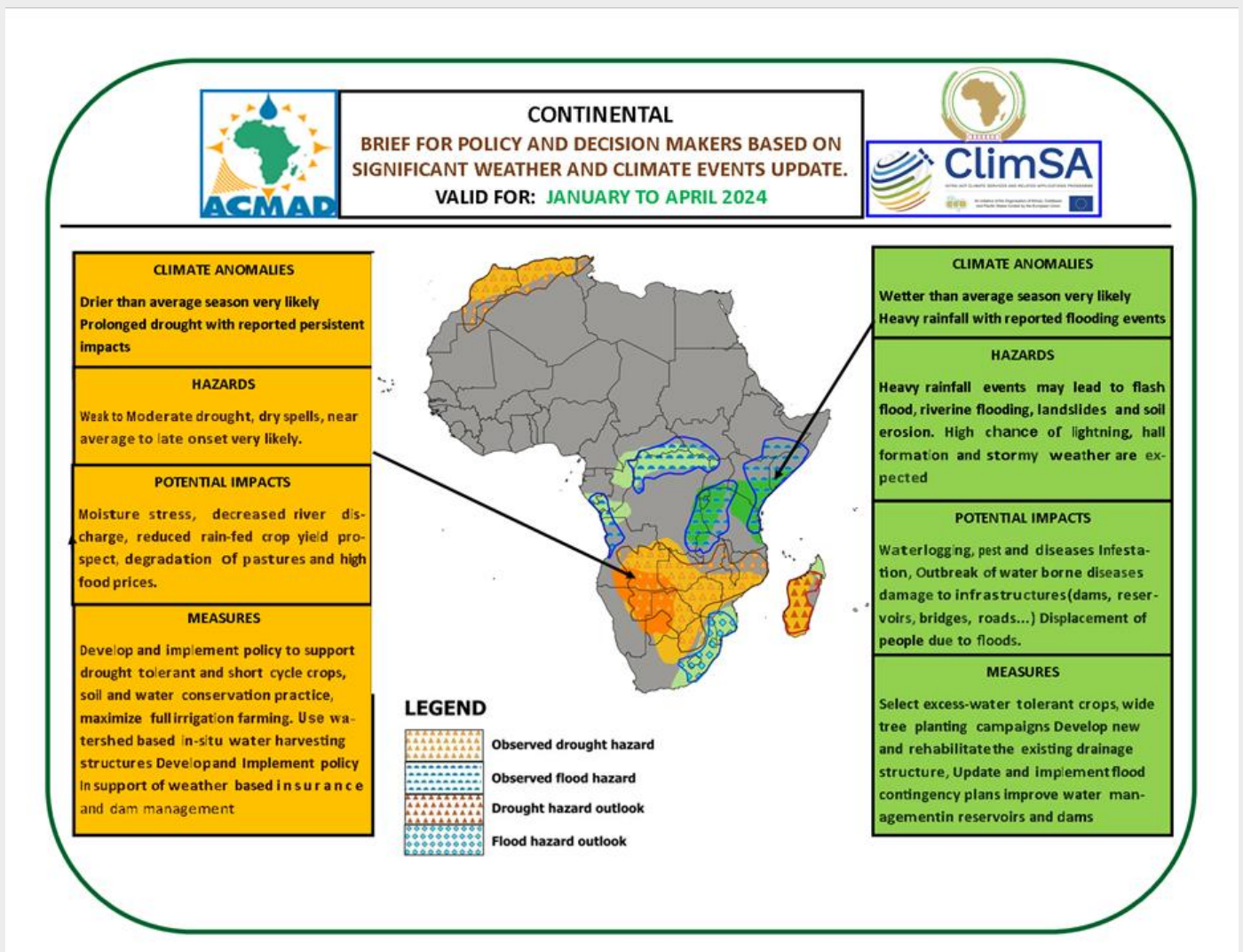


Climate Services for Disaster Risk Reduction in Africa

DROUGHT SERVICE AND SEASONAL CLIMATE FORECAST.

ISSUED: 25 January 2024

Selected Significant Weather and Climate events 'updates: Valid for
December 2023 to March 2024



DROUGHT SERVICE AND SEASONAL CLIMATE FORECAST

BULLETIN No.10, 2023

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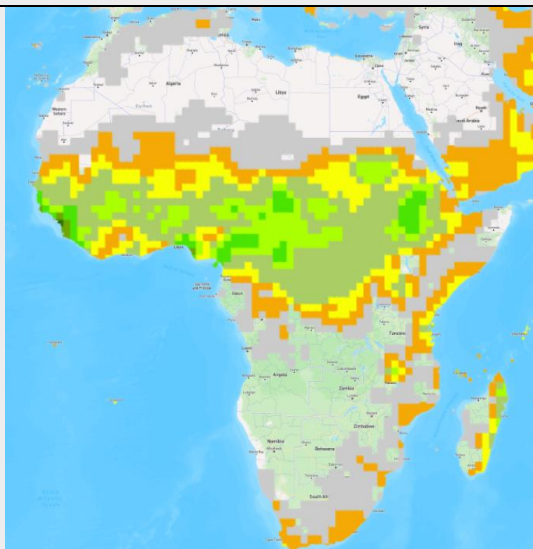
HIGHLIGHTS

Performance of the past season and impacts.

- ✚ In Tanzania, at least 40 people have died after floods and landslides in Hanang district ([Floodlist, 4 December 2023](#)).
- ✚ In Kenya, heavy rainfall has caused widespread damage: 46 people have died and 58,000 people have been affected ([Floodlist, 14 November 2023](#)).
- ✚ In Somalia, at least 14 people have died following heavy rain from October to early November and more than 706,100 ([Floodlist, 6 November 2023](#)).
- ✚ In Malawi, heavy rainfall experienced from late October to early November has caused severe flooding in the Nsanje District where the Thangadzi and Milole rivers broke their banks ([floodlist, 6 November 2023](#)).
- ✚ In Cameroon, 30 people have died following severe floods triggered by days of heavy rain in the city of Yaoundé ([floodlist, 10 October 2023](#)).

OUTLOOK NOVEMBER-DECEMBER-JANUARY AND DECEMBER-JANUARY-FEBRUARY 2024 SEASONS

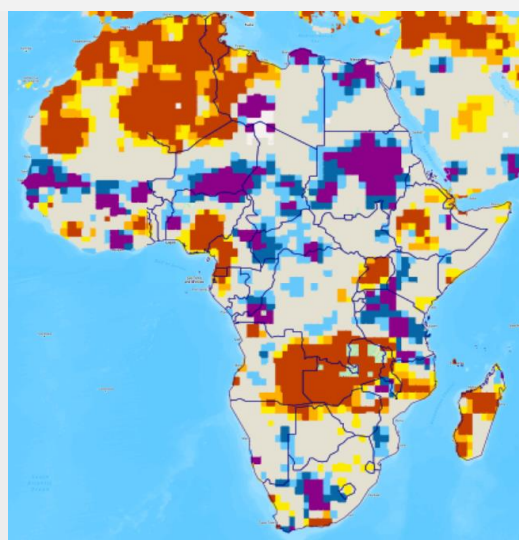
- ✚ The Equatorial Sea surface temperatures (SSTs) have been above average conditions across most of the Pacific Ocean from August to October 2023. During the November 2023 to February 2024 period, ENSO is favoured to persist in the moderate El Nino phase.
- ✚ Above average SSTs were observed over the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

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

During December 2023, above to well above average precipitation was observed over Senegal, Gambia, Guinea-Bissau, north Guinea, East Cote d'Ivoire to west Ghana, north Togo, Benin, western Nigeria, south-west Central Africa Republic, and northeast Congo Republic, Northeast DRC, southernmost Sudan, eastern South Sudan, East Uganda, Ethiopia, Kenya, much of Somalia, central to South Mozambique, Easternmost South Africa.

Below to well below average precipitation was observed over north Algeria, Tunisia, Sierra Leone, Liberia, most parts of south Mali, east Nigeria, most of Cameroon, Equatorial Guinea, most of East DRC, Angola and the southern part of Botswana a central part of South Africa and Northern Madagascar.

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

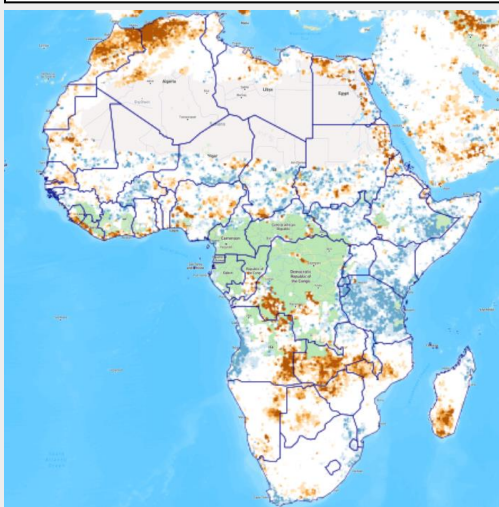
1.2. STANDARDIZED PRECIPITATION INDEX (SPI)

During December 2023, the SPI index shows a dry to extremely dry situation over north Algeria, Tunisia, Guinea, Sierra Leone, Liberia, west Cote d'Ivoire, south Mali, much of Nigeria, Cameroon, Eq Guinea, much of Gabon, south Tchad, south South-Sudan, westernmost Uganda, Rwanda, Burundi, much of DRC, Congo Rep, Burundi, Rwanda, Angola, western Tanzania, northernmost Madagascar.

Wet to extremely wet conditions were recorded over much of Senegal, Gambia, northwest Guinea, easternmost Cote D'Ivoire, Ghana, Togo, Benin, part of the South-Central Africa Republic, east Uganda, Kenya, Ethiopia, Somalia, Much of Mozambique, westernmost South Africa and northern Madagascar.

Figure 3: Standardized precipitation index for December 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

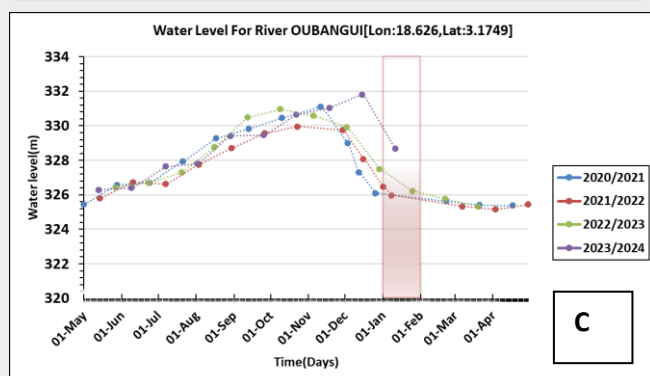
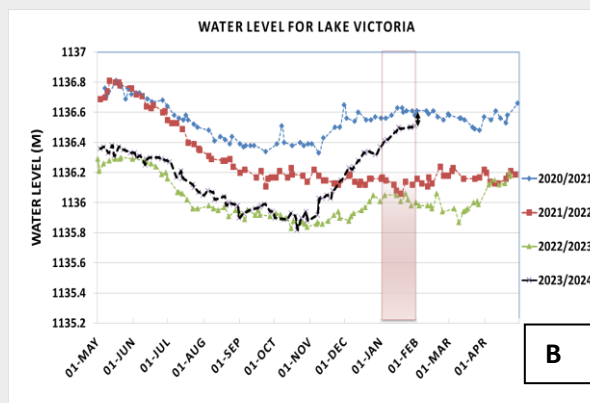
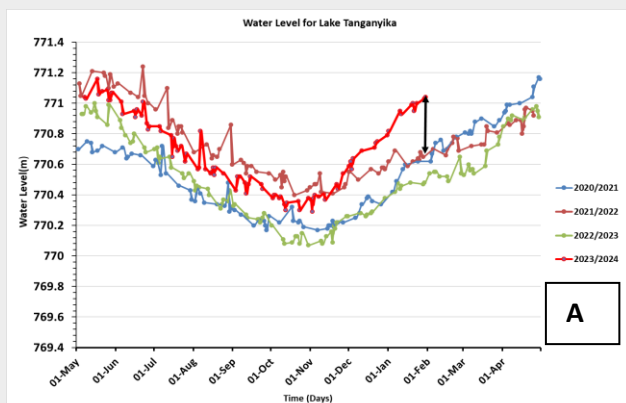


Strong to moderate moisture deficit was located over Morocco, Tunisia, north Algeria, Mali, east Nigeria, south Cameroon, Eq. Guinea, Gabon, Congo Republic, much of Angola and Namibia, DRC, South Sudan, Uganda, Burundi, Kenya, Ethiopia and Somalia, much of Mozambique, north Zimbabwe, and much of Zambia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

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

Figure 4: Soil moisture anomaly for December 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



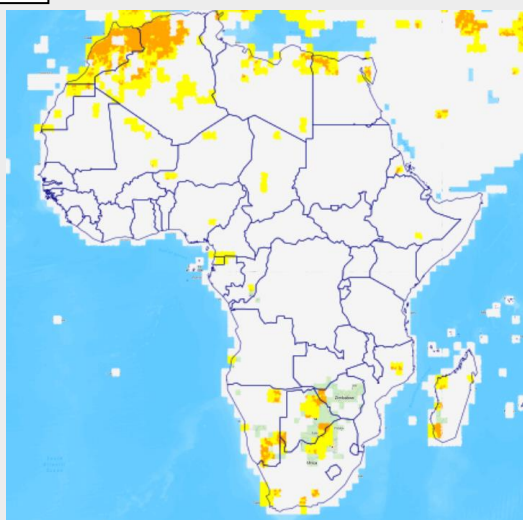
A decreasing trend in water levels observed in past months tends to take a positive direction in the Tanganyika and Victoria Lakes due to the start of the rainy season. A pick-up in water level is expected in the coming months. An increase in the rainfall situation observed in some parts of DRC has contributed 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_LEVEL.

II DROUGHT MONITORING

Africa Drought Monitor Intensity:

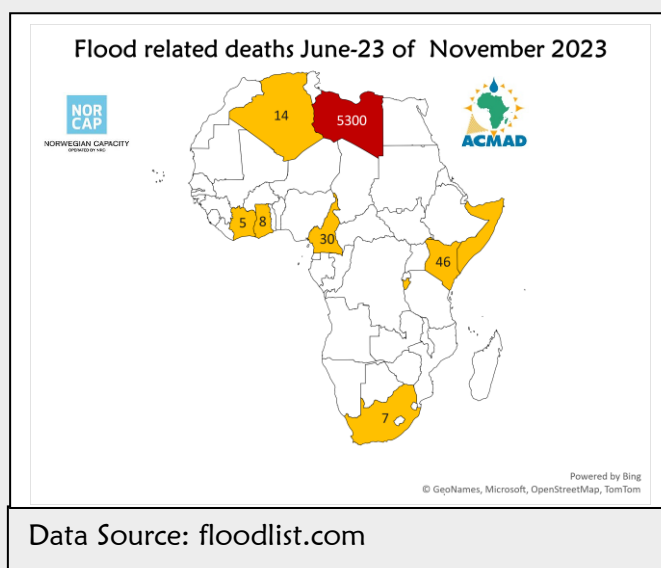
-  RR < [50] % or RR [50; 75] % ; SPI[-3;-2] or SPI<[-3], SM<[-60] & NDVI<[-0.20] **Severe drought**
-  RR [50; 75] %; SPI [-2; -1]; SM [-60; -10]mm & NDVI [-0.20; -0.1] **Moderate intensity drought**
-  RR [75; 100] %; SPI [-1; -0.5]; SM [-30; -10]mm & NDVI [-0.1; 0.05] **Low intensity drought**
-  **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 3rd dekad in December 2023.

Figure 6: African Drought Monitor, expressed as a composite of Precipitation, SPI, Soil Moisture deficit, and water level, valid for 3rd dekad December 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 23 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 and Somalia, 8 in Ghana, 5 in Ivory Coast, 30 in Cameroon and 7 in South Africa, 4 in Burundi and 46 in Kenya (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 November-December-January (NDJ) and December-January-February (DJF) forecast products from Global Producing Centers for Long Range Forecasts, the following outlooks for precipitation and temperature are provided for November-December-January (NDJ) and December-January-February (DJF) 2023-24 seasons across Africa (see the figures: Fig7, Fig8, Fig9, and Fig10):

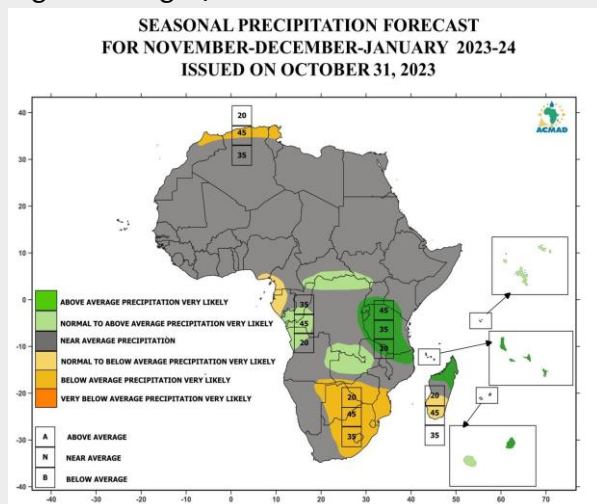


Figure 7: Seasonal precipitation forecast for November-December-January 2023/2024.

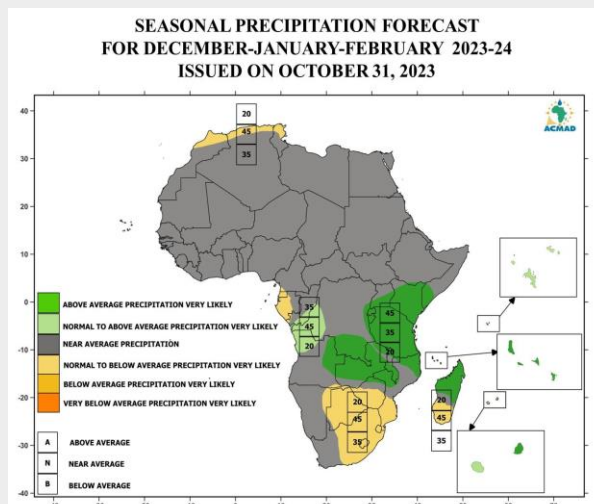


Figure 8: Seasonal precipitation forecast for December-January -February 2023/2024.

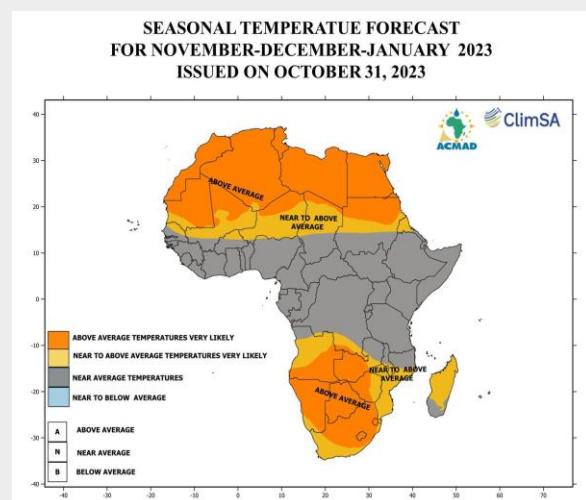


Figure 9: Seasonal Temperature Forecast for November-December-January 2023/2024.

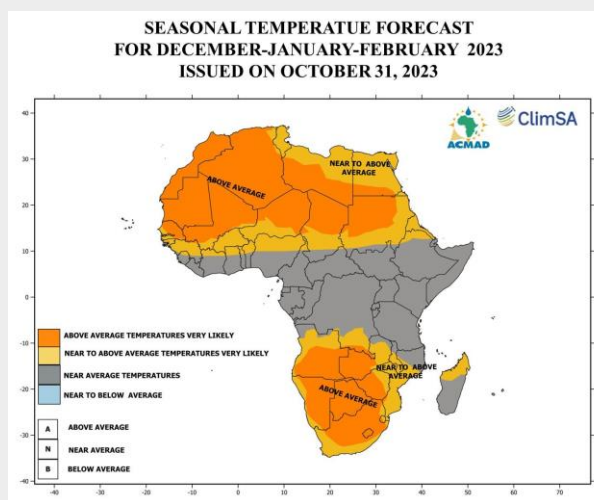


Figure 10: Seasonal Temperature Forecast for December-January-February 2023/2024.

During the November-December-January-February 2023/24 period:

- The outlook for the rainfall season during the November 2023 to February 2024 period is that 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.
- The seasons of November 2023 to February 2024, normal to above rainfalls are very likely over southern Gabon, southern Congo, northern, south-eastern and south-western DRC and north-western Angola.
- Over the easternmost of DRC, southern Uganda, much of Rwanda, Burundi, Tanzania, northern Mozambique and Madagascar above normal precipitation is expected from November 2023 to February 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 during the season of November 2023 to February 2024.

V. POTENTIAL IMPACTS EXPECTED AND RESPONSE MEASURES

The following impacts are expected during the coming seasons:

5.1 Agriculture and Food Security Sector

The outlook for the rainfall season during the November 2023 to February 2024 period is that 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 November 2023 to February 2024, normal to above rainfalls are very likely over southern Gabon, southern Congo, northern, south-eastern and south-western DRC and north-western 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 southern Gabon, southern Congo, northern, south-eastern and south-western DRC and north-western Angola normal to above normal precipitation is expected from November 2023 to February 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 during the season of November 2023 to February 2024.

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.

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)

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).

For more products and info on the drought, please visit the Africa Drought Monitoring and Advisory services at <https://bit.ly/3GbSaOf>. Note that the system is an ongoing improvement.