REPUBLIC OF KENYA
MINISTRY OF ENVIRONMENT AND NATURAL RESOURCES
STATE DEPARTMENT OF ENVIRONMENT
KENYA METEOROLOGICAL DEPARTMENT
Dagoretti Corner, Ngong Road, P. O. Box 30259, 00100 GPO, Nairobi, Kenya
Telephone: 254 (0) 20 3867880-7**, Fax:** 254 (0) 20 3876955/3877373/3867888,
e-mail: director@meteo.go.ke, info@meteo.go.ke
Website: http://www.meteo.go.ke

THE OUTLOOK FOR THE OCTOBER-NOVEMBER-DECEMBER (OND) 2017 SEASON AND REVIEW OF RAINFALL DURING THE "LONG RAINS" (MARCH TO MAY) 2017 & JUNE-JULY-AUGUST (JJA) 2017 SEASONS

Ref No: KMD/FCST/5-2017/SO/03

Issue Date: 29/08/2017

1. HIGHLIGHTS

1.1 Forecast for the October-November-December (OND) 2017 "Short Rains" Season

The Climate Outlook for the October-November-December (OND) 2017 "Short Rains" season indicates that much of the country is likely to experience enhanced rainfall. This will be driven by warmer than average Sea Surface Temperatures (SSTs) over the western Equatorial Indian Ocean (adjacent to the East African coastline) coupled with cooler than average SSTs over the eastern Equatorial Indian Ocean (adjacent to Australia). This constitutes a positive Indian Ocean Dipole (IOD) that is favorable for good rainfall over much of East Africa. The distribution of the rainfall in time and space is expected to be generally good over most places especially during October and the peak month of November. Generally dry conditions are, however, likely to prevail over much of the country for most of December.

1.2 Review of the Rainfall in March-May 2017

Most parts of the country experienced below-normal rainfall that was mainly recorded in April and May 2017. A few stations in southeastern Kenya, and the Coastal strip recorded above-normal (enhanced) rainfall (more than 125 percent of their seasonal Long-Term Means (LTMs) for March-April-May (MAM).

The distribution, both in time and space, was generally poor over most parts of the country including the western and central regions including the areas that recorded above normal rainfall. The seasonal rainfall onset was very late over the entire country with most areas remaining sunny and dry throughout the month of March 2017.

1.3 Review of the Rainfall in June-August 2017

Most parts of the country experienced generally sunny and dry weather conditions during June-July-August (JJA) 2017. Near-Average rainfall was recorded over several parts of western Kenya while occasional cool and cloudy conditions were observed over the Central Highlands and Nairobi area especially in August. The JJA temperatures were generally warmer than average over much of the country.

2. FORECAST FOR OCTOBER-NOVEMBER-DECEMBER 2017 "SHORT-RAINS".

The "Short Rains" October to December (OND) season constitutes an important rainfall season in Kenya and more so in the Central and Southeastern parts of Kenya. During OND 2017, it is expected that most parts of the country will experience enhanced rainfall that will also be well distributed both in time and space. The expected enhanced rainfall will mainly be driven by the cooler than average SSTs over the eastern Equatorial Indian Ocean (adjacent to Australia) coupled with warmer than average SSTs over the western Equatorial Indian Ocean (adjacent to the East African coast). This constitutes a positive Indian Ocean Dipole (IOD) that is favorable for good rainfall in the country.
The expected onsets, cessation and the 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 2017.

The specific outlook for October-November-December (OND) 2017 is as follows:

The areas likely to receive **near-normal** rainfall include: **the Western Counties** (Busia, Vihiga, Kakamega, Bungoma); **Nyanza Counties** (Kisumu, Siaya, Homa Bay, Nyamira, Migori, Kisii); **Some Counties in southern, central and north Rift Valley;** (Kericho, West Pokot, Nandi, Bomet, Baringo, Uasin Gishu, Trans Nzoia, Nakuru, Narok, Kajiado); **Nairobi and Kiambu Counties** and **Some Counties in southeastern Kenya** (Taita Taveta, Machakos, Makueni, Kitui and most of Tana River): These areas are shown in light blue colour in **figure 3**.

The areas likely to receive **near-normal to above-normal (enhanced)** rainfall include: **North Eastern Counties** (Mandera, Wajir, Garissa, Isiolo); **Counties in Coast Region** (Mombasa, Kilifi, Kwale, Lamu and parts of Tana River), **Some Counties in Central Kenya** (Kirinyaga, Nyeri, Murang'a, Nyandarua), **Counties in Eastern Region** (Meru, Embu, Tharaka, Isiolo, Marsabit) and **Counties in North Western** (Turkana, Samburu): These areas are shown in light green colour in **Figure 3**

3. ONSET AND CESSATION DATES

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

- Nyanza and Western Counties (Kisumu, Siaya, Homa Bay, Nyamira, Migori, Kisii, Busia, Vihiga, Kakamega, Bungoma 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 third to fourth week of December;
- The North Rift Counties (Uasin Gishu, Trans Nzoia): The onset at Kitale, Eldoret etc. is expected during the second week of October and the cessation during the first to second week of December. A dry spell is expected to occur prior to the onset of the Short Rains.

- Northern Rift Valley Counties: The onset in the Northwestern parts of the country (Turkana, West Pokot counties etc.) is expected during the fourth week of October while cessation is expected during the fourth week of November to first week of the December;
- Central Counties: Central Highlands (Meru, Embu, Nyeri, Murang'a, Laikipia etc) are expected to experience their onsets in the second to third week of October. The rains will cease during the second to third week of December;
- Nairobi County and parts of Southeastern lowlands (Dagoretti, Kabete, Eastleigh, Machakos, Kangundo, etc): The onset is likely to occur during the third to fourth week of October and the cessation during the second to third week of December.
- Northeastern Counties (Mandera, Wajir, Garissa, 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;
- Central Rift Valley: The Central Rift Valley areas (Nakuru, Narok, Nyahururu etc) are likely to experience the onset during the third to fourth week of October and the cessation during the first to second week of December. Narok County is, however, likely to experience rainfall up to the end of December and into early January 2018.
- Southern and some of the Coast Region Counties: The southeastern lowlands (Voi, Taveta, Makindu, Tana River) are likely to realize the onset during the fourth week of October and cessation during the third to fourth week of December.
- Onset over the Coastal strip is likely during the second to third week of October and the cessation during the first to second week of December.

The onset and cessation dates are as depicted in **figure 4a and 4b** respectively.

4. EXPECTED DISTRIBUTION

The OND 2017 rainfall is expected to be well distributed both in time and space, during the Onset month of October and the peak month of November. Most parts of the country are, however, likely to experience generally dry conditions or long dry spells in December.

5. POTENTIAL IMPACTS OF THE OND 2017 RAINS

In view of the forecasted good rainfall, many sectors are likely to be impacted in various ways. With adequate preparations, the country can avoid some of the likely negative impacts while taking full advantage of the positive ones. The most likely impacts are highlighted below:

5.1 Agriculture, Livestock Development and Food Security Sectors

Enhanced rainfall is expected over most agricultural areas of the country. It is also expected that the rainfall will be well distributed making it favorable

for agricultural activities in most of the areas. Farmers are, therefore, advised to take advantage and make use of the good rains to maximize crop production. The early cessation expected in some agricultural areas is however, likely to interfere with crop development before maturing.
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.

5.2 Environment and Natural Resources Sectors

The anticipated enhanced rainfall is likely to result in to improved vegetation in most places. People are encouraged to make use of the good rainfall by planting trees in order to increase the forest cover.

5.3 Water and Sanitation

Water resources in urban areas such as Nairobi, Nakuru, Mombasa, Garissa, Eldoret etc. are expected to improve following the forecasted enhanced rainfall.

5.4 Disaster Management Sector

In western Kenya where near-average rainfall is expected, lightning strikes may occur especially in Counties like Kisii, Kisumu, Kakamega and Bungoma (especially Mt. Elgon areas) areas. Cases of floods are also likely especially in areas forecasted to receive enhanced rainfall. The disaster management institutions should be on the lookout for such occurrence.

5.5 Health Sector

Diseases associated with excessive water such as malaria may emerge in various parts of the country that are expected to receive enhanced rainfall. 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.

5.6 Transport and Public Safety Sector

The expected enhanced rainfall is likely to lead to muddy conditions on the roads in some parts of the country. This may result into slippery conditions that may cause vehicles to steer of the road and cause accidents. 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. This may lead to transport problems especially during rush hours and more so in areas where the roads become impassable when it rains.

5.7 Energy Sector

The major river catchment areas for the country's hydroelectric power generating dams are forecast to receive near-average to above-average rainfall. This means that surface water run-offs may register average to above-average inflows into rivers Sondu Miriu, Tana and Athi. This is expected to increase the water levels in dams, and improve the capacity for hydroelectric power generation in the hydropower dams.

6. WEATHER REVIEW DURING MAM AND JJA 2017 RAINFALL SEASONS

6.1 Review of March-April-May (MAM) 2017 and associated impacts

6.1.1 Review of March-April-May (MAM) 2017

An assessment of the rainfall recorded from 1st March to 31st May 2017 indicates that the rainfall performance was generally poor over most parts of the country. The seasonal rainfall was also characterized by late onset as well as poor distribution, both in time and space. Generally sunny and dry weather conditions were dominant over the much of the country during the onset month of March 2017.
Much of the rainfall was recorded during the second half of April and in May 2017.

Most meteorological stations in the country recorded total seasonal rainfall below 75 percent of their seasonal Long-Term Means (LTMs) for March to May. The most depressed rainfall of less than 40 percent of the seasonal LTM was recorded at Nyahururu, Mandera, Moi Airbase, Wilson Airport, Marsabit and Lodwar. However, Machakos station in Southeastern Kenya and Mtwapa and Mombasa along the Coastal strip recorded above-normal (enhanced) rainfall of more than 125 percent of their seasonal LTMs as seen in figure 1.

Mtwapa Meteorological station recorded the highest rainfall amount of 848.7mm, which was 140% of its seasonal LTM. *This was mainly a result of short-lived intense rainfall events experienced at the station that included 75.2mm and 192.5mm recorded on 4th and 8th May 2017 respectively. The total 267.7mm for the two days was about 45% of the total amount of 591.5mm received in May 2017 and 31% of the seasonal total.* Other stations that recorded MAM seasonal rainfall totals exceeding 500mm include; Kakamega 623.7mm (92%), Mombasa 620.9mm (129%), Kericho 581.4mm (86%), Kisii 560.3mm (82%) and Kisumu 536.4mm (99%). Msabaha, Nyeri, Malindi, Lamu, Embu, Meru, Machakos, Eldoret Airport and Kitale stations recorded between 300 and 500mm while the rest of the stations recorded less than 300mm.

6.1.2 Impacts Associated With the MAM 2017 "Long-Rains"

The poor rainfall performance and delayed onset over much of the country was associated with, among
others:

- Late planting of crops in the agricultural areas especially in the central and western highlands including the maize-basket areas of Trans Nzoia and Uasin Gishu;
- Poor pasture regeneration and limited water availability for livestock in the pastoral areas of Narok, Kajiado and other areas within Rift Valley as well as the northern parts of the country;
- Slight improvements in the water levels in the Seven-Forks as well as Turkwel and Sondu Miriu hydroelectric power generation dams;
- Flooding, displacement of more than 1500 local residents in the Coastal areas including Kwale as well as death of about 15 people in

Mombasa due to short-lived heavy rainfall events worsened by poor urban drainage leading to surface runoff of huge volumes of water that destroyed infrastructure and property.

6.2 Review of June-July-August (JJA) 2017

Most parts of the country remained generally sunny and dry for most of the JJA 2017 season. Several meteorological stations in Northeastern, Southeastern and parts of Central Kenya recorded monthly rainfall totals of less than 30mm. Some stations like Garissa, Wajir, Mandera, Machakos and Voi recorded less than 10mm throughout the JJA season.

However, several stations in Western Kenya recorded significant amounts of rainfall during the season. The rainfall was, however, generally depressed at most stations as compared to the JJA Long-Term Means (LTMs) as seen in **figure 2**. Kitale and Eldoret stations that are in the maize basket areas of Kenya as well as Kakamega station recorded near-average rainfall (119, 102 and 95 percent of their LTMs respectively) during the season.

Most stations along the Coastal strip also recorded above 75 percent of their LTMs. The highest percentage of 92 percent was recorded at Mombasa while Mtwapa station recorded 91 percent. Msabaha and Malindi stations recorded highly depressed rainfall of just 50 and 54 percent of their JJA LTMs respectively.

In terms of temperatures, analysis of the JJA 2017 air temperature indicated that both the minimum (night-time) and maximum (day-time) temperatures for the season were warmer than average at most stations with sunny conditions dominating. The daytime temperatures in the Central highlands and Nairobi area rarely fell below 20°C. However, cool and chilly conditions were occasionally observed towards the end of July and parts of August.

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.

MR. Peter G. Ambenje
DIRECTOR OF METEOROLOGICAL SERVICES & PERMANENT REPRESENTATIVE OF KENYA WITH WMO

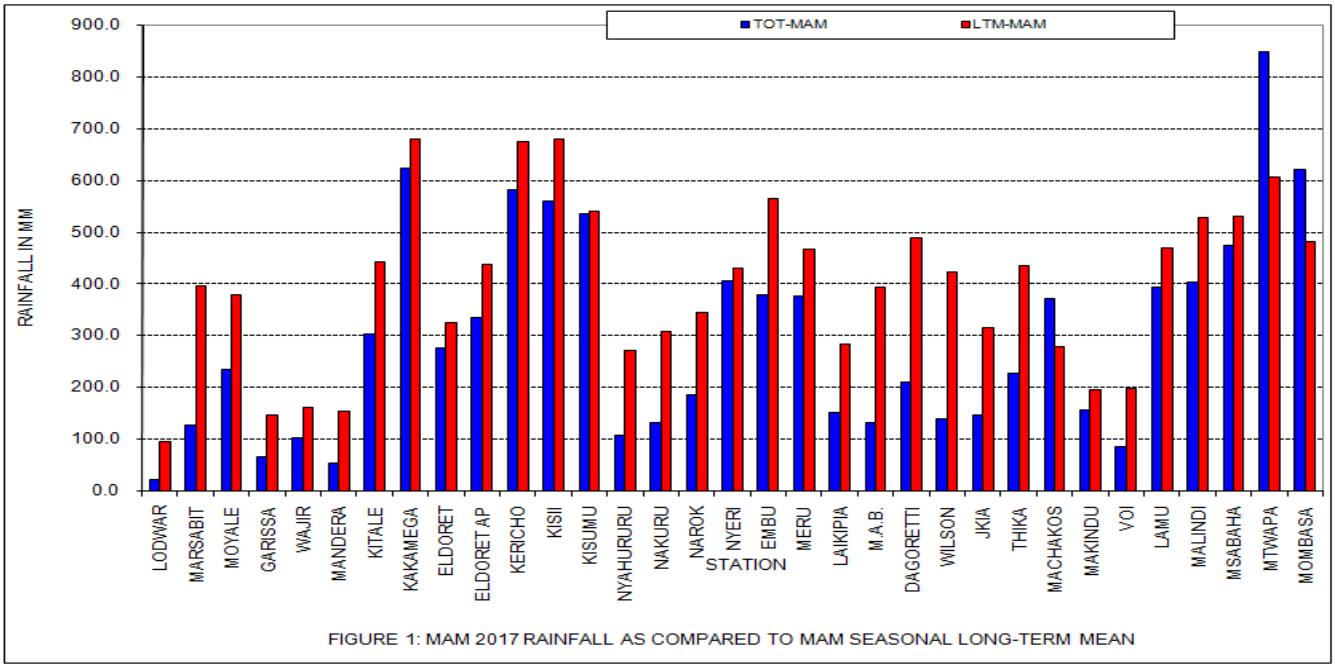

FIGURE 1: MAM 2017 RAINFALL AS COMPARED TO MAM SEASONAL LONG-TERM MEAN

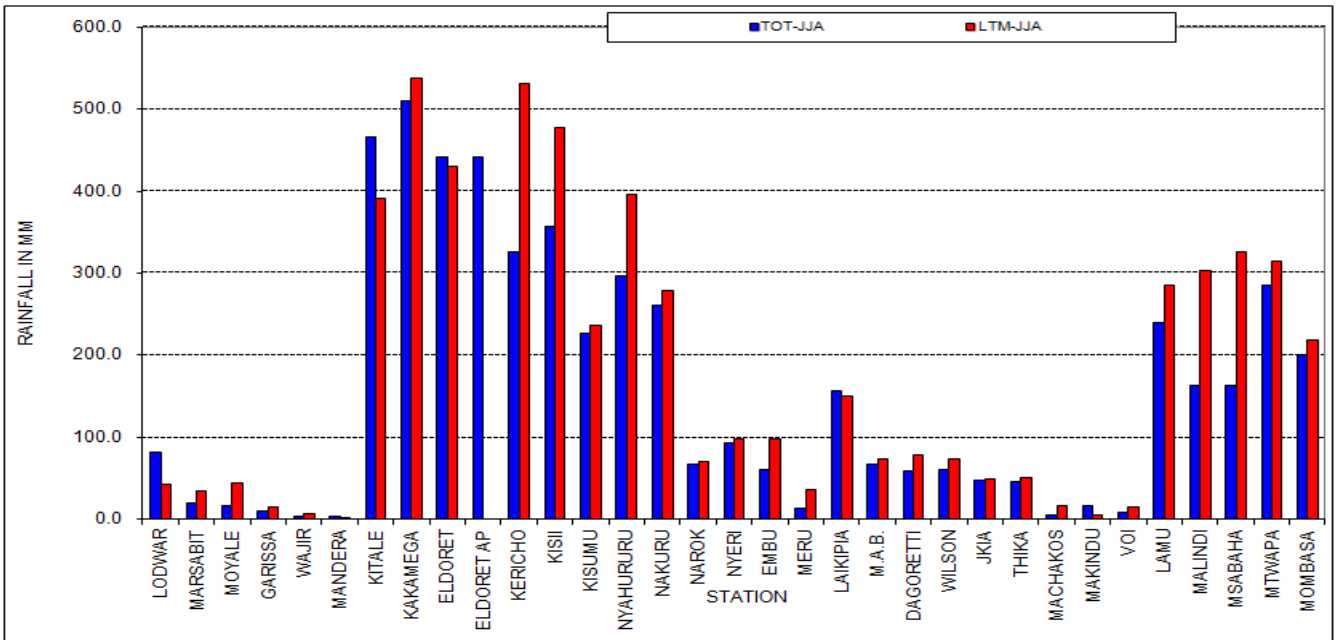

FIGURE 2: JJA 2017 RAINFALL AS COMPARED TO JJA SEASONAL LONG-TERM MEAN

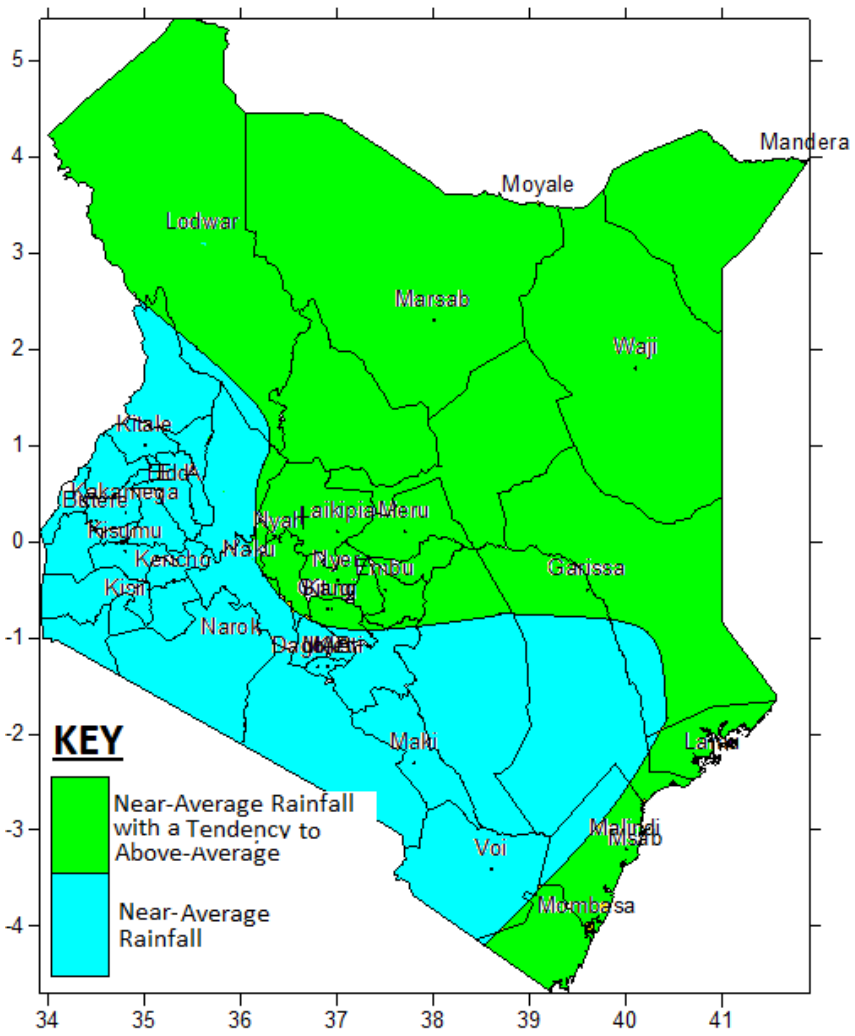

Figure 3: OND 2017 Rainfall Outlook

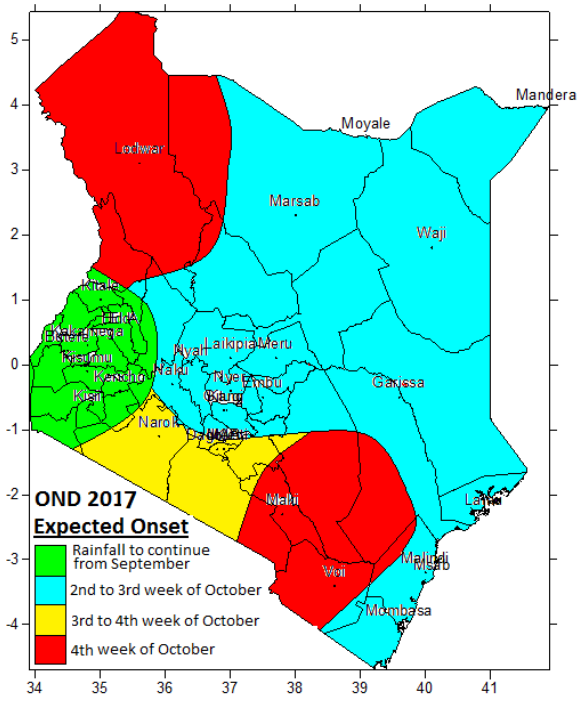

FIGURE 4A: EXPECTED OND 2017 ONSET DATES

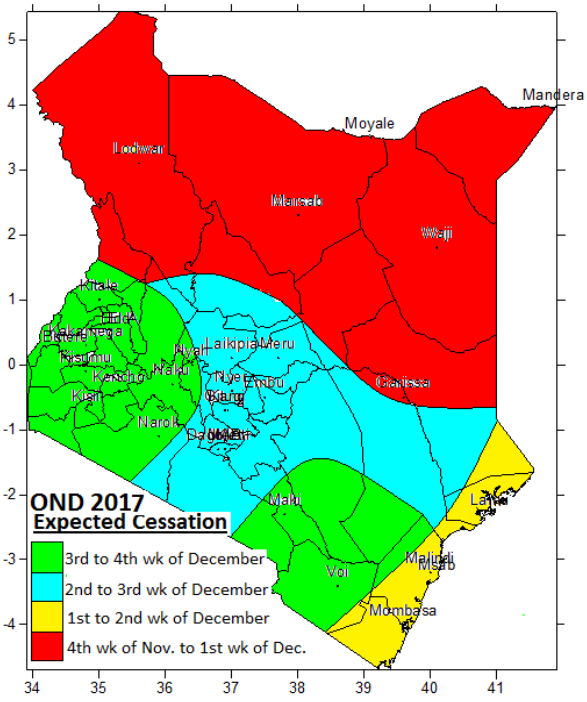

FIGURE 4B: EXPECTED OND 2017 CESSATION DATES