



REPUBLIC OF KENYA  
MINISTRY OF ENVIRONMENT AND FORESTRY  
**KENYA METEOROLOGICAL DEPARTMENT**

Dagoretti Corner, Ngong Road, P. O. Box 30259, 00100 GPO, Nairobi, Kenya

**Telephone:** 254 (0) 20 3867880-7, +254 724 255 153/4

**E-mail:** director@meteo.go.ke, info@meteo.go.ke , irdkmd@gmail.com

**Website:** <http://www.meteo.go.ke>

**THE OUTLOOK FOR THE OCTOBER-NOVEMBER-DECEMBER (OND) 2018 SEASON AND REVIEW OF RAINFALL DURING THE “LONG RAINS” (MARCH TO MAY) & JUNE-JULY-AUGUST (JJA) 2018 SEASONS**

*Ref No: KMD/FCST/5-2018/SO/03*

*Issue Date: 04/09/2018*

## **1. HIGHLIGHTS**

### **1.1 Forecast for the October-November-December (OND) 2018 “Short Rains” Season**

*The Climate Outlook for the October-November-December (OND) 2018 “Short Rains” season indicates that much of the country is likely to experience above average rainfall. The distribution of the rainfall in time and space is expected to be good over most places especially during the peak month of November. The onset of the OND 2018 seasonal rainfall is expected to be timely over most of the country.*

### **1.2 Review of the Rainfall in March-May 2018**

*The March-April-May (MAM) 2018 rainfall season was characterized by very heavy rainfall that pounded most parts of the country. The rainfall caused massive flooding and other severe impacts that included loss of several lives. It also led to displacement of thousands of families as well as massive destruction of property and infrastructure. Analyses of the MAM 2018 seasonal rainfall indicated that most Meteorological stations in the country received **above-normal** rainfall. The seasonal rainfall totals recorded at some stations were the highest ever recorded since the stations were opened.*

### **1.3 Review of the Rainfall in June-August 2018**

*Most parts of the country remained generally dry during June-July-August (JJA) 2018. Near-Average rainfall was recorded over several parts of western Kenya while mainly cool/cold and cloudy conditions with occasional early morning drizzles and afternoon/night rains were observed over the Central Highlands and Nairobi area especially in July. The JJA temperatures were generally warmer than average over most of the Country.*

## 2. FORECAST FOR OCTOBER-NOVEMBER-DECEMBER (OND) 2018 “SHORT-RAINS” SEASON.

The “Short Rains” October to December (OND) season constitutes an important rainfall season in Kenya and more so in the Central and South-eastern regions. During OND 2018, it is expected that most parts of the country will experience enhanced rainfall that will also be well distributed both in time and space. This will be more so over North-eastern, North-western, Western, Central and the Coastal regions of Kenya.

The expected onset, cessation and distribution of rainfall are derived from Canonical Correlation Analysis (CCA) of historical rainfall data as well as statistical analysis of past years (analogue years), which exhibited similar characteristics to the year 2018.

The specific outlook for October-November-December (OND) 2018 is as follows:

The areas likely to receive **Above-normal (highly enhanced)** rainfall include: **the Western Counties** (Busia, Vihiga, Kakamega, Bungoma); **Nyanza Counties** (Kisumu, Siaya, Homa Bay, Nyamira, Migori, Kisii); **Counties in Eastern Region** (Meru, Embu, Tharaka); **Counties in Central Kenya** (Kirinyaga, Nyeri, Murang’a, Kiambu, Nyandarua); **Nairobi County**; **Counties in Central and North Rift Valley** (Kericho, West Pokot, Nandi, Bomet, Baringo, Elgeyo Marakwet, Uasin Gishu, Laikipia, Trans Nzoia, Nakuru); **Counties in North Western** (Turkana, Samburu); **North Eastern Counties** (Mandera, Wajir, Garissa, Isiolo, Marsabit); **Counties in the Coastal Region** (Mombasa, Kilifi, Kwale, Lamu and parts of Tana River); and **Machakos County in southeastern Kenya**. These areas are shown in **dark green color** in **Figure 1**.

The areas likely to receive **near-normal to above-normal (enhanced)** rainfall include: **Counties in southern Rift Valley** (Narok, Kajiado); and **Most Counties in Southeastern Kenya** (Taita-Taveta, Makueni, Kitui and most of Tana River): These areas are shown in **light green color** in **Figure 1**

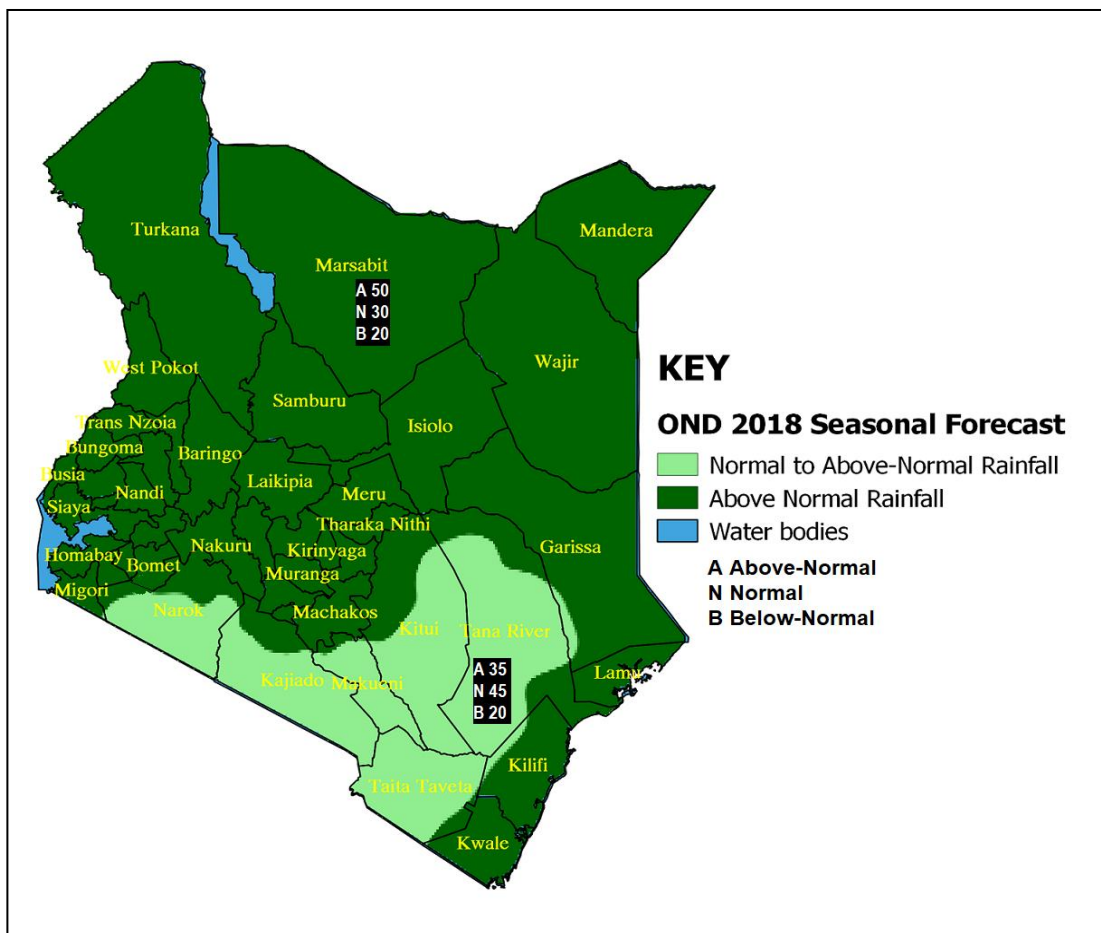


Figure 1: OND 2018 Rainfall Outlook

### 3. ONSET AND CESSATION DATES

The expected onset and cessation dates for specific areas are as follows:

- (i). **Nyanza, Western and North Rift Counties** (Kisumu, Siaya, Homa Bay, Nyamira, Migori, Kisii, Busia, Vihiga, Kakamega, Bungoma, Uasin Gishu, Trans Nzoia etc): These counties are expected to continue experiencing rainfall during the first week of October spreading from the month of September. The rains are expected to cease during the fourth week of December;
- (ii). **Northern Rift Valley Counties:** The onset in the Northwestern parts of the country (Turkana, West Pokot, etc.) is expected during the third to fourth week of October while cessation is expected during the first to second week of the December;
- (iii). **Central Counties including Nairobi and parts of Central Rift Valley:** (Meru, Embu, Nyeri, Murang'a, Nyahururu, Nakuru, Laikipia, Dagoretti, Kabete, Eastleigh, etc) are expected to experience their onsets in the second to third week of October. The rains will cease during the third to fourth week of December;

- (iv). **Southeastern (*Ukambani*) areas** (Machakos, Makueni, Kitui, etc): The onset is likely to occur during the third to fourth week of October and the cessation during the third to fourth week of December.
- (v). **Northeastern and Northern Counties** (Mandera, Wajir, Garissa, Isiolo, Marsabit): are expected to experience their onsets in the second to third week of October and the cessation during the fourth week of November to first week of December. The month of December is likely to be generally dry over the extreme northern parts of this region;
- (vi). **Southern Rift Valley** (Narok, Kajiado, etc): These counties are likely to experience the onset during the third to fourth week of October and the cessation during the third to fourth week of December. Narok County is, however, likely to experience rainfall up to the end of December and into early January 2019.
- (vii). **Counties in Southern Kenya and part of the Coast Region** (Voi, Taveta, Makindu, and Tana River): These counties are likely to realize the onset during the fourth week of October to the first week of November and cessation during the third to fourth week of December.
- (viii). Onset over the Coastal strip (Kwale, Kilifi, Lamu, Mombasa) counties is likely to occur during the third to fourth week of October and the cessation during the first to second week of December.

The expected onset and cessation dates are as shown in **figures 2a & 2b** respectively.

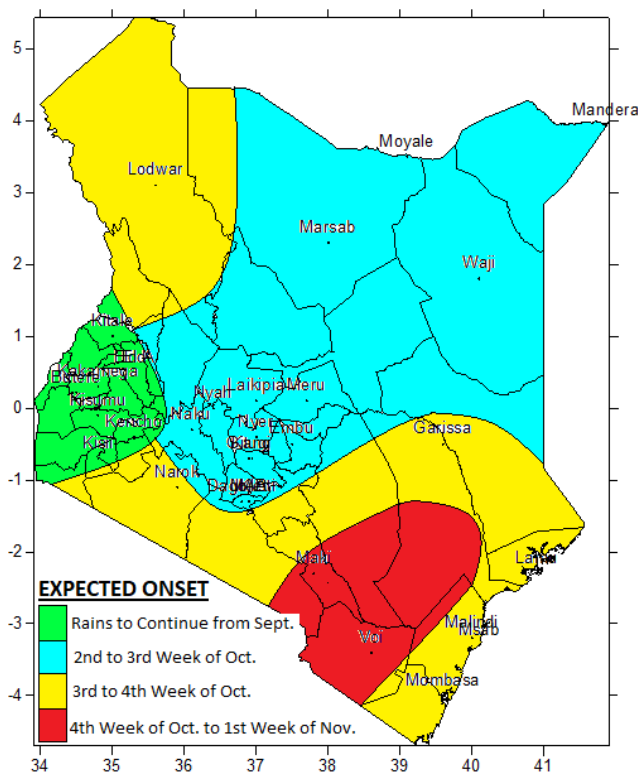


Fig. 2a: Expected Onset for OND 2018 Rains

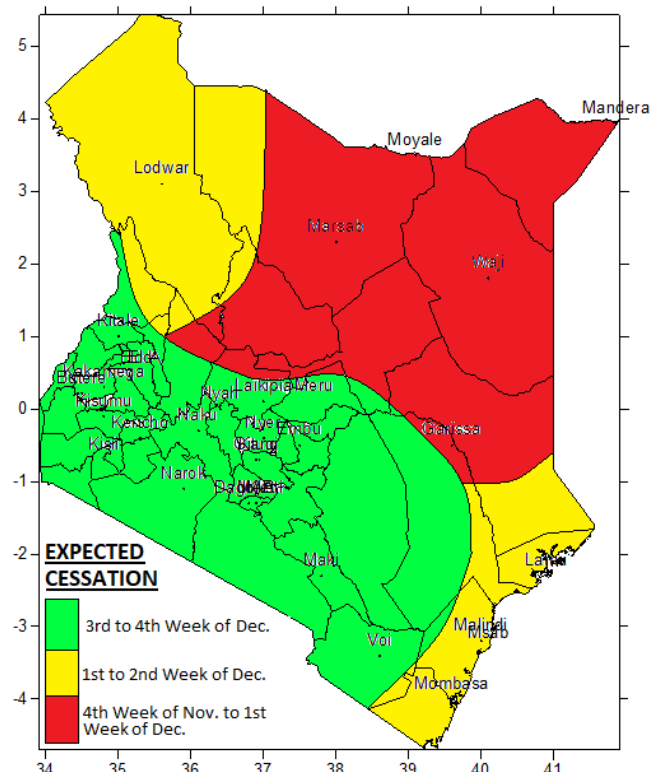


Fig. 2b: Expected Cessation for OND 2018 Rains

### **3. EXPECTED DISTRIBUTION**

The OND 2018 rainfall is expected to be well distributed both in time and space, throughout the season. This will be more so during the rainfall peak month of November.

### **4. POTENTIAL IMPACTS OF THE OND 2018 RAINS**

Following the forecasted enhanced rainfall over most parts of the country, various sectors are expected to experience both positive and negative impacts. Contingency measures should therefore, be put in place to avoid some of the probable negative impacts and at the same time take full advantage of the positive ones. The most likely impacts are as follows:

#### ***4.1 Agriculture, Livestock Development and Food Security Sectors***

The enhanced and well distributed rainfall that is expected over most agricultural areas of the country will be favorable for agricultural activities. Farmers are, therefore, advised to take advantage of the good rains to maximize on crop production. Foliage and pasture conditions in the pastoral areas of Northeastern, Northwestern and Southeastern Kenya are expected to improve significantly as a result of the expected good rainfall performance during the season. Pastoralists are also advised to on livestock production in order to benefit fully from the increased pastures

#### ***4.2 Environment and Natural Resources Sectors***

Vegetation cover is expected to improve significantly over most parts of the country as a result of the enhanced rainfall. People are encouraged to plant more trees in order to increase forest cover.

#### ***4.3 Water and Sanitation***

The forecasted enhanced rainfall is expected to increase water resources in the catchment areas to the benefit of urban centers such as Nairobi, Nakuru, Mombasa, Garissa, Eldoret etc. People are also encouraged to harvest as much water as possible for future use. Urban centers are also encouraged to urgently construct storm drainage systems and open up clogged drainages to avoid piling of floodwaters in cities and towns from surface runoff triggered by heavy rainfall storms.

#### ***4.4 Disaster Management Sector***

In western Kenya where above-average rainfall is expected, lightning strikes are highly probable especially in Counties like Kisii, Kisumu, Kakamega and Bungoma. Cases of flooding in prone areas such as



Budalang'i and Kano plains as well as landslides/mudslides in susceptible areas of Western, Central and Rift Valley are also likely to occur. The National Disaster Operations Centre is, therefore, advised to be on standby in order to ensure mitigation of any negative impacts that may arise.

#### **4.5 Health Sector**

Various parts of the country are likely to experience outbreak of diseases that are associated with excessive water such as malaria. The Ministry of Health should, therefore, be on the lookout for such cases. Hospitals should be equipped with necessary drugs to be able to deal with such situations as they arise.

#### **4.6 Transport and Public Safety Sector**

Muddy and slippery conditions will occur on various roads in several parts of the country. Motorists are, therefore, advised to drive carefully in order to avoid accidents that may emanate from such slippery conditions.

Flash floods are likely to occur over several parts of the country especially during the peak month of November. This may lead to transport problems especially during rush hours and more so in areas where the roads become impassable when it rains.

#### **4.7 Energy Sector**

All the major River catchment areas for the country's hydroelectric power generating dams are expected to receive above-average rainfall. This means that surface water run-offs are also likely to register above-average inflows into Rivers such as Sondu Miriu, Tana and Athi. This is expected to increase the water levels in dams, and improve the capacity for hydroelectric power generation.

### **5. WEATHER REVIEW DURING MARCH-APRIL-MAY AND JUNE-JULY-AUGUST 2018 RAINFALL SEASONS**

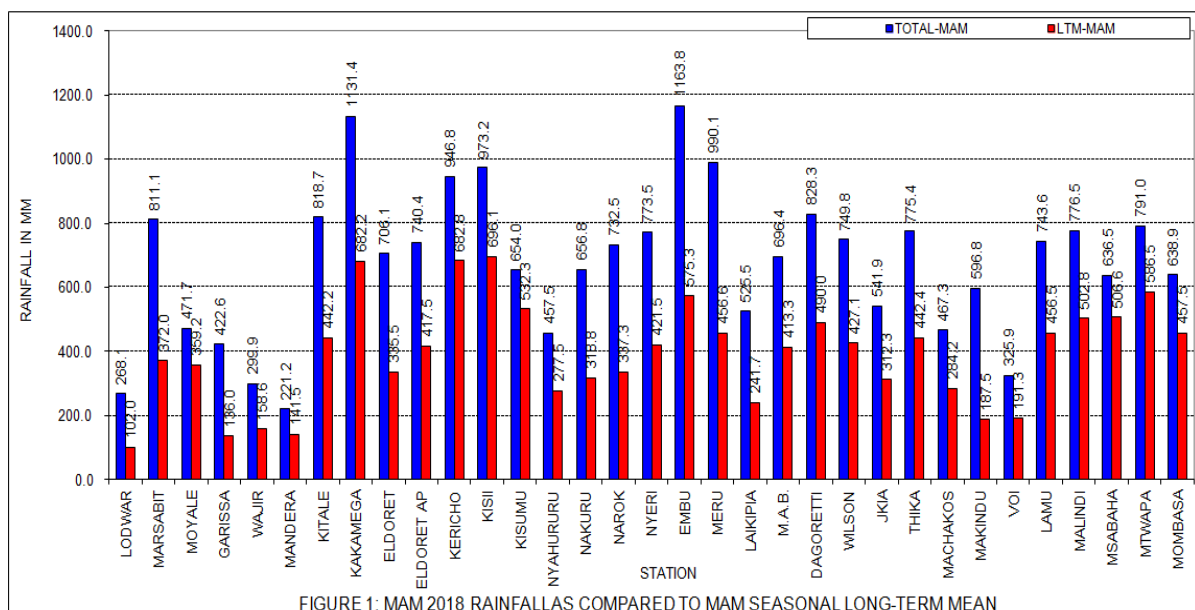
#### **5.1 Review of March-April-May (MAM) 2018 and associated impacts**

The March-April-May 2018 seasonal rainfall was characterized by heavy storms that caused massive flooding over most parts of the country and landslides/mudslides in isolated areas. Analysis of the MAM 2018 rainfall from 1<sup>st</sup> March to 31<sup>st</sup> May indicates that most meteorological stations in the country recorded **above-normal (highly enhanced)** rainfall. Stations like Makindu, Garissa, Lodwar, Marsabit, Laikipia Airbase, Narok, Meru, Eldoret, Nakuru and Embu recorded above 200 percent (more than twice) of their MAM seasonal LTMs. All the other meteorological stations in the country recorded above-normal rainfall (more than 125 percent of

their LTMs) with most of them recording above 150 percent. There was no station in the entire country that recorded less than 100 percent.

Further analysis indicates that the MAM 2018 seasonal rainfall amounts recorded at some stations were the highest on record. The rainfall recorded at Narok station, for example, was the highest ever recorded since 1950, considering both the MAM and October-November-December (OND) seasons. The station recorded 732.5mm as compared to 686.4mm recorded during the OND 1961 and 610.8mm during MAM 1957 seasons. Other stations that recorded the highest amounts on record include Eldoret-Kapsoya, (highest since 1972), Kitale (highest since 1979), Kericho (highest since 1974), Laikipia Airbase (highest since 1957), Makindu (highest since 1950), Kakamega (highest since 1958), Nakuru (highest since 1964), Embu (highest since 1976) and Nyeri (highest since 1968).

Embu Meteorological station recorded the highest seasonal rainfall amount of 1163.8mm (189%) as compared to its MAM seasonal LTM of 575.3mm. Other stations that recorded rainfall exceeding 800mm include Kakamega – 1131.4mm, Meru – 990.1mm, Kisii – 973.2mm, Kericho – 946.8mm, Dagoretti Corner – 828.3mm, Kitale – 818.7mm and Marsabit – 811.1mm. Mtwapa, Malindi, Thika, Nyeri, Wilson Airport, Lamu, Eldoret Airport, Narok and Eldoret (Kapsoya) recorded between 700 and 800mm while the rest of the stations recorded below 700mm. The lowest amount of 221.2mm was recorded at Manderata meteorological station. **Figure 3** shows the MAM 2018 rainfall recorded from 1<sup>st</sup> March to 31<sup>st</sup> May (**Blue bars**) compared to the MAM LTMs (**Red bars**).



### **5.1.1 Impacts Associated With the MAM 2018 “Long-Rains”**

The MAM 2018 seasonal rainfall was associated with both positive and negative impacts country-wide as follows:

#### **Positive Impacts**

- (i). In the agricultural areas of the country that include Western, Nyanza, central Rift Valley, Central and Southeastern Kenya, good crop performance was reported in some regions that were not affected by floods and landslides.
- (ii). The enhanced rainfall in pastoral areas improved pasture and water availability for livestock despite the flooding experienced in the areas.
- (iii). The Seven Forks, Turkwel and Sondu Miriu power generating dams filled to capacity as a result of the heavy rainfall in the catchment areas. This enhanced hydro-power generation in the country.
- (iv). Water resources for drinking, sanitation and industrial use improved significantly as a result of the heavy rainfall experienced over most parts of the country.
- (v). The heavy rainfall was conducive for tree-planting. The Ministry of Environment spearheaded tree-planting exercises country-wide and this will go a long way to increase the forest cover.

#### **Negative Impacts**

- (i). The heavy rainfall experienced in various agricultural areas caused massive flooding that hampered crop performance. The floods submerged crop plantations in counties like Kisumu.
- (ii). The floods and landslides that resulted from heavy rainfall affected the better part of the country. According to the National Disaster Operations Centre (NDOC), the most affected counties included Tana-River, Mandera, Turkana, Kisumu, Garissa, Isiolo, Taita-Taveta, Wajir, West-Pokot, Marsabit, Samburu and Narok.
- (iii). Reports from NDOC also indicated that up to mid-May, the heavy rainfall in the country had claimed 183 lives, 54 people were injured, and 53,675 households were affected while 225,360 people were displaced.
- (iv). Flash floods that occurred in various parts of the country led to transport disruption after several roads became impassable. There was also massive destruction of property and infrastructure country-wide.
- (v). Isolated cases of diseases like cholera emerged in some areas due to contaminated drinking water sources. Water-borne diseases such as malaria also increased due to increased breeding sites for mosquitoes.

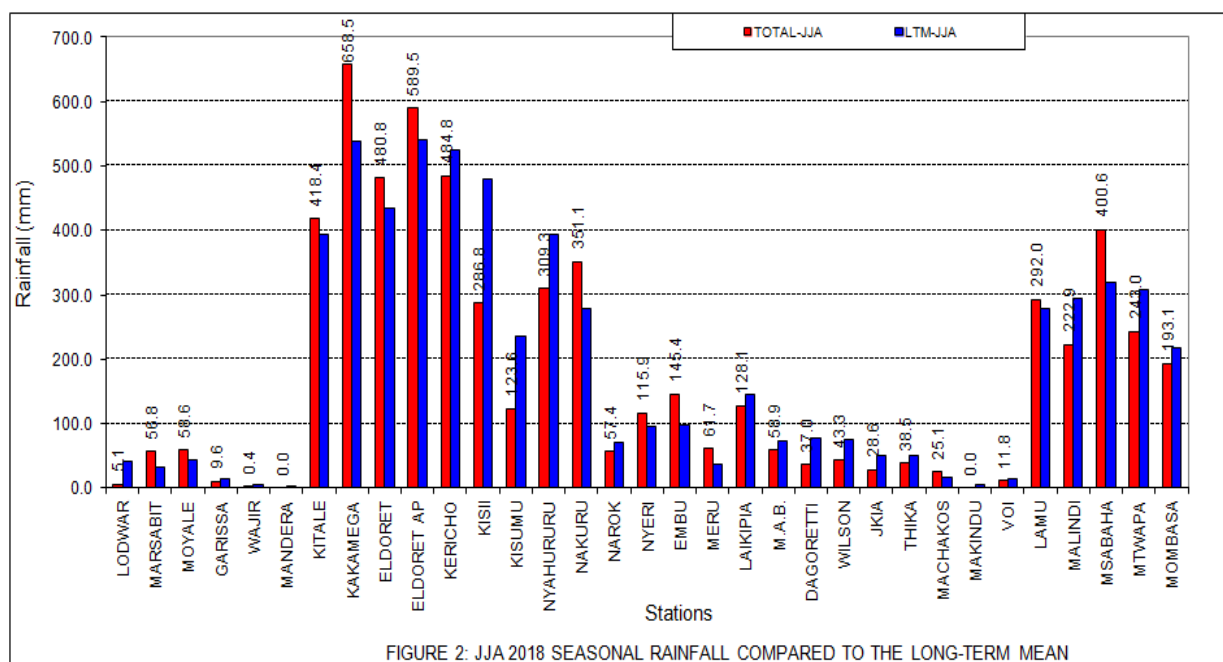


- (vi). Several areas suffered environmental degradation that was caused by soil erosion following the heavy rainfall. Several rivers such as Tana, Ewaso Nyiro, Yala and Nyando burst their banks due to heavy rains in the catchment areas.
- (vii). The heavy rains also led to massive destruction of infrastructure especially roads.

## 5.2 Review of June-July-August (JJA) 2018

Most parts of the country remained generally sunny and dry for most of the JJA 2018 season. Several meteorological stations in North-western, North-eastern, Southeastern and parts of Central Kenya including Nairobi recorded monthly rainfall totals of less than 10mm. Some stations like Garissa, Wajir, Manderera and Makindu recorded no rainfall at all throughout the JJA 2018 season.

Elsewhere, several stations in Western Kenya recorded significant amounts of rainfall during the season. The rainfall was, however, generally depressed in the Lake Victoria basin (around Kisii and Kisumu) but near-average in the western highlands (Kakamega, Eldoret, Kericho, Kitale, etc) as seen in **figure 4**. Kitale and Eldoret stations that are in the grain basket areas of Kenya as well as Kakamega station recorded 106, 111 and 122 percent of their LTM's respectively during the season.



Most stations along the Coastal strip also recorded above 75 percent of their LTM's. The highest percentage of 126 percent was recorded at Msabaha station while Lamu station recorded 105 percent.

In terms of temperatures, analysis of the JJA 2018 air temperature indicated that both the minimum (night-time) and maximum (day-time) temperatures for the season were warmer than average at most stations. The daytime temperatures in the Central highlands and Nairobi area occasionally fell below 20°C especially in July. A few days turned out to be cold and chilly.

***N.B: This forecast should be used in conjunction with the five-day, weekly and monthly forecasts including updates, advisories and alerts issued by this Department.***



Stella Aura, MBS

**Ag. DIRECTOR OF METEOROLOGICAL SERVICES**