CENTRE AFRICAIN POUR LES APPLICATIONS DE LA METEOROLOGIE AU DEVELOPPEMENT

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AFRICAN CENTRE OF METEOROLOGICAL APPLICATIONS FOR DEVELOPMENT

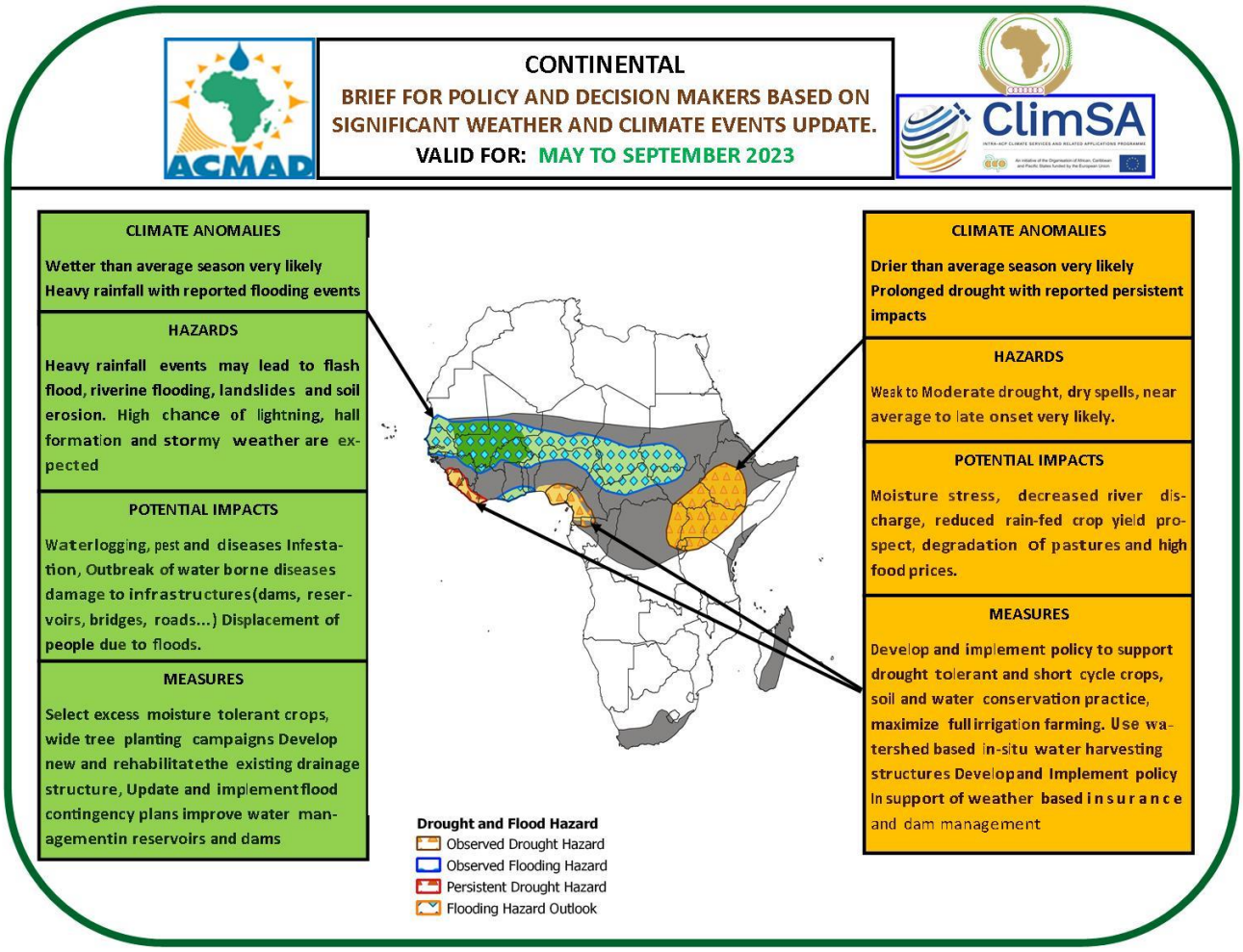
Institution Africaine parrainée par la CEA et l'OMM • African Institution under the aegis of UNECA and WMO

Climate Services for Disaster Risks Reduction in Africa

DROUGHT SERVICE AND SEASONAL CLIMATE FORECAST.

ISSUED: 28 April 2023

Selected Significant Weather and Climate events 'updates: Valid for May to July 2023.



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DROUGHT SERVICE AND SEASONAL CLIMATE FORECAST

BULLETIN No.3, 2023

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HIGHLIGHTS

Performance of the past season and impacts.

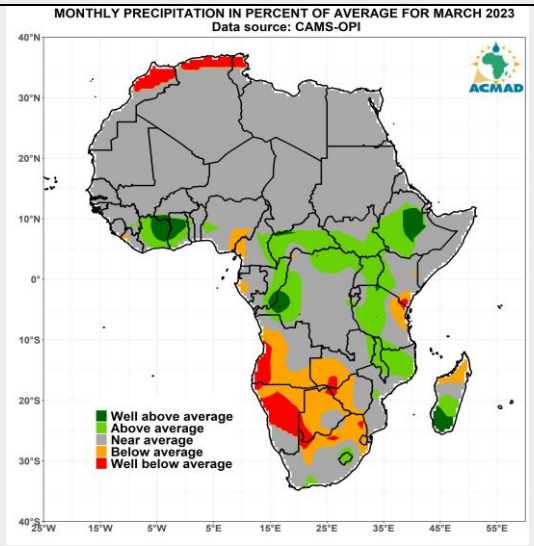
- In Ghana, 3 people died after heavy rainfall lasted several hours and caused flooding in many parts of the capital (Floodlist, 08 March 2023).
- In Malawi, it has been reported that 507 people have lost their lives, with at least 537 people still missing, and over 553,600 people displaced in more than 540 sites (OCHA, 22 Mar 2023).
- In the Southwest of Cameroon, one person reportedly died after being dragged by flood water and dozens were made homeless after severe flash floods On 18 March 2023 (Floodlist,19 February 2023).
- In Somalia, at least 20 people have lost their lives after sudden flash floods in the district of Bardhere (Floodlist 27, March 2023).
- In South Africa, at least 3 people lost their lives and one is reported missing, following flash flooding in parts of the Eastern Cape (Floodlist, 27 March 2023).
- In Kenya, at least 12 people have lost their lives and hundreds have been displaced from their homes after storms, heavy rain and flooding (Floodlist, 29 March 2023).

OUTLOOK MAY-JUNE-JULY AND JUNE-JULY-AUGUST 2023 SEASONS

- The Equatorial Sea surface temperatures (SSTs) have been near average conditions across most of the Pacific Ocean from March to April 2023. During the May to August 2023 period, ENSO is favoured to transition from neutral (positive SSTs) to a weak El Nino phase.
- Above average SSTs were observed over the Tropical North Atlantic (TNA) from January to April 2023. Most model outputs and expert judgments favour the persistence of above average conditions during the evolution of the seasons (May to August 2023).
- Above average SSTs characterized the North Atlantic Tropical (NAT) during February to April 2023 period. During the coming months, May to August, above average SSTs is expected to persist.
- Near to above average SSTs characterized the South Atlantic Tropical (SAT) from February to April 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 April 2023. Model outputs and our expert judgment favour the persistence of these conditions during the coming seasons (MJJ and JJA 2023).
- Sea Surface Temperatures in the Western Tropical Indian Ocean (WTIO) and South-Eastern Tropical Indian Ocean (SETIO) have been near average during February to April 2023. Model outputs and our expert assessments are in favour of the persistence of this condition for the coming four months.
- The Sea Surface Temperatures over the Mediterranean Sea have been above average during January to April 2023. Model outputs and our expert judgment predicted near-average conditions during the next seasons (MJJ and JJA 2023).

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

1.1 PRECIPITATION IN PERCENT OF AVERAGE

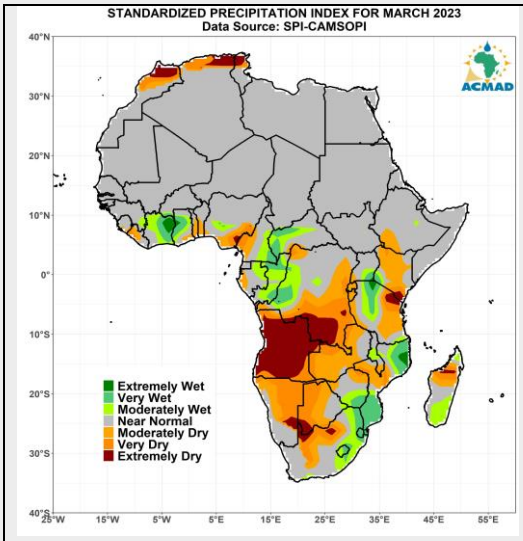


During March 2023, above to well above average precipitation was observed over much of Ghana, Ivory Coast, Congo Republic, Central Africa Republic, much of South Sudan, Ethiopia, much of Uganda, northern and Western DRC, southern Madagascar, western Tanzania, westernmost Kenya, Malawi, and northern Mozambique.

Below and well below precipitation was observed over northern Morocco, Algeria, Tunisia, southwest Nigeria and westmost Cameroon, much of Angola, Namibia, Botswana, west Zambia, and Zimbabwe, northern parts of South Africa, northern Madagascar, pocket area of southern Kenya and northwest Tanzania.

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

1.2. STANDARDIZED PRECIPITATION INDEX (SPI)



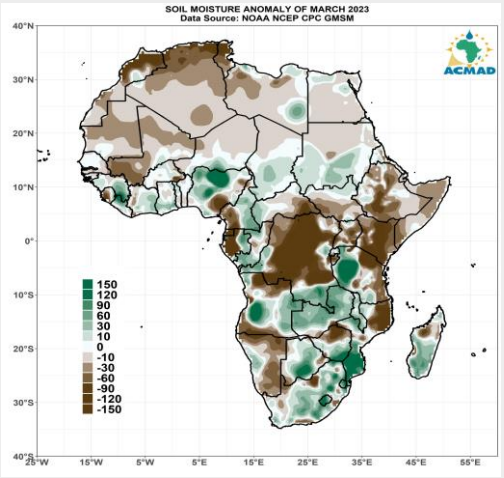
The SPI for March 2023 shows a dry to extremely dry situation over northernmost Morocco, Algeria, Tunisia, Madagascar, and north-west South Africa, Botswana, Namibia, Angola, Zambia, central Mozambique and southern Malawi, much of DRC, Burundi, Rwanda, West Tanzania, much of Kenya and parts of southern Ethiopia, south-east Nigeria and western parts of Cameroon, much of Togo, southern Benin and northwest Liberia.

Wet to extremely wet conditions were observed over much of Ivory Coast, Ghana, east Cameroon, west Central Africa, Congo Republic, western DRC, Central Tanzania, central Malawi, northwest and south Mozambique, and part of northern Madagascar.

Figure 3: Standardized precipitation index *for March 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

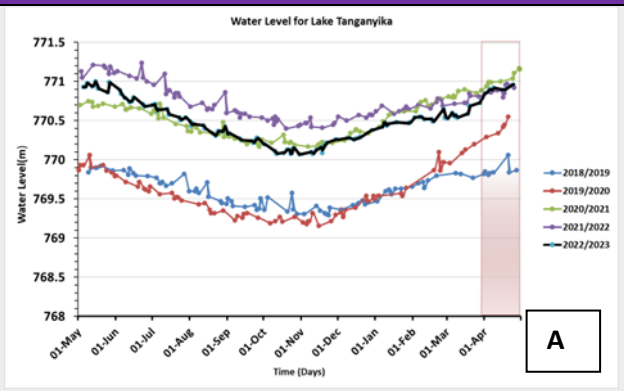


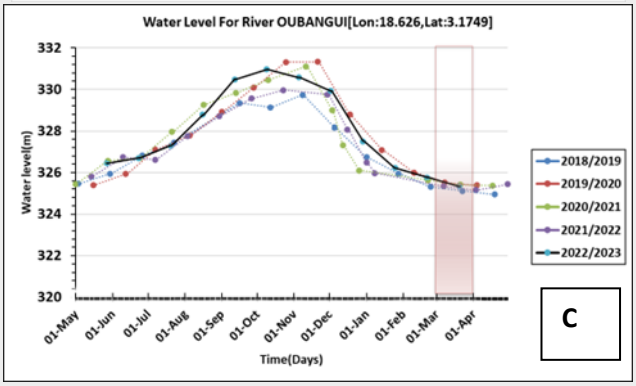
A strong to moderate moisture deficit was located over Tunisia, much of Algeria, Morocco, south Mali, Sierra Leone, south Nigeria, southern Cameroon, west Gabon, DRC, much of Central Republic, South Soudan, Ethiopia much of Somalia, Kenya, Uganda, Burundi, east Tanzania, Namibia.

Below average precipitation was recorded over most of these areas during January and February 2023. This resulted in large moisture deficits and below average vegetation conditions.

Figure 4: Soil moisture anomaly for March 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 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 some 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 OUBANHUI[**C**]. Data Source: https://doi.org/10.244/329360/HYDROWEB_WATER_+%EVEL£

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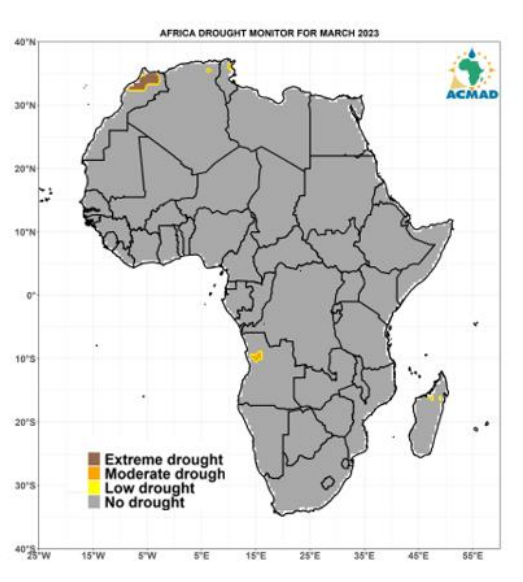
II DROUGHT MONITORING

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

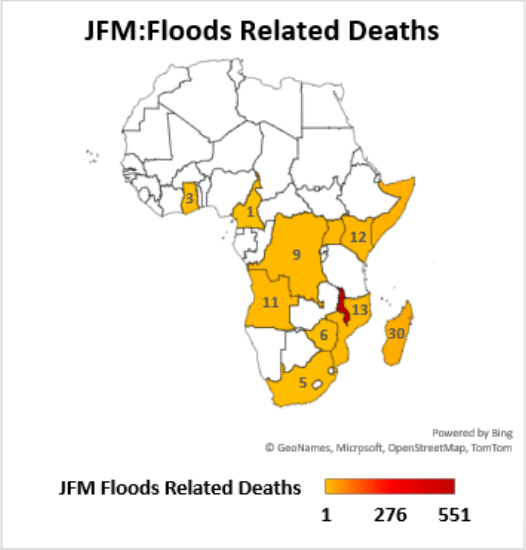


Given the cumulative precipitation deficits during the past and the month of January, SPI, and soil moisture deficits, the adjacent map characterizes the drought situation in Africa during March 2023. In this venue, During March 2023 low to moderate-intensity drought was recorded over Northern Morocco, Algeria, Tunisia, Madagascar and part of Angola.

According to UNHCR, The Horn of Africa region continues to experience the longest and most severe drought on record, threatening lives and livelihoods. The dramatic food insecurity situation in drought-affected areas is expected to persist, driving high humanitarian needs well through 2023, with forecasts predicting a sixth failed rainy season in March-May 2023 (UNHCR, 28 February 2023).

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

III. RECORDED IMPACTS



At least 671 people have been recorded to have lost their lives due to flooding during the months of January, February, and March 2023 combined. Out of those deaths, Malawi recorded 551 deaths- the highest number of deaths recorded in the last three months, 30 deaths recorded in Madagascar, 20 in Somalia, 11 deaths recorded in Angola and 13 in Mozambique, 12 in Kenya, 9 in DRC, 10 in Uganda, 5 deaths in South Africa, 6 deaths in Zimbabwe and 2 in Namibia, 1 in Cameroon and 3 in Ghana.

Data Source: floodlist. com

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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 May-June-July (MJJ) and June-July-August (JJA) 2023 seasons across Africa (see the figures: Fig7, Fig8, Fig9, and Fig10):

During the May to August 2023 period.

- The outlook for the rainfall season during the May to August 2023 period is that below average and normal to below average rainfall is expected over western and eastern parts of the Guinea Gulf region, north-eastern of DRC, much of Rwanda, Uganda, western and northern Kenya, south-eastern South-Sudan and western Ethiopia,

- From May to July 2023 normal to above average rainfall is very likely over southern Niger, northern Nigeria, western and southern Chad, northernmost of Cameroon, CAR, and north-western South-Sudan south-western Sudan. And above average precipitation is expected over southern Mauritania, much of Senegal, Gambia, Guinea Bissau, southern Mali and northern Burkina Faso.

- Over south-western Mauritania, much of Senegal, Gambia, southern Niger, northern Nigeria, central eastern parts of Nigeria, most of southern Chad, northern Cameroon, CAR, north-western South-Sudan and south-western Sudan. And above average precipitation over south-eastern Mauritania, southern Mali and much of Burkina Faso is expected during June to August 2023

- Near to above average temperature is very likely over Morocco, Algeria, Tunisia, Libya, Egypt, northern Sudan, Chad, Niger, Mali and Mauritania, Mali, south of Angola, Zimbabwe and Mozambique, much of Botswana, South Africa, Lesotho, Eswatini, and southern Mozambique during May to August 2023.

- From May to August 2023 Above average temperature is very likely over south-eastern Algeria, southern Libya, much of Egypt, eastern Namibia, western Botswana, and northern South Africa.

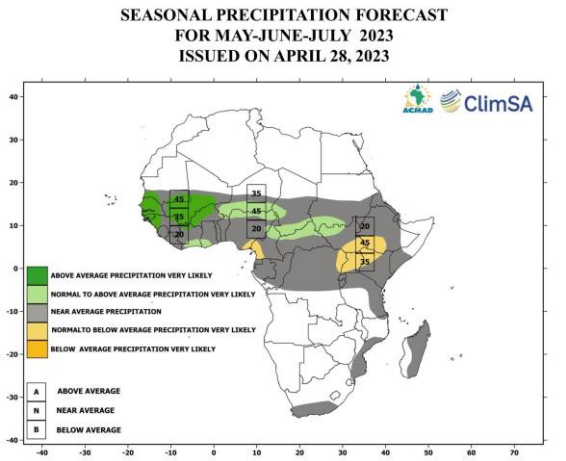

Figure 7: Seasonal precipitation forecast for May June-July2023.

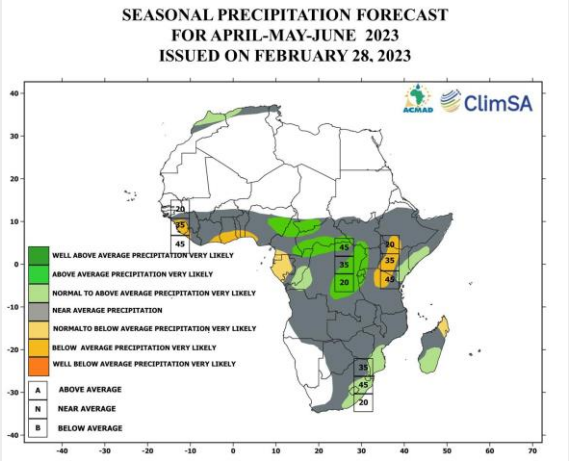

Figure 8: Seasonal precipitation forecast for June-July-August 2023.

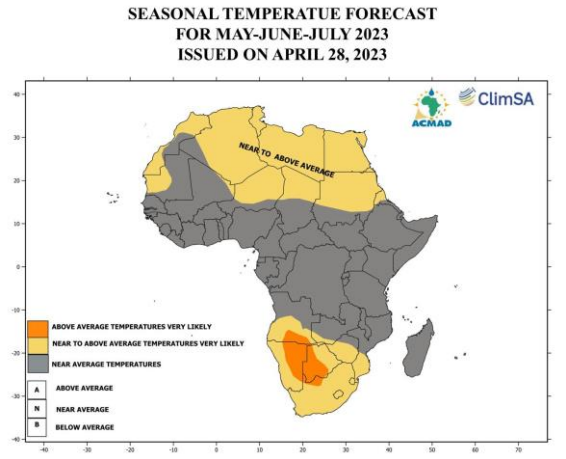

Figure 9: Seasonal Temperature forecast for May-June-July 2023

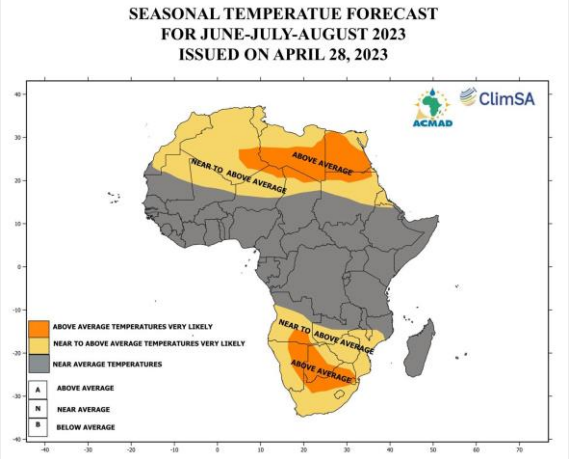

Figure 10: Seasonal Temperature forecast for June-July-August 2023

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

From May to July 2023 normal to above average rainfall is very likely over southern Niger, northern Nigeria, western and southern Chad, northernmost of Cameroon, CAR, and north-western South-Sudan south-western Sudan. And above average precipitation is expected over southern Mauritania, much of Senegal, Gambia, Guinea Bissau, southern Mali and northern Burkina Faso.

The rainfall season during the May to August 2023 period is below average and normal to below average rainfall is expected over western and eastern parts of the Guinea Gulf region, north-eastern of DRC, much of Rwanda, Uganda, western and northern Kenya, south-eastern South-Sudan and western Ethiopia.

Above average temperature is very likely over south-eastern Algeria, southern Libya, much of Egypt, eastern Namibia, western Botswana, and northern South Africa from May to August 2023.

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 average rainfall is very likely over southern Niger, northern Nigeria, western and southern Chad, northernmost of Cameroon, CAR, and north-western South-Sudan south-western Sudan. And above average precipitation is expected over southern Mauritania, much of Senegal, Gambia, Guinea Bissau, southern Mali and northern Burkina Faso.
during May to July 2023.

Near to above average temperature is very likely over Morocco, Algeria, Tunisia, Libya, Egypt, northern Sudan, Chad, Niger, Mali and Mauritania, Mali, south of Angola, Zimbabwe and Mozambique, much of Botswana, South Africa, Lesotho, Eswatini, and southern Mozambique during May to August 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, monitors 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).