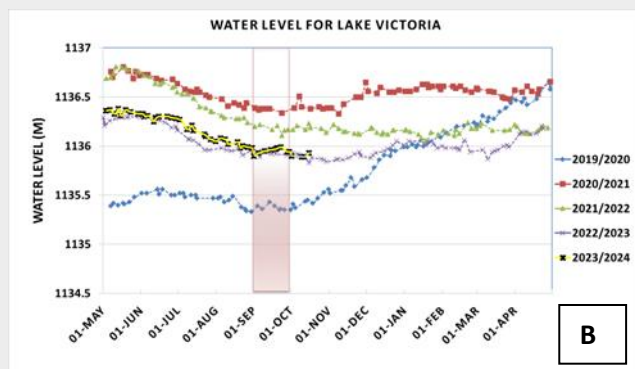
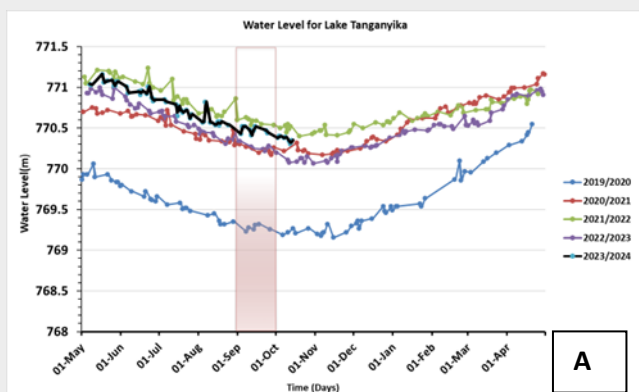


Strong to moderate moisture deficit was located over Morocco, Tunisia, north Algeria, Mali, east Nigeria, south Cameroon, Equ. Guinea, Gabon, Congo Republic, much of Angola and Namibia, DRC, South Sudan, Uganda, Burundi, Kenya, Ethiopia and Somalia, much of Mozambique, north Zimbabwe, and much of Zambia and northern part of South Africa.

Over most of these areas, below average precipitation has been recorded between July and September. This resulted in large moisture deficits and below average vegetation conditions.

Figure 4: Soil moisture anomaly for September 2023. Green corresponds to positive anomalies, white to near-average soil moisture conditions, and brown and dark brown denotes negative anomalies. Data source: <http://www.esrl.noaa.gov/psd/data/gridded/data.cpcsoil.html>

1.5. WATER LEVEL



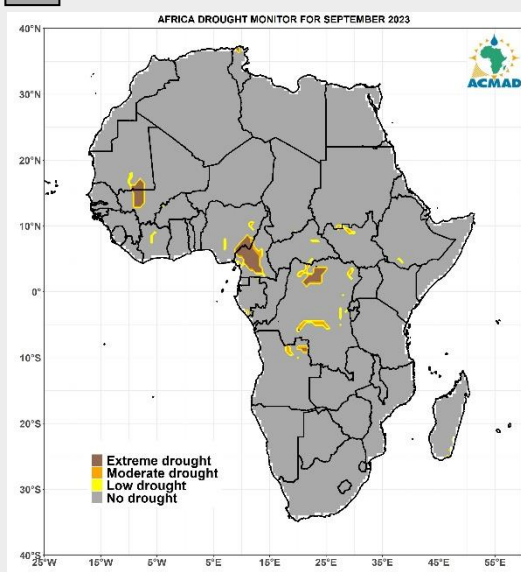
A decrease in water levels is observed in the Tanganyika and Victoria Lakes. This is the result of a cumulative rainfall deficit recorded over the last few months in some parts of Eastern Africa. It is also due to the start of the dry seasons in these parts of the region. An increase in the rainfall situation observed in some parts of DRC has contributed to an increase in water levels in River OUBANHUI.

Figure 5: Daily water levels of Lake Tanganyika[A], Lake Victoria[B] and River OUBANHUI[C]. Data Source: https://doi.org/10.24400/329360/HYDROWEB_WATER_+%EVELE

II DROUGHT MONITORING

Africa Drought Monitor Intensity:

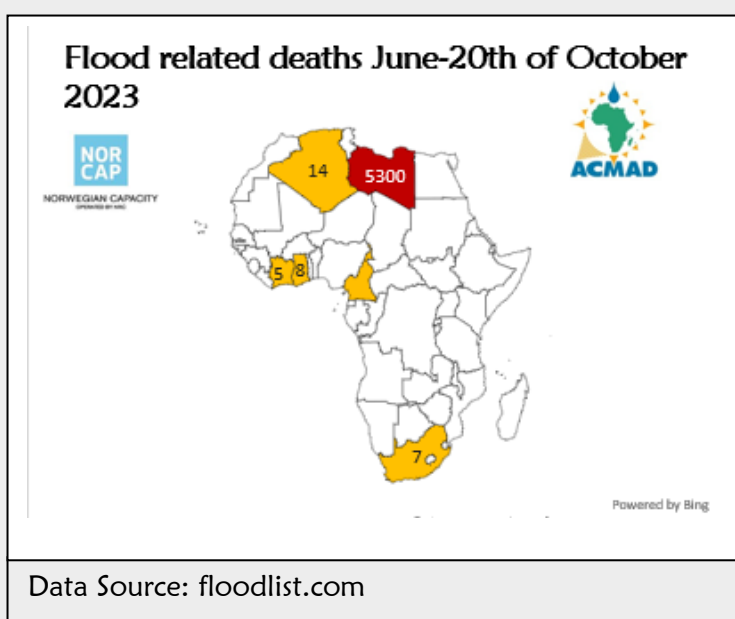
-  RR < [50] % or RR [50; 75] % ; SPI[-3;-2] or SPI<[-3], SM<[-60] & NDVI<[-0.20] **Severe drought**
-  RR [50; 75] %; SPI [-2; -1]; SM [-60; -10]mm & NDVI [-0.20; -0.1] **Moderate intensity drought**
-  RR [75; 100] %; SPI [-1; -0.5]; SM [-30; -10]mm & NDVI [-0.1; 0.05] **Low intensity drought**
-  **No drought signals.**



Considering the cumulative precipitation deficits during the past months of June and July, SPI and soil moisture deficits, the adjacent map characterizes the drought situation in Africa during September 2023.

Figure 6: African Drought Monitor, expressed as a composite of Precipitation, SPI, Soil Moisture deficit, and water level, valid for September 2023.

III. RECORDED IMPACTS



No floods' related deaths were recorded in the months of July and August. However, in the previous month and as of 20 Oct. 23, it has been reported that at least 5364 people lost their lives mainly due to Storm Daniel that hit Libya causing at least 5300 people, 14 deaths have been recorded in Algeria, 8 in Ghana, 5 in Ivory Coast, 30 in Cameroon and 7 in South Africa (see adjacent map)

IV. CLIMATE AND HAZARDS OUTLOOK

Given these SST anomalies, sub-surface temperature patterns and trends, knowledge and understanding of seasonal climate variability in Africa, and the available long-range forecast products from Global Producing Centers for Long Range Forecasts, the following outlooks for precipitation and temperature are provided for October-November-December (OND) and November-December-January (NDJ) 2023-24 seasons across Africa (see the figures: Fig7, Fig8, Fig9, and Fig10):

During the October-November-December-January 2023-24 period:

- ✓ The outlook for the rainfall season during October 2023 to January 2024 period is that very below average to below average and normal to below average rainfall is expected over northern Africa, south-eastern Nigeria, western Cameroon, most of the SADC Countries and southern Madagascar.
- ✓ From October 2023 to January 2024, normal to above rainfalls are very likely over southern Gabon, much of Congo, western DRC and northern Angola.
- ✓ Over eastern DRC, southern Uganda, much of Rwanda, Burundi, Tanzania and northern Madagascar above normal precipitation is expected from October 2023 to January 2024.
- ✓ Near to above and above average temperature is very likely over Morocco, Algeria, Tunisia, Libya, Egypt, Sudan, Chad, Niger, Mali and much of Mauritania, Angola, Zambia, Namibia, Botswana, southern of South Africa, Mozambique and Madagascar

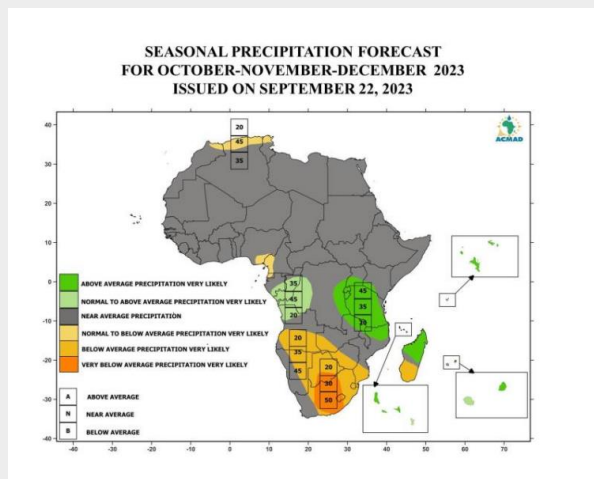


Figure 7: Seasonal precipitation forecast for October-November-December 2023.

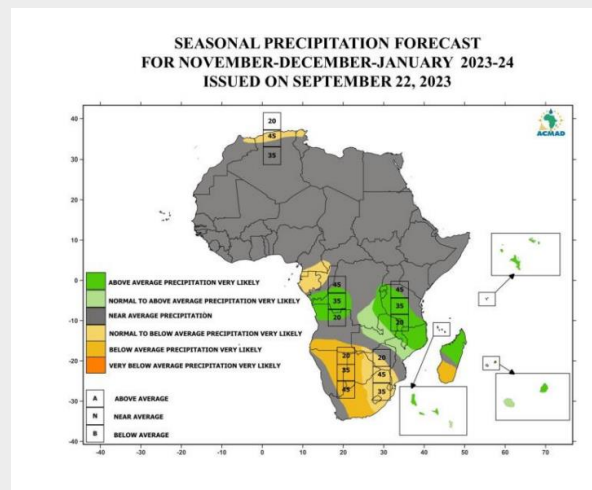


Figure 8: Seasonal precipitation forecast for November-December 2023-January 2024.

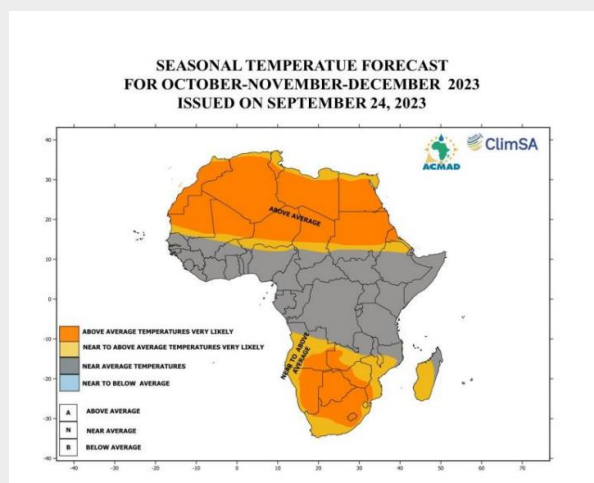


Figure 9: Seasonal Temperature Forecast for October-November-December 2023.

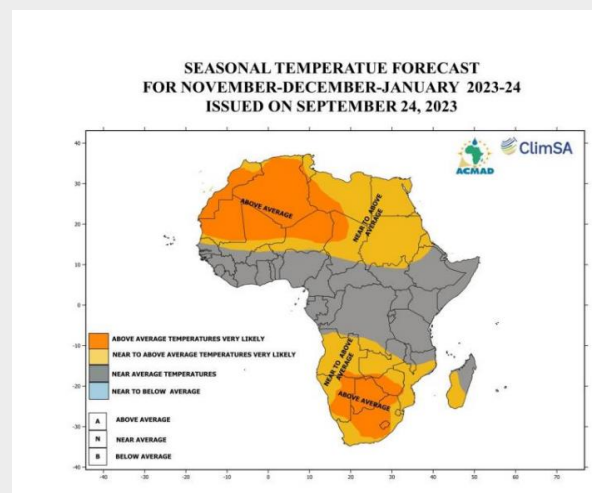


Figure 10: Seasonal Temperature Forecast for November-December 2023-January 2024.

NB: Users are advised to seek more detailed climate information on the distribution of precipitation during the season, impacts, and action options from the National Meteorological and Hydrological Services and the ACMAD website (www.acmad.net/www.acmad.org)

V. POTENTIAL IMPACTS EXPECTED AND RESPONSE MEASURES

The following impacts are expected during the coming seasons:

5.1 Agriculture and Food Security Sector

The outlooks for the rainfall season during the October 2023 to January 2024 period is that very below average to below average and normal to below average rainfall is expected over northern Africa, south-eastern Nigeria, western Cameroon, most of the SADC Countries and southern Madagascar.

From October 2023 to January 2024, normal to above rainfalls are very likely over southern Gabon, much of Congo, western DRC and northern Angola.

Above average, rainfall conditions are expected to lead to further excessive rainfall leading to heavy precipitation leading to flash floods and landslides soil erosion events, which will affect livestock products, impact on crop yield and cause erosion, waterlogging, leaching of animal wastes etc. It is therefore important to prepare for emergency assistance. Select excess moisture-tolerant crops, rehabilitate existing drainage structures; and update and implement flood contingency plans. A rainfall deficit will lead to drought. Water supply and demand management; estimate the number of current water supplies; develop ways to reduce water use and identify potential supplemental water supplies are the recommended measures to respond to drought.

5.2 Health Sector

Over eastern DRC, southern Uganda, much of Rwanda, Burundi, Tanzania and northern Madagascar above normal precipitation is expected from October 2023 to January 2024.

Near to above and above average temperature is very likely over Morocco, Algeria, Tunisia, Libya, Egypt, Sudan, Chad, Niger, Mali and much of Mauritania, Angola, Zambia, Namibia, Botswana, southern of South Africa, Mozambique and Madagascar.

The risk of vector and water-borne diseases is particularly high, especially for cholera and malaria outbreaks, and flooding will exacerbate poor water and sanitation

conditions. It is therefore advised that hygiene and sanitation be enforced, monitor malaria and cholera cases and preposition drug stocks. Take precautions for heat stress where the expected temperature is above normal.

5.3 Disaster Management Sector

The expected near-to-above-average precipitation with moderate to heavy precipitation is usually associated with floods. These conditions are favourable to massive displacement of people and continued destruction of infrastructure, property and livelihoods. It is thus advisable to update and implement flood contingency plans.

5.4 Water Resources Management and the Energy Sectors

The regions expecting significant precipitation deficits will experience impacts on water resources, including low water levels in reservoirs, dams and rivers, water shortages for domestic use, disruption in hydropower generation, crop failure and reduced livestock productivity as well as reduced income from agricultural labour and livestock exports.

It is advisable to sensitize and prepare the populations and businesses for power brownouts and water restrictions. Develop water conservation practices and implement policies in support of weather-based insurance and dam management. Alternative sources of energy should be considered.

VI. Drought Service and Seasonal Climate Forecast methodology

DROUGHT INDICATORS

a) Precipitation ftp://ftp.cpc.ncep.noaa.gov/precip/data-req/cams_opi_v0208/–

Provides information on Meteorological Drought.

b) Soil Moisture <http://www.esrl.noaa.gov/psd/data/gridded/data.cpcsoil.htm> land

c) Vegetation Index Anomaly (NDVI) USGS Land DAAC MODIS 250m –both

b) and c) provide information on Agricultural Drought.

d) Water level e.g. Lake Victoria provides information on the drought situation in the region.

The Africa Drought Monitor focuses on continental, broad-scale conditions by creating composites of a) to c) with four drought indicator categories (see page 6).

SEASONAL CLIMATE FORECAST

The **Seasonal Climate Forecast** by ACMAD is generated using a probabilistic approach based upon the assessment of outputs from global single and multi-model ensemble forecasting systems, statistical seasonal forecasting tools, analogue years, persistence, composites, patterns and trend analysis as well as available findings from climate studies at local, national, regional and global levels and expert knowledge. Eight (8) steps are integrated into the final forecast (step 9) as listed here (Refer to the ACMAD's Technical Note).