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AFRICAN CENTRE OF METEOROLOGICAL APPLICATIONS FOR DEVELOPMENT

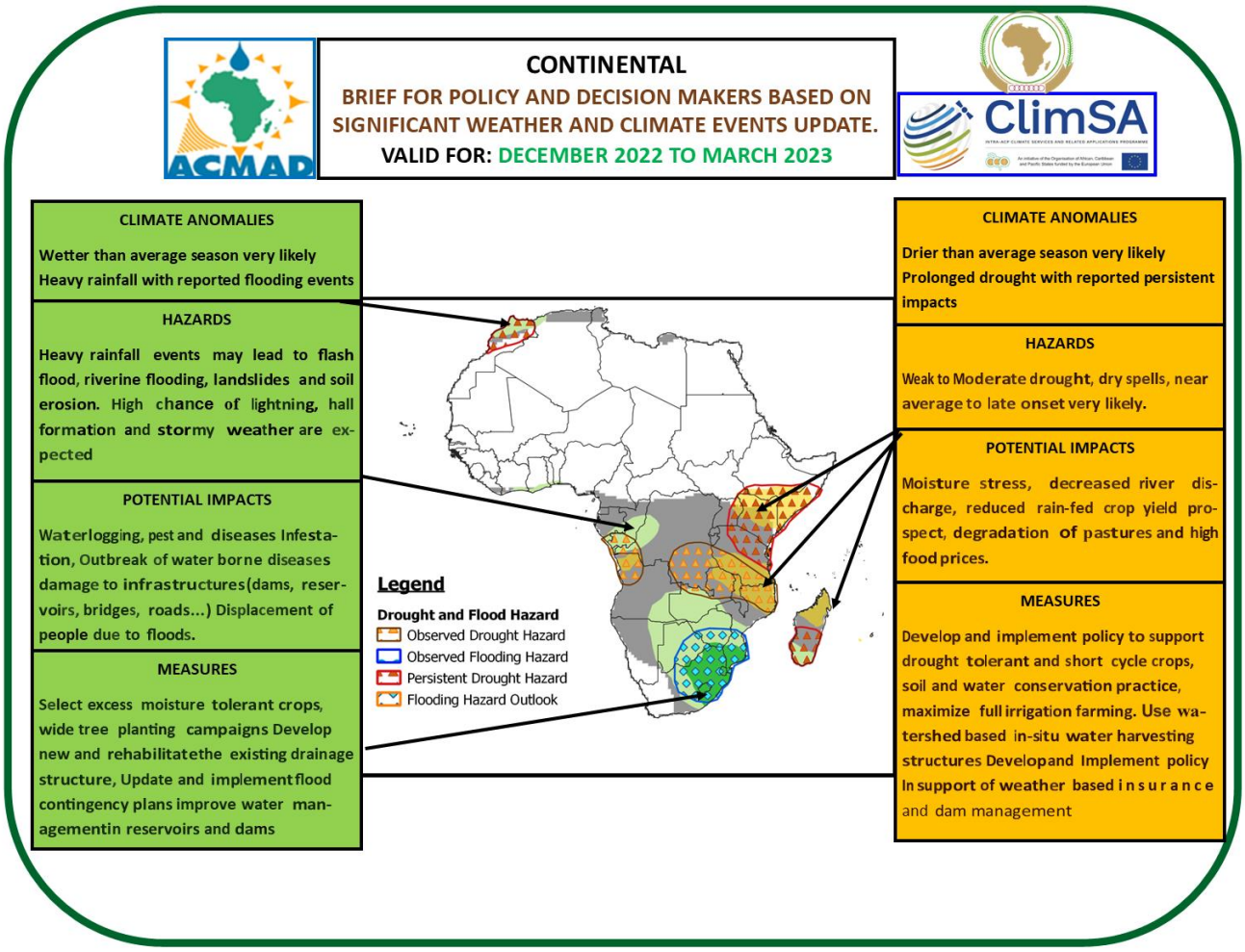
Institution Africaine parrainée par la CEA et l'OMM • African Institution under the aegis of UNECA and WMO

Climate Services for Disaster Risks Reduction in Africa

DROUGHT SERVICE AND SEASONAL CLIMATE FORECAST

ISSUED: 16 November 2022

Selected Significant Weather and Climate events 'updates: Valid for December 2022 to March 2023.



DROUGHT SERVICE AND SEASONAL CLIMATE FORECAST

BULLETIN No.12, 2022

Contents

HIGHLIGHTS

Performance of the past season and impacts

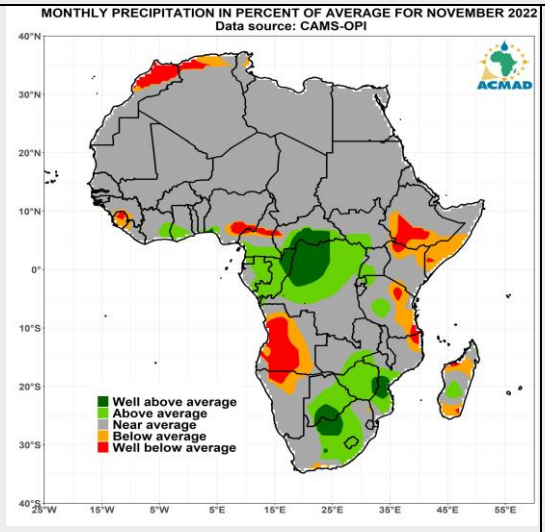
- In Cameroon at least 20 people have died and 10 people were injured following a deadly landslide caused by heavy rain (floodlist, 29 November 2022).
- In DRC, as many as 36 people have lost their lives in a landslide and floods following heavy rainfall (floodlist, 23 November 2022).
- In Rwanda, local media reported that 3 people lost their lives after heavy rain that triggered floods in the capital of Kigali (floodlist, 3 October 2022).
- In Ethiopia, more than 180,000 people were displaced in Gambella Region following floods triggered by heavy rainfall (floodlist, 4 November 2022).
- According to the United Nations Children's Fund, at least 27.7 million children in 27 countries worldwide have been affected by floods (floodlist, 9 November 2022).
- At least 36.4 million people in the Horn of Africa will be affected by the most prolonged and severe drought in the last months of 2022, this includes 24.1 million in Ethiopia, 7.8 million in Somalia and 4.5 million in Kenya(OCHA, 29 November 2022)

OUTLOOK NOVEMBER-DECEMBER 2022-JANUARY 2023 AND DECEMBER 2022- JANUARY FEBRUARY 2023 SEASONS

- Below average Sea Surface Temperatures (SSTs) were observed over most of the Equatorial Pacific (ENSO region) since May to November 2022, the negative anomalies persisted over the Equatorial Pacific region; the models' outputs and experts' judgments are in favor for the persistence of the weak La Nina is very likely during December 2022 to March 2023.
- Near-average SSTs were observed over the Tropical North Atlantic (TNA) during November 2022. Most models' outputs and expert judgment are favorable for persistence of neutral conditions during the December 2022 to March season.
- Near average Sea Surface Temperatures characterize the North Atlantic Tropical (NAT) since during November 2022. A persistence of this condition is very likely during December 2022 to March 2023 season.
- Near-average Sea Surface Temperatures characterize the South Atlantic Tropical (SAT) during November 2022. There is a high chance that This condition will persist in the coming months.
- The Tropical South Atlantic (TSA) has been near average since August to November 2022. Models' outputs and expert judgment are favorable for a neutral to below average of this pattern during the coming seasons.
- Seas surface temperatures of the Western Tropical Indian Ocean (WTIO) and South-eastern Tropical Indian Ocean (SETIO) have been near to below average. Models' outputs and experts' assessments are favorable support the persistence of these conditions during the coming months.
- The Seas surface temperatures of the Mediterranean Sea have been near average from September to November 2022. Models' outputs and expert judgment are favorable for the persistence of this condition during the coming few months.

I.REVIEW OF DROUGHT INDICATORS: Precipitation, SPI, Soil Moisture, NDVI and Water Level

1.1 PRECIPITATION IN PERCENT OF AVERAGE

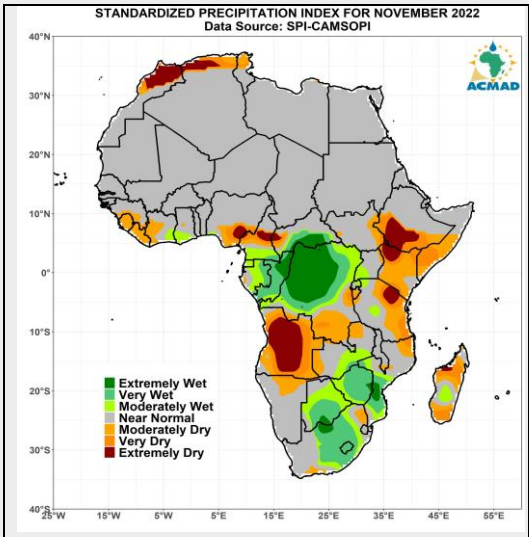


During November 2022, above to well above average precipitation was observed over southeast Ivory Coast, south Ghana, southern Cameroon, West Ghana, Congo republic, much of DRC, Central African Republic, southern South Sudan, Southwest Uganda, Rwanda, much Botswana, Zimbabwe, South Mozambique, Central South Africa, central Madagascar.

Below and well below precipitation was observed over northern Morocco, northernmost Algeria, Sierra Leone, much of Angola, eastern Tanzania, south Ethiopia, Southern Somalia, and southern and northern parts of Madagascar.

Figure 2: Precipitation in per cent of the average *for November 2022 (Data source: https://iridl.ldeo.columbia.edu/SOURCES/.NOAA/.NCEP/.CPC/.CAMS_OPI/.v0208/.mean/.prcp)*

1.2. STANDARDIZED PRECIPITATION INDEX (SPI)



The SPI for November 2022 reveals that very dry to extremely dry conditions were observed over northern Morocco, northernmost Algeria, northern Tunisia, Sierra Leone, Liberia, Western Ghana, South Nigeria, central Cameroon, Angola, Burundi, eastern Tanzania, south Ethiopia, Southern Somalia, and southern and northern parts of Madagascar.

Very wet to extremely wet conditions were recorded over southeast Ivory Coast, south Ghana, southern Cameroon, West Ghana, much of Congo republic, much of DRC, southern Central African Republic, Southwestern Uganda, Rwanda, much Botswana, Zimbabwe, South Mozambique, Central South Africa, central Madagascar.

Figure 3: Standardized precipitation index *for November 2022. 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/

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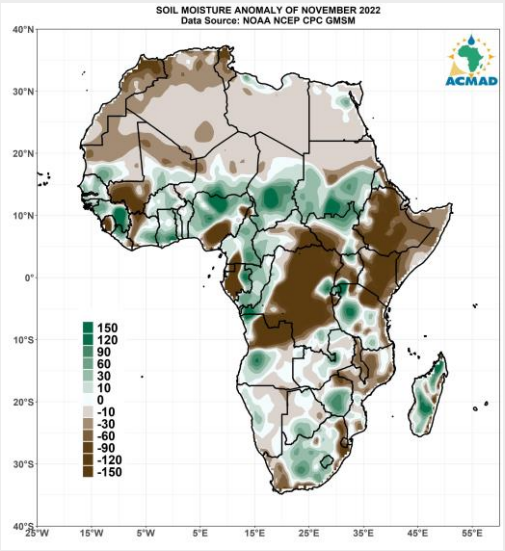
1.3. SOIL MOISTURE ANOMALY

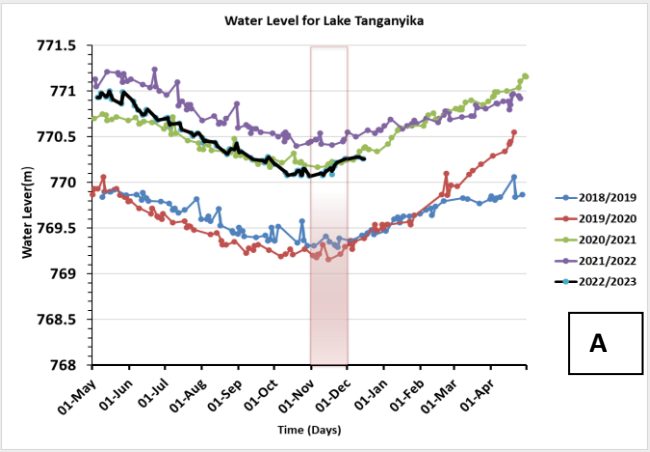


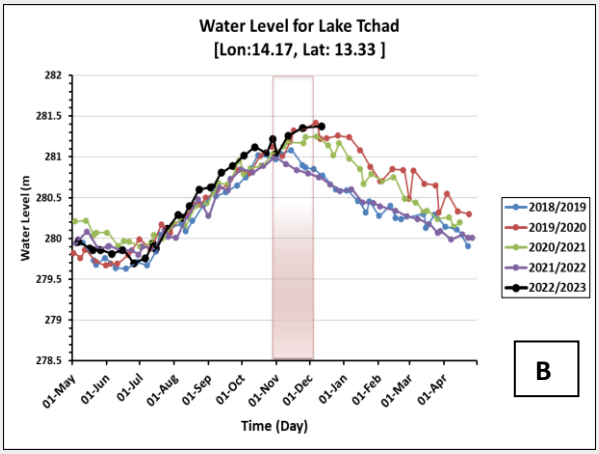
Strong to moderate moisture deficit was located over much of Morocco, north Algeria, Tunisia, Mauritania south and north Mali, Sierra Leone, East Ivory coast, parts of southern Nigeria, Gabon, Much of DRC, East South Sudan, Kenya, Uganda, Ethiopia, Somalia, Zambia, Malawi, Mozambique, North Angola, Botswana and Namibia.

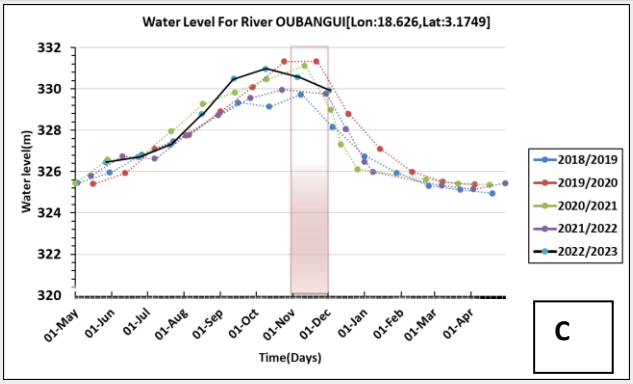
Below average precipitation was recorded over most of these areas during November 2022 which resulted in large moisture deficits and below average vegetation conditions.

Figure 4: Soil moisture anomaly for November 2022. 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 cumulative precipitation deficit was recorded during the past months over some parts of the central DRC, leading to the observed decrease in water levels in the river OUBANGUI and A slight increase in Lake Tchad during November 2022 has been recorded. Also, the rainfall observed in eastern Africa contributed to a slight increase in water levels in Lake Tanganyika.

Figure 5: Daily water levels of Lake Tanganyika[A], Lake Tchad[B] and River OUBANHUI[C]. Data Source: http://hydroweb.theialand.fr/collections/hydroweb

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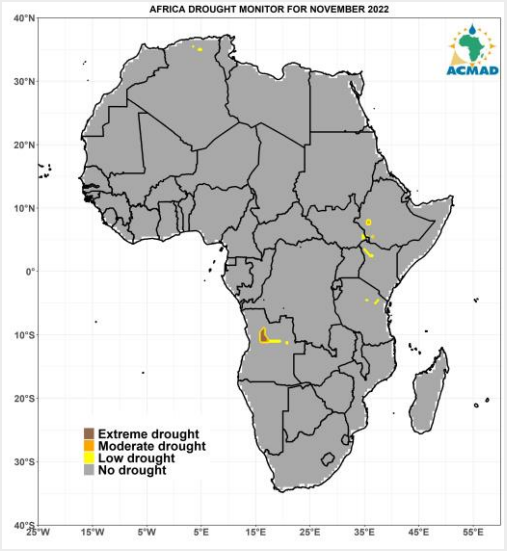
II DROUGHT MONITORING

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 signal

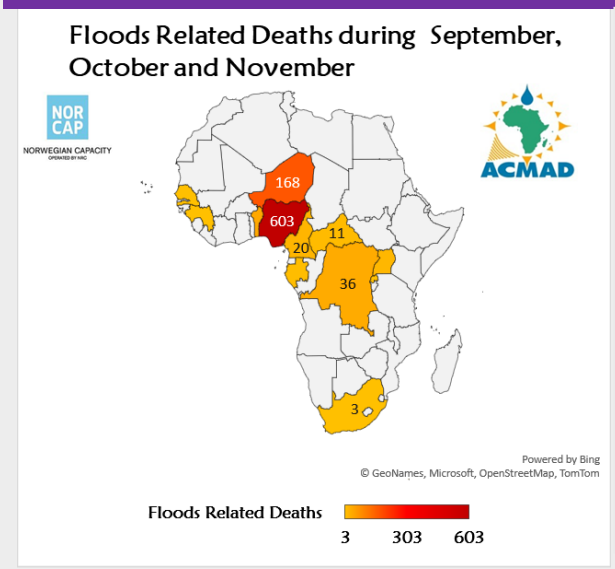


Given the cumulative precipitation deficits during the past and the month of November, SPI and soil moisture deficits, the adjacent map characterizes the drought situation in Africa during November 2022.

According to OCHA, 36.4 million people including 24.1 million in Ethiopia, 7.8 million in Somalia and 4.5 million in Kenya will be affected by the most prolonged and severe drought in the last months of 2022, (OCHA, 29 November 2022)

Figure 6: African Drought Monitor, expressed as a composite of Precipitation, SPI, Soil Moisture deficit, and water level, valid for November 2022.

III. RECORDED IMPACTS



As of November, at least 914 people have been recorded to have lost their lives due to flooding during the months of September , October and November combined. Out of those deaths, Nigeria recorded 603 deaths, the highest deaths recorded in the last three months, 168 deaths were recorded in Niger ,40 deaths recorded in Benin , 17 deaths were recorded in Uganda, 11 deaths recorded over Central Africa Republic, 7 deaths in Gabon, 20 deaths in Cameroon, 3 deaths in Rwanda, Guinea, Senegal and south Africa recorded 3 deaths each.

Data Source: floodlist. com,(October 2022)

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 Centres for Long Range Forecasts, the following outlooks for precipitation and temperature are provided for December-January-February 2022-23(DJF) and January-February-March (JFM) 2023 seasons across Africa (see the figures: Fig7, Fig8, Fig9 and Fig10):

During December 2022 to March 2023 period:

- Normal to below rainfall is expected over north-western Angola, eastern DRC, much of Rwanda, Burundi, Tanzania, southern Uganda, Kenya, northern Zambia, Malawi, Mozambique, Madagascar, Seychelles, Comoros, Mauritius and Reunion Islands from December 2022 to March 2023 season.

- Normal to above normal precipitation is very likely over southern Congo, western DRC, southern Zambia, much of Botswana, central and southern Zimbabwe, southern Mozambique, Africa and southern Madagascar from December 2022 to March 2023.

- From December 2022 to February 2023 above normal precipitation is expected over Eastern parts of South Africa, Lesotho, and Eswatini and southernmost of Mozambique

- Near to above average Temperature is very likely over Egypt, northern Sudan, Chad, Niger and Mali, Mauritania from December 2022 to March 2023.

- From December 2022 to February 2023, near to below average temperatures are very likely over Angola, Zambia, Namibia, Botswana, South Africa, Lesotho and Eswatini

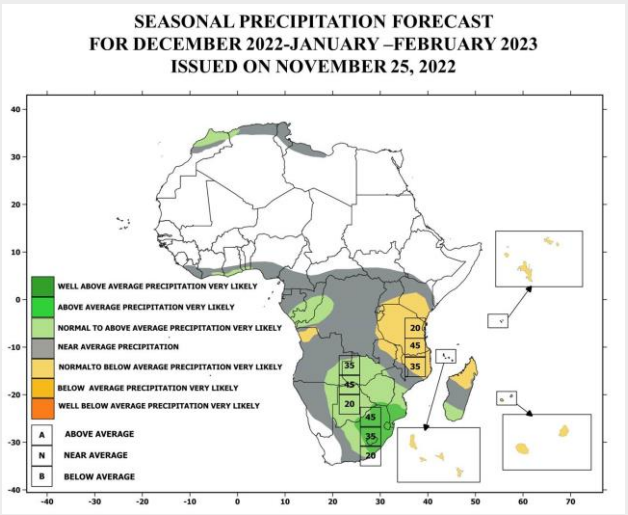


Figure 7: Seasonal precipitation forecast for December 2022-January -February 2023

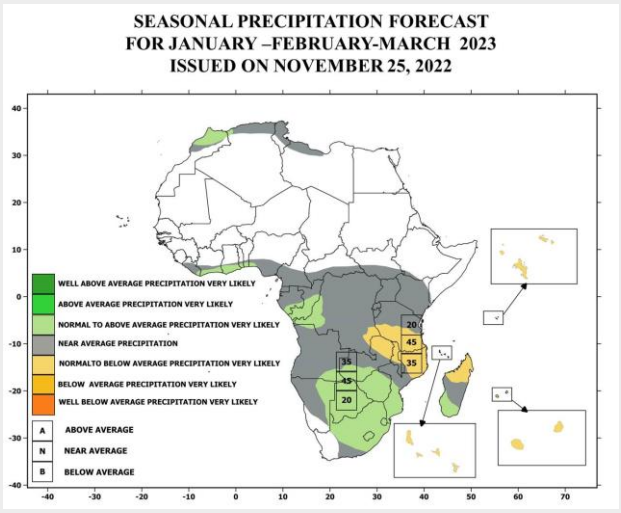


Figure 8: Seasonal precipitation forecast for January -February-March 2023

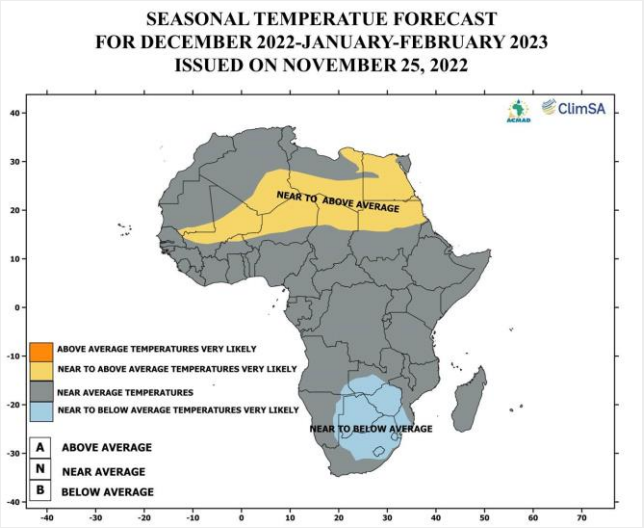


Figure 9: Seasonal Temperature forecast for December 2022-January-February 2023

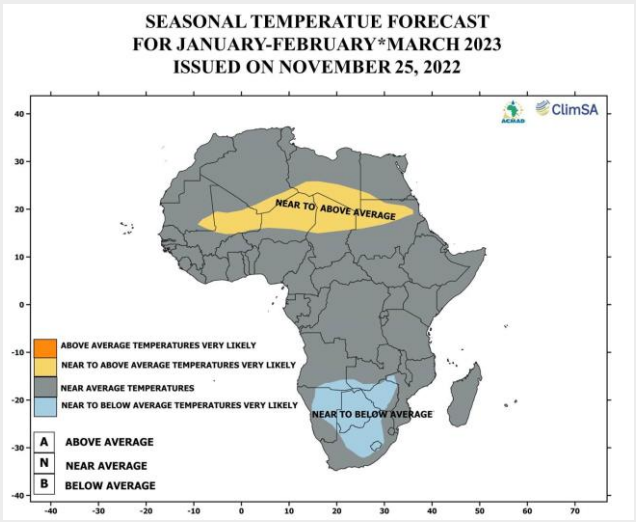


Figure 10: Seasonal Temperature forecast for January -February-March 2023

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

- Normal to below rainfall is expected over north-western Angola, eastern DRC, much of Rwanda, Burundi, Tanzania, southern Uganda, Kenya, northern Zambia, Malawi, Mozambique, Madagascar, Seychelles, Comoros, Mauritius and Reunion Islands during December 2022 to March 2023 season.

- Normal to above normal precipitation is very likely over southern Congo, western DRC, and southern Zambia, much of Botswana, central and southern Zimbabwe, southern Mozambique, Africa and southern Madagascar during December 2022 to March 2023.

- From December 2022 to February 2023 above normal precipitation is expected over Eastern parts of South Africa, Lesotho, and Eswatini and southernmost of Mozambique

- Near to above average Temperature is very likely over Egypt, northern Sudan, Chad, Niger and Mali, and Mauritania during December 2022 to March 2023.

- During December 2022 to February 2023, near to below average temperatures are very likely over Angola, Zambia, Namibia, Botswana, South Africa, Lesotho and Eswatini.

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

- Normal to above normal precipitation is very likely over southern Congo, western DRC, and southern Zambia, much of Botswana, central and southern Zimbabwe, southern Mozambique, Africa and southern Madagascar during December 2022 to March 2023
- From December 2022 to February 2023 above normal precipitation is expected over Eastern parts of South Africa, Lesotho, and Eswatini and southernmost of Mozambique.
- Near to above average Temperature is very likely over Egypt, northern Sudan, Chad, Niger and Mali, and Mauritania during December 2022 to March 2023.
- During December 2022 to February 2023, near to below average temperatures are very likely over Angola, Zambia, Namibia, Botswana, South Africa, Lesotho and Eswatini.

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 policy 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).