February 2016
No. ICPAC/02/287

IGAD Climate Prediction and Applications Centre Monthly Bulletin, January 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^o and 5^o latitude, with the northern and southern sectors occupying the rest of the northern and southern parts of the region respectively

1. HIGHLIGHTS/ ACTUALITES

- Rainfall activities were mainly observed over the southern sector as well as south western and central parts of the equatorial sector of the Greater Horn of Africa (GHA) during the month of January 2016;
- During March to May 2016 rainfall season the western, central and northeastern parts of the equatorial sector as well as the southern parts of the northern sector are likely to receive near normal to above normal rainfall.
- The socio-economic impacts associated with the observed rainfall over the GHA during the month of January 2016 resulted in improved crop, pasture and foliage conditions, increase in water related diseases; and improvement in water resources.

2. INTRODUCTION

In this bulletin, the climatic conditions observed over the GHA region in the month of January 2016 is reviewed and the climate outlook for March to May 2016 rainfall season is also provided. Highlights on the socio-economic impacts associated with both the observed conditions and the outlook is 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 January 2016 are discussed under section 4, while the dominant weather systems are discussed in the section that follows. The climate outlook over the GHA for March to May 2016 is presented in section 6. The socio-economic impacts associated with the observed climatic conditions during January 2015 and those expected from the climate outlook is presented the final section.

3. SUMMARY

This bulletin has three main components, these are: the climatic conditions observed during the month of January 2016 over GHA, the climate outlook for March to May 2016 rainfall period, and the impacts associated with both the observed climate conditions and the climate outlook.

Rainfall activities were mainly observed over much of the southern sector as well as southwestern and central parts of the equatorial sector of the GHA region during the month of January 2016. The observed rainfall conditions over parts of

the Greater Horn of Africa during January resulted in improved crop, pasture and foliage conditions, replenishment of water resources, and few cases of flooding were also reported which led to disruption of livelihood.

The climate outlook for the March to May 2016 rainfall season indicates that much of Uganda; much of Rwanda; northern parts of Burundi; western, central and north eastern Kenya; southern parts of South Sudan; southern parts of Ethiopia; and central parts of Somalia are likely to receive near normal to above normal rainfall. The northern parts of Sudan; northern parts of Eritrea; and northern parts of Djibouti are likely to be generally dry while the rest of the GHA is likely to experience near normal to below normal rainfall during the March to May rainfall season (Figure 8).

4. CLIMATE PATTERNS IN JANUARY 2016

The climatological summary for the rainfall amounts and rainfall severity indices over the GHA in the month of January 2016 are provided in this section. The rainfall severity indices are derived only for those areas in the GHA region where the month of January is not a generally dry month.

4.1 Rainfall amounts and performance during January 2016

During the month of January 2016, most of Tanzania; much of Burundi; southern parts of Rwanda; and western and central parts of Kenya recorded between 100mm to more than 200mm of rainfall (Figure 1). The rest of the GHA region recorded between 50mm to 100mm or less than 50 mm of rainfall during the month of January 2016.

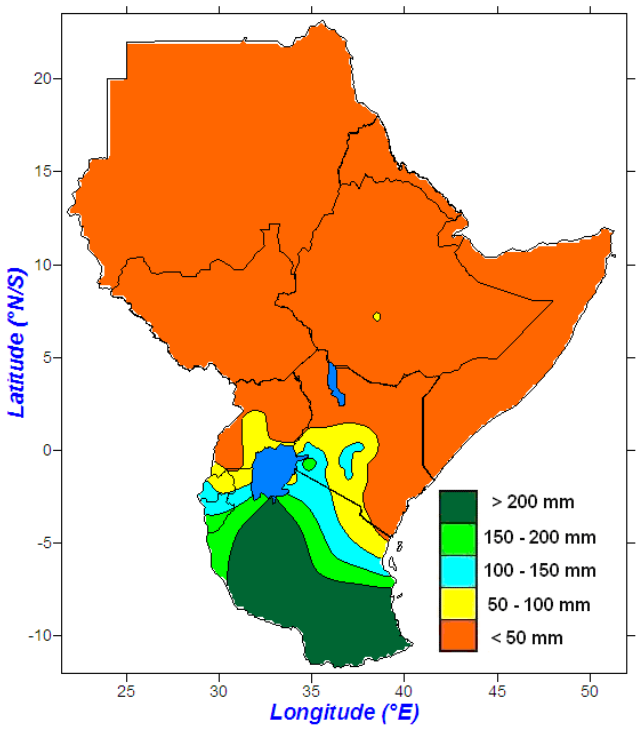

Figure 1: Spatial distribution of rainfall during the month of January 2016

4.2 Climate severity

Rainfall severity indices are derived by considering all observations which are less than 25% (first quartile) of the ranked historical records to be dry while those which are more than 75% (third quartile) are considered wet.

During the month of January 2016, much of Tanzania, Rwanda, Burundi, south eastern Uganda, and parts of western and central Kenya recorded near-normal to wet conditions (Figure 2). The rest of the GHA was generally dry (Figure 2).

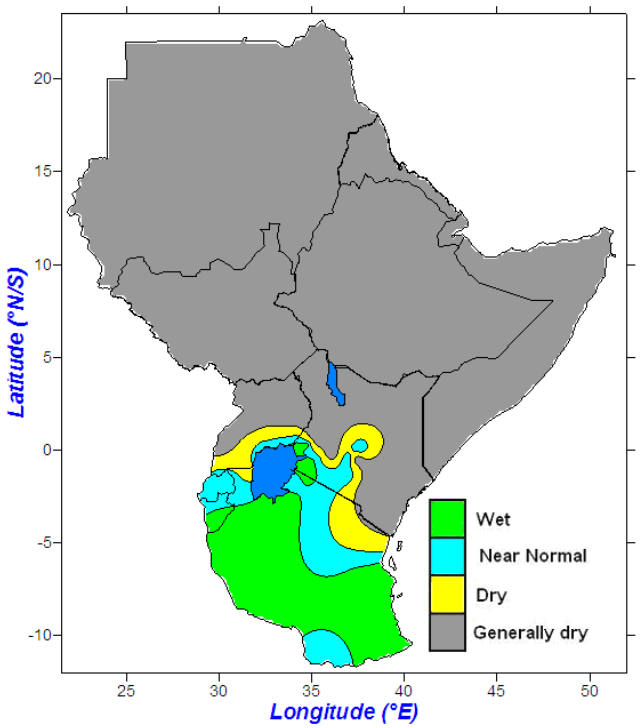

Figure 2: Rainfall severity index for the month of January 2016

4.2.1 Cumulative climate stress severity monitoring

The extent of climate-related impacts on any particular system depends on the severity and duration of the climate stress. Direct and indirect severe impacts on health and food security, water resources and livestock, among other socio-economic sectors emanates from cumulative climate stress severity. The indices used to monitor cumulative rainfall severity over GHA are presented in the next section.

4.2.2 Cumulative rainfall performance from June 2015 to January 2016

The cumulative dekadal rainfall was used to evaluate the rain water stress over GHA region. Figure 3 shows the cumulative rainfall performance since June 2015. Near normal to below normal rainfall was observed over eastern parts of the equatorial sector (Figure 3a). Near normal to above normal conditions were experienced over western parts of the southern sector (Figure 3b and 3c).

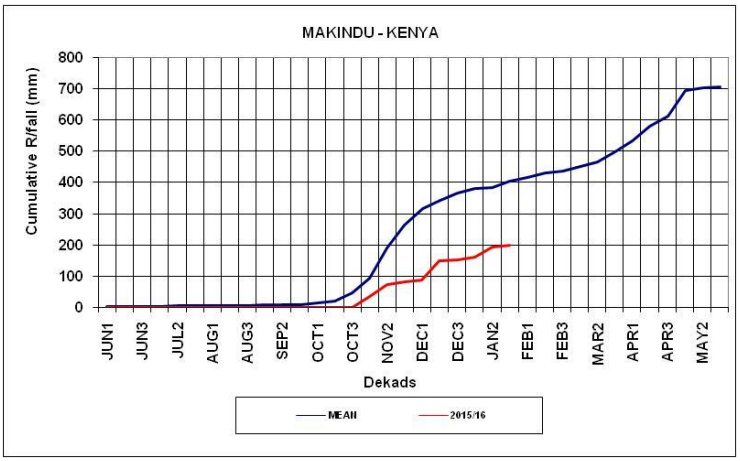

Figure 3a: Cumulative rainfall series for Makindu

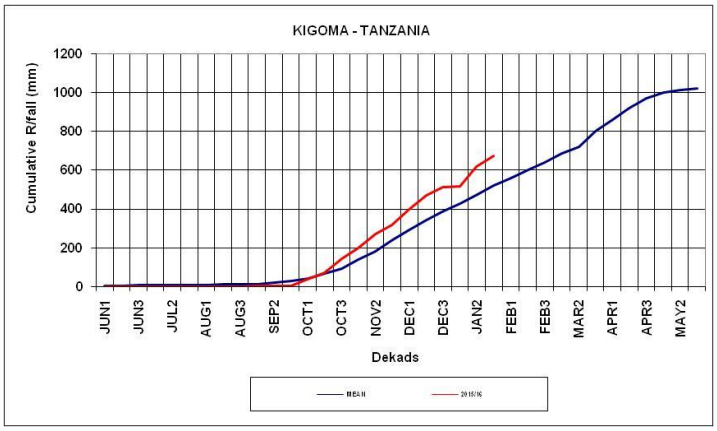

Figure 3b: Cumulative rainfall series Kigoma

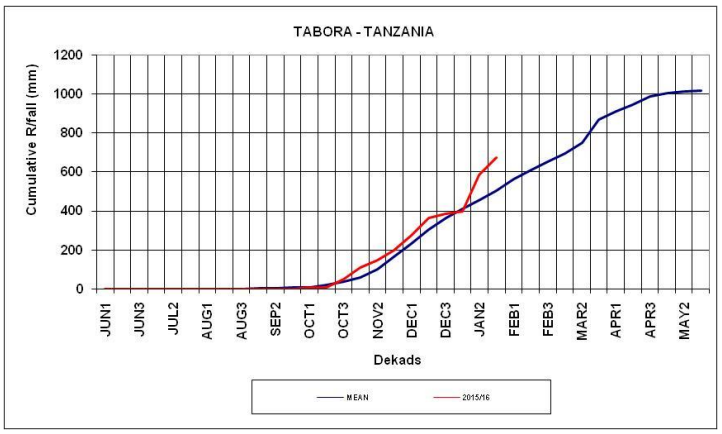

Figure 3c: Cumulative rainfall series for Tabora

4.3 Rainfall anomalies

4.3.1 Rainfall anomalies during November 2015 to January 2016 period

During November 2015 to January 2016 rainfall period, much of Sudan, western parts of Eritrea, northern parts of South Sudan, isolated parts of eastern Ethiopia, and north eastern and eastern parts of Kenya recorded less than 75% of long term rainfall for the period (Figure 4), northern, south western and eastern tip of Ethiopia; northern, central and parts of southern Somalia; north, central, and south eastern tip of Tanzania; western, central and parts of coastal Kenya; central and western Uganda; and south western South Sudan recorded more than 125 % of the long term rainfall for the period. While the rest of the region received between 75% and 125% of long term rainfall for the November to January rainfall period (Figure 4).

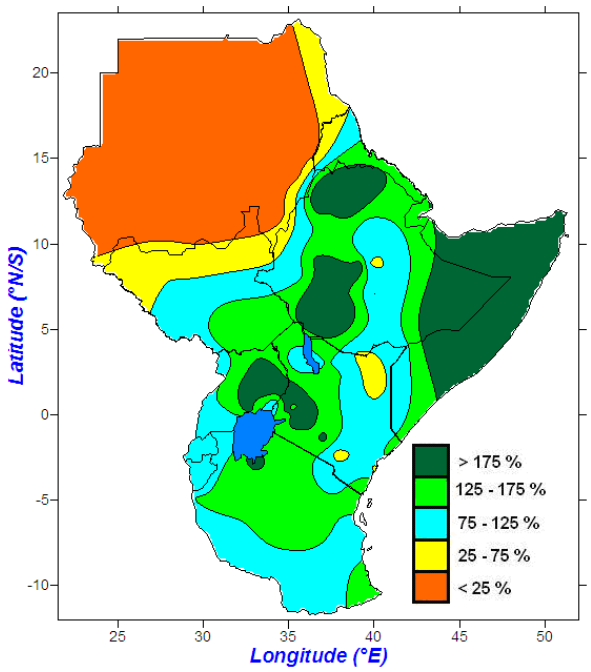

Figure 4: Spatial pattern of rainfall anomalies for November to January 2016 period

4.4 Temperature anomalies

4.4.1 Maximum temperature anomalies

During the month of January 2016, warmer than average maximum temperatures prevailed over most parts of the Greater Horn of Africa (GHA) region (Figure 5a) except for much of Sudan, northern parts of South Sudan, parts of eastern Uganda, and parts of western Kenya which recorded less than average maximum temperatures. Northeastern parts of Kenya, eastern and south eastern parts of Ethiopia, and central coast of Tanzania recorded positive maximum temperature anomalies exceeding 2°C were (Figure 5a). Negative temperature anomalies exceeding 2°C was recorded over much of Sudan and north western parts of South Sudan (Figure 5a).

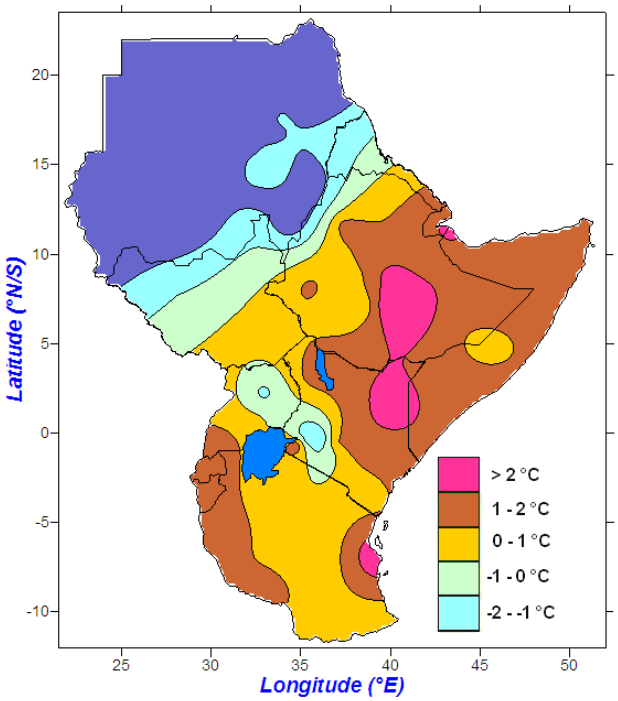

Figure 5a: Maximum temperature anomalies for January 2016

4.4.2 Minimum temperature anomalies

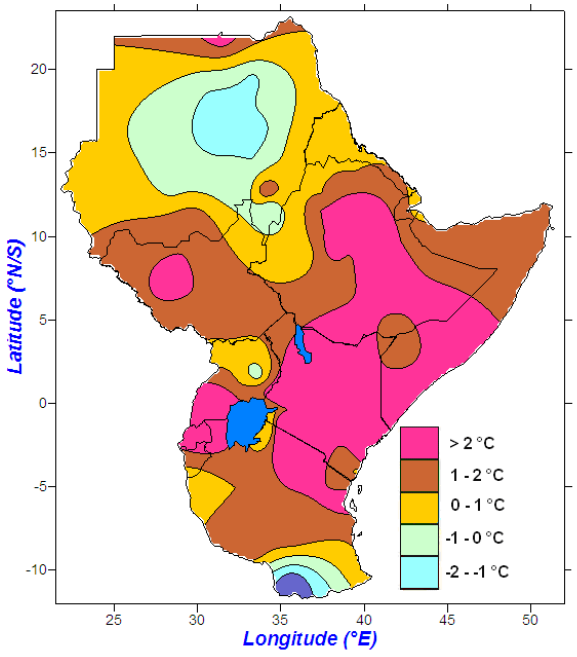

Figure 5b: Minimum temperature anomalies for the month of January 2016

During the month of January 2016, most parts of the GHA recorded warmer than average minimum temperatures except for central and south western parts of Sudan, isolated parts of western Uganda, and south western parts of Tanzania. Negative minimum temperature anomalies exceeding 2°C was recorded over south western parts of Tanzania (Figure 5b). Eastern and south eastern parts of Ethiopia, central and southern parts of Somalia, parts of north western South Sudan, south western Uganda, much of Rwanda, northern parts of

Burundi; north western and north eastern parts of Tanzania and most parts of Kenya recorded positive minimum temperature anomalies exceeding 2°C (Figure 5b) during the month of January 2016.

5. STATUS OF THE CLIMATE SYSTEMS

During the period between the end of January and the end of February 2016 above average sea surface temperatures (SSTs) were observed over equatorial Indian Ocean. The eastern equatorial Indian Ocean indicated warmer than average SSTs, while western equatorial Indian Ocean indicated near normal SSTs (Fig.6) resulting in a negative Indian Ocean dipole index (Figure.7a). Warmer than average SSTs were observed over much of equatorial Pacific Ocean (Figure. 6).

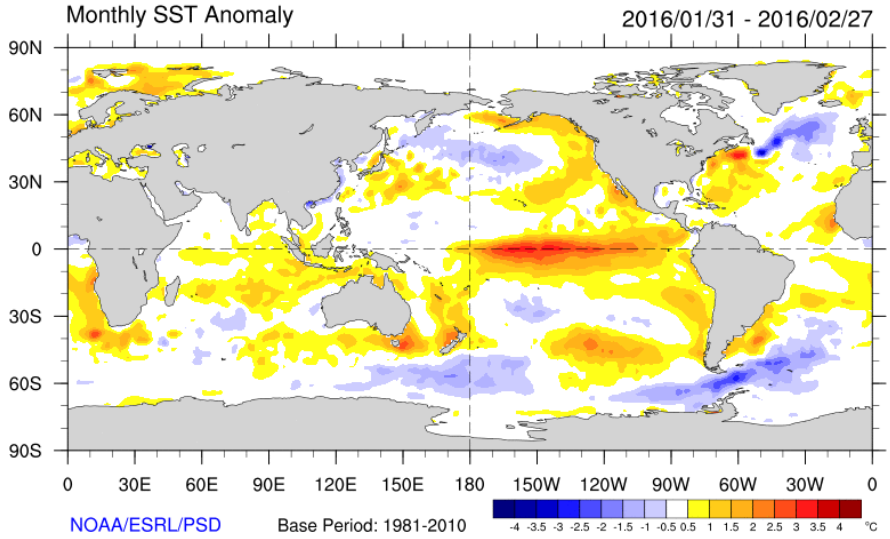

Figure 6: Sea Surface Temperature anomalies for the period 18 October to 14 November 2015 (Courtesy of NOAA)

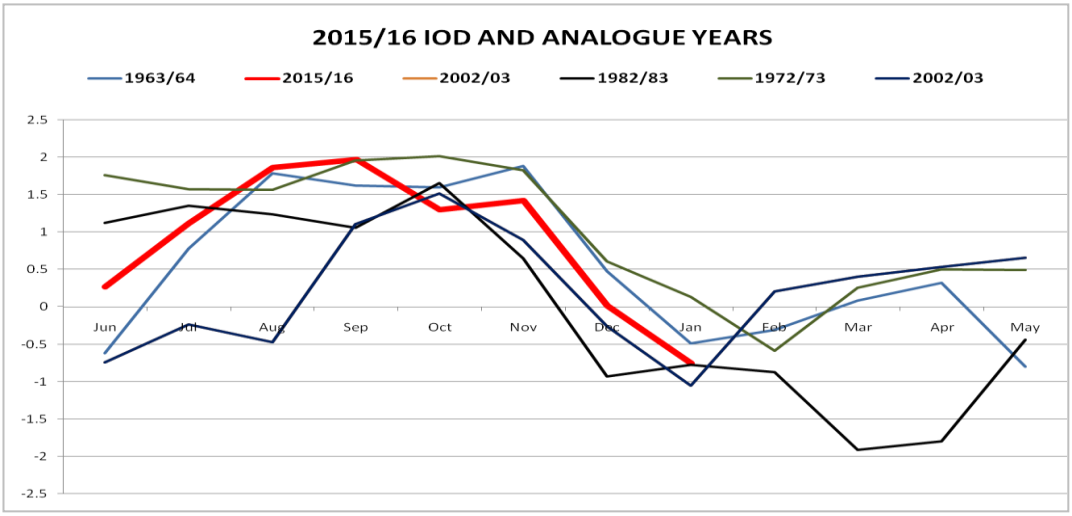

Figure 7a: Indian Ocean Dipole (IOD) for 2015/2016 and Analogue Years

6.0 CLIMATE OUTLOOK FOR MARCH TO MAY 2016

6.1 The Climate Outlook Forum

The Forty Second Greater Horn of Africa Climate Outlook Forum (GHACOF 42) was convened from 22nd to 23rd February 2016 at Lemigo Hotel, Kigali, Rwanda by the IGAD Climate Prediction and Applications Centre (ICPAC), the Rwanda Meteorology Agency (Meteo Rwanda) and partners to develop a consensus climate outlook for the March to May 2016 season over the GHA region. The GHA region comprises Burundi, Djibouti, Eritrea, Ethiopia, Kenya, Rwanda, Somalia, South Sudan, Sudan, Tanzania and Uganda. The forum reviewed the state of the global and regional climate systems and their implications on the March to May seasonal rainfall over the region. Among the principal factors taken into account were the observed and predicted atmosphere-ocean conditions in the Indian and Atlantic Oceans with implications of transporting moisture and rainfall distribution in the region as well as global scale forcing due to the decaying El Niño conditions in the tropical Pacific. Users from agriculture and food security, livestock, water resources, disaster risk management, Non- Governmental Organizations and development partners discussed the potential implications of the consensus climate outlook, and developed mitigation strategies for their respective countries and sectors.

6.2 Climate Outlook for March to May 2016

The rainfall and temperature outlooks for March to May 2016 for various zones within the GHA region are given in Figure 1 and Figure 2 respectively.

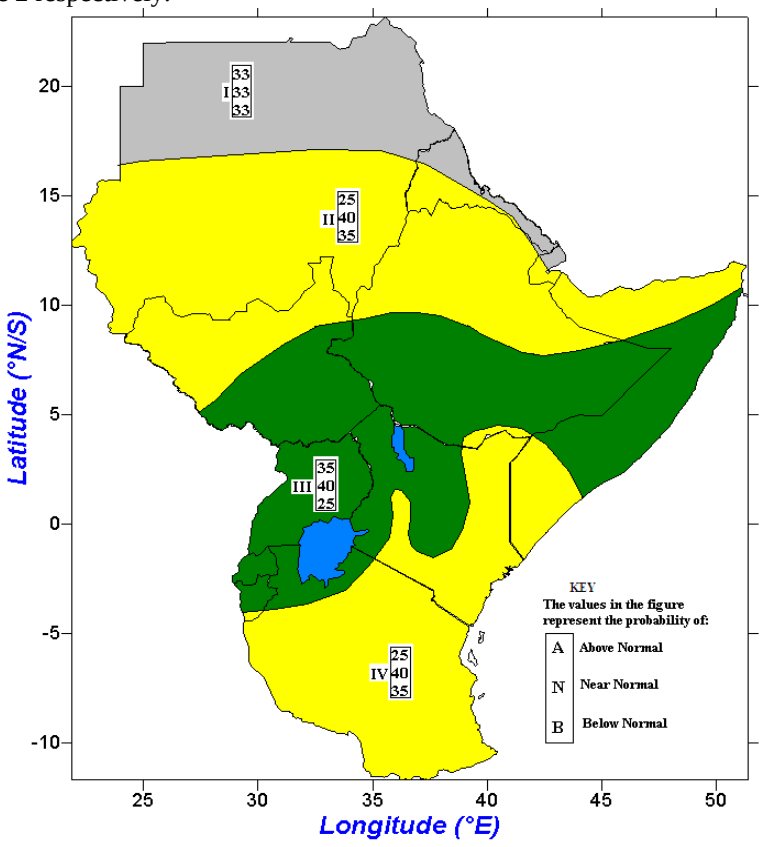

Figure 1: Greater Horn of Africa Consensus Rainfall Outlook for the March to May 2016 season

Zone I: Usually dry during March to May.
Zone II: Increased likelihood of near normal to below normal rainfall.
Zone III: Increased likelihood of near normal to above normal rainfall.
Zone IV: Increased likelihood of near normal to below normal rainfall.

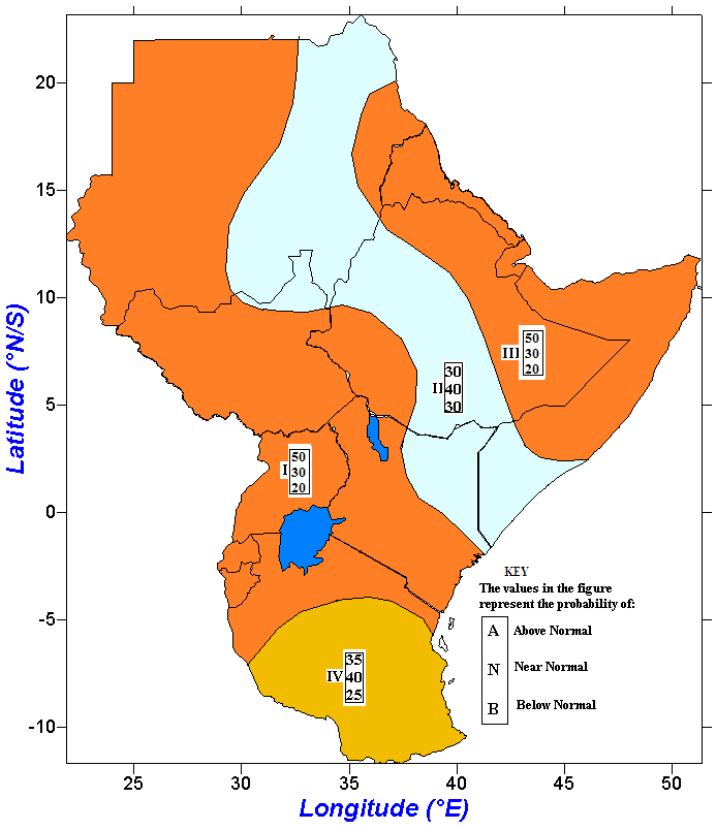

Figure 2: Greater Horn of Africa Consensus Mean Temperature Outlook for March to May 2016 season

Zone I: Increased likelihood of above normal mean temperatures.
Zone II: Increased likelihood of near normal mean temperatures.
Zone III: Increased likelihood of above normal mean temperatures.
Zone IV: Increased likelihood of near normal to above normal mean temperatures.

Note:

The numbers for each zone indicate the probabilities of rainfall and mean temperature in each of the three categories, above-, near-, and below-normal. The top number indicates the probability of rainfall and mean temperature occurring in the above-normal category; the middle number is for near-normal and the bottom number for the below-normal category. For example in zone III, Figure 1, there is 35% probability of rainfall occurring in the above-normal category; 40% probability of rainfall occurring in the near-normal category; and 25% probability of rainfall occurring in the below-normal category. In zone I, Figure 2, there is 50% probability of mean temperature occurring in the above-normal category; 30% probability of mean temperature occurring in the near-normal category; and 20% probability of mean temperature occurring in the below-normal category. The boundaries between zones should be considered as transition areas.

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 difference of the Normalized Difference Vegetation Index (NDVI) between January 2016 and December 2015 indicates improvement in vegetative conditions over central, western, and southern Tanzania; parts of Burundi; western parts of Rwanda; and southern parts of Uganda (Figure 9). The rest of the region indicated deteriorated, little or no change in vegetative conditions (Figure 9).

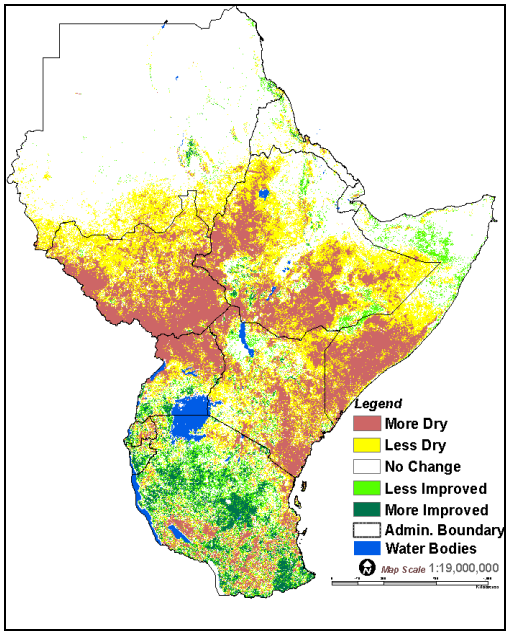

Figure 9: Vegetation difference between January 2016 and December 2015 over the Greater Horn of Africa

7.2 Impacts of observed climate conditions during January 2016

The socio-economic impacts associated with the observed rainfall over much of the Greater Horn of Africa during the month of January 2015 were as follows:

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

In regions that experienced dry conditions the impacts were:

- Poor pasture and water availability leading to reduced livestock productivity;
- Increased water related diseases;
- Poor crop performance.

7.3 Potential impacts for March to May 2016 climate outlook

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

- Good prospects for crop and livestock performance;

- Improvement in water resources and replenishment of reservoirs;
- Flooding and instances of landslides, that may lead to destruction of property;
- Outbreaks 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;
- Outbreaks of water related diseases;
- If the dry conditions occur within the agricultural areas, this could lead to water stress conditions and may cause significant water and pasture scarcity, crop and livestock losses.