IGAD Climate Prediction and Applications Centre Monthly ClimateBulletin, ClimateReview for November 2018 and Forecasts for January2019

1. INTRODUCTION

This bulletin reviews the November 2018 climate conditions over the Greater Horn of Africa (GHA) region and highlights the January 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 November 2018, while the dominant weather systems are discussed in section 4. In section 5, the January 2018 climate forecasts over the GHA are presented. The socio-economic impacts associated with the observed climatic conditions and those expected from January 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^{o}N and 5^{o}S latitude, with the northern and southern sectors occupying the rest of the northern and southern part of the region respectively.

2. HIGHLIGHTS

Rainfall was concentratedmainly in thewestern and central part of the equatorial sector, northwester part of the southern sector, and also southern parts of northern sector of the GHA.Below normal rainfall was recorded over central and eastern part of the equatorial sector, eastern apart of the southern sector, and in a few areas in the southern parts of the northern sector of the GHA. Much of the rest of the GHA recorded near normal rainfall duringthe month of November 2018(Figure 2 and 3).

Much of the equatorial and southern sectors of the GHA recorded maximum and minimum temperature warmer than or near the long-term mean. However, the western, central and southeastern parts of the northern sector of the northern sector recorded maximum and minimum temperature cooler than the long-term mean. Maximum and minimum temperature that exceeded the long-term means was recorded in areas in the northern and south-central parts of the northern sector of the GHA in the month of November 2018.

The general rainfall condition in the southern and western equatorial sector of GHA resulted in improvement of water and pasture conditions leading to good crop, and livestock productivity. The eastern part of the equatorial sector experienced depressed rainfall conditions in the month of November 2018. Some places in western and coastal equatorial sector reported flooding.

By November 2018, the Oceanic Nino Index (ONI), a primary index used to monitor the El Nino-Southern Oscillation (ENSO)had apositive signal (Figure 7a). The Indian Ocean Dipole (IOD) indicated a positive phase(Figure 7b).The ONIand IOD are forecasted to persist inpositive phasestowards the end of 2018 and the beginning of 2019.

In the month of January 2019, rainfall is expected to be concentrated over much of southern sector andsouthern part of the equatorial sector of the GHA.South-central part of the northern sector of the GHAis also forecasted to record a little amount of rainfall (Figure 8a).

3. CLIMATE PATTERNS IN NOVEMBER 2018

The rainfall amounts (Figure 1) and performance as compared to the long-termmean (1981-2010) using percentage of long term average (Figure 2) and Standardized Precipitation Index (SPI) (Figure 3) for November 2018 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

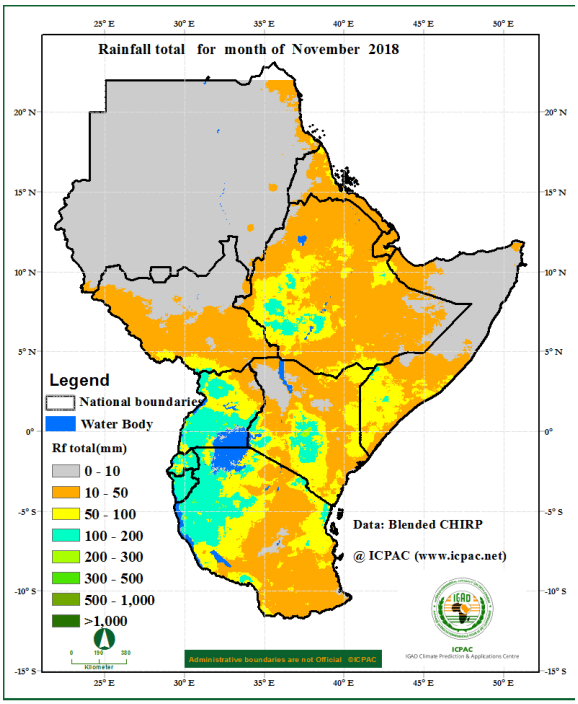

Figure 1: Spatial distribution of rainfall during the month of November 2018*(Data Source : Blended CHIRPS)*

South Sudan,Ethiopiaand Somalia:several parts of Ethiopia, western and southern parts of South Sudan, and southern Somalia recorded rainfall between10mmto100mm.Southwest part of Ethiopia recorded rainfall between 100mm and 200mm. Most of these areas recorded near normal rainfall conditions.

Rwanda, Burundi, and Uganda: Most of Uganda, western Rwanda, and northern Burundi recorded between 50mmand 200mm of rainfall, except for northeast Uganda which recorded less than 50mm of rainfall. The rainfall was mainly near normal over much of these areas.

Sudan, Eritrea, and Djibouti: Much of Eritrea, Djibouti and western Sudan recorded rainfall between 10mm and 50mm. The rainfall was mainly near normal in most of these areas.

Kenya and Tanzania:western, central, eastern parts of Kenya, and northwestern Tanzania recorded rainfall of between 50mm and 200mm.northwestern Kenya, and central Tanzania recorded less than 10mm of rainfall. Much of the rest of these areas recorded rainfall in the range of 10 - 50mm. Central and eastern parts of Kenya, and parts of eastern Tanzaniaexperienced below normal rainfall, while much of the rest of these areas experienced near normal rainfall.

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

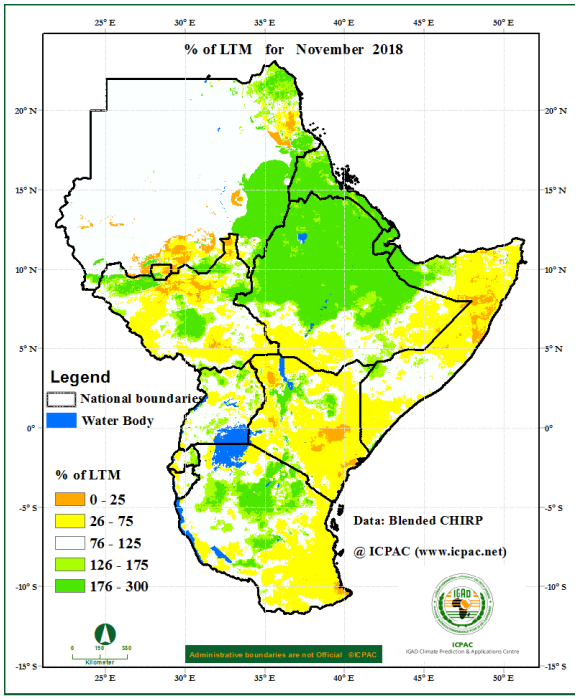

Figure 2: Percentage of average rainfall for November 2018*(Data Source: Blended CHIRPS)*

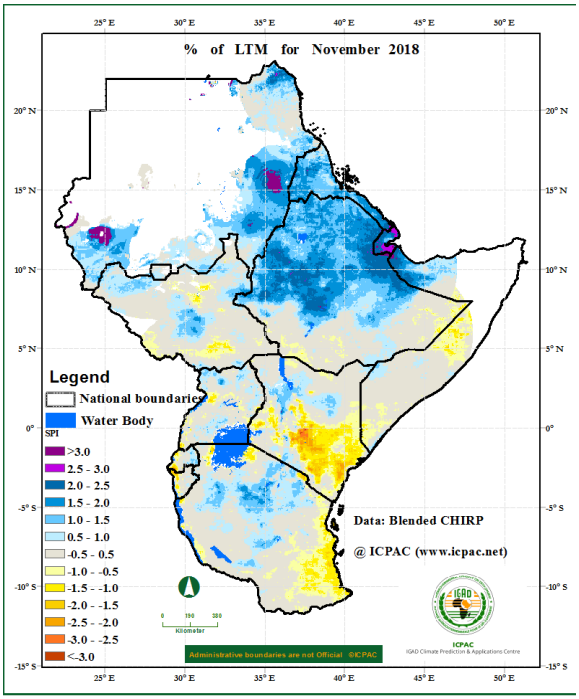

Figure 3: Standardized Precipitation Index for November 2018*(Data Source: Blended CHIRPS)*

Temperature Conditions

Sudan, Eritrea,and South Sudan:most of these areas recorded maximum temperatures cooler than the long-term mean except for north-western Sudan which recorded maximum temperature warmer than the long-term mean. southern part of Sudan, northern part of South Sudan, and western Eritrea recorded minimum temperatures that were cooler than the long-term mean. Isolated areas in northern part of Sudan, and the areas in southern part of South Sudan recorded minimum temperature that was warmer than the mean. Much of the rest of these areas recorded minimum and maximum temperature that was near the long-term mean.

Ethiopia and Somalia: the northwestern and eastern Ethiopia extending north and central Somalia recorded maximum temperature that was cooler than the long term mean. Northern and southeastern part of Ethiopia, as well as northeastern Somalia recorded minimum temperatures that was cooler than the long term mean. Much of the rest of these areas recorded maximum and minimum temperatures that was warmer than the long-term mean.

Much of the rest of the GHArecorded maximum and minimum temperature that was warmer than or near the long-termmean.

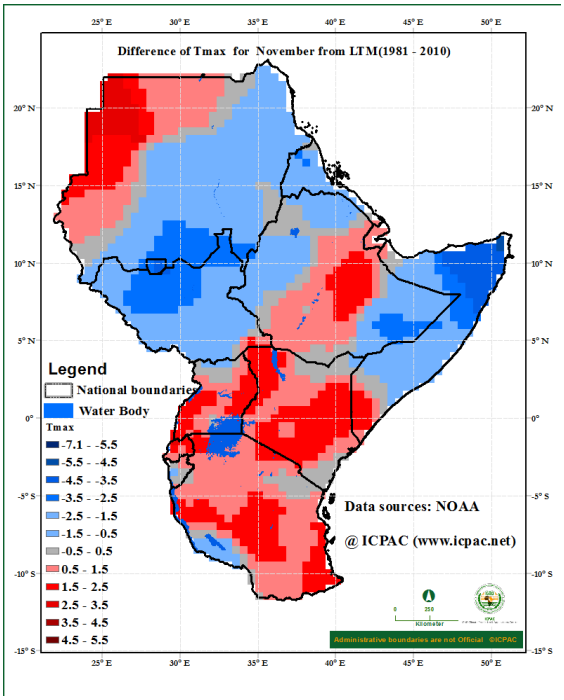

Figure 4a: Maximum temperature anomalies for November 2018 from LTM, 2008-2017 (*Data Source: Data Source: provided by the NOAA/OAR/ESRL PSD)*

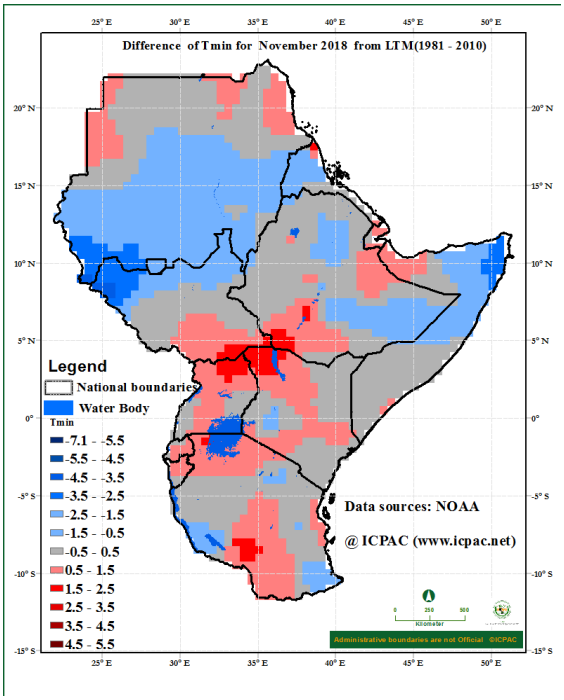

Figure 4b: Minimum temperature anomalies for November 2018 from LTM, 2008-2017 *(Data Source: Data Source: provided by the NOAA/OAR/ESRL PSD)*

Vegetation Condition Indicators

The Normalized Difference Vegetation Index (NDVI) anomaly for November 2018(Figure 9) indicates that:

South Sudan, Kenya and Somalia:several parts of South Sudan, central and eastern parts of Kenya as well as central and southeastern Somalia showed signs of deterioration of vegetative conditions as compared to the long-term mean. However areas in eastern South Sudan, northeastern and coastal Kenya, as well as southwestern parts of Somalia showed signs of improved vegetative conditions.

Ethiopia and Tanzania: several parts of Ethiopia and western and eastern parts of Tanzaniashowed signals of improved vegetative condition as compared to the long term average. A few areas in southern Ethiopia and also northern parts of Tanzania showed signs of deteriorated vegetative conditions as compared with the long-term mean.

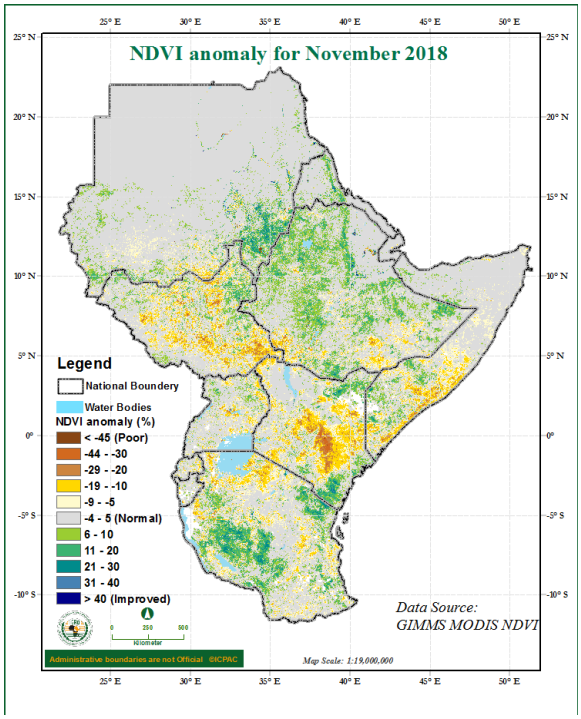

Figure 5: Normalized Difference Vegetation Index (NDVI) for November 2018 *(Data Source: USGS-NASA)*

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 November 2018. (Figure 9).

4. STATUS OF THE CLIMATE SYSYEMS

The Sea Surface Temperature (SST) anomaly during the period of 4thNovemberto 1stDecember2018 showed that equatorial Pacific Ocean was dominated by warmer than the average SST anomaly(Figure 6), this situation currently presents a positive, Oceanic Nino Index (ONI) (Figure 7).Models forecasting El Niño Southern Oscillation ENSO eventshow a an increased likelihood of a weakEl Niño phase toward the end of the year 2018 and early 2019. Near average to cooler than average SST conditions dominated eastern equatorial Indian Ocean(Figure 6), while in the western equatorial Indian Ocean SST warmer than average was recorded. This pattern has presented a positivephase of the Indian Ocean Dipole(IOD) (Figure 8). Models showa likelihood of a persistent positive IOD towards the end of the year 2018 and beginning of 2019.

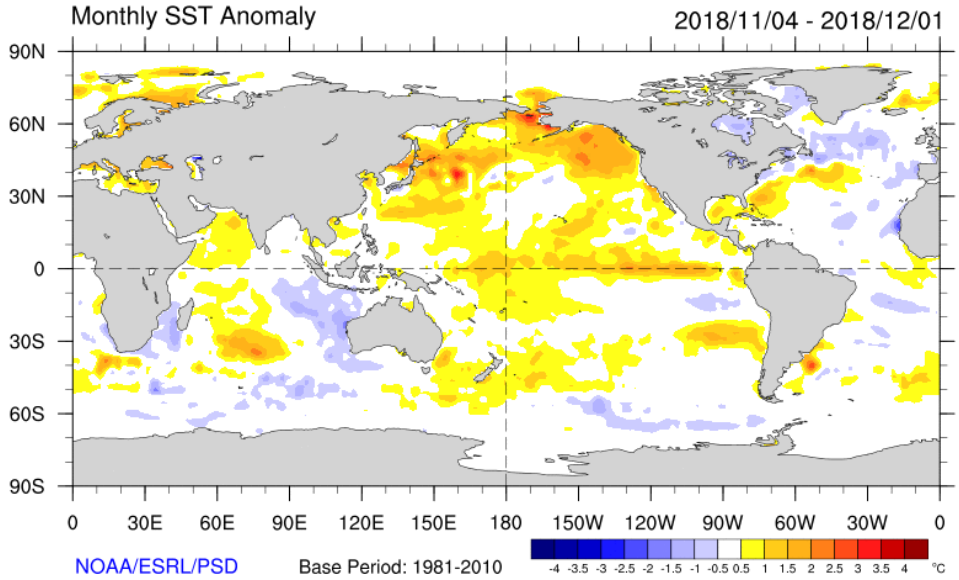

Figure 6: Sea Surface Temperature anomalies for the period 4thNovember 2018to1stDecember 2018 (*Source: NOAA/ESRL/PSD***)**

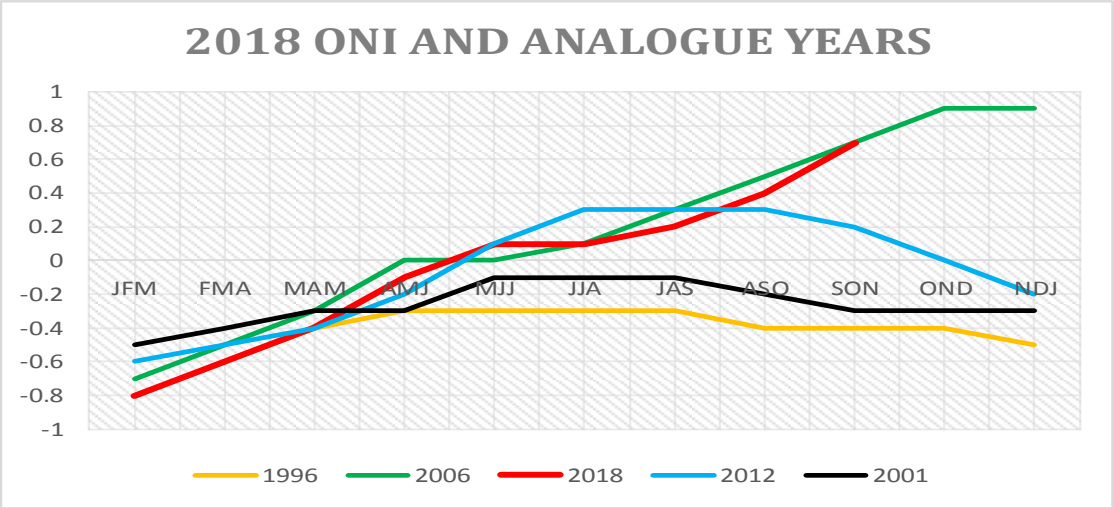

Figure 7: The Indian Ocean Dipole (IOD) during 2018 and analogue years.

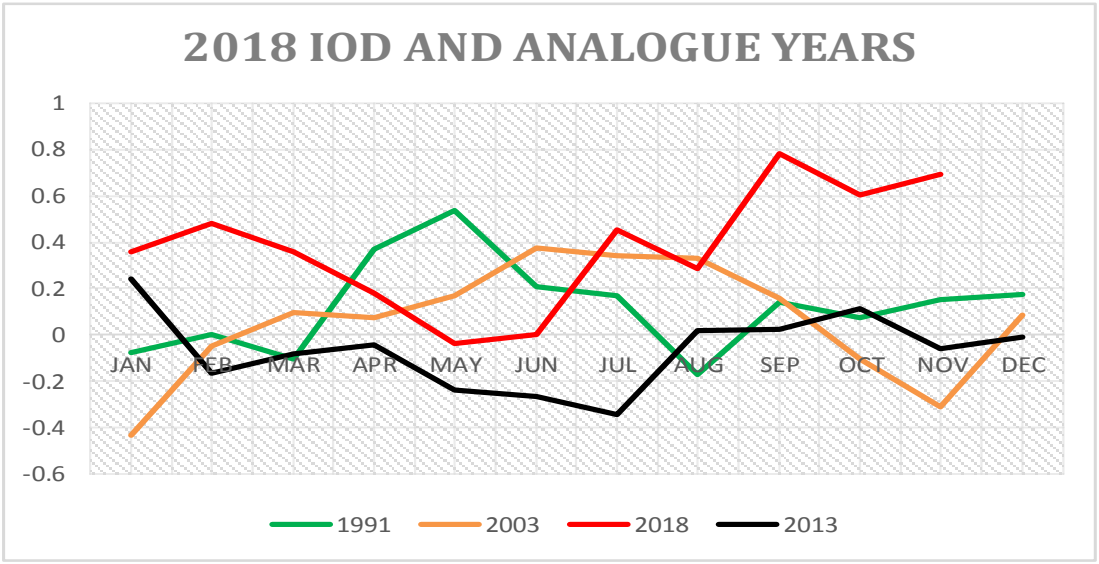

Figure 8: The Oceanic Nino Index (ONI) during 2018 and analogue years.

5. CLIMATE OUTLOOK FOR JANUARY 2019

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

The January 2019 rainfall forecast

During the month of January 2019,rainfall will be concentrated over Tanzania,Rwanda, Burundi, southern part of Uganda, and southwest part of Kenya. Central and southeastern Ethiopia, northern Uganda, and central and southeastern Kenya are expected to record small amount of rainfall (Figure 9a).Much of the areas covering Sudan, South Sudan, Eritrea, Djibouti, northern Kenya, northwest and eastern Ethiopia, and much of Somalia are expected to record small amount of rainfall or remain generally dry.

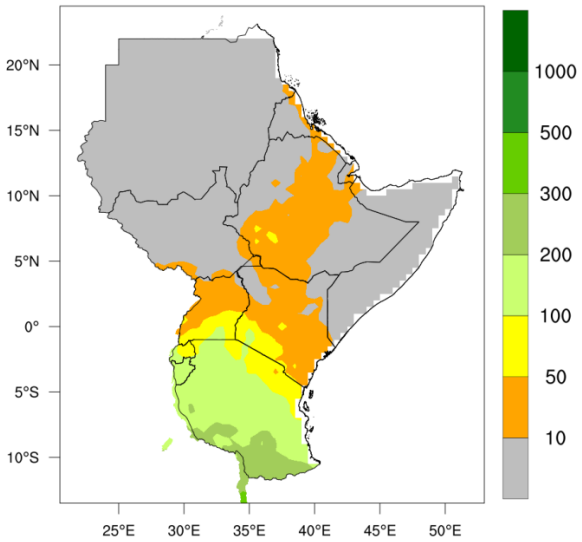

Figure 9a: Forecast of rainfall total for January 2019 (Ensemble GCM).

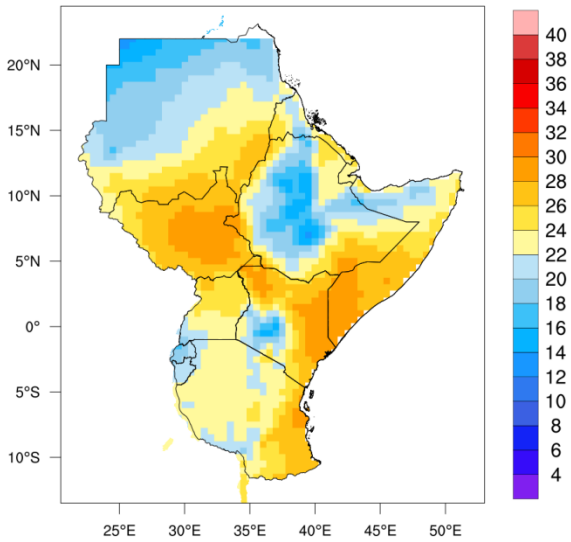

Figure 9b: Mean temperature forecast for January 2019 (Ensemble GCM).

January 2019 Temperature forecast

Average temperature of cooler than 22^{o}C is likely to be observed over northern parts of Sudan,western Eritrea, western and central Ethiopian highlands, north-western Somalia,south-western parts of Uganda, western and central Kenya, over much of Rwanda, and Burundi. Much of the rest of the GHA is likely to record average temperatures warmer 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 November 2018

During the month of November 2018,flooding was reported over eastern Sudan, coastal Kenya and in western Uganda.Some parts of the equatorial sector experienced depressed rainfall conditions associated with late onset of OND rainfall season causing prospects of poor crop, water and livestock performance.

Potential impacts for January 2019 climate outlook

In the month of January 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 south-western parts of the equatorial sector as well as much of the southern sector of the GHA.

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