# IGAD Climate Prediction and Applications Centre Monthly Climate Bulletin, Climate Review for February 2019 and Forecasts for April 2019

## 1. INTRODUCTION

This bulletin reviews the February 2019 climate conditions over the Greater Horn of Africa (GHA) region and highlights the April 2019 rainfall and temperature forecasts together with the socio-economic impacts associated with both the observed and the forecasted climate conditions.

There are six sections in this bulletin. The major highlights from both the observed and expected climate conditions are outlined in section2. Section 3 discusses the climate patterns that prevailed in the month of February 2019, while the dominant weather systems are discussed in section 4. In section 5, the April 2019 climate forecasts over the GHA are presented. The socio-economic impacts associated with the observed climatic conditions and those expected from April 2019 climate forecasts are outlined in section 6.

*For referencing within this bulletin, the GHA is generally divided into three sub-sectors: The equatorial sector lying approximately between $5^oN$ and $5^oS$ latitude, with the northern and southern sectors occupying the rest of the northern and southern part of the equatorial region respectively.*

## 2. HIGHLIGHTS

Rainfall was mainly recorded in the southern sector, southern part of the equatorial sector, and south-central and southwest part of the northern sector of the GHA. Some places in central and southwest Ethiopia, southwest and central part of the equatorial sector, south-central part of the northern sector, and southeast part of the southern sector of the GHA recorded rainfall that was less than normal. Much of the rest of the GHA recorded near normal rainfall, except for central part of Tanzania which recorded above normal rainfall, during the month of February 2019 (Figure 2 and 3).

Maximum temperature warmer than the climatological mean was recorded in south-central part of the northern sector, and over much of the equatorial and southern sectors of the GHA. Several areas in GHA recorded minimum temperature that was warmer than or near the climatological mean. The western and southeast part of the northern sector of the GHA recorded maximum and minimum temperature that was cooler than the climatological mean for the month of February 2019.

The general rainfall condition in the southern sector of GHA resulted in prospects of improvement of water and pasture conditions leading to good crop, and livestock productivity. The some areas in the equatorial sector of the GHA reported continued dry conditions following depressed rainfall conditions in the September to December 2018 short rain season, which has led to water stress related impacts.

By February 2019, the Oceanic Nino Index (ONI), a primary index used to monitor the El Nino-Southern Oscillation (ENSO) had a positive signal (Figure 7a) denoting an El Nino condition. The Indian Ocean Dipole (IOD) indicated a weak positive index (Figure 7b).The ONI and IOD are forecasted to persist in positive and neutral phases respectively over much of the second quater of 2019.

In the month of April 2019, rainfall is expected to be concentrated over much of equatorial sector, southern part of the northern sector, and northern and eastern parts of the southern sector of the GHA (Figure 8a).

## 3. CLIMATE PATTERNS IN FEBRUARY 2019

The rainfall amounts (Figure 1) and performance as compared to the climatological mean (1981-2010) using percentage of long term average (Figure 2) and Standardized Precipitation Index (SPI) (Figure 3) for February 2019 are provided in this section. The minimum (Figure 4b) and maximum (Figure 4b) temperature anomalies relative to Long term mean (1981-2010) are also given.

## Rainfall performance

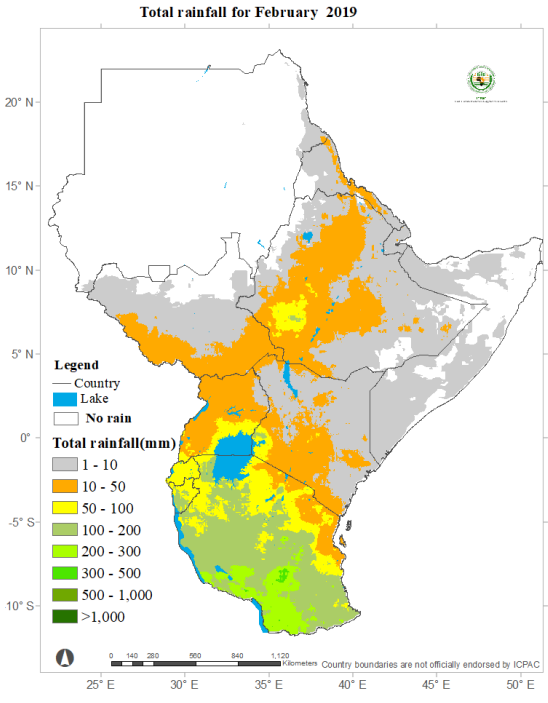


**Figure 1: Spatial distribution of rainfall during the month of February 2019***(Data Source : Blended CHIRPS)*

**South Sudan, Ethiopia, Kenya and Uganda:** The southwest and central Ethiopia, south and western South Sudan, several parts of Uganda, western, central and southeast Kenya mainly recorded rainfall of between 10mm and 50mm. Some areas in southwest Ethiopia, and the margins of Lake Victoria recorded between 50mm and 100mm of rainfall. The centrala nd southern parts of Ethiopia, south, west and east Uganda, north, and western Kenya the rainfall was mainly below normal. Much of the rest of these areas recorded near normal rainfall condition.

**Rwanda Burundi and Tanzania:** much of Rwanda, eastern Burundi, and northern and northeastern Tanzania recorded between 10mm and 100mm of rainfall. Western Burundi, and western, central and southern parts of Tanzania recorded between 100mm and 300mm of rainfall. several parts of Burundi, western part of Rwanda, northern and eastern part of Tanzania recorded below normal rainfall. Much of the rest of these areas recorded near normal rainfall.

Much of the rest of the GHA recorded less than 10mm of rainfall that resulted to generally dry or near normal rainfall conditions.

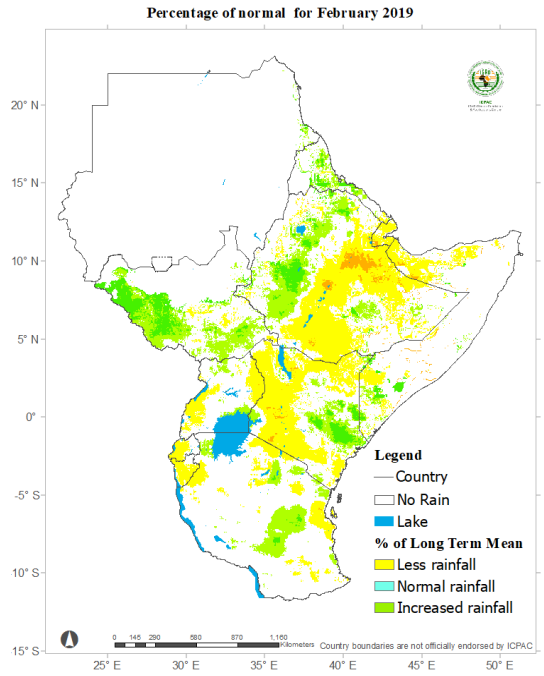


**Figure 2: Percentage of average rainfall for February 2019** *(Data Source: Blended CHIRPS)*

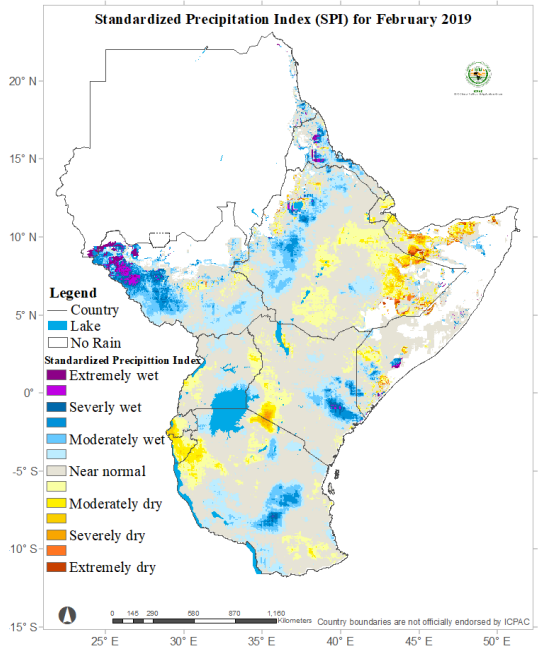


**Figure 3: Standardized Precipitation Index for February 2019** *(Data Source: Blended CHIRPS)*

## Temperature Conditions

**Sudan, Eritrea, Ethiopia and Somalia:** western several parts of Sudan, South Sudan and Somalia, western and eastern Ethiopia, and western part of Eritrea recorded maximum temperature that was cooler than the climatological mean. Western part of Sudan, northwest South Sudan, southeast Ethiopia, and northeast Somalia recorded minimum temperature that was cooler than the climatological mean. Much of the rest of these areas recorded maximum and minimum temperature that was warmer than or near the climatological mean.

**Ethiopia and Tanzania:** eastern Ethiopia extending to north and central Somalia maximum temperatures cooler than the climatological mean was recorded. Much of the rest of these areas recorded maximum temperature warmer than the climatological mean. The northwest and southern parts of Ethiopia, and southern Somalia recorded minimum temperatures warmer than the long-term mean. Much of the rest of these areas recorded maximum and minimum temperatures that was cooler than or near the climatological mean.

**Uganda, Kenya, Rwanda, Burundi and Tanzania:** Most of these areas recorded maximum and minimum temperature warmer than or near the climatological mean.

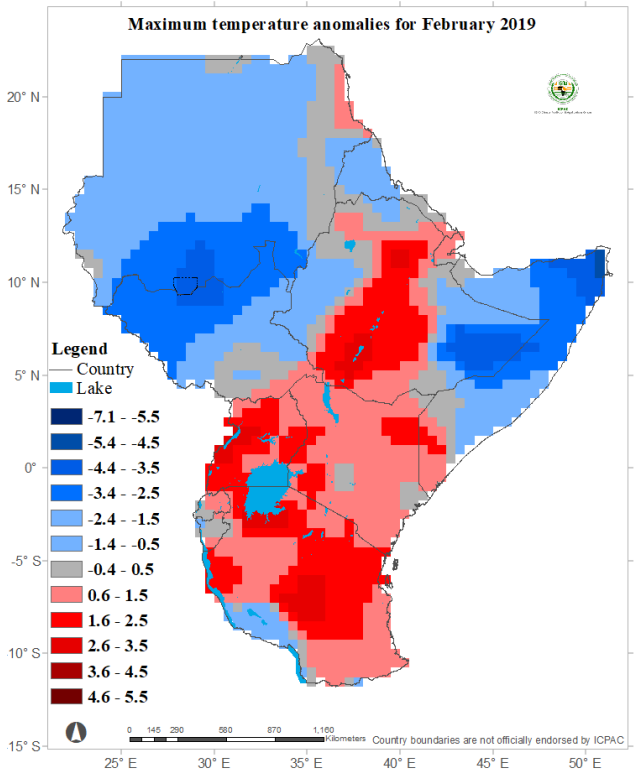


**Figure 4a: Maximum temperature anomalies for February 2019 from LTM, 1981-2010 (***Data Source: Data Source: provided by the NOAA-NCEP CPC .GTS grided data)*

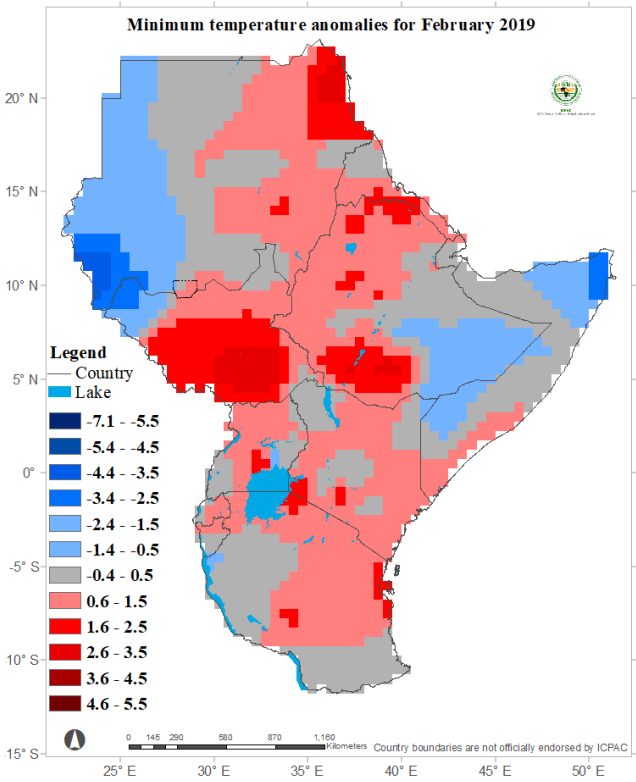


**Figure 4b: Minimum temperature anomalies for February 2019 from LTM, 1981-2010** *(Data Source: Data Source: provided by the NOAA-NCEP CPC .GTS grided data)*

## Vegetation Condition Indicators

The Normalized Difference Vegetation Index (NDVI) anomaly for February 2019 (Figure 5) indicates that:

**South Sudan, Ethiopia, and Tanzania:** signs of improvement in vegetative condition as compared to the mean was observed in western and northeast South Sudan, western parts of Ethiopia, and in north-central and eastern Tanzania. However some areas in the eastern margins of central Ethiopia, and in northeast Tanzania showed signs of deterioration in vegetative conditions.

**Uganda and Kenya:** eastern Several parts of Uganda, and western, central and southern parts of Kenya showed signs of deterioration in vegetative conditions as compared with the mean.

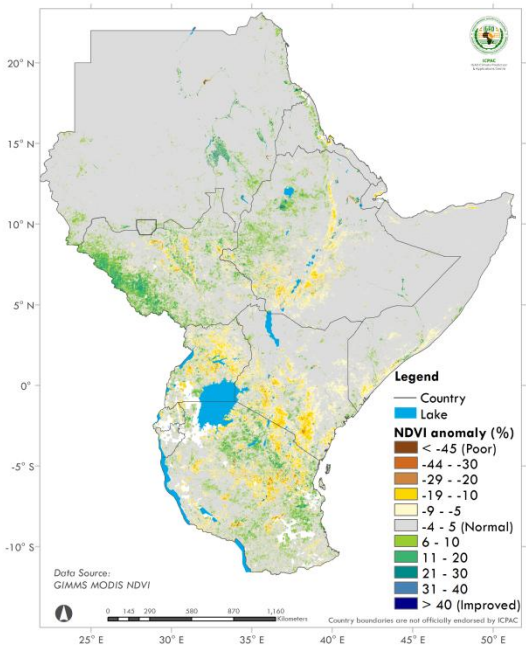


**Figure 5: Normalized Difference Vegetation Index (NDVI) for February 2019** *(Data Source: USGS-NASA)*

Much of the rest of the GHA region indicated little or no change in vegetative conditions as compared to the average for the month of February 2019. (Figure 9).

## 4. STATUS OF THE CLIMATE SYSYEMS

The Sea Surface Temperature (SST) anomaly during the period of February 2019 showed that equatorial Pacific Ocean was dominated by warmer than the average SST (Figure 6), this situation currently presents a positive, Oceanic Nino Index (ONI) (Figure 8) and an El Niño condition. Models forecasting El Niño Southern Oscillation ENSO event show a likelihood of a persistent El Niño phase through much of the second quarter of year 2019. Near average to warmer than average SST conditions dominated equatorial Indian Ocean (Figure 6). This pattern has presented a weak positive Indian Ocean Dipole (IOD) (Figure 7). Models show a likelihood of a persistent neutral phase of the IOD through much of the second quarter of 2019.

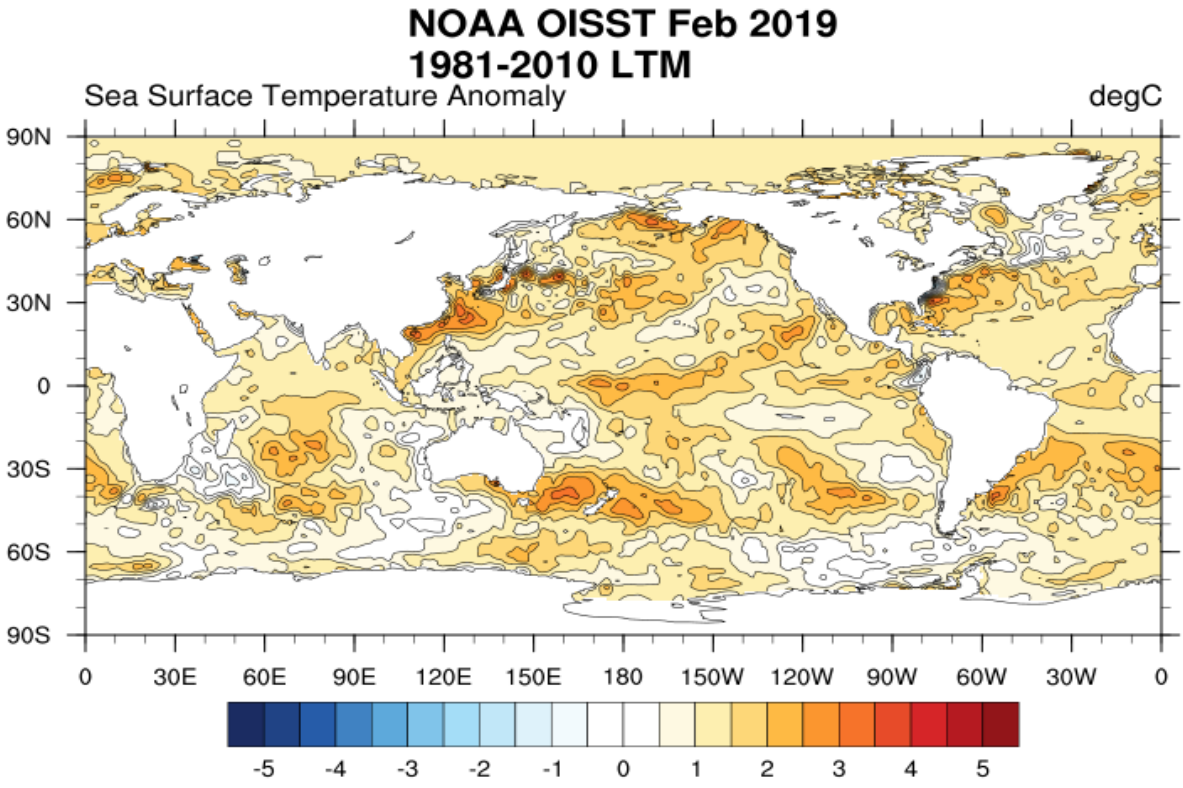


**Figure 6: Sea Surface Temperature anomalies for the period of February 2019 (***Source: NOAA***)**

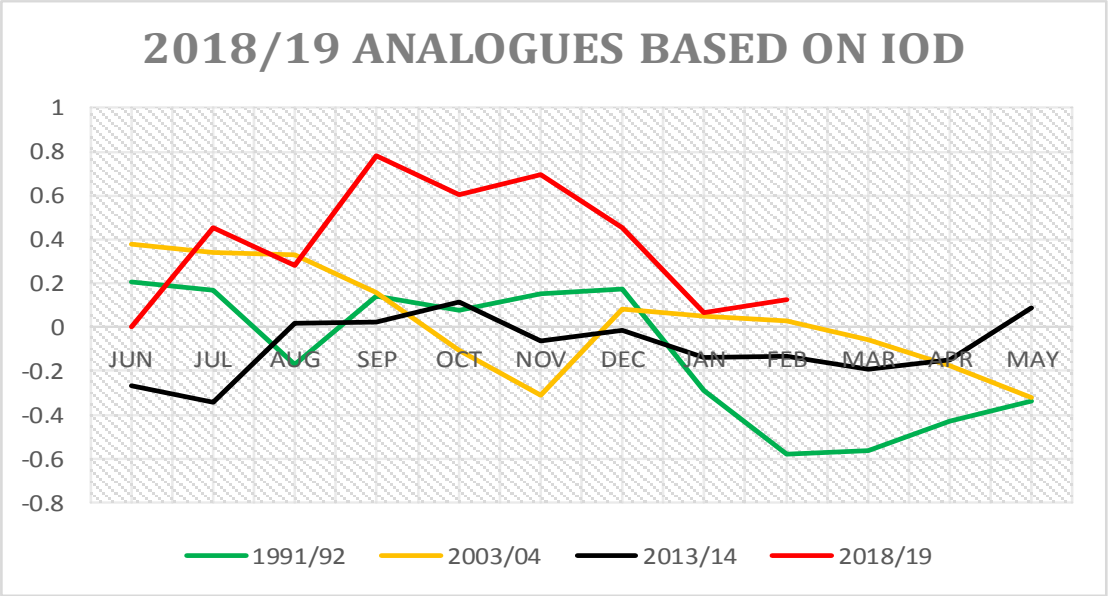


**Figure 7: The Indian Ocean Dipole (IOD) during 2019 and analogue years.**

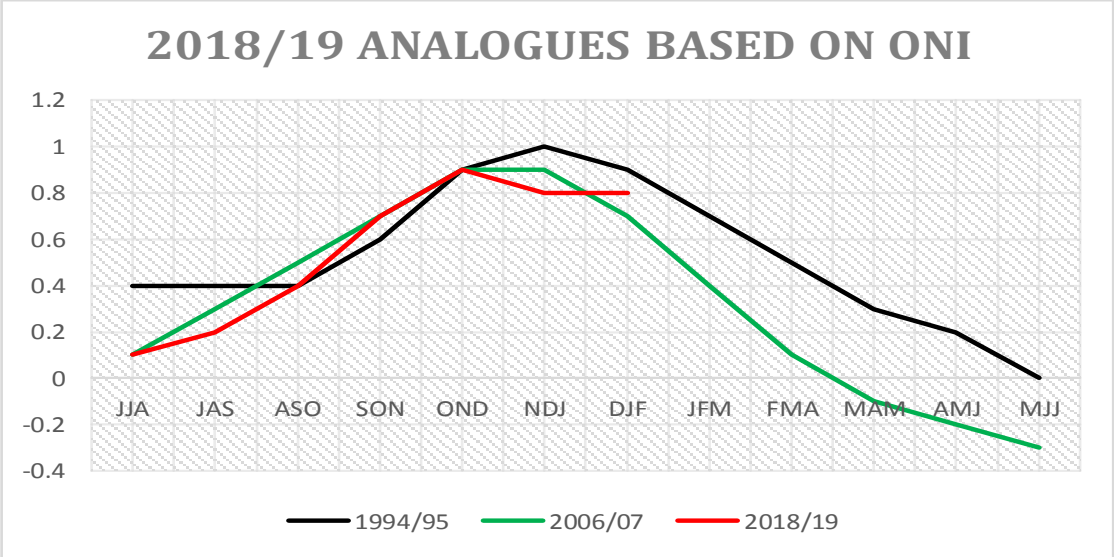


**Figure 8: The Oceanic Nino Index (ONI) during 2019 and analogue years.**

## 5. CLIMATE OUTLOOK FOR APRIL 2019

The climate outlook for temperature and precipitation for the month of April 2019 are generated from the GHA region customized Weather Research and Forecasting (WRF) model.

### The April 2019 rainfall forecast

During the month of April 2019, rainfall will be concentrated over several parts of Uganda, Kenya, Rwanda, Burundi, in southern part of South Sudan, southern Somalia, southern and central Ethiopia, and northern and eastern Tanzania. Several parts of Sudan, eastern and southern Eritrea, parts of Djibouti, northern and central Somalia, northwest Kenya, and central and southwest Tanzania are forecasted to record small amount of rainfall or remain generally dry (Figure 9a).

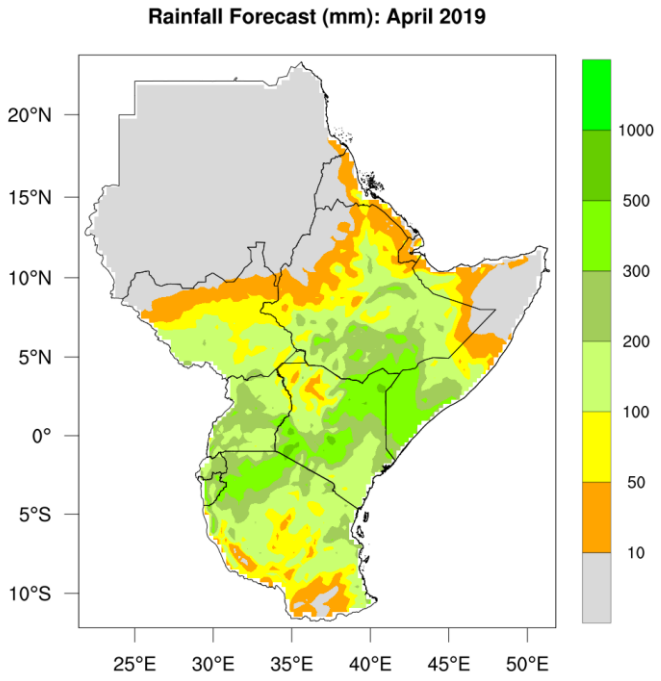


**Figure 9a: Forecast of rainfall total for April 2019 (WRF).**

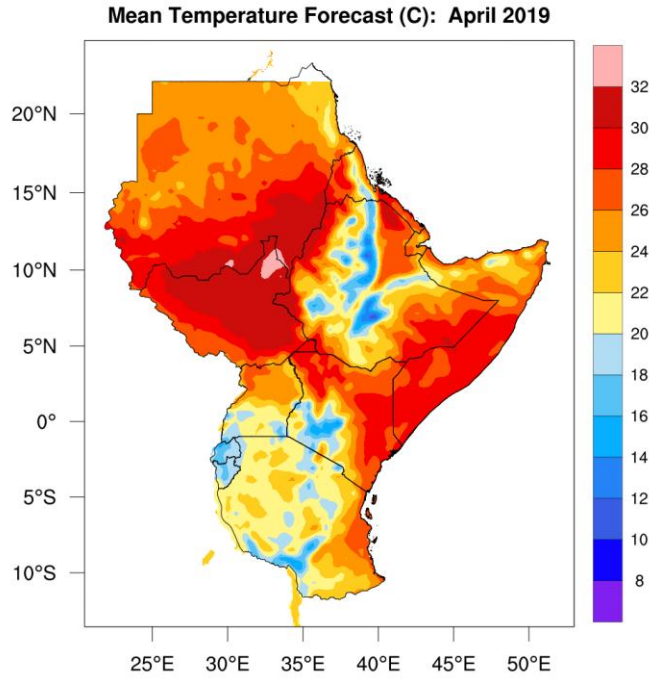


**Figure 9b: Mean temperature forecast for April 2019 (WRF).**

### April 2019 Temperature forecast

Much of Sudan, South Sudan, Djibouti, Somalia, western and southern Eritrea, northern and eastern Ethiopia, northern Uganda, northern and eastern Kenya, and eastern Tanzania are forecasted to recorded mean temperature exceeding 26$^{o}$C. Western and central Ethiopian highlands, southern Uganda, western and central highlands of Kenya, and over much of Rwanda and Burundi is forecasted to record average temperature that is cooler than 22$^{o}$C (Figure 9b).

## 6. IMPACTS ON SOCIO-ECONOMIC SECTORS

The socio-economic impacts associated with observed climate conditions are provided below.

### Impacts of observed climate conditions during February 2019

During the month of February 2019, some places in eastern and central parts of the equatorial sector continued to experienced dry conditions associated with depressed OND 2019 rainfall season causing prospects of poor crop, water and livestock performance.

### Potential impacts for April 2019 climate outlook

In the month of April 2019, the forecasted climate is likely to result to improved water availability, improved crop and pasture conditions leading to good prospects for crop and livestock performance especially in equatorial sector of the GHA.