# IGAD Climate Prediction and Applications Centre Monthly Climate Bulletin, Climate Review for December 2017

## 1. INTRODUCTION

This bulletin reviews the December 2017 climate condition over the Greater Horn of Africa (GHA) region and highlights the February 2018 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 discussed the climate patterns that prevailed in the month of December 2017, while the dominant weather systems are discussed in the section 4. In section 5, the February 2018 climate forecasts over the GHA are presented. The socio-economic impacts associated with the observed climatic conditions and those expected from February 2018 climate forecasts are outlined in the last section.

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

## 2. HIGHLIGHTS

Rainfall was mainly experienced in southern sector and southern part of the equatorial sector of the GHA. Much of the equatorial sector as well as northeastern part of the southern sector of the GHA experienced depressed rainfall conditions. However much of the rest of the GHA experienced near normal rainfall conditions, except for a few areas in western and southern parts of Tanzania which had enhance rainfall conditions during December 2017(Figure 2 and Figure 3).

Warmer than the average maximum temperatures conditions was experienced mainly over southwestern and southeastern parts of northern sector, as well as western and eastern parts of the equatorials sector of GHA during the month of December 2017 (Figure 4a). Areas covering north of Sudan as well as parts of western Ethiopia indicated cooler than the average condition for maximum temperature. Warmer than the average minimum was experienced mainly in southern part of the northern of the GHA (Figure 4b), while much of the rest of the GHA recording near average condition for maximum and minimum temperature during the month of 2017.

Improvement in water and pasture conditions resulting to prospects of good crop and commencement of planting season, and livestock productivity following the rainfall condition for the month of December. However a few places especially in the eastern part of the equatorial sector as

well as northern and south-eastern parts of the northern sector experience impacts of depressed rainfall conditions that has led to deterioration of water of resources, and general water stress as direct negative impacts of depressed rainfall conditions. A few places also reported flooding which interrupted livelihoods especially in some areas in Sudan and in the southwestern parts of the equatorial sector of the GHA.

In December 2017, the Oceanic Nino Index (ONI) as one of the primary indices used to monitor the El Nino-Southern Oscillation (ENSO) signal showed a neutral phase of ENSO (Figure 7a) and Indian Ocean Dipole (IOD), which is the signal of interaction between the ocean and the atmosphere in the Indian Ocean showed positive phase of IOD (Figure 7b). The ONI is forecasted to persist in a neutral phase in the coming few months with an increasing chance of negative phase towards the end of the year 2017 and the beginning of 2018, while the IOD shows more likelihood of persisting in the positive phase during this period.

In the month of February 2018, rainfall is expected to be concentrated over much of southern sector and southern parts of the equatorial sector of the GHA. A few areas in the northern parts of the equatorial sector and southeastern part of the northern sector of the GHA are also likely to record some rainfall (Figure 8a) activities.

## 3. CLIMATE PATTERNS IN DECEMBER 2017

The rainfall amounts (Figure 1) and performance as compared to the Long Term Mean (1981-2010) using percentage of long term average (Figure 2) and Standardized Precipitation Index (SPI) (Figure 3) for December 2017 are provided in this section. The minimum (Figure 4b) and maximum (Figure 4b) temperature anomalies relative to Long term mean (2008-2016) are also given.

### Rainfall amounts in December 2017

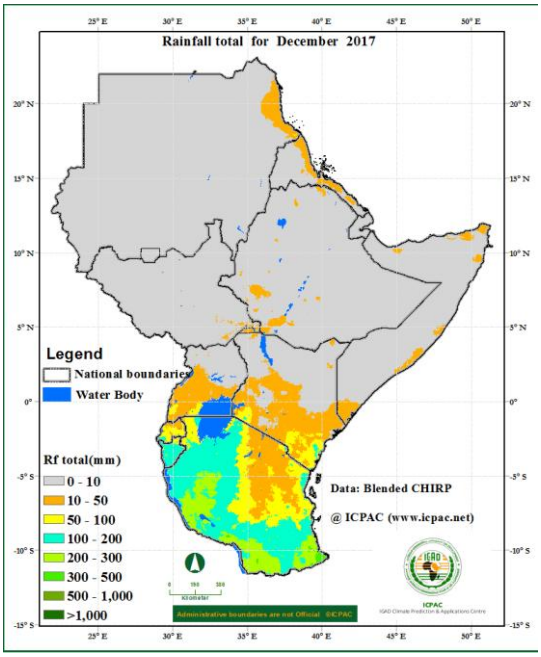


**Figure 1: Spatial distribution of rainfall during the month of December 2017***(Data Source : Blended CHIRPS)*

During the month of December 2017, parts of western and southern parts of Tanzania recorded between 200mm and 300mm of rainfall which was the highest range of rainfall recorded. Much of Burundi and in parts of western and southern Tanzania, eastern parts of Sudan, coast of Eritrea, as well as southwestern and southern coast of Kenya recorded rainfall exceeding 100mm. Rainfall amounts of between 10mm and 100mm was recorded in southern part of Uganda, southern part of Kenya, over much of Rwanda, and in northeastern Tanzania. Much of the rest of the GHA region recorded less than 10mm of rainfall during the month of December 2017 (Figure 1).

### Rainfall severity in the month of December 2017

In December 2017, eastern Sudan extending to western Eritrea, and over a few areas in northwest

and northeast South Sudan, and southwestern and southeast part of Tanzania had rainfall exceeding 125% of the long term average. Much of Sudan, northern part of South Sudan, some parts of northern Somalia, much of Burundi, southwestern part of Rwanda, and northwest, west, and southern parts of Tanzania near average rainfall conditions of between 75% and 125% of the long term average was recorded. Much of the rest of the GHA recorded rainfall less than 75% of the long term average. Southwestern Sudan, northern and southeastern parts of South Sudan, southern and southeastern Ethiopia; over several parts of Somalia, northern Kenya; and in parts of northwestern and eastern Uganda; and over several parts of north, western and southern Tanzania showed poor rainfall performance compared with the month of November 2017. Areas in eastern Sudan and southeastern Tanzania showed indication of improvement in rainfall performance as compared with the previous month

Much of the Uganda, over several parts of Kenya, southwestern Ethiopia, southern Somalia, and northeastern Tanzania experienced moderately dry to severely dry conditions. A few areas in eastern Sudan, western Eritrea, Djibouti, central South Sudan, and western and southern parts of Tanzania experienced moderately wet to severely wet conditions. Much of the rest of the GHA experienced near normal conditions during the month of December 2017.

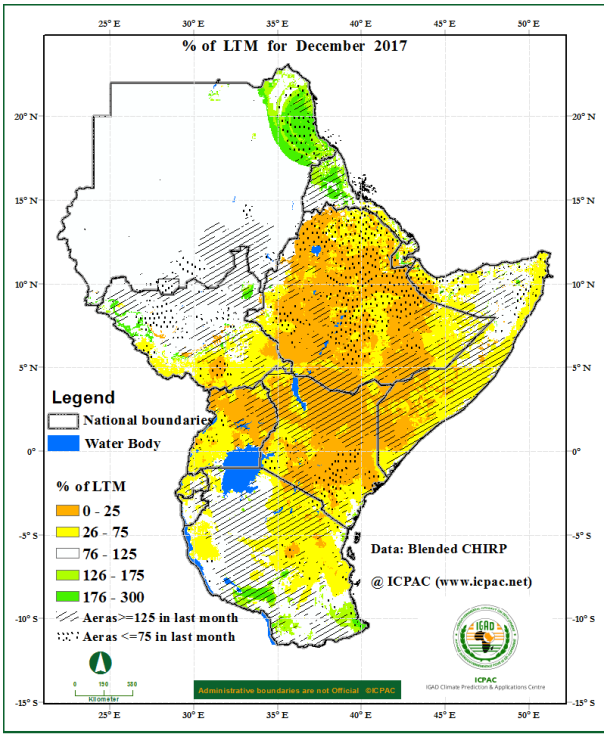


**Figure 2: Percentage of average rainfall for December 2017** *(Data Source: Blended CHIRPS)*

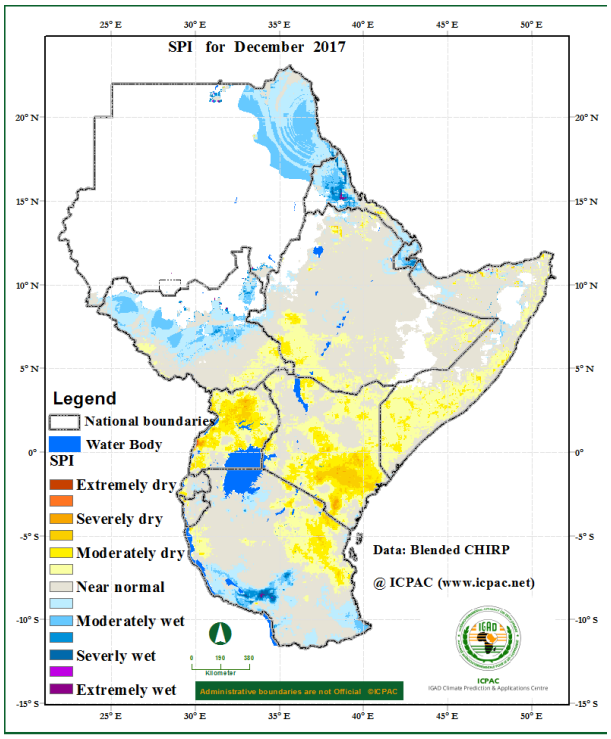


**Figure 3: Standardized Precipitation Index for December 2017** *(Data Source: Blended CHIRPS)*

## Temperature Conditions

During December 2017, warmer than the average maximum temperatures conditions was experienced mainly over much of Sudan, South Sudan, and southwestern Eritrea; in parts of western and southern western Ethiopia, and western Eritrea; over much of Uganda, and Kenya; and in parts of

northern Tanzania, southwestern Somalia and eastern Rwanda. A few areas in northern Somalia, southern Eritrea, and southwestern Tanzania recorded cooler than the average for maximum temperature while much of the rest of the GHA recorded near the average for maximum temperatures (Figure 4a).

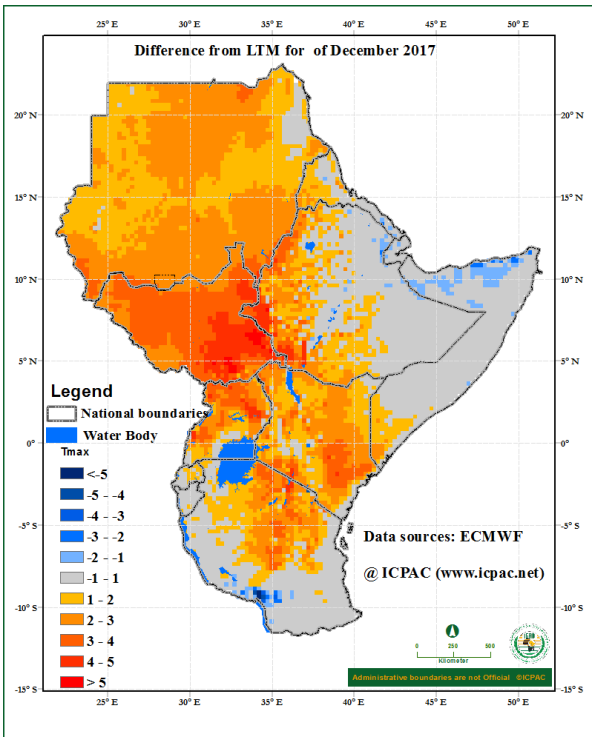


**Figure 4a: Maximum temperature anomalies for December 2017 *f*rom LTM, 2008-2016 (*Data Source: ECMWF)***

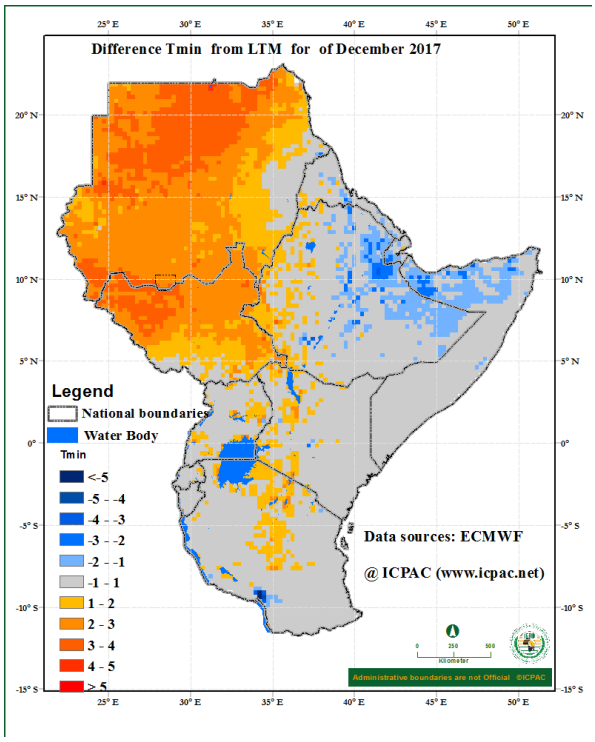


**Figure 4b: Minimum temperature anomalies for December 2017 from LTM, 2008-2016** *(Data Source: ECMWF)*

Much of Sudan, and South Sudan; and in parts of western Ethiopia, western Kenya, eastern and southern Uganda, and north-central to central Tanzania warmer than the average conditions for minimum temperatures was recorded during the month of December 2017. The rest of the GHA recorded near the average conditions for the minimum temperature, except for areas in eastern Ethiopia, and northern Somalia which recorded cooler than the average conditions for minimum temperature. (Figure 4b).

## Vegetation Condition Indicators

The Normalized Difference Vegetation Index (NDVI) anomaly for December 2017 indicates that much of Uganda, southern parts of South Sudan, eastern and southern parts of Ethiopia, much of southern and central Somalia, eastern and southern Kenya, and northeastern Tanzania experience deterioration in vegetative conditions as compared to the long term average. Isolated parts of South Sudan, eastern Ethiopia, and over much of western, east and south of Tanzania showed improvement in vegetative conditions as compared to the long term average. Much of the rest of the GHA region indicated little or no change in vegetative conditions as compared to the long term average for the month of December 2017. (Figure 9).

## 4. STATUS OF THE CLIMATE SYSYEMS

The Sea Surface Temperature (SST) anomaly during the period 10 December 2017 – January 08, 2018 showed that over central equatorial Pacific Ocean stretching towards the eastern equatorial Pacific region (Niño 4 to Niño 1&2 areas), cooler than average SST anomaly was observed, with the area stretching from central towards western equatorial Pacific Ocean recording warmer than average SST (Figure 5), however this situation presents a weak La Niña phase (Figure 6) however models show an increased likelihood of persistence of a negative El Niño Southern Oscillation phase through the first quarter of the year 2018. Near average to cooler than average SST conditions dominated eastern side of equatorial Indian Ocean (Figure 5) with much of the central to western equatorial Indian Ocean experiencing near average to cooler than average SST. This pattern has presented a weak positive phase of the Indian Ocean Dipole (IOD) (Figure 7). Models show persistence of a positive phase of the IOD during the initial periods of year2018.

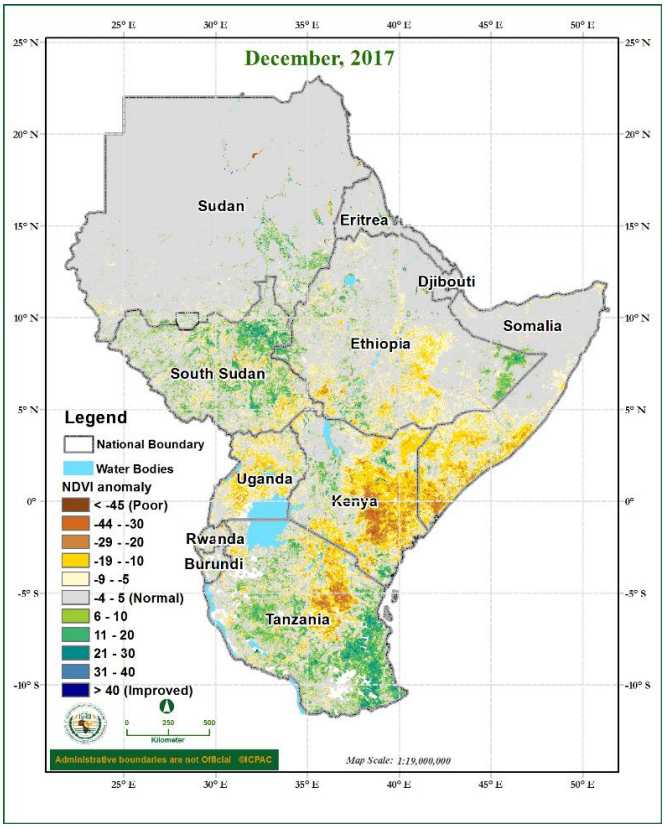


**Figure 9: Normalized Difference Vegetation Index (NDVI) for December 2017 over the Greater Horn of Africa** *(Data Source: USGS-NASA)*

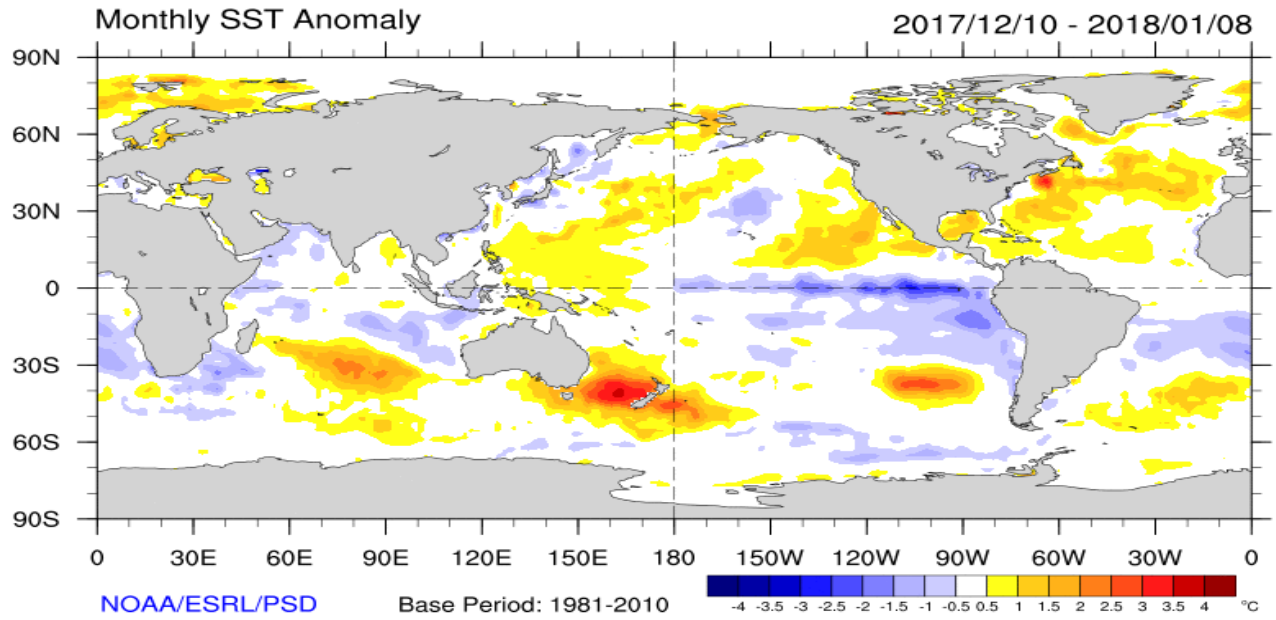


**Figure 5: Sea Surface Temperature anomalies for the period 10 December 2017 to 08 January 2018 (***Source: NOAA/ESRL/PSD***)**

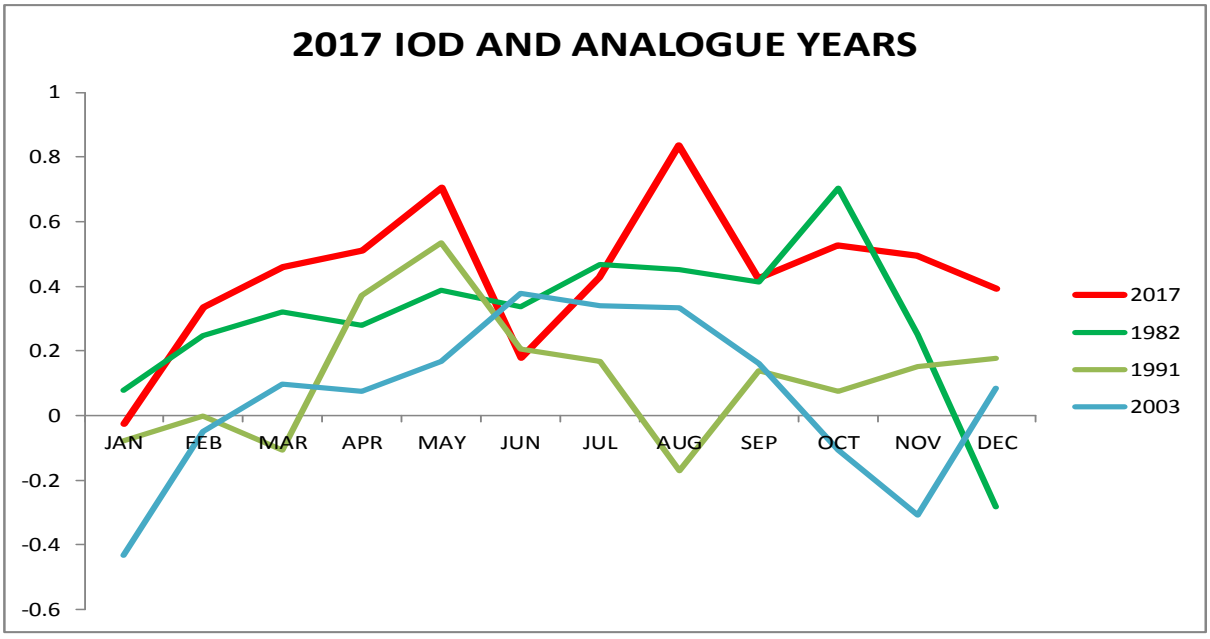


**Figure 6: The Indian Ocean Dipole (IOD) during 2016/17 and analogue years.**

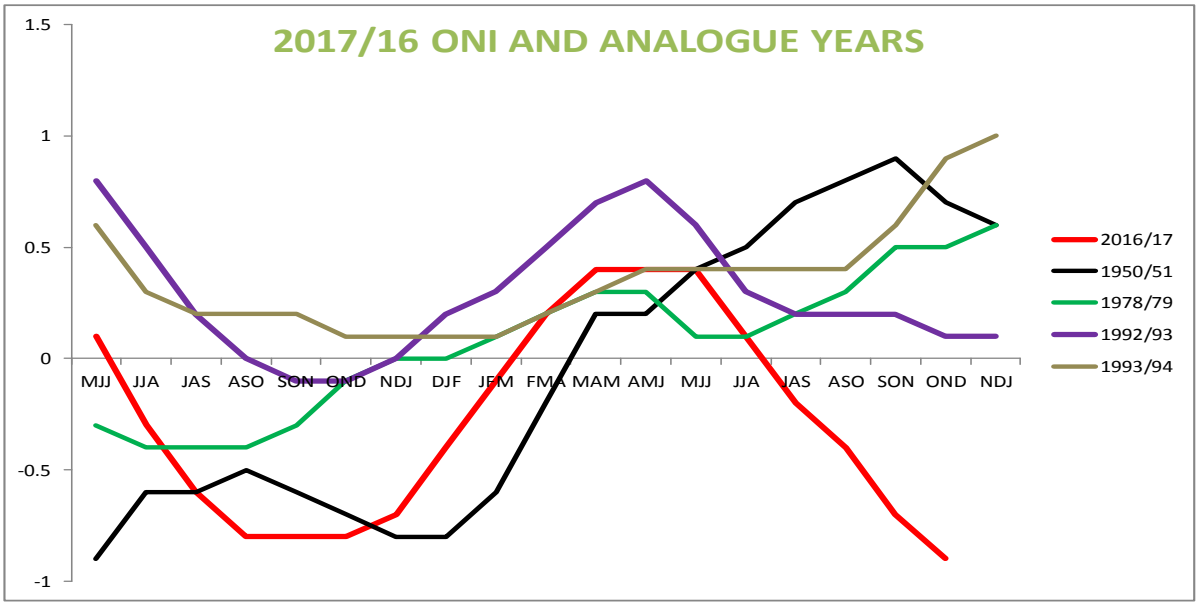


**Figure 7: The Oceanic Nino Index (ONI) during 2016/17 and analogue years.**

## 5. CLIMATE OUTLOOK FOR FEBRUARY 2018

The climate outlook for temperature and precipitation for the month of February 2018 are generated from the GHA region customized WRF model.

### The February 2018 rainfall forecast

During the month of February 2018, rainfall will be concentrated over much of Tanzania, and in parts of Rwanda, Burundi, southern parts of Uganda as well as in parts of coastal Kenya. (Figure 8a). Much of the areas covering central Sudan, South Sudan Eritrea, Djibouti, Ethiopia, Somalia Northern and central Uganda, and over much of Kenya are likely to remain generally dry or record small amounts of rainfall.

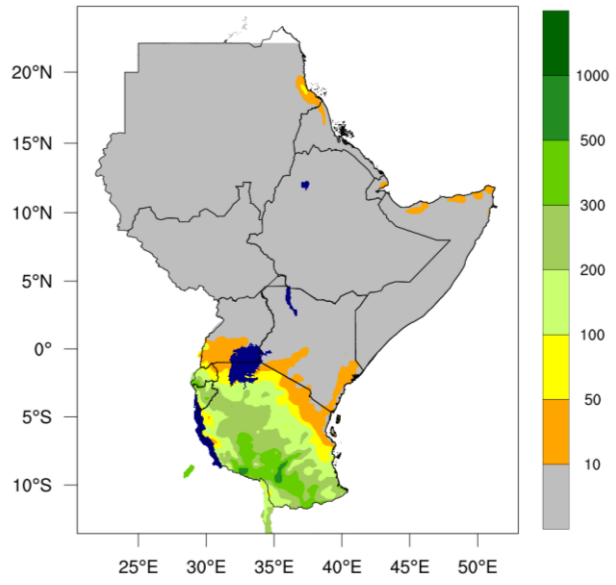


**Figure 8a: Forecast of rainfall total for February 2018**

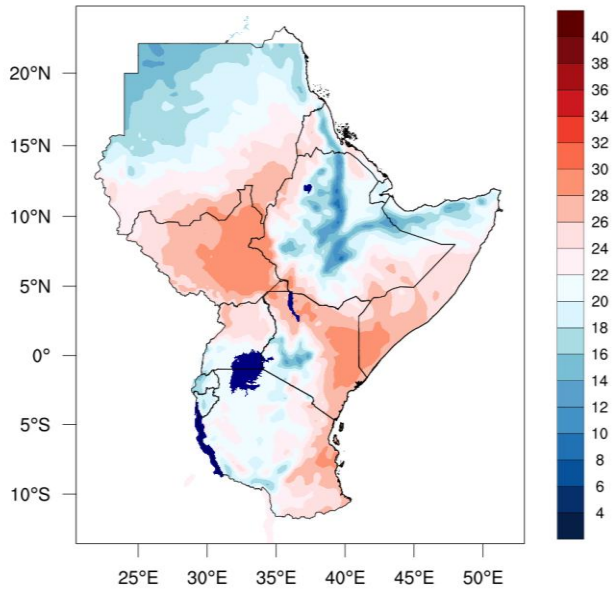


**Figure 8b: Mean temperature forecast for February 2018.**

### The February 2018 Temperature forecast

Average temperature of cooler than 22°C is likely to be observed over northern and central Sudan, central Eritrea, over much of Djibouti, north, central and eastern Ethiopia, northern Somalia, western and central Kenya, Rwanda, Burundi, southern Uganda, and in western and northwestern Tanzania. Much of the rest of the GHA is likely to record average temperatures warmer than 22°C, with western parts of South Sudan, northern and eastern parts of Kenya, southern Somalia, and coastal Tanzania likely to record temperature exceeding 28°C (Figure 8b).

## 6. IMPACTS ON SOCIO-ECONOMIC SECTORS

The socio-economic impacts associated with observed rainfall conditions and those from the February 2018 rainfall and temperature forecast are provided below.

### Impacts of observed climate conditions during December 2017

During the month of December 2017, several areas especially in the central and southeastern parts of the northern sector, central and southwestern parts of the equatorial sector as well as northwestern parts of the southern sector of the GHA experienced good rainfall performance leading to improved pasture and water conditions during December 2017. However a few areas in the northern sector of the GHA showed persistence in dry conditions leading to continued deterioration in water and pasture conditions.

### Potential impacts for February 2018 climate outlook

In the month of February 2018, the forecasted climate is likely to result to improved water availability, crop and pasture conditions leading to good prospects for crop and livestock performance especially in much of the southern sector of the GHA. Southwestern and southern parts of Tanzania, are likely

to experienced high rainfall which might lead to flooding and the associated impact. While much of the eastern part of the equatorial sector of the GHA is likely to remain hot and dry resulting to continued deterioration in water and pasture resources.

For more information contact

ICPAC P.O. Box 10304, 00100 Nairobi, KENYA;

Tel: +254-020-3514426

E-mail: director@icpac.net

THIS BULLETIN IS PRODUCED IN COLLABORATION WITH THE NATIONAL METEOROLOGICAL AND HYDROLOGICAL SERVICES (NMHSs) IN THE GREATER HORN OF AFRICA (GHA)