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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 western and south-western parts of the southern sector as well as central and south-western parts of the equatorial sector of the Greater Horn of Africa (GHA) during the month of December 2015;
- During February to March 2016 rainfall period, much of the southern sector and southern parts of the equatorial 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 December 2015 resulted in improved crop, pasture and foliage conditions; increase in water related diseases; improvement in water resources; as well as flooding over few areas.

2. INTRODUCTION

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

3. SUMMARY

This bulletin has three main components. These are: the climatic conditions observed during the month of December 2015 over GHA, the climate outlook for February and March 2016 rainfall period, and the impacts associated with both the observed climate conditions and the climate outlook.

Rainfall activities were mainly observed over western and south-western parts of the southern sector; as well as south-western and central parts of the equatorial sector of the GHA region during the month of December 2015. These observed rainfall conditions 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 February and March 2016 rainfall season indicates an increased likelihood of near normal to above normal rainfall over most parts of the southern sector and southern parts of the equatorial sector. The rest of the GHA region is likely to remain dry during the outlook period (Figure 8).

4. CLIMATE PATTERNS IN DECEMBER 2015

The climatological summary for the rainfall amounts and rainfall severity indices over the GHA in the month of December 2015 are provided in this section. The rainfall severity indices are derived only for those areas in the GHA region where the month of December is not a generally dry month.

4.1 Rainfall amounts and performance during December 2015

During the month of December 2015, most parts of Tanzania excluding the northern coast and north-western; western and central parts of Kenya; northern part of Burundi; parts of south western Ethiopia; as well as south eastern parts of Uganda received between 50mm to over 200mm of rainfall (Figure 1). Isolated parcels over western and central Kenya; and northern and south-western Tanzania receiving more than 200mm of rainfall. The rest of the GHA region received less than 50 mm of rainfall during the month of December 2015 (Figure 1).

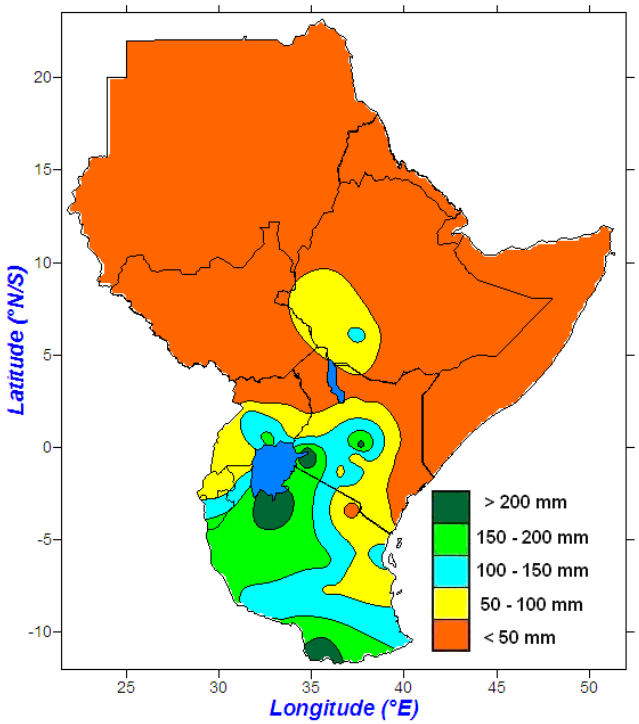

Figure 1: Spatial distribution of rainfall during the month of December 2015

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 December 2015, southern half of Uganda; southern and central parts of Kenya; most parts of Tanzania; northern Rwanda; and northern Burundi recorded near normal to wet rainfall conditions (Figure 2). The rest of the GHA was dry (Figure 2).

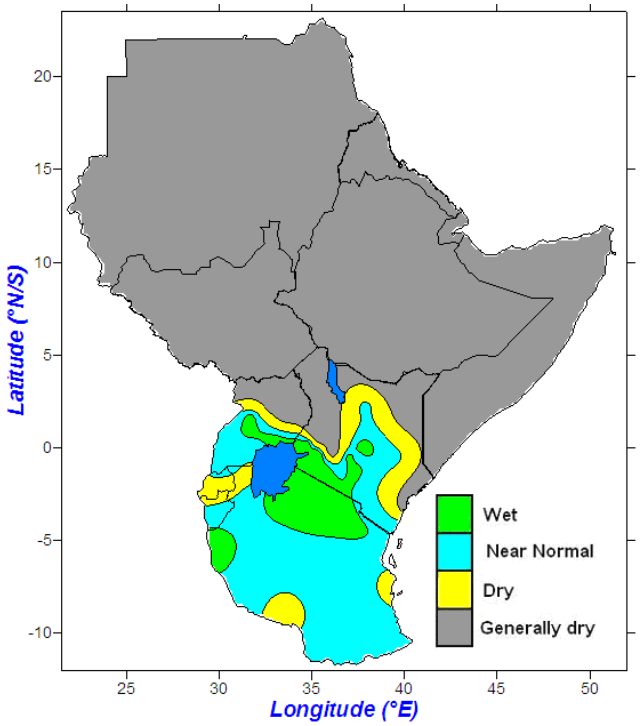

Figure 2: Rainfall severity index for the month of December 2015

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

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 above normal rainfall conditions was observed over central part of equatorial sector and southern part of the Southern sector (Figure 3a and 3c). Near normal to below normal conditions were experienced over eastern part of the equatorial sector (Figure 3b).

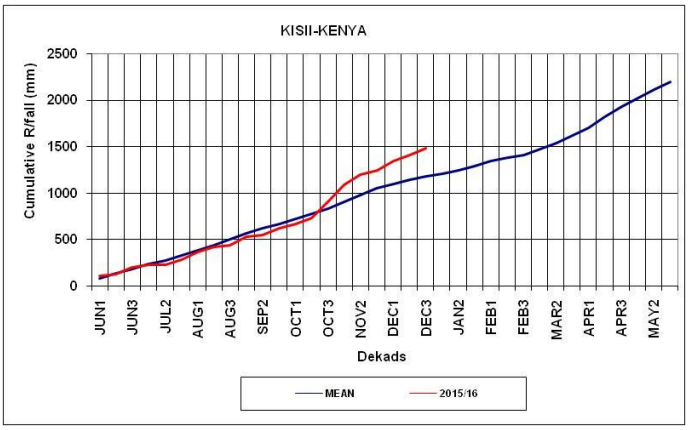

Figure 3a: Cumulative rainfall series for Kisii

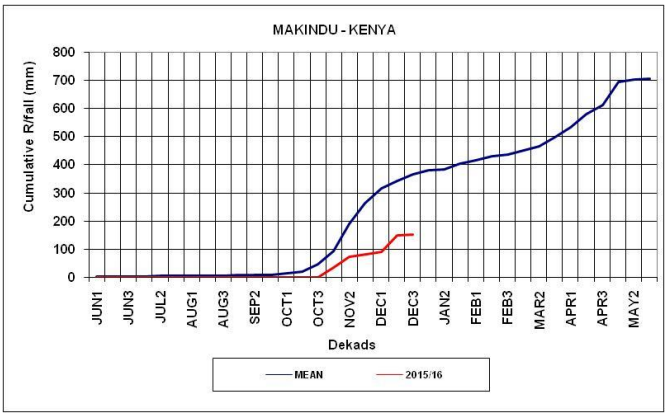

Figure 3b: Cumulative rainfall series Makindu

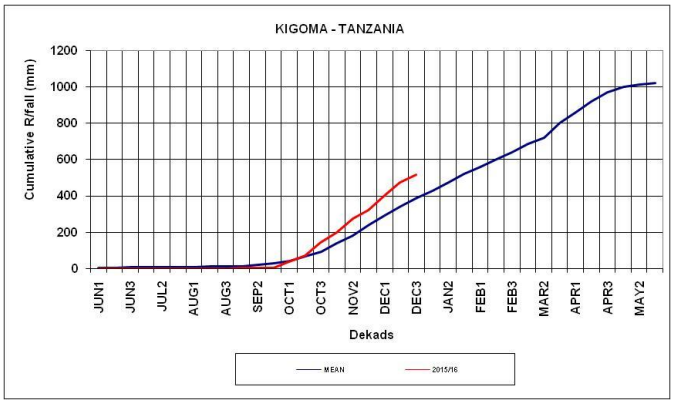

Figure 3c: Cumulative rainfall series for Kigoma

4.3 Rainfall anomalies

4.3.1 Rainfall anomalies during October to December 2015 period

During October to December 2015 rainfall period, southern parts of Sudan; central and southern parts of Eritrea; Djibouti and Somalia; western and south-western parts of South Sudan; south western, northern and eastern parts of Ethiopia; central, eastern and south-eastern parts of Uganda; western half of Kenya; and northern and central parts of Tanzania received more than 125% of long term rainfall for the period (Figure 4). Northern and eastern parts of Sudan; central and eastern parts of Ethiopia; south-eastern parts of Kenya; and southern coast of Tanzania received less than 75% of the long term rainfall for the period. The rest of the GHA received between 75%-125% of long term rainfall for the October to December rainfall period (Figure 4).

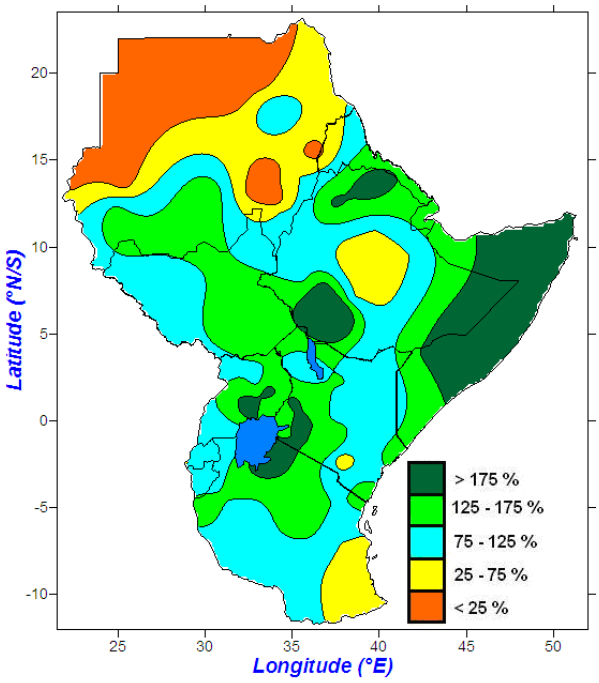

Figure 4: Spatial pattern of rainfall anomalies for October to December 2015 period

4.4 Temperature anomalies

4.4.1 Maximum temperature anomalies

During the month of December 2015, warmer than average maximum temperature prevailed over most parts of the Greater Horn of Africa (GHA) region (Figure 5a) except for most parts of Sudan; northern Eritrea; most parts of South Sudan; western parts of Ethiopia; northern half of Uganda; western parts of Kenya; and northern Tanzania which recorded negative anomalies of maximum temperature. Most parts of Sudan and northern part of South Sudan recorded 2°C below the average maximum temperature for the month. Positive maximum temperature anomalies exceeding 2°C were recorded over eastern Ethiopia; eastern part of Kenya; southern part of Somalia; and north-western and central coast of Tanzania (Figure 5a).

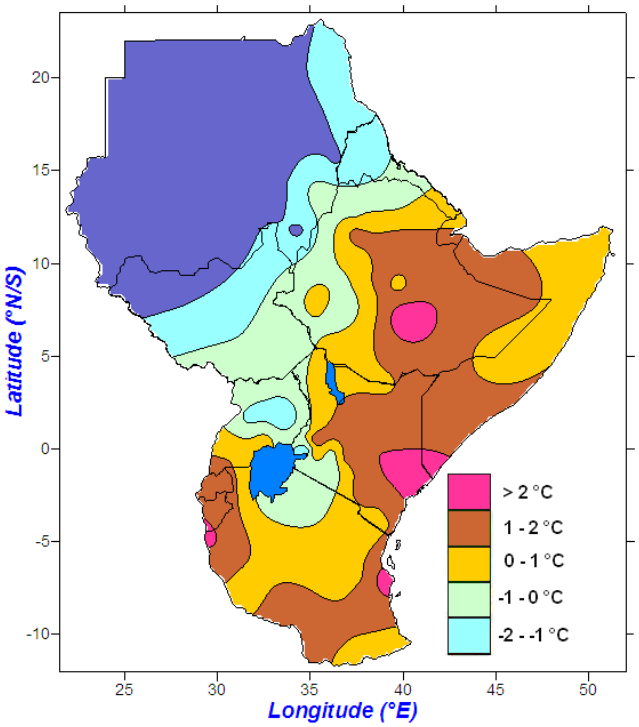

Figure 5a: Maximum temperature anomalies for December 2015

4.4.2 Minimum temperature anomalies

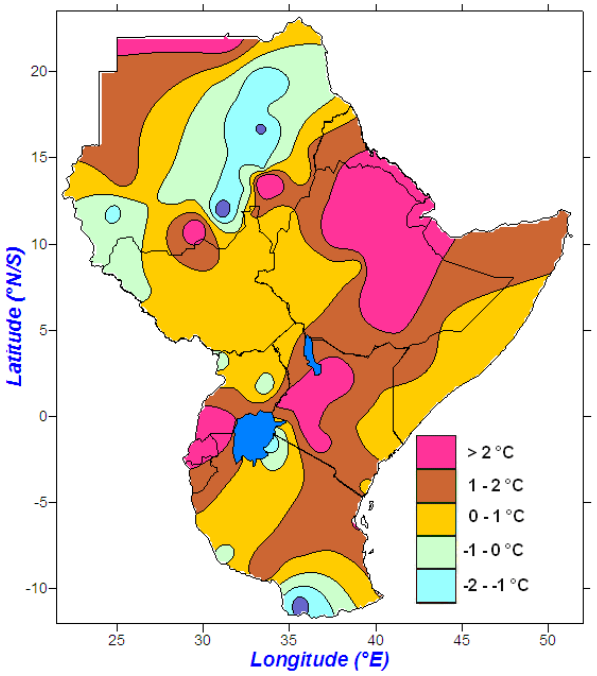

Figure 5b: Minimum temperature anomalies for the month of December 2015

During the month of December 2015, most parts of the GHA received warmer than average minimum temperature except for eastern and south-western parts of Sudan; some parts of northern Uganda; and north-western, western and south-western parts of Tanzania, which received negative minimum temperature anomalies. Positive minimum temperature anomalies exceeding 2°C were observed over northern, central and eastern Ethiopia; northern, eastern and

southern tips of Sudan; central and southern Eritrea; Djibouti; western parts of Kenya; south-western parts of Uganda; and most parts of Rwanda (Figure 5b).

5. STATUS OF THE CLIMATE SYSTEMS

During the period between late-December 2015 and late-January 2016 above average sea surface temperatures (SSTs) were observed over most of the equatorial Indian Ocean. The eastern equatorial Indian Ocean indicated warmer than average SSTs, while western equatorial Indian Ocean indicated neutral to warmer than average SSTs (Fig.6) resulting in a neutral Indian Ocean dipole index (Figure.7a). Warmer than average SSTs were observed over eastern equatorial Pacific Ocean (Figure. 6).

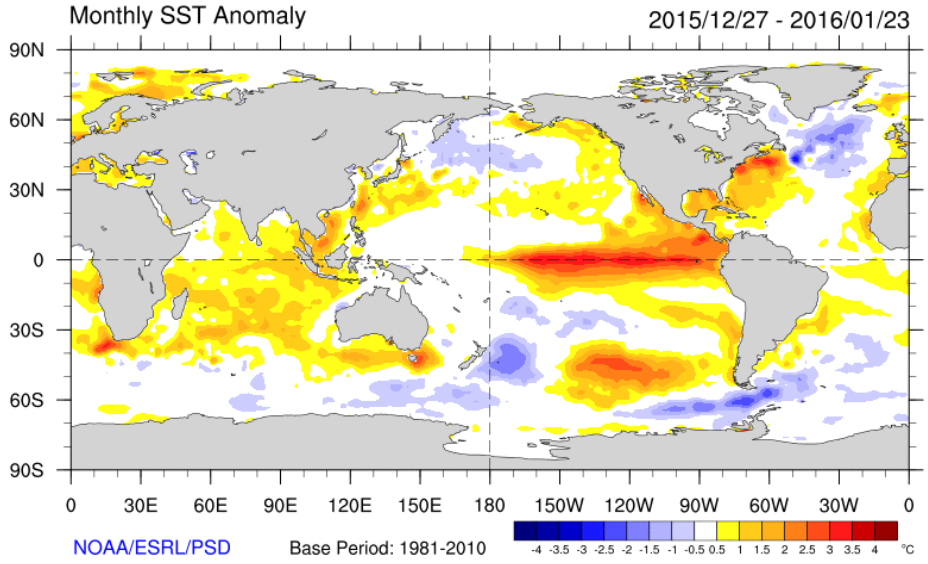

Figure 6: Sea Surface Temperature anomalies for the period 27th December 2015 to 23rd January 2016 (Courtesy of NOAA)

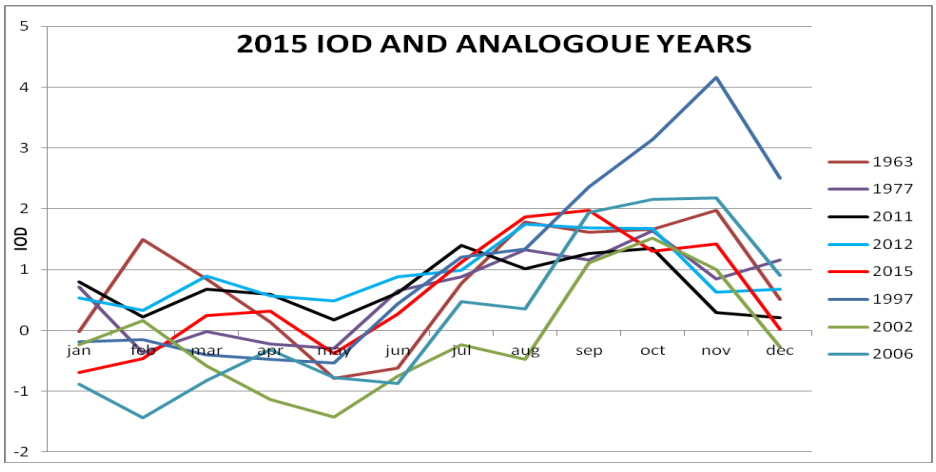

Figure 7a: Indian Ocean Dipole (IOD) for 2015 and Analogue Years

6.0 CLIMATE OUTLOOK FOR FEBRUARY AND MARCH 2016

The rainfall outlook for February and March 2016 period indicates a likelihood of near normal to above normal rainfall over Zone III represented by western and southern parts of Kenya, southern parts of Uganda, much of Tanzania, Rwanda and Burundi (Figure 8). Near normal to below normal rainfall is likely to occur within Zone II represented by northern and central parts of Uganda; northern, eastern and south-eastern parts of Kenya; southern parts of Somalia; southern parts of South Sudan; and south-western parts of Ethiopia. The rest of the region is likely to experience generally dry conditions (Figure 8).

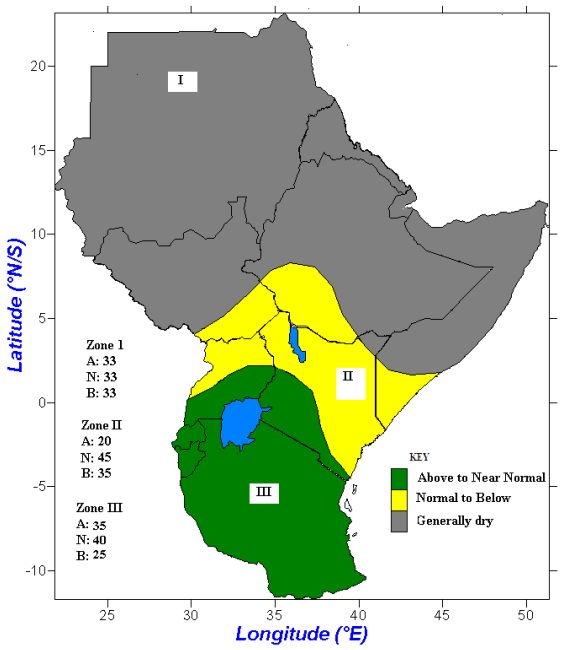

Figure 8: Climate Outlook for December 2015 to February 2016 rainfall season

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 difference of the Normalized Difference Vegetation Index (NDVI) between November and December 2015 indicates that deteriorated vegetative conditions was observed over southern parts of Sudan; most parts of South Sudan; north-western and eastern parts of Ethiopia; north-eastern tip of Kenya; and central and southern parts of Somalia (Figure 9). Improved vegetative conditions was observed over; most parts of Tanzania, Rwanda, Burundi and Kenya; southern tip of Somalia; and south-western Ethiopia. The rest of the region indicated little or no change in vegetative conditions (Figure 9).

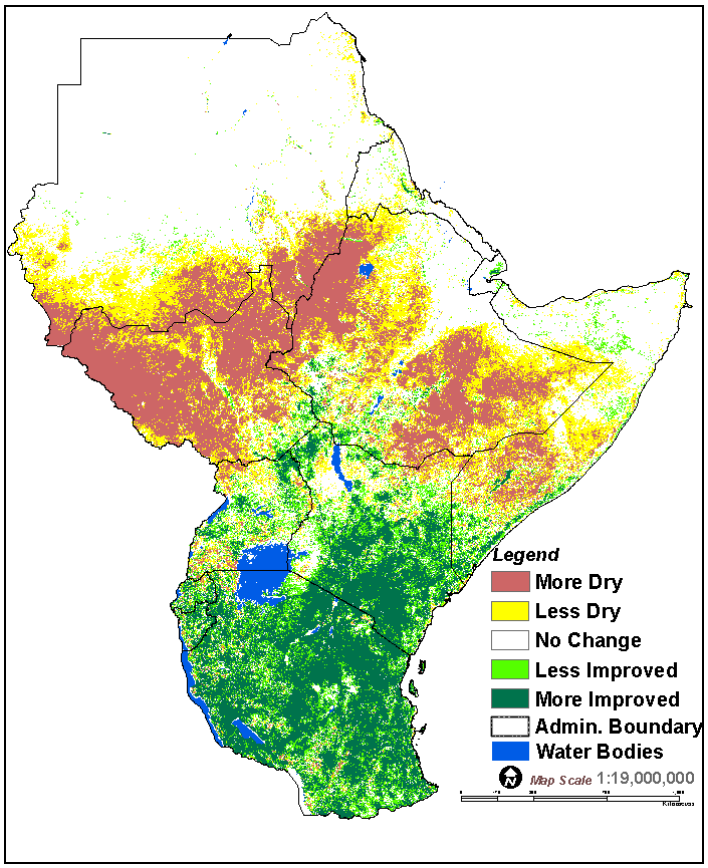

Figure 9: Vegetation difference between December and November 2015 over the Greater Horn of Africa

7.2 Impacts of observed climate conditions during December 2015

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

- Improved crop, pasture and foliage conditions;
- Replenishment of water reservoirs;
- Localised flooding leading to destruction of property, displacement of people, and disruption of livelihood;
- 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 February to March 2015 climate outlook

The areas expected to receive near 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 that may lead to disruption of livelihood of people, and 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.