

## IGAD Climate Prediction and Applications Centre Monthly Bulletin, August 2016

*For referencing within this bulletin, the Greater Horn of Africa (GHA) is generally subdivided into three sub-sectors: The equatorial sector lying approximately between -5° and 5° latitude, with the northern and southern sectors occupying the rest of the northern and southern parts of the region respectively*

### 1. HIGHLIGHTS

- Rainfall activities were mainly observed over much of western and central parts of the northern sector, as well as over the western parts of the equatorial sector during the month of July 2016.
- The socio-economic impacts associated with the observed rainfall over the GHA during the month of July 2016 resulted in improved crop, pasture and foliage conditions, improvement in water resources, flooding, and increase in water related diseases and these climate conditions are expected to be experienced in September over parts of northern sectors of the GHA.
- During the period of September 2016, much of northern sector and the western equatorial sectors of the GHA are likely to receive near normal to above normal rainfall.

### 2. INTRODUCTION

In this bulletin, the climate conditions recorded over the GHA region in the month of July 2016 is reviewed and the rainfall and temperature predicted for September 2016 period is also provided. Highlights on the socio-economic impacts associated with both the observed conditions and the predicted are also given.

There are seven sections in this bulletin. In section 1, the major highlights from both the observed and expected climate conditions are outlined. Section 3 provides an overall summary. The climate patterns that prevailed in the month of July 2016 are discussed under section 4, while the dominant weather systems are discussed in the section that follow. An update climate predicted over the GHA for September 2016 period is presented in section 6. The socio-economic impacts associated with the observed climatic conditions in July 2016 and those expected from the climate predicted for September presented the final section.

### 3. SUMMARY

This bulletin has three main components, these are: the climatic conditions observed during the month of July 2016 over GHA, the climate predicted for September 2016 period, and the impacts associated with both the observed climate conditions and the climate prediction.

Rainfall activities were mainly observed over most parts of the northern sector as well as over few areas in western parts of the equatorial sector of the GHA region during the month of July 2016.

The observed rainfall conditions over parts of the Greater Horn of Africa during the month of July 2016 resulted in improved crop, pasture and foliage conditions, and replenishment of water resources and increase in water related diseases and climate suitability for seasonal endemic malaria within areas in the northern sector.

The rainfall predicted for September 2016 in Figure 8a indicates that western and central parts of the northern sector are likely to receive more than 200mm of rainfall. Areas in western parts of the equatorial sector are likely to receive rainfall between 100- 200mm.

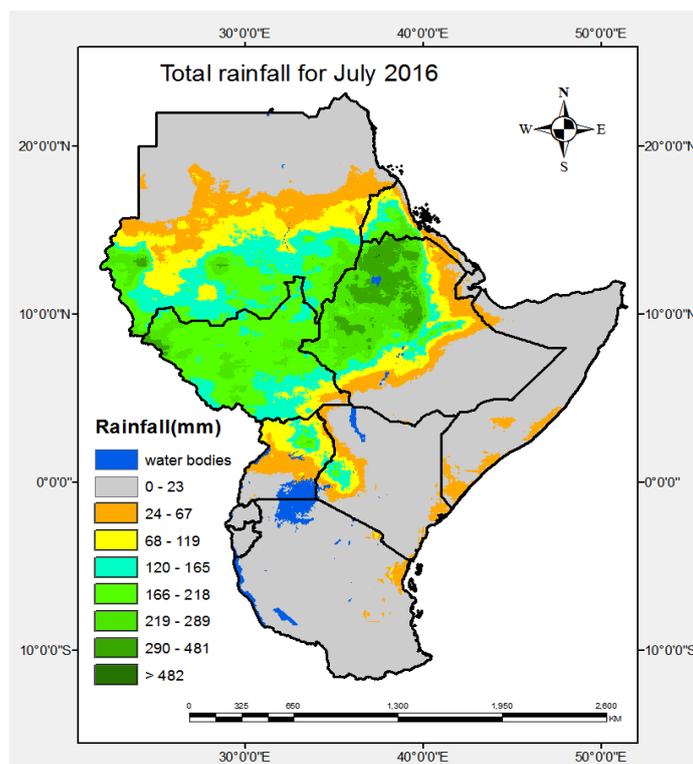
In the month of September 2016 (Figure 8b) northern parts of the northern sector are expected record average temperature that exceeds 30°C, while much of central Ethiopia, western and central equatorial sector as well as central and western and south western parts of Tanzania, are expected to record average temperatures of less than 20°C.

#### 4. CLIMATE PATTERNS IN JULY 2016

*The climatological summary for the rainfall in terms of amount, percentage of average, and standardized precipitation index for July 2016 Rainfall performance as Compared to the Long-Term Mean over the GHA are provided in this section.*

##### 4.1 Rainfall amounts and performance during July 2016

During the month of July 2016, western and northern parts of Ethiopia; western central and northern parts of South Sudan; scattered parts of Sudan recorded between 100mm to more than 400mm of precipitation. Western Kenya and scattered parts of Somalia coastal, Central and northern parts of Uganda and central Sudan received between 23mm to 120mm of rainfall. The rest of the GHA region recorded less than 23mm of rainfall (Figure 1).



**Figure 1: Spatial distribution of rainfall during the month of July 2016**

### 4.2. Rainfall performance as compared to the Long Term Mean

Figure 2 shows the July 2016 rainfall performance as Compared to the Long-Term Average for the northern, equatorial and southern sectors of GHA. In the month of July stations within the northern sector and parts of equatorial sector are expected to receive significant rainfall amounts. Several stations in northern and equatorial sector recorded near average to above average rainfall amounts, with a few station recording below average rainfall for the month of July 2016. However much of the southern sector stations recorded less than the average rainfall expected in July (Figure 2a, 2b and 2c).

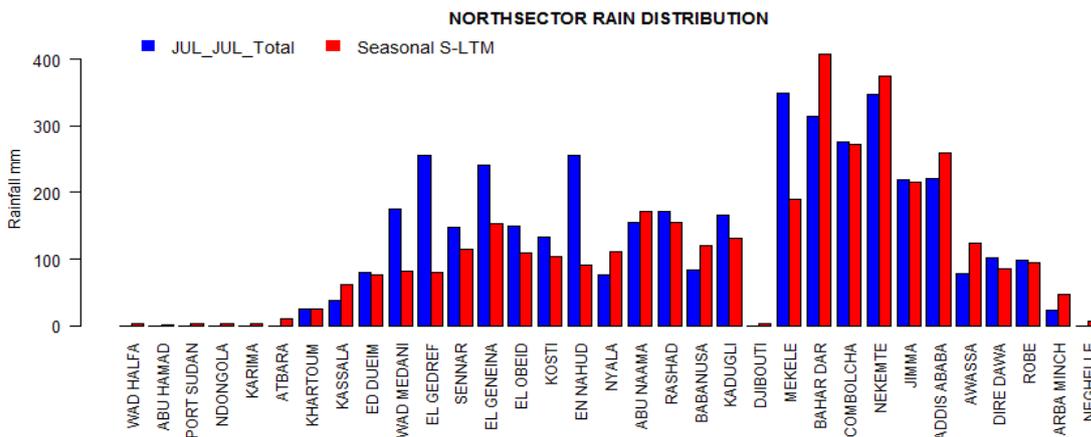


Figure 2a: July 2016 Rainfall performance as Compared to the Long-Term Mean over GHA northern sector

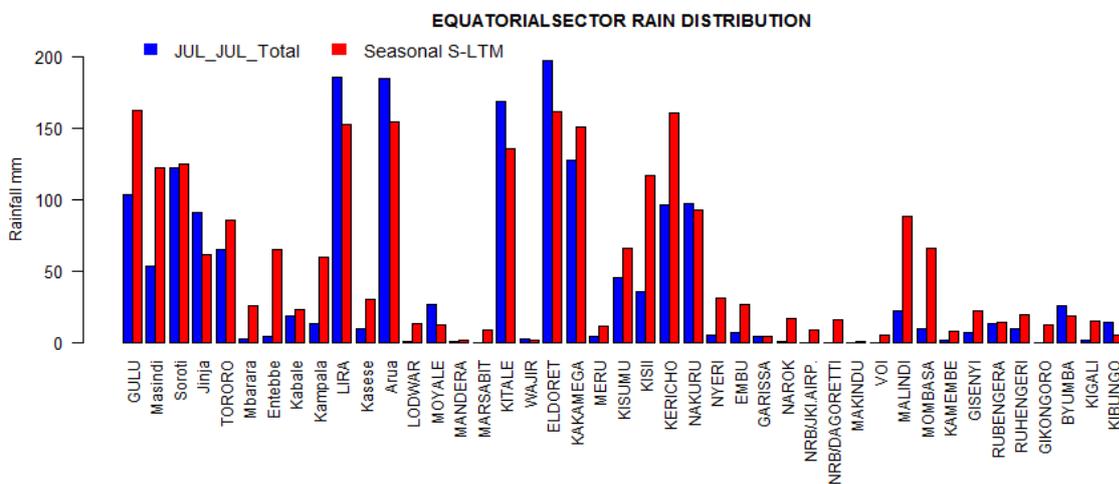


Figure 2b: July 2016 Rainfall performance as Compared to the Long-Term Mean over GHA Equatorial sector

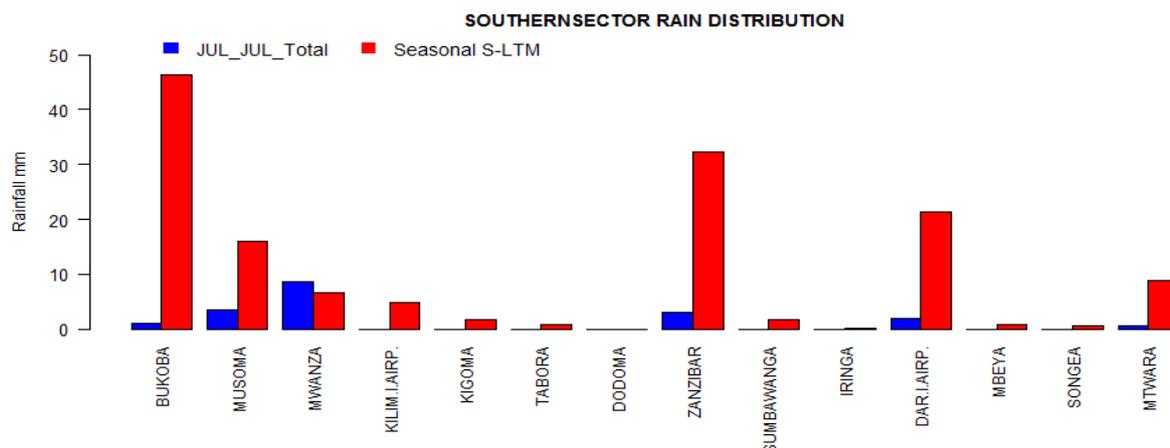


Figure 2c: July 2016 Rainfall performance as Compared to the Long-Term Mean over GHA Southern sector

### 4.3 Rainfall severity in the month of July 2016

Figure 3 shows the percent of average of the July 2016 rainfall and Figure 4 shows the standardized precipitation index (SPI) for the same month. Rainfall amounts ranging between 125% to more than 175% of the long term mean rainfall was recorded in areas around central, eastern and southern parts of Sudan; over much of Eritrea; northern and north eastern Ethiopia; isolated parts of central South Sudan; north eastern parts of Kenya; south eastern Rwanda; and in isolated areas round southern central Tanzania (Figure 3). Areas around these regions including southern parts of Sudan; western, northern and north eastern Ethiopia; central and north eastern South Sudan; parts of western Uganda recorded rainfall amount ranging between 75% and 125% of the long term average rainfall. The rest of the GHA region recorded less than 75% of the long term average precipitation for month of July (Figure 3).

During the month of July 2016, moderate to severely wet rainfall conditions was observed over central and southern parts of Sudan; over much of Eritrea; northern Ethiopia; central parts of South Sudan and parts of north eastern Kenya (Figure 4). Moderately dry to severely dry rainfall conditions was mainly observed in the south western Ethiopia; western and southern Uganda; western central and coastal areas of Kenya; southern Somalia and over eastern Tanzania during the month of July 2016 (Figure 4). The rest of the GHA region indicated near normal to generally dry rainfall conditions.

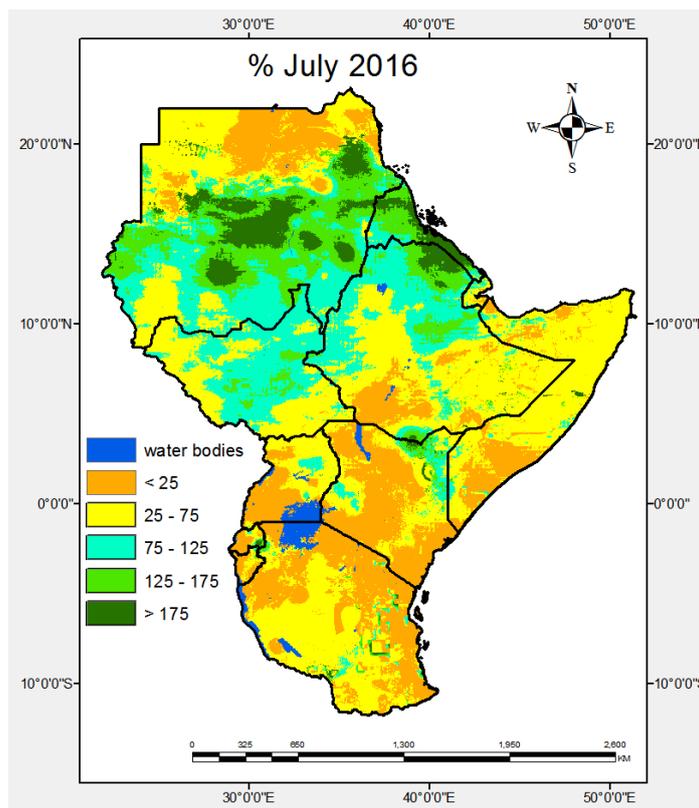


Figure 3: Percentage of average rainfall for July 2016

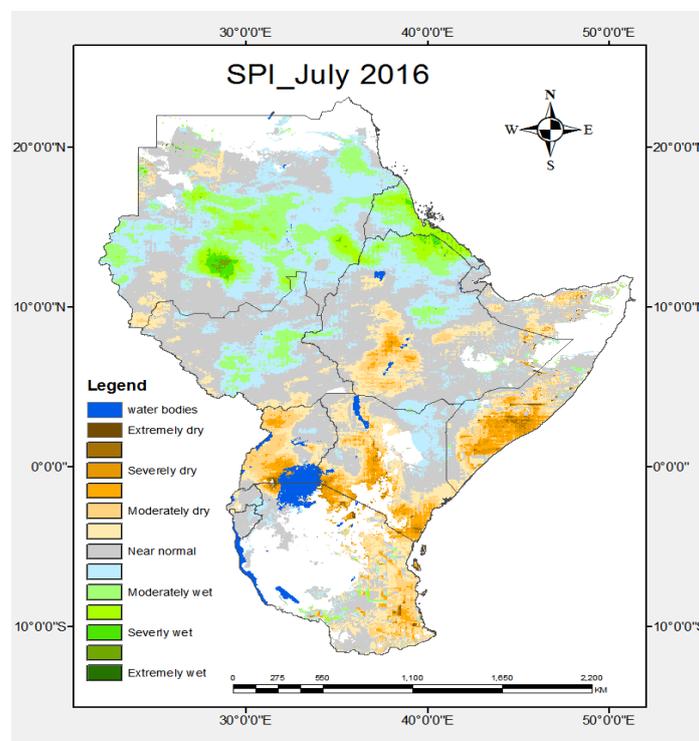


Figure4: Standardized Precipitation Index for July 2016

#### 4.4 Temperature anomalies

#### 4.4.1 Maximum temperature anomalies

During the month of July 2016, warmer than average maximum temperatures prevailed over most of the GHA (Figure 5a) except for isolated areas in northwest and south eastern Sudan; central part of Ethiopia; and central part of Kenya, which recorded cooler than average maximum temperature anomalies. Above average maximum temperature anomalies exceeding 2°C were recorded over regions in southern Ethiopia, southern of Uganda, and south western Kenya (Figure 5a).

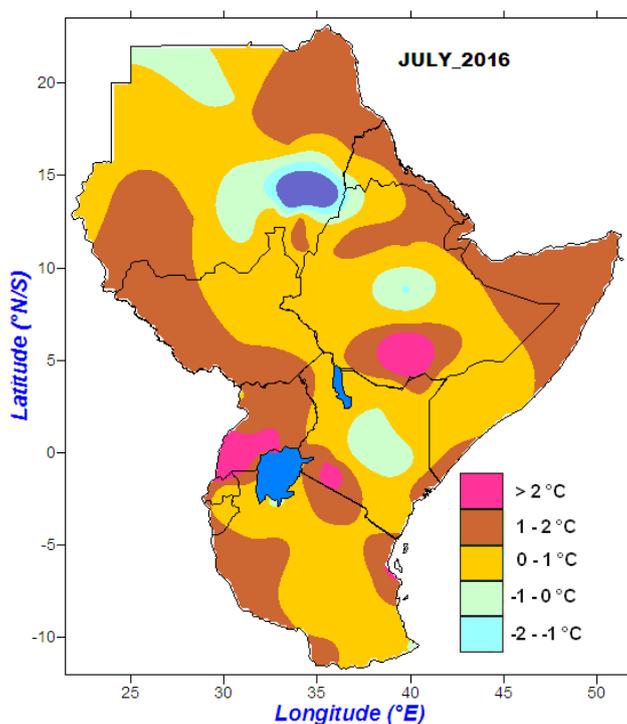


Figure 5a: Maximum temperature anomalies for July 2016

#### 4.4.2 Minimum temperature anomalies

During the month of July 2016, much of the equatorial and northern sectors of the Greater Horn of Africa (GHA) recorded warmer than average minimum temperature anomaly except for isolated areas in eastern Sudan and central Ethiopia; and central and southern Tanzania which recorded cooler than average minimum temperatures. Positive minimum temperature anomalies exceeding 2°C was recorded over much of northern Sudan; over south western and south central parts of Sudan; over much of Djibouti; north eastern Ethiopia; northern Somalia; central part of the northern South Sudan and south eastern South Sudan; southern and north eastern Uganda; western Kenya; and northern and west of Tanzania (Figure 5b).

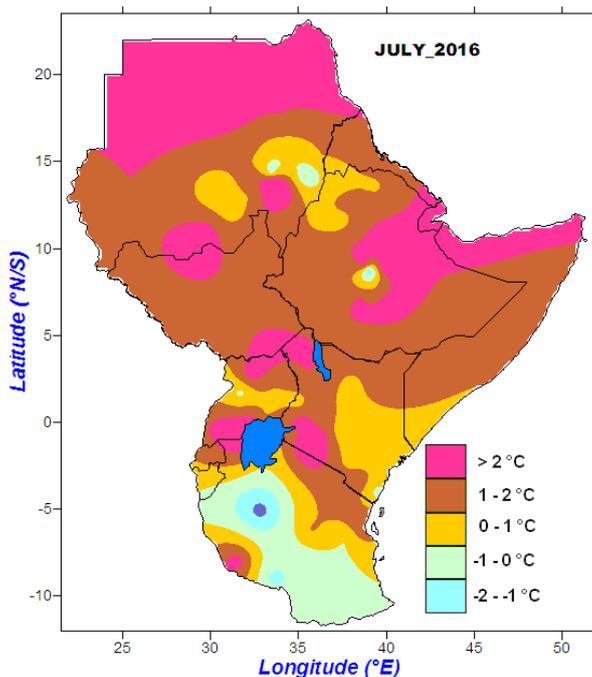


Figure 5b: Minimum temperature anomalies for July 2016

**5. STATUS OF THE CLIMATE SYSTEMS**

During the period between 24 of July and the 20 of August 2016, the cooler than normal sea surface temperature (SSTs) is observed over central and eastern equatorial Pacific Ocean (Niño 1+2, Niño 3, Niño 3.4 and western part of Niño 4), This represents a typical pattern of an evolving la Niña. Average to above average sea surface temperatures (SSTs) is observed over eastern and central equatorial Indian Ocean and cooler than average SST is observed over western equatorial Indian Ocean (Figure 6). This represents a pattern for a negative phase of the Indian Ocean Dipole (IOD) (Figure 7).

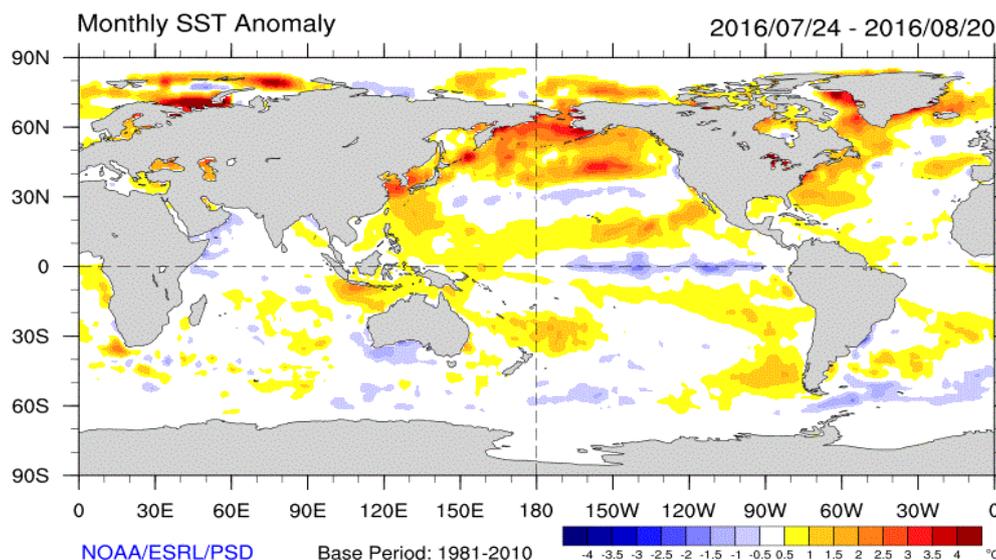


Figure 6: Sea Surface Temperature anomalies for the period 24 July to 20 August 2016 (Courtesy of NOAA/ESRL/PSD)

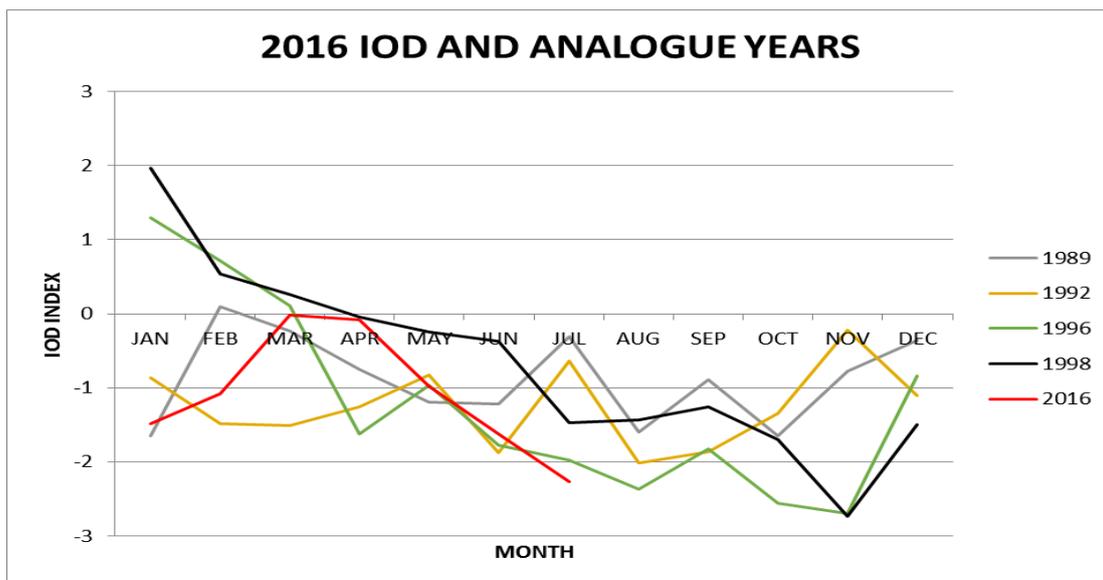
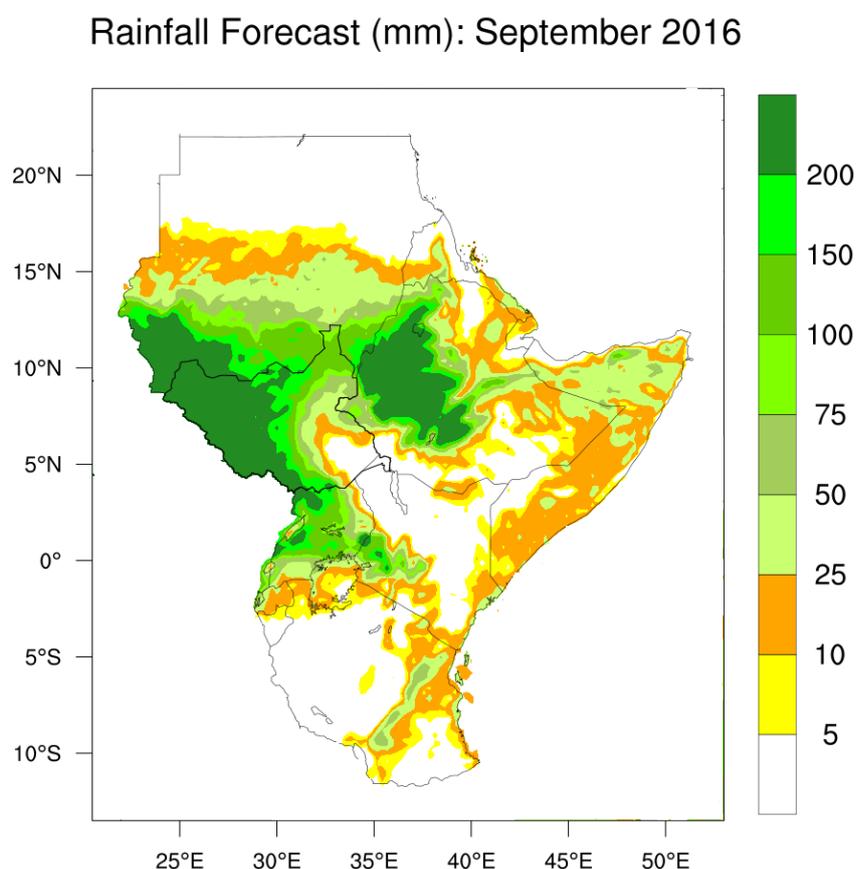


Figure 7: Indian Ocean Dipole (IOD) for 2016 and Analogue Years

## 6.0 CLIMATE OUTLOOK FOR SEPTEMBER 2016

### 6.1 The rainfall forecast for September

The rainfall forecast for GHA region is given in Figure 8a below. Wet conditions are likely to be in the northern and western equatorial sector this include southern part of Sudan extending to northern and western areas of South Sudan; western, and north western Ethiopia; western and north western Uganda; and part of western Kenya. Much of central and western parts of Tanzania, central and northeast of Kenya, southeast of south Sudan and extreme northern Sudan are usually climatology dry during September and are likely to receive less 5mm rainfall. The rest of the GHA region are likely to receive between 5mm and 50mm of rainfall in the month of September 2016 (Figure 8a).



**Figure 8a: Rainfall Outlook for the August-September 2016 rainfall period**

6.2 Temperature Outlook for August to September 2016

The temperature forecast for GHA region is given in Figure 8b below. Much of parts of Tanzania, western Kenya, most of central, western and northern Ethiopia are predicted to receive average temperature less than 20°C, while northern parts of Sudan, northeast of Ethiopia, Eritrea costal and Djibouti are exceeding 30 °C. Much of Somalia and South Sudan expected to receive average temperature ranging between 22- 25°C.

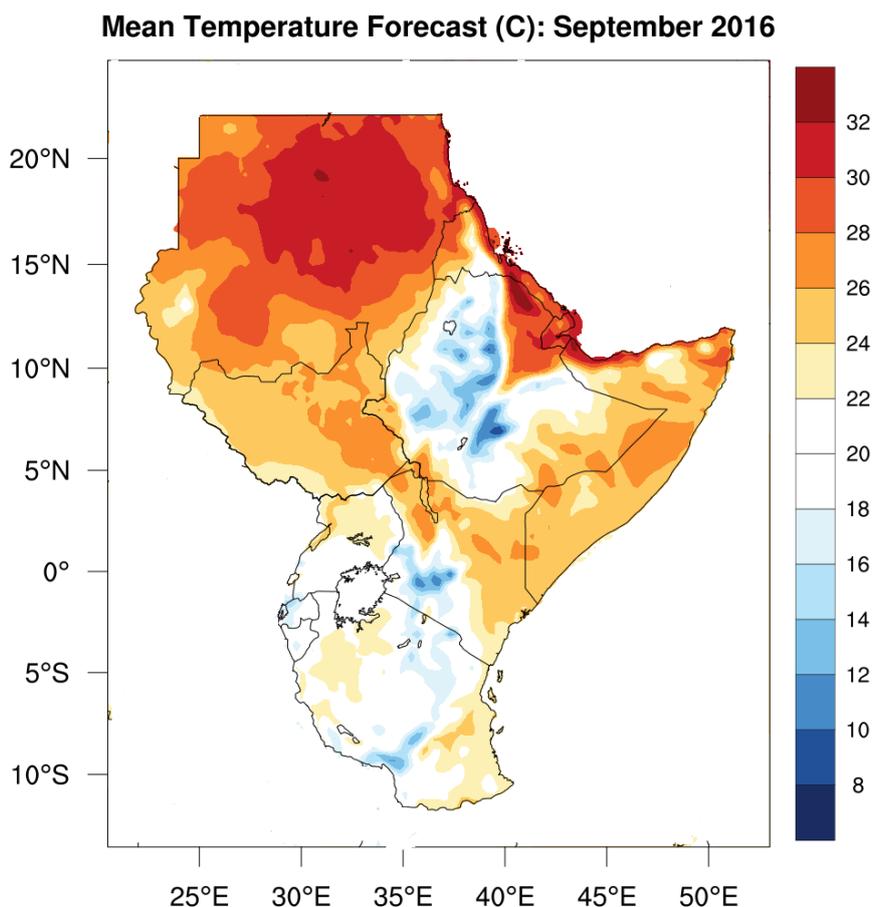


Figure 8b: Mean Temperature Outlook for August-September 2016 season

## 7.0 IMPACTS ON SOCIO-ECONOMIC SECTORS

The socio-economic impacts associated with observed rainfall conditions and those from the climate outlook are provided below.

### 7.1 Vegetation condition indicators and associated impacts

The Normalized Difference Vegetation Index (NDVI) of July 2016 indicates that normal to above normal vegetative conditions was improved in southern sector mainly recorded over southern and central parts of Sudan extending to the western and eastern, central and northern parts of South Sudan and north western parts of Ethiopia. The equatorial and the southern sectors indicated deterioration in vegetative condition except northern Uganda and western Kenya. The northern parts of Sudan; much of Eritrea, Djibouti and northern parts of Somalia indicated little or no change in vegetative conditions (Figure 9).

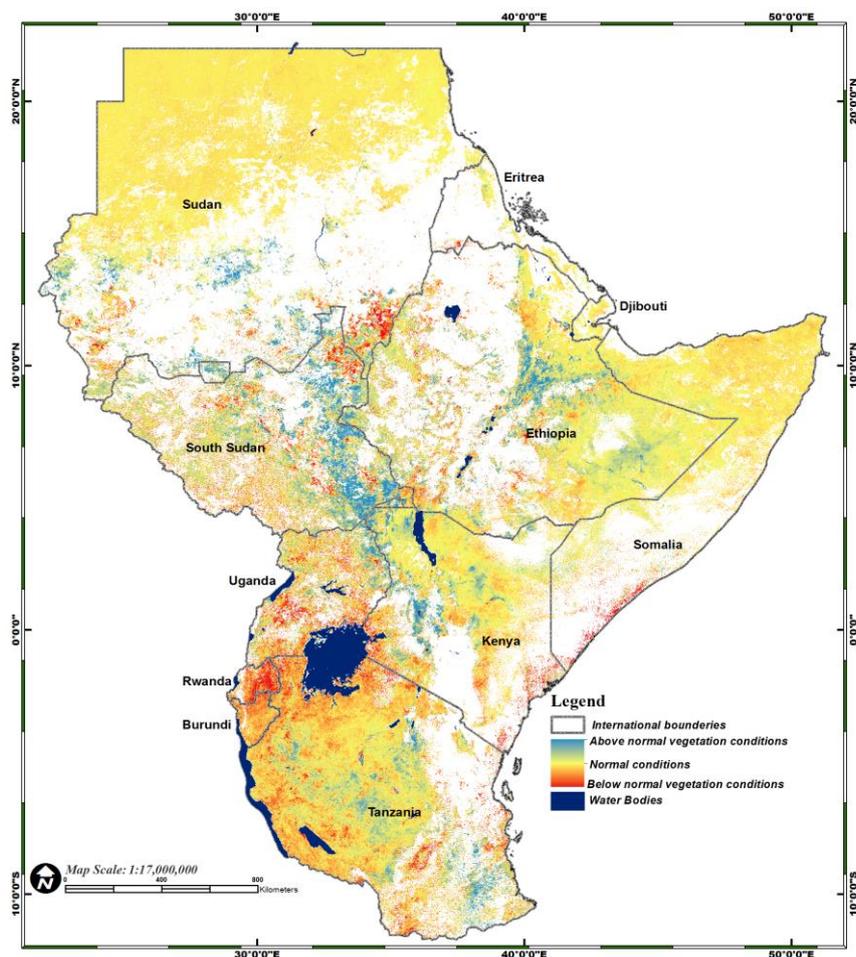


Figure 9: Normalized Difference Vegetation Index (NDVI) of July 2016 over the Greater Horn of Africa

### 7.2 Impacts of observed climate conditions during July 2016

The socio-economic impacts associated with the observed rainfall over much of the Greater Horn of Africa during the month of July 2016 were as follows:

- Improved crop, pasture and foliage conditions;
- Replenishment of water reservoirs;
- Increase of water related diseases;
- Flooding over selected areas

- Climate suitability of epidemic Malaria over selected areas

In regions that experienced dry conditions the impacts were:

- Increased water stress and improvement in conditions related to suitability of epidemic Malaria and water related diseases.
- Prospects of reduced performance in crop conditions and water resource availability

### **7.3 Potential impacts for September 2016 climate outlook**

The areas expected to receive normal to above normal rainfall are likely to have the following impacts:

- Improvement in pasture and crop conditions leading to good prospects for crop and livestock performance;
- Improvement in water resources and replenishment of reservoirs;
- Flooding that may lead to disruption of livelihoods, and destruction of property;
- Prevalence of water related diseases.

The areas expected to receive near normal to below normal rainfall are likely to have the following impacts:

- Poor prospects for crop and pasture performance;
- Existence of water related diseases.