

Climate Services for Disaster Risks Reduction in Africa

DROUGHT SERVICE AND SEASONAL CLIMATE FORECAST

ISSUED: 25 November 2022

Selected Significant Weather and Climate events 'updates: Valid for
November 2022 to February 2023.



CONTINENTAL

BRIEF FOR POLICY AND DECISION MAKERS BASED ON
SIGNIFICANT WEATHER AND CLIMATE EVENTS UPDATE.

VALID FOR: DECEMBER 2022 TO MARCH 2023



CLIMATE ANOMALIES

Wetter than average season very likely
Heavy rainfall with reported flooding events

HAZARDS

Heavy rainfall events may lead to flash
flood, riverine flooding, landslides and soil
erosion. High chance of lightning, hail
formation and stormy weather are ex-
pected

POTENTIAL IMPACTS

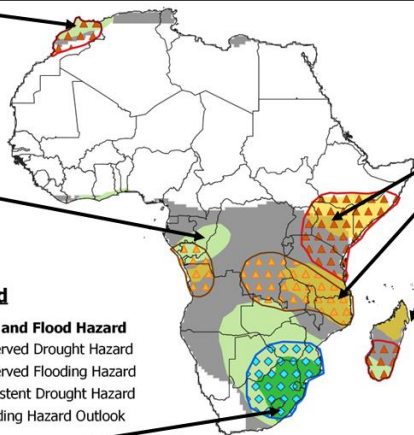
Waterlogging, pest and diseases Infesta-
tion, Outbreak of water borne diseases
damage to infrastructures (dams, reser-
voirs, bridges, roads...) Displacement of
people due to floods.

MEASURES

Select excess moisture tolerant crops,
wide tree planting campaigns Develop
new and rehabilitate the existing drainage
structure, Update and implement flood
contingency plans improve water man-
agement in reservoirs and dams

Legend

Drought and Flood Hazard
 Observed Drought Hazard
 Observed Flooding Hazard
 Persistent Drought Hazard
 Flooding Hazard Outlook



CLIMATE ANOMALIES

Drier than average season very likely
Prolonged drought with reported persistent
impacts

HAZARDS

Weak to Moderate drought, dry spells, near
average to late onset very likely.

POTENTIAL IMPACTS

Moisture stress, decreased river dis-
charge, reduced rain-fed crop yield pro-
spect, degradation of pastures and high
food prices.

MEASURES

Develop and implement policy to support
drought tolerant and short cycle crops,
soil and water conservation practice,
maximize full irrigation farming. Use wa-
tershed based in-situ water harvesting
structures Develop and implement policy
in support of weather based insurance
and dam management

DROUGHT SERVICE AND SEASONAL CLIMATE FORECAST

BULLETIN No.11, 2022

Chair Editorial Board:

Dr. André KAMGA. F. (Director General)

Editorial Board:

DG. André KAMGA. F. (Chair)

Dr. Romeo Nkurunziza (Climate Monitoring)

Dr. Pierre KAMSU

Mr Mduduzi Gamedze

Mr Ibrahim Dan Dije

Mr. Hubert KABENGELA (Climate Monitoring)

Mr Serge Bayala

Mr. Godefroy Nshimirimana

Dr. Kamoru Abiodun Lawal

Contents

Highlights.....	3
I- Review of Drought indicators.....	4-5
II- Drought monitoring.....	6
III- Recorded impacts.....	6-7
IV- Climate and hazards outlook.....	7-8
V- Potential impacts expected and response measures	9-10
VI- Drought service and Seasonal Climate Forecast methodology	11

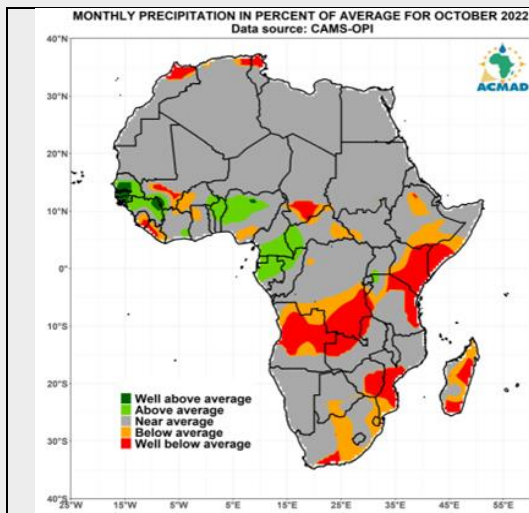
HIGHLIGHTS

Performance of the past season and impacts

- ✚ In Benin, as of October 24th, at least 40 people have died and around 1300 households displaced after weeks of flooding since September this year ([floodlist, 24 October 2022](#)).
- ✚ In Gabon, as many as 7 people have lost their lives in the Libreville landslide following heavy rainfall on two consecutive days of 20 to 21 October 2022 ([floodlist, 23 October 2022](#)).
- ✚ In Central Africa Republic, at least 11 people have lost their lives after heavy rain in 12 prefectures as well as leaving thousands displaced ([floodlist, 3 October 2022](#)).
- ✚ In Nigeria, as of October 16th, as many as 603 people have died and 1.3 million displaced following floods triggered by heavy rainfall in the country since February this year and flooding that could last until the end of November ([Floodlist, 17 October 2022](#)).
- ✚ In Tchad, almost 1 million people have been affected by a long-term consequence of flooding as damage to crops increased food insecurity in the country- indicated the United Nations Office for Coordination of Humanitarian Affairs (OCHA) ([floodlist, 7 October 2022](#)).
- ✚ As of October 2022, due to climate change and drought, Over 500,000 people in Kenya's Turkana region are facing starvation and in Somalia, the drought has affected 7 million people who are in dire need of assistance ([Maringa, 24th October 2022](#)).

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

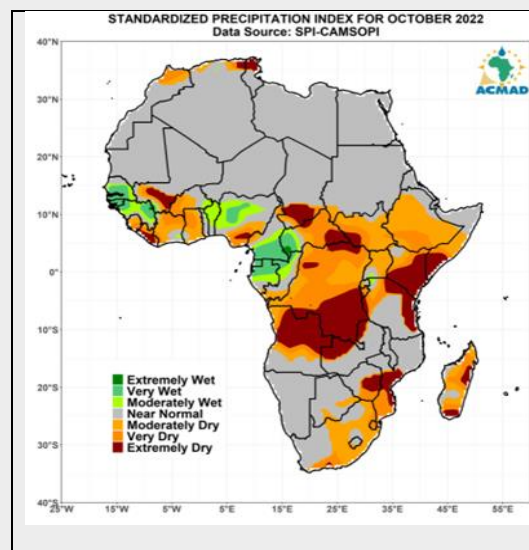
- ✚ Below average Sea Surface Temperatures (SSTs) were observed over most of the Equatorial Pacific (ENSO region) since May to August 2022, the negative anomalies persisted over the Equatorial Pacific region; the models' outputs and experts' judgments are in favor for the persistence of the weak La Nina is very likely during November 2022 to February 2023.
- ✚ Near average SSTs were observed over the Tropical North Atlantic (TNA) during October 2022. Most models' outputs and expert judgment are favorable for persistence of neutral conditions during November 2022 to February season.
- ✚ Near average Sea Surface Temperatures characterize the North Atlantic Tropical (NAT) since October 2022. A persistence of this condition is very likely during November 2022 to February 2023 season.
- ✚ Near average Sea Surface Temperatures characterize the South Atlantic Tropical (SAT) during October 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 October 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 July to October 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 October 2022, above to well above average precipitation was observed over much of Senegal, Gambia, Guinea, much of Togo, Northeast and central Nigeria, southwest Cameroon, Gabon and northern east Congo.

Below and well below average precipitation was observed over northern Morocco, Northernmost Algeria, northern Tunisia, south Ethiopia, Kenya, South Somalia, Northwest Tanzania, much of Madagascar, central and south Mozambique, western Zimbabwe, west south Africa, much of Angola, northernmost Zambia, South DRC, Part of South Tchad, Sierra Leone, Liberia and parts of South Mali.

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

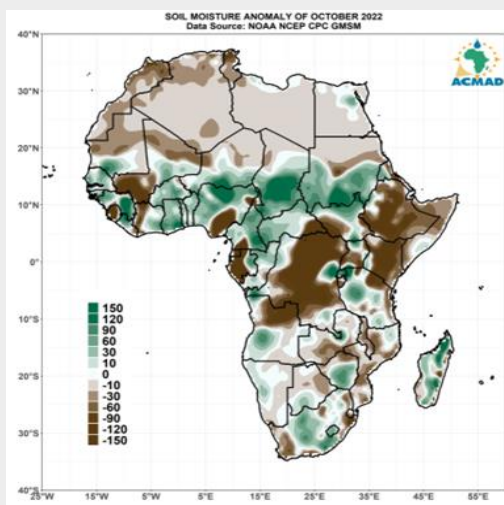
1.2. STANDARDIZED PRECIPITATION INDEX (SPI)

The SPI for October 2022 reveals that very dry to extremely dry conditions were observed over northern Morocco, Northern Algeria, North Tunisia, South Mali, Sierra Leone, Liberia, Ghana, Ivory Coast and much of central Africa and Eastern Africa, much of South Africa, Southwest Zimbabwe South Mozambique and much of Madagascar.

Very wet to extremely wet conditions were recorded over Senegal, Gambia, Guinea, much of Togo, south Cameroon, Gabon northern East Congo Republic and East Central Republic.

Figure 3: Standardized precipitation index for October 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/

1.3. SOIL MOISTURE ANOMALY

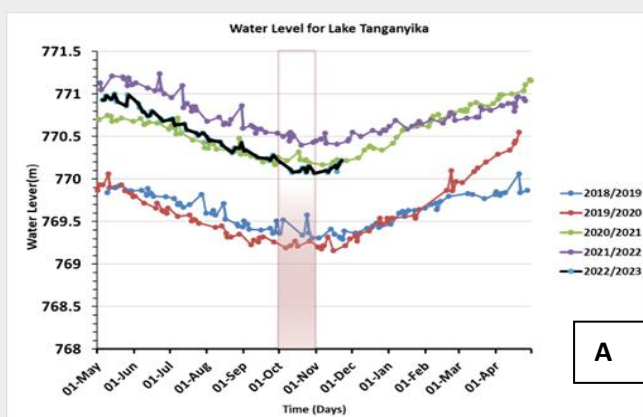


Strong to moderate moisture deficit was located over much of Morocco, north Algeria, Tunisia, Mauritania south and north Mali, Sierra Leone, East Ivory coast, parts of southern Nigeria, Gabon, Much of DRC, East South Sudan, Kenya, Uganda, Ethiopia, Much of Somalia, Zambia, Malawi, Mozambique, North Angola,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

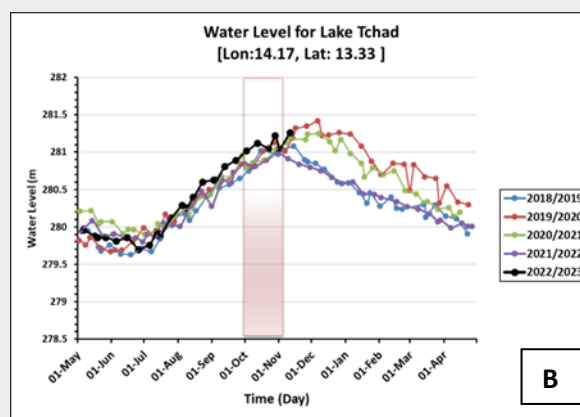
Below average precipitation was recorded over most of these areas during October 2022 which resulted in large moisture deficits and below average vegetation conditions.

Figure 4: Soil moisture anomaly for October 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>

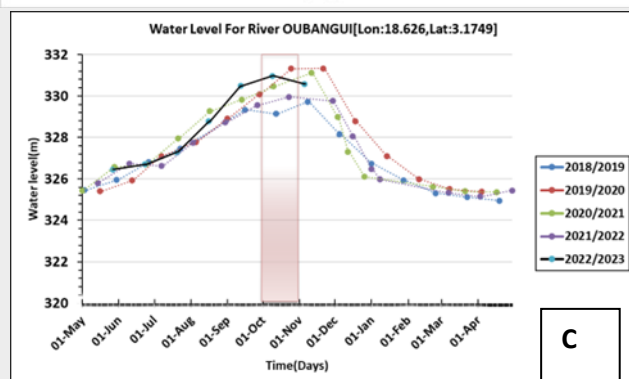
1.5. WATER LEVEL



A



B



C

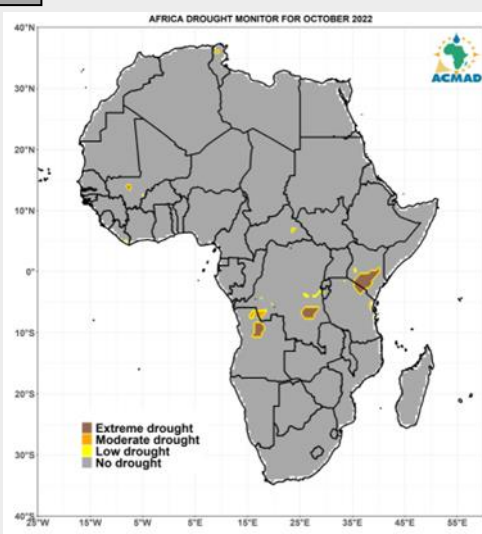
A cumulative precipitation deficit was recorded during the past months over some parts of the central Africa region, leading to the observed decrease in water levels in the river OUBANGUI and Lake Tchad during October 2022. Also, the rainfall observed in eastern Africa contributed to a slight increase in water levels in Lake Tanganyika.

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

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

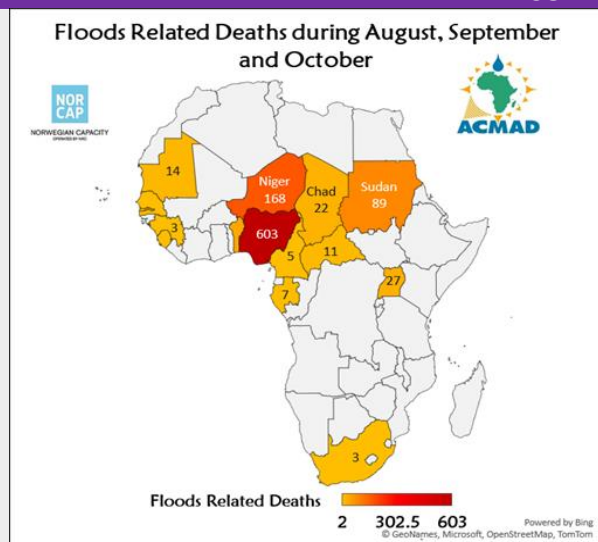


Given the cumulative precipitation deficits during the past and the month of October, SPI and soil moisture deficits, the adjacent map characterizes the drought situation in Africa during October 2022.

Over 500,000 people in Kenya's Turkana region are facing starvation and in Somalia, the drought has affected 7 million people who are in dire need of assistance (Maringa, 24th October 2022)

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

III. RECORDED IMPACTS



As of October, at least 1004 people have been recorded to have lost their lives due to flooding during the months of August, September and October combined. Out of those deaths, Nigeria recorded 603 deaths, the highest deaths recorded in the last three months, 168 deaths were recorded in Niger, 89 deaths recorded in Sudan, 27 deaths were recorded in Uganda, 11 deaths recorded over Central Africa Republic, 2 deaths in Gambia, 22 deaths in Chad, 5 deaths in Cameroon, 6 deaths in Sierra Leone, Guinea 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 November-December 2022-January (NDJ) and December 2022-January 2023 (NDJ) seasons across Africa (see the figures: Fig7, Fig8, Fig9 and Fig10):

During November 2022 to February 2023 period:

- ✚ Below-normal precipitation was experienced over Morocco, northern Algeria, and Tunisia, most of the Western Africa region, central and southern parts of the Central Africa, southern parts of Eastern Africa, and eastern Madagascar during October 2022.
- ✚ Above to well above precipitation was observed over Senegal, Gambia, Guinea Bissau, western Nigeria, western of the central part of the Equatorial region, eastern South-Sudan, Ethiopia, and south-eastern of SADC region.
- ✚ Below average to normal to below rainfall is expected over Morocco, south-western of DRC, 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 November 2022 to February 2023 season.
- ✚ Normal to above normal precipitation is very likely over southern CAR, south-easternmost of Cameroon, northern and central Congo, northern DRC, southern South-Sudan, northernmost of Uganda, south-eastern of Angola, southern Zambia, much of Botswana, central and southern Zimbabwe, southern Mozambique, western South Africa and southern Madagascar during November 2022 to February 2023.
- ✚ From November 2022 to February 2023 above normal precipitation is expected over Central parts of South Africa, Lesotho and Eswatini.
- ✚ Near to above average Temperature is very likely over Algeria, Tunisia Libya, Egypt, Sudan, Chad, Niger, Mali, Mauritania, Angola, Namibia, Botswana, Zambia, Zimbabwe, and Mozambique during November 2022 to February 2023.
- ✚ During November 2022 to February 2023, near to below average temperatures are very likely over Angola, Namibia, Botswana, South Africa and Lesotho

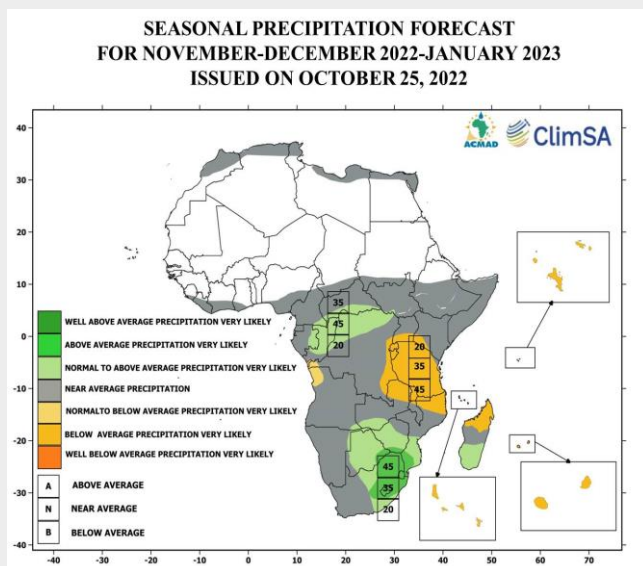


Figure 7: Seasonal precipitation forecast for November -December 2022-January 2023

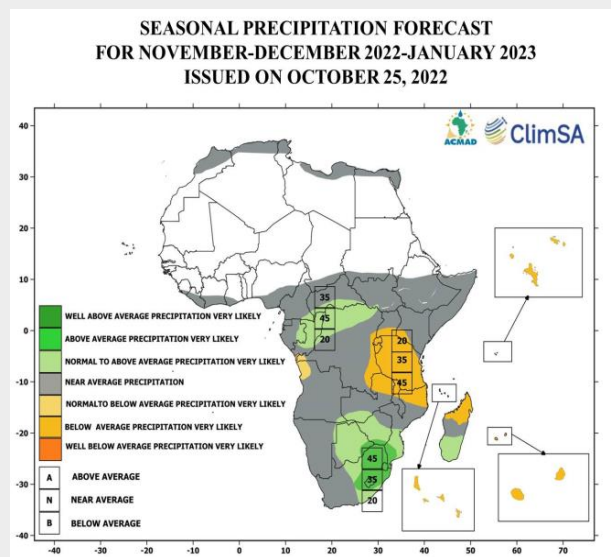


Figure 8: Seasonal precipitation forecast for December 2022-January -February 2023

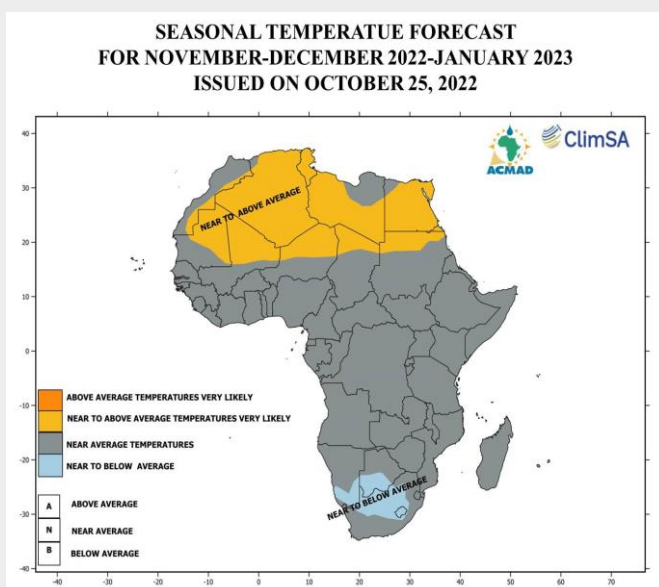


Figure 9: Seasonal precipitation forecast for November -December 2022-January 2023

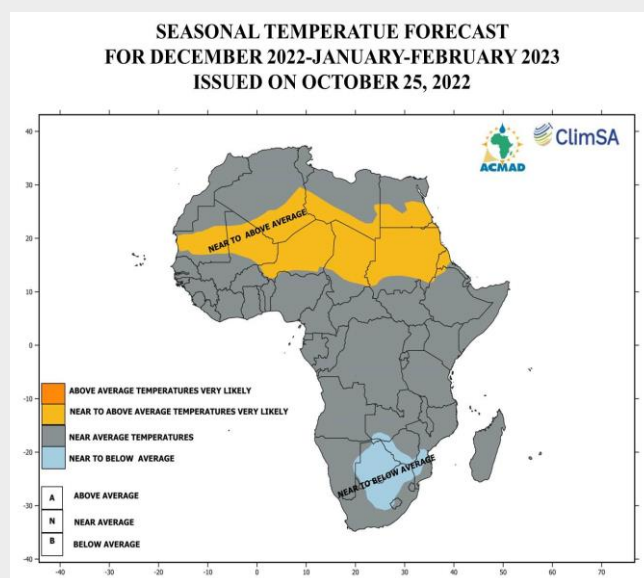


Figure 10: Seasonal precipitation forecast for December 2022-January -February 2023

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

- ✦ Below average to normal to below rainfall is expected over Morocco, south-western of DRC, 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 November 2022 to February 2023 season.
- ✦ Normal to above normal precipitation is very likely over southern CAR, south-easternmost of Cameroon, northern and central Congo, northern DRC, southern South-Sudan, northernmost of Uganda, south-eastern of Angola, southern Zambia, much of Botswana, central and southern Zimbabwe, southern Mozambique, western South Africa and southern Madagascar during November 2022 to February 2023.
- ✦ From November 2022 to February 2023 above normal precipitation is expected over Central parts of South Africa, Lesotho and Eswatini.
- ✦ Near to above average Temperature is very likely over Algeria, Tunisia Libya, Egypt, Sudan, Chad, Niger, Mali, Mauritania, Angola, Namibia, Botswana, Zambia, Zimbabwe, and Mozambique during November 2022 to February 2023.
- ✦ During November 2022 to February 2023, near to below average temperatures are very likely over Angola, Namibia, Botswana, South Africa and Lesotho.

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 crops 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 CAR, south-easternmost of Cameroon, northern and central Congo, northern DRC, southern South-Sudan, northernmost of Uganda, south-eastern of Angola, southern Zambia, much of Botswana, central and southern Zimbabwe, southern Mozambique, western South Africa and southern Madagascar during November 2022 to February 2023.
- ✚ From November 2022 to February 2023 above normal precipitation is expected over Central parts of South Africa, Lesotho and Eswatini.
- ✚ Near to above average Temperature is very likely over Algeria, Tunisia Libya, Egypt, Sudan, Chad, Niger, Mali, Mauritania, Angola, Namibia, Botswana, Zambia, Zimbabwe, and Mozambique during November 2022 to February 2023.

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.

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).