

Climate Services for Disaster Risks Reduction in Africa

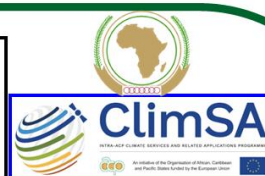
DROUGHT SERVICE AND SEASONAL CLIMATE FORECAST.

ISSUED: 20 January 2022

Selected Significant Weather and Climate events 'updates: Valid for
January to April 2023.



CONTINENTAL
BRIEF FOR POLICY AND DECISION MAKERS BASED ON
SIGNIFICANT WEATHER AND CLIMATE EVENTS UPDATE.
VALID FOR: **JANUARY TO APRIL 2023**



CLIMATE ANOMALIES

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

HAZARDS

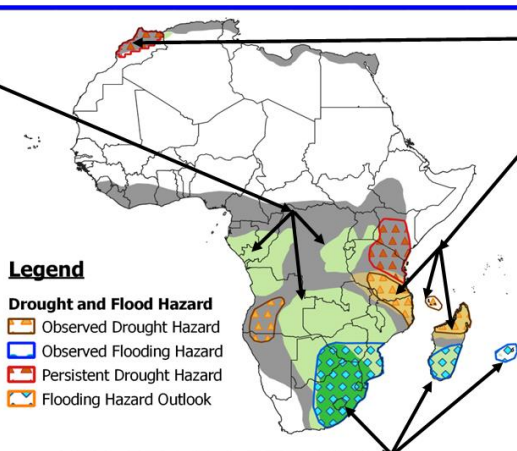
Heavy rainfall events may lead to flash flood, riverine flooding, landslides and soil erosion. High chance of lightning, hail formation and stormy weather are expected

POTENTIAL IMPACTS

Waterlogging, pest and diseases Infestation, Outbreak of water borne diseases damage to infrastructures (dams, reservoirs, 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 management 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 discharge, reduced rain-fed crop yield prospect, 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 watershed 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.1, 2023

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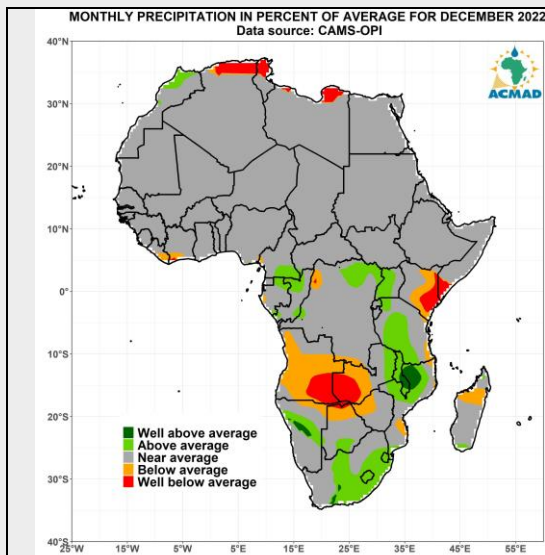
HIGHLIGHTS

Performance of the past season and impacts.

- ✚ In Namibia, two people died following three months' worth of rain in 24 hours, causing floods in the city of Windhoek ([Floodlist, 15 December 2022](#)).
- ✚ In DRC, at least 120 people died in the capital city of Kinshasa, following heavy that triggered flooding and landslides([Floodlist, 14 December 2022](#)).
- ✚ In South Africa, 9 people died and at least 17 people were missing following flash floods in Johannesburg ([Floodlist, 4 December 2022](#)).
- ✚ In Angola, floods and landslides have caused damage to hundreds of Homes Damaged and fatalities-2 dead following heavy rain in three provinces([Floodlist, 2 December 2022](#)).
- ✚ In Eastern DRC, at least 9 people have died from landslides triggered by heavy rain in Kalehe Territory in South Kivu Province ([Floodlist, 2 December 2022](#)).

OUTLOOK JANUARY-FEBRUARY-MARCH AND FEBRUARY-MARCH -APRIL 2023 SEASONS

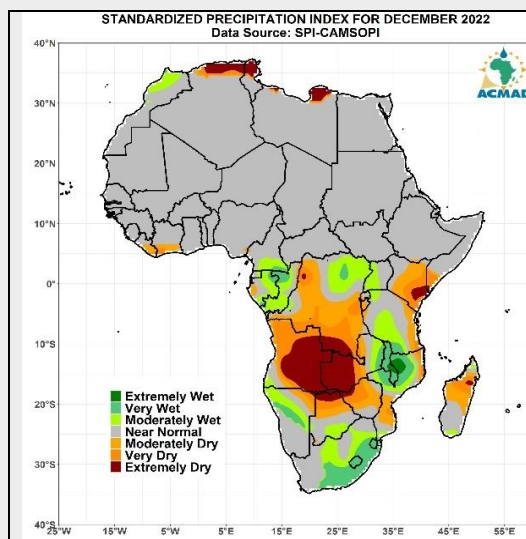
- ✚ Below average Sea Surface Temperatures (SSTs) were observed over most of the Equatorial Pacific (ENSO region) since May to December 2022 and the negative anomalies persisted over the Pacific equatorial region; the model's output and experts' judgment are in favour of the persistence of a weak La Nina during the January to March 2023 period.
- ✚ Near-average SSTs were observed over the Tropical North Atlantic (TNA) during December 2022. Most models' outputs and expert judgment are favourable for the persistence of neutral to warm conditions during the January to April 2023 season.
- ✚ Near-average Sea Surface Temperatures characterize the North Atlantic Tropical (NAT) since November 2022. The persistence of this condition is very likely during the January to April 2023 season.
- ✚ Warm Sea Surface Temperatures characterize the South Atlantic Tropical (SAT) during November 2022. This condition is expected to persist in the coming months.
- ✚ The Tropical South Atlantic (TSA) has been near average from September to November 2022. Models' outputs and expert judgment are favourable for warm SSTs during the January to April 2023 season.
- ✚ Seas surface temperatures of the sub-tropical Indian Ocean (SIOD) have been near to above average. Models' outputs and experts' assessments are in favour of the persistence of these conditions during the coming months.
- ✚ The sea surface temperatures of the Mediterranean Sea have been near average from September to November 2022. Models' outputs and expert judgment are favourable for near to above average 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 December 2022, above to well above average precipitation was observed over the northern part of Morocco, Northernmost Gabon, southwest Cameroon, northern east Congo Republic, northern east DRC, Much of Uganda and Tanzania, Malawi, northeast Mozambique, much of South Africa, parts of central Namibia and southernmost Madagascar.

Below and well below precipitation was observed over northernmost Algeria, North Tunisia, Northern Libya, east Kenya, south Somalia, central parts of Madagascar, northwest Zimbabwe, central to west Zambia, North Botswana, northernmost Namibia, Angola, south Ivory Coast and Liberia.

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

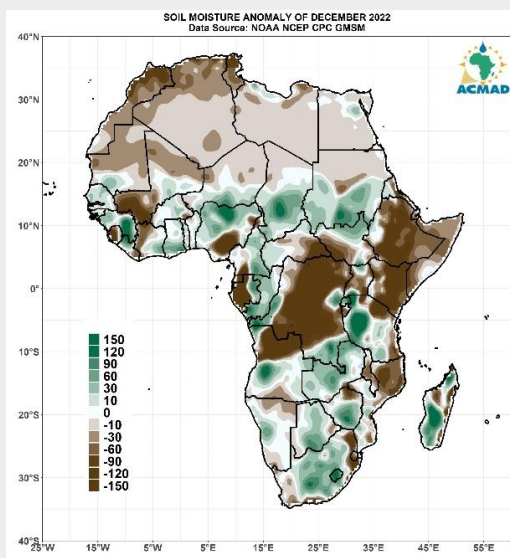
1.2. STANDARDIZED PRECIPITATION INDEX (SPI)

The SPI for December 2022 reveals that very dry to extremely dry has been observed over northernmost Algeria, Tunisia and Libya, much of Kenya, south Somalia, Eastern Tanzania, central Madagascar, much of DRC, Zambia, Zimbabwe, South Mozambique, Angola, north Botswana, Southern Ivory Coast and Liberia.

Very wet to extremely wet conditions were recorded over Northern parts of Morocco, Southern Cameroon, northern east Gabon, Congo Republic, northeast DRC, west Uganda, central Tanzania, Eastern Zambia, Malawi, central Mozambique, much of South Africa

Figure 3: Standardized precipitation index for December 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

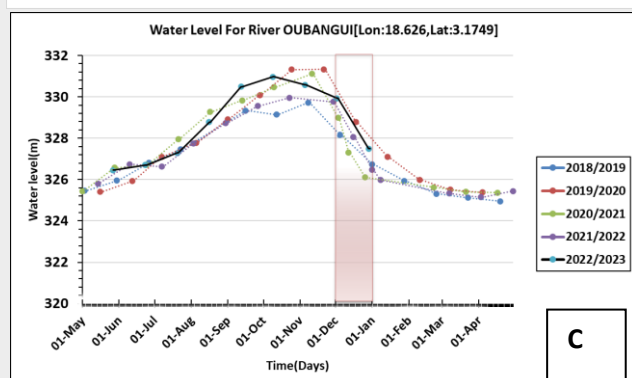
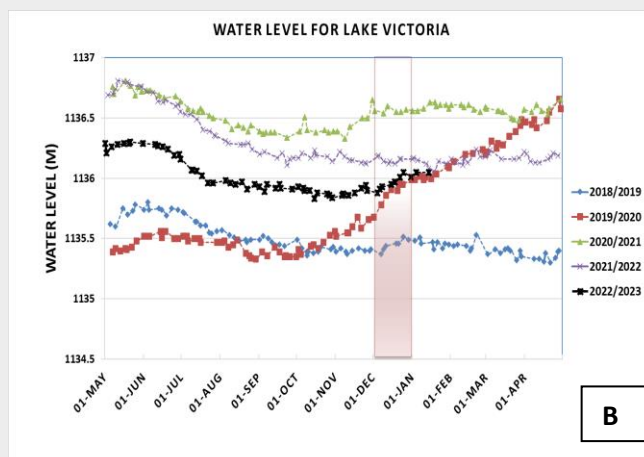
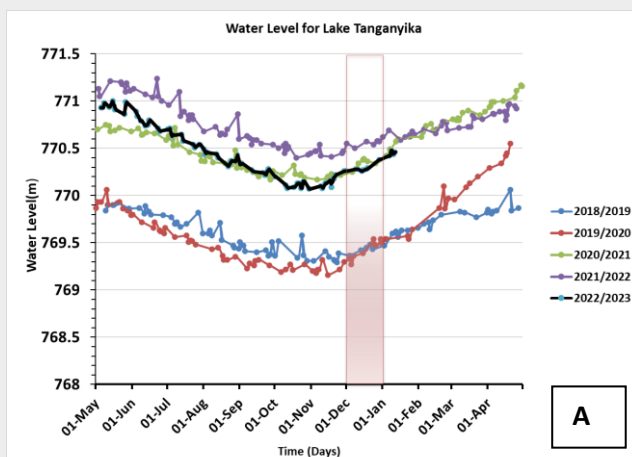


Strong to moderate moisture deficit was located over northern Morocco, northernmost Algeria, Tunisia, Mauritania, much of Mali, east Ivory Coast, Sierra Leone, south Nigeria, west Gabon, much of DRC, central to east Central Africa Republic, west South Sudan, much of Uganda, Ethiopia, Eritrea, Djibouti, Somalia north Mozambique, Malawi and north east South Africa.

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

Figure 4: Soil moisture anomaly for December 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



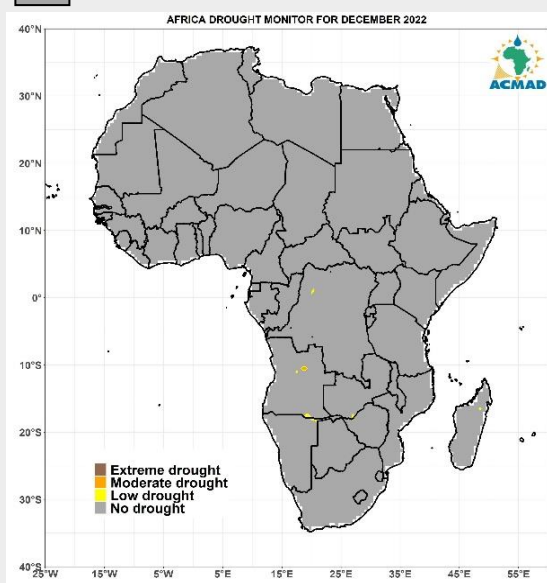
A cumulative precipitation deficit was recorded during the past months over some parts of the central DRC, leading to the observed decrease in water levels in the river OUBANGUI and the rainfall observed in most parts of eastern Africa contributed to an increase in water levels in both Lake Tanganyika and Lake Victoria.

Figure 5: Daily water levels of Lake Tanganyika[A], Lake Victoria[B] and River OUBANGUI[C]. Data Source: <http://hydroweb.theialand.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

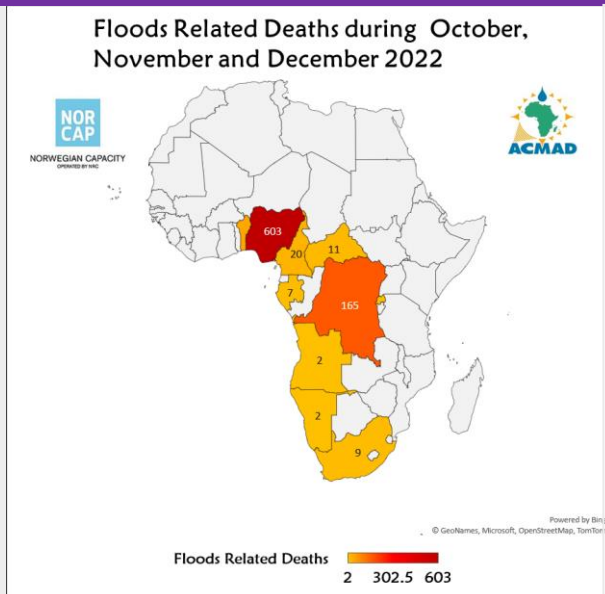


Given the cumulative precipitation deficits during the past and the month of November, SPI and soil moisture deficits, the adjacent map characterizes the drought situation in Africa during December 2022.

According to the UN news, nearly two million children across Ethiopia, Kenya and Somalia are estimated to need urgent treatment for severe acute malnutrition, the deadliest form of hunger and water insecurity has more than doubled with close to 24 million people now confronting dire water shortages ([news.un.org, 22 December 2022](https://news.un.org/en/2022/12/drought-africa)).

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

III. RECORDED IMPACTS



At least 862 people have been recorded to have lost their lives due to flooding during the months of October, November and December combined. Out of those deaths, Nigeria recorded 603 deaths, the highest deaths recorded in the last three months, 40 deaths recorded in Benin, 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

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 January-February-March (JFM) and February-March-April (FMA) 2023 seasons across Africa (see the figures: Fig7, Fig8, Fig9 and Fig10):

During January 2023 to April 2023 period:

- ✚ Normal to below rainfall is expected over north-eastern Zambia, eastern DRC, northern Malawi, southern Tanzania, northern Mozambique and northern Madagascar during the January to April 2023 seasons.
- ✚ Normal to above normal precipitation is very likely over south-eastern Gabon, southern Congo, eastern and western DRC, Burundi, Rwanda, north-western Tanzania, southern, Uganda, most of Zambia, north-west and south-eastern Angola, much of Botswana, Zimbabwe, Mozambique, north-eastern Namibia, southern Malawi, central South Africa and southern Madagascar during January 2023 to April 2023.
- ✚ 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 January to March 2023 above normal precipitation is expected over central to eastern parts of South Africa, eastern Botswana, Lesotho, Eswatini, southern Zimbabwe and southernmost of Mozambique.
- ✚ Near to above average temperatures are very likely over Egypt, northern Sudan, Chad, Libya, Tunisia, Algeria and Morocco during the January to April 2023 period.
- ✚ During January to April 2023, near to below average temperatures are very likely over southern Angola, southwestern Zambia, eastern Namibia, Botswana, central South Africa, Lesotho, Eswatini, south-western Mozambique and south-western Zimbabwe.

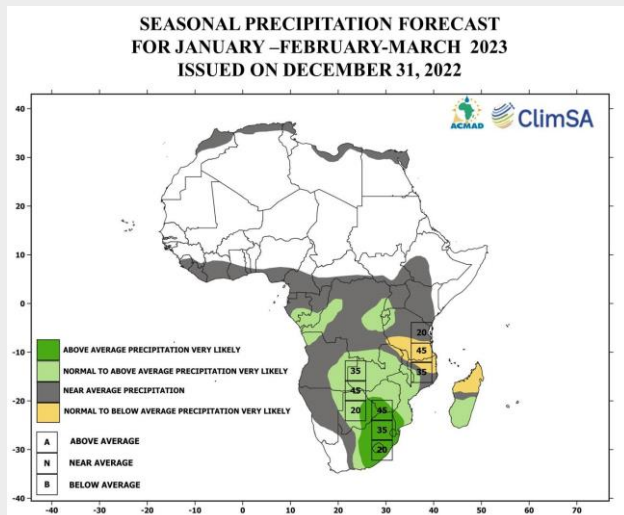


Figure 7: Seasonal precipitation forecast for January -February-March 2023.

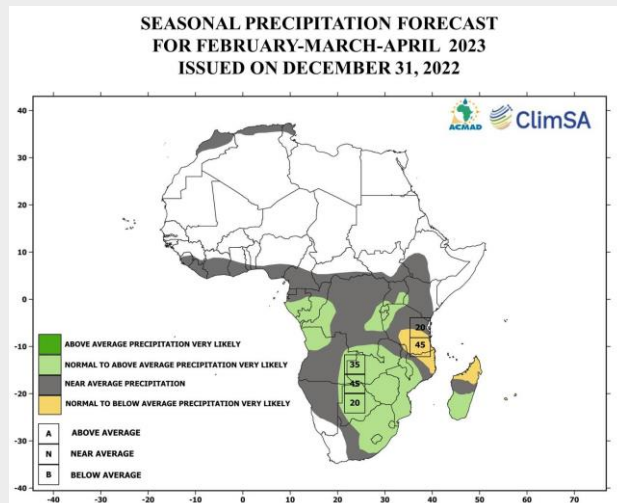


Figure 8: Seasonal precipitation forecast for February-March-April 2023.

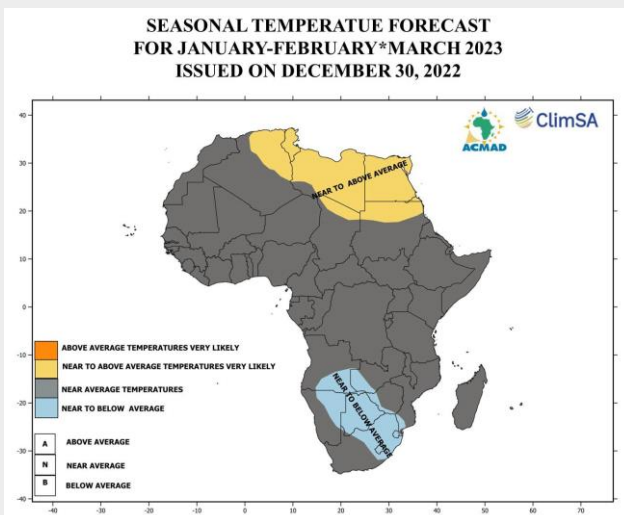


Figure 9: Seasonal Temperature forecast for January-February-March 2023

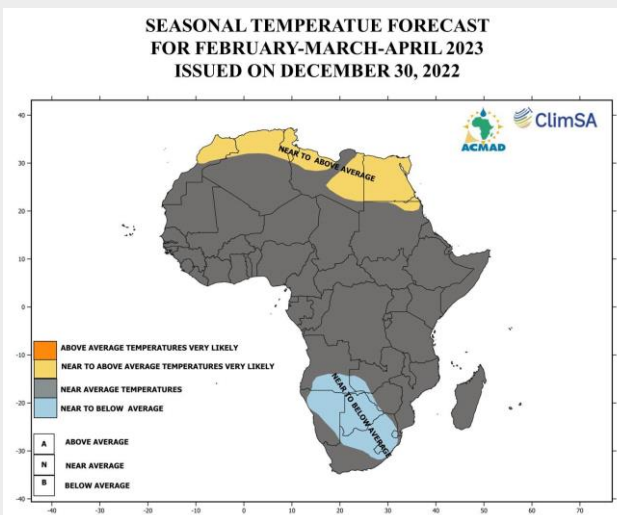


Figure 10: Seasonal Temperature forecast for February-March-April 2023

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-eastern Zambia, eastern DRC, northern Malawi, southern Tanzania, northern Mozambique and northern Madagascar during the January to April 2023 seasons.
- ✦ Normal to above normal precipitation is very likely over south-eastern Gabon, southern Congo, eastern and western DRC, Burundi, Rwanda, north-western Tanzania, southern, Uganda, most of Zambia, north-west and south-eastern Angola, much of Botswana, Zimbabwe, Mozambique, north-easter Namibia, southern Malawi, central South Africa and southern Madagascar during January 2023 to April 2023.
- ✦ From January to March 2023 above normal precipitation is expected over central to eastern parts of South Africa, eastern Botswana, Lesotho, Eswatini, southern Zimbabwe and southernmost of Mozambique.
- ✦ Near to above average temperatures are very likely over Egypt, northern Sudan, Chad, Libya, Tunisia, Algeria and Morocco during the January to April 2023 period.
- ✦ During January to April 2023, near to below average temperatures are very likely over southern Angola, south western Zambia, eastern Namibia, Botswana, central South Africa, Lesotho, Eswatini, south-western Mozambique and south-western Zimbabwe.

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 Normal to above normal precipitation is very likely over south-eastern Gabon, southern Congo, eastern and western DRC, Burundi, Rwanda, north-western Tanzania, southern, Uganda, most of Zambia, north-west and south-eastern Angola, much of Botswana, Zimbabwe, Mozambique, north-easter Namibia, southern Malawi, central South Africa and southern Madagascar during January 2023 to April 2023.
- ✚ From January to March 2023 above normal precipitation is expected over central to eastern parts of South Africa, eastern Botswana, Lesotho, Eswatini, southern Zimbabwe and southernmost of Mozambique.
- ✚ Near to above average temperatures are very likely over Egypt, northern Sudan, Chad, Libya, Tunisia, Algeria and Morocco during the January to April 2023 period.

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).