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MINISTRY OF ENVIRONMENT & FORESTRY
KENYA METEOROLOGICAL DEPARTMENT

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**THE OUTLOOK FOR DECEMBER 2021 AND THE WEATHER REVIEW FOR
NOVEMBER 2021**

1. HIGHLIGHTS

1.1. The Weather Outlook for December 2021

December normally marks the cessation of the October-November-December (OND) “short-rains” season in Kenya. The forecast for the month of December indicates that several parts of the country are likely to experience below-average (generally depressed) rainfall. However, near average rainfall is likely over the South eastern lowlands, Highlands East of the Rift Valley as well as parts of Central and South Rift Valley. Isolated storms are likely in these regions during the first half of the month.

The rainfall distribution, both in time and space, is expected to be generally poor. The October-November-December (OND) 2021 seasonal rainfall is likely to cease between the second to fourth weeks of December over several parts of the country.

1.2. The Weather Review for November 2021

Dry weather conditions were experienced over several parts of the country. However, occasional rainfall was experienced over few areas in the Highlands West of the Rift Valley, the Lake Victoria Basin, Central and South Rift Valley and the Highlands East of the Rift Valley.

Nairobi, the Southeastern lowlands, Northeastern and the Coastal region experienced rainfall in the fourth week of November. Isolated storms were also recorded over the Southeastern lowlands, Coastal region, Highlands East of the Rift Valley that resulted in floods. Mandera and Msabaha are the only stations that recorded above normal rainfall at 170.6% and 154.8%, respectively. Kisumu, Thika, Moyale, Embu and Meru recorded near average rainfall at 96.7%, 83.8%, 82.3%, 80.7% and 77.2% respectively. All the other stations recorded less than 75% of their November Long-term Means (LTMs). All the other stations recorded less than 75% of their November LTMs.

The distribution both in time and space was generally poor in most areas with most of the rainfall being experienced during the last week of November.

2. The Weather Outlook for December 2021

This climate outlook for December 2021 is mainly based on the prevailing and expected Sea Surface Temperature Anomalies (SSTAs) over the Pacific, Indian Ocean and Atlantic Ocean. **Figure 1a** illustrates the climatology of December.

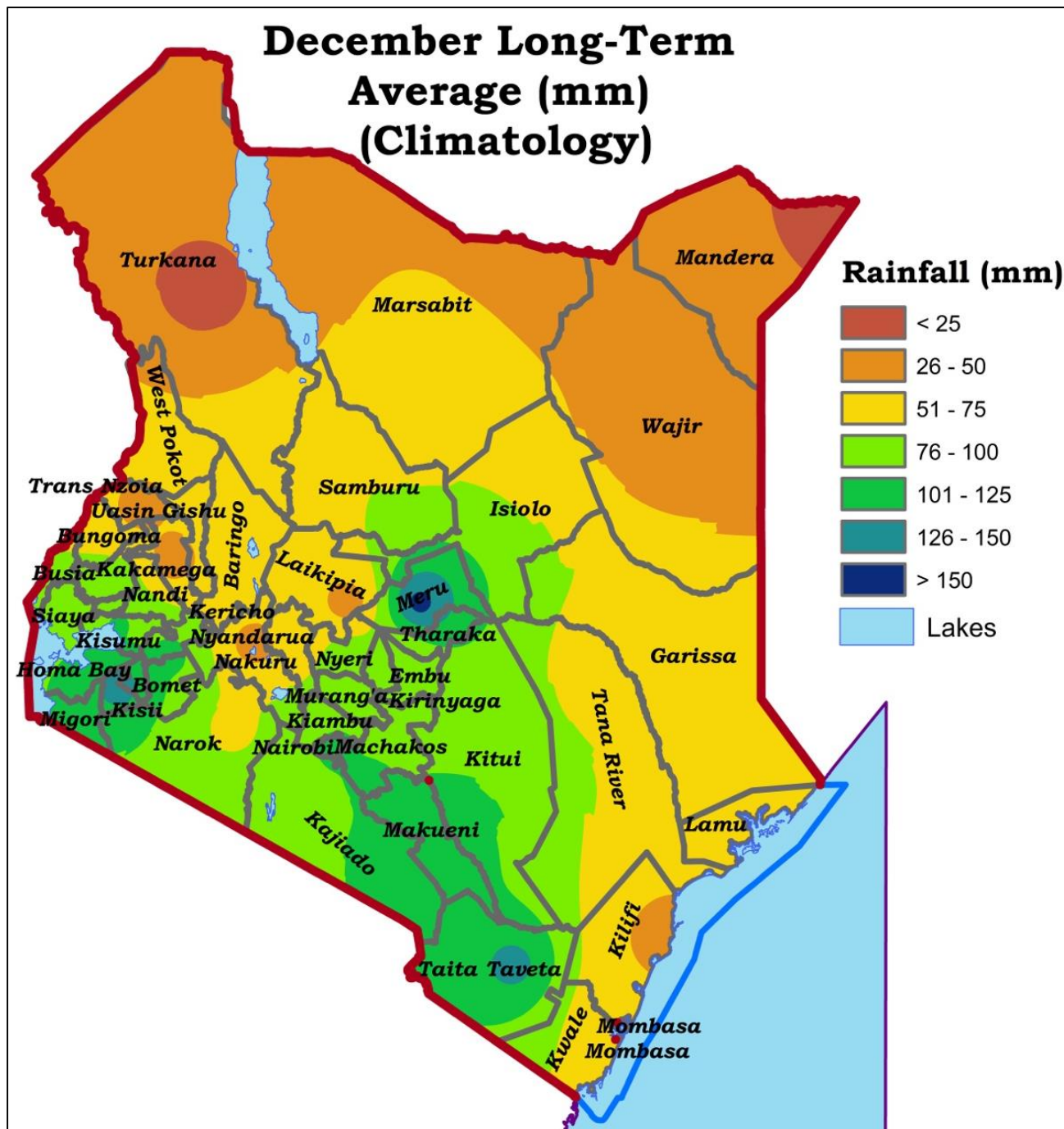


Figure 1a: Climatology of December (LTM)

2.1 Rainfall Forecast for December 2021

In the last four weeks, equatorial SSTs have been below average across most of the Eastern and Central Pacific Ocean. This was an indication that negative ENSO (La Nina) conditions are present in the Pacific Ocean. This configuration is associated with below normal rainfall over the country. During this period, warmer than average SSTs have also been observed along the equatorial Eastern Indian Ocean and near average SSTs over equatorial Western Indian Ocean indicating the existence of a neutral IOD.

The predicted cessation and distribution of rainfall has been derived from statistical analysis of past years which exhibited similar characteristics to the current year.

The forecast indicates that several parts of the country are likely to experience below-average rainfall during the month of December. The Southeastern lowlands, Coastal region, Highlands East of the Rift valley and parts of southern rift Valley are however likely to receive near to below average rainfall as depicted in **Figure 1b**. Isolated storms are likely in these regions during the first half of the month.

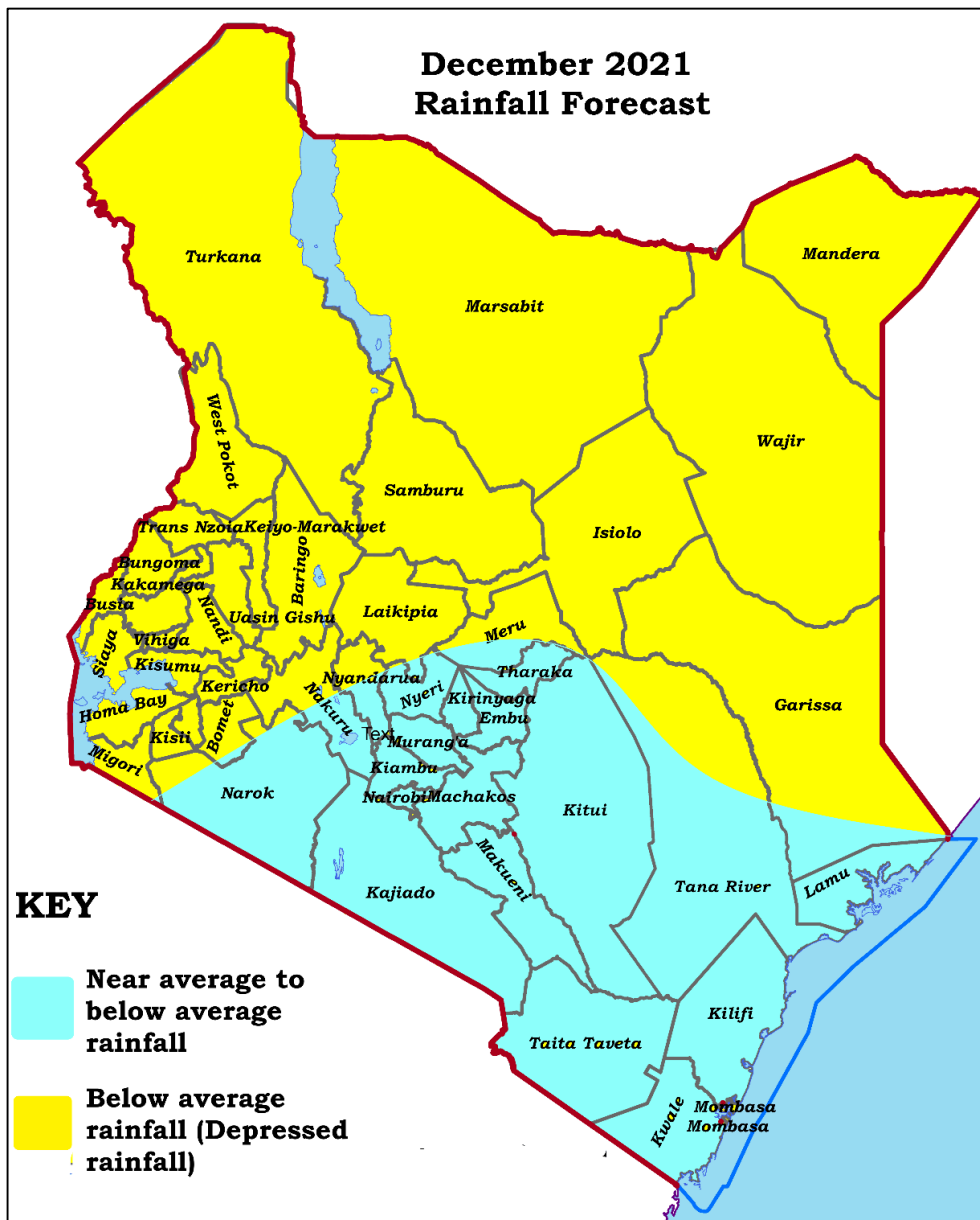


Figure 1b: December 2021 Forecast

The rainfall distribution, both in time and space, is also expected to be generally poor over most parts of the country.

2.2 Outlook for Specific Areas

2.2.1 The Lake Victoria Basin, Highlands West of the Rift Valley and (Siaya, Kisumu, Homa Bay, Migori, Kisii, Nyamira, Trans Nzoia, West Pokot, Baringo, Uasin Gishu, Elgeyo-Marakwet, Nandi, Laikipia, Nakuru, Narok, Kericho, Bomet, Kakamega, Vihiga, Bungoma and Busia): Occasional rainfall is expected throughout the month of December. The rainfall is likely to be below the long-term average amounts for December.

In the Central and South Rift Valley (Nakuru, Narok) Occasional rainfall is expected throughout the month of December. The rainfall is likely to be near to below the long-term average amounts for December.

Cessation is likely to be between the third to fourth week of December 2021 except over south Rift Valley (Narok) where cessation is expected between the fourth week of December 2021 and first week of January 2022.

2.2.2 North-western Region (Turkana and Samburu): Sunny and dry conditions are likely to be experienced throughout the month. Cessation is undefined.

2.2.3 Highlands East of the Rift Valley and Central Kenya (Nairobi, Nyandarua, Nyeri, Kirinyaga, Murang'a, Kiambu, Meru, Embu, and Tharaka): Occasional rainfall is expected during the first half of the month. The expected total amounts are likely to be near to below the long-term average for December. Cessation is likely to be between the third and fourth week of December 2021.

2.2.4 North-eastern Region (Marsabit, Mandera, Wajir, Garissa and Isiolo): Sunny and dry conditions are likely to be experienced throughout the month. Occasional rainfall is however expected over few places during the first week of December 2021. The expected amount of rainfall is likely to be below the long-term average amount for December. Cessation is undefined.

2.2.5 South-eastern Lowlands (Kajiado, Kitui, Makueni, Machakos and Taita Taveta): Occasional rainfall is expected during the first half of December 2021. The expected amount of rainfall is likely to be near to below the long-term average for December. **The first half of the month is likely to experience occasional isolated storms.** Cessation is likely to be between the third to fourth week of December 2021.

2.2.6 The Coastal Strip (Mombasa, Tana River, Kilifi, Lamu and Kwale): Occasional rainfall is expected during the first half of December 2021. The expected amount of rainfall is likely to be near to below the long-term average amounts for December. **The first half of the month is likely to**

experience occasional isolated storms. Cessation is likely to be between second to third week of December.

2.3 POTENTIAL IMPACTS

The following are the likely impacts during the month of December 2021:

2.3.2 Agriculture and Food Security

The depressed rainfall expected over the Northern sector of the country is likely to exacerbate the depletion of pasture and water for livestock and human consumption. The expected rainfall during the beginning of the month over the Southeastern lowlands and Coastal strip is likely to improve the food security in these areas as water and pasture will be rejuvenated.

2.3.2. Disaster Management

Human to human and human to wildlife conflicts are likely to continue being experienced in the ASAL counties of the Northeastern, Northwestern, due to competition over limited water resources and pasture.

In the South eastern lowlands, Highlands East of the Rift Valley and the Coastal region where isolated storms are likely, flash floods are likely to occur. This may result in loss of lives and property.

2.3.3. Water Resources Management and Energy

The major river catchment areas for the country's hydroelectric power generating dams are expected to experience below average rainfall. The water levels in the dams across the country are therefore likely to register reduced inflow. In the South eastern lowlands as well as the Coastal regions where rainfall is expected at the beginning of the month, residents are encouraged to harvest rain and runoffs for consumption.

2.3.4. Environment

December marks the end of the short rains season over Kenya. However, the occasional rainfall over expected over parts of the Western sector of the country including Central and South Rift Valley is likely to maintain conducive soil moisture to sustain tree growth. The public should therefore take advantage of these conditions to plant trees and to put in place measures to conserve the environment.

2.3.5. Health

Malnutrition related diseases are likely to escalate in the ASAL regions. Relevant authorities should put plans in place to provide food and food supplements to the most affected communities.

2.3.6. Transport and Public Safety Sector

The expected occasional rainfall especially at the beginning of the month may cause slippery roads in some parts of the country increasing the risk of accidents. Flash floods may cause transport challenges on poorly drained roads especially during rush hours and more so in areas where the roads become impassable when it rains.

3. WEATHER REVIEW FOR NOVEMBER 2021

The month of November is normally the peak month for the October-November-December (OND) “short-rains” season. An analysis of rainfall performance in the month of November 2021 up to 28th shows that several meteorological stations experienced dry weather conditions. However, occasional rainfall was experienced over few areas in the Highlands West of the Rift Valley, the Lake Victoria Basin, Central and South Rift Valley and parts of the Highlands East of the Rift Valley. Nairobi, most of southeastern lowlands, the coastal region, northeast and parts of northwest experienced rainfall during the fourth week of November.

Isolated storms were recorded over the southeastern lowlands, coastal region, Lake Victoria Basin and the Highlands East of the Rift Valley. For instance, Msabaha meteorological station recorded 88.9mm in 24 hours on 27th November. On the same day, Makindu station recorded 62.4mm. Thika meteorological station recorded 82.5mm in 24 hours on 26th November 2021, while Kisumu recorded 47.2mm on the same day. Other rainfall stations that recorded high amounts of rainfall in 24 hours include Mlenge and Mtakuja stations in Taita Taveta County that recorded 78.0mm and 72.8mm respectively on 26th November 2021, Wote and Kako Waia in Makueni that recorded 154.5mm and 98.4mm respectively on 27th November, Kibauni and Masii in Machakos that recorded 81.4mm and 74.5mm on 27th November, Kirathe and Mayori in Embu that recorded 120.0mm and 108.9mm respectively on 27th November among others.

Most meteorological stations recorded rainfall that was less than 75% of their November LTMs (depressed rainfall). Mandera and Msabaha are the only stations that recorded above normal rainfall at 170.6% and 154.8% respectively. Kisumu, Thika, Moyale, Embu and Meru recorded near average rainfall at 96.7%, 83.8%, 82.3%, 80.7% and 77.2% respectively. All the other stations recorded less than 75% of their November LTMs.

The highest monthly rainfall of 234.9mm (77.2% of November LTM) was recorded in Meru station. Embu, Kitui, Thika, Makindu, Msabaha, Kisumu, Kisii and Moi Airbase reported 195.3mm, 177.6mm, 156.2mm, 134.2mm, 126.8mm, 126.2mm, 110.2mm, and 101.1mm respectively. The rest of the stations recorded less than 100mm of rainfall with Lodwar and Lamu having recorded no rainfall at all.

The distribution both in time and space was generally poor in most areas with most of the rainfall being experienced during the last week of November. For instance Msabaha station remained dry throughout the month but recorded heavy rainfall of 88.9mm and 36.5mm on 27th and 28th November respectively attaining above normal rainfall in two days. Manderera station remained dry until 26th and 27th November when it recorded 30.6mm and 22.1mm respectively and also attained above normal rainfall.

Figure 2a shows the total rainfall amount recorded in November (**Blue bars**) as compared to the November LTMs (**Red bars**) while **Figure 2b** shows the rainfall performance in November 2021 as a percentage of the November LTM.

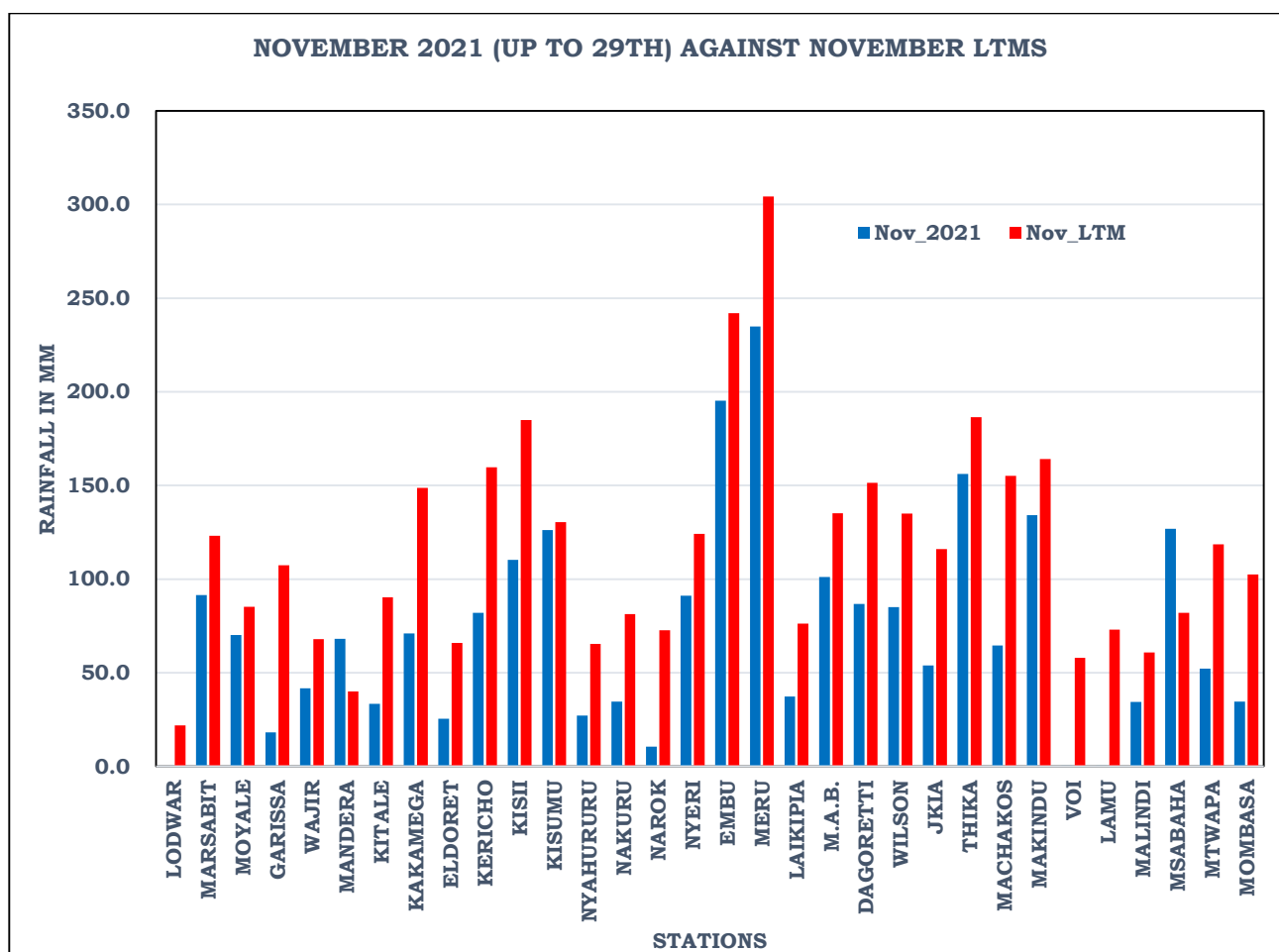


Figure 2a: November 2021 Rainfall Totals (mm) against November LTM

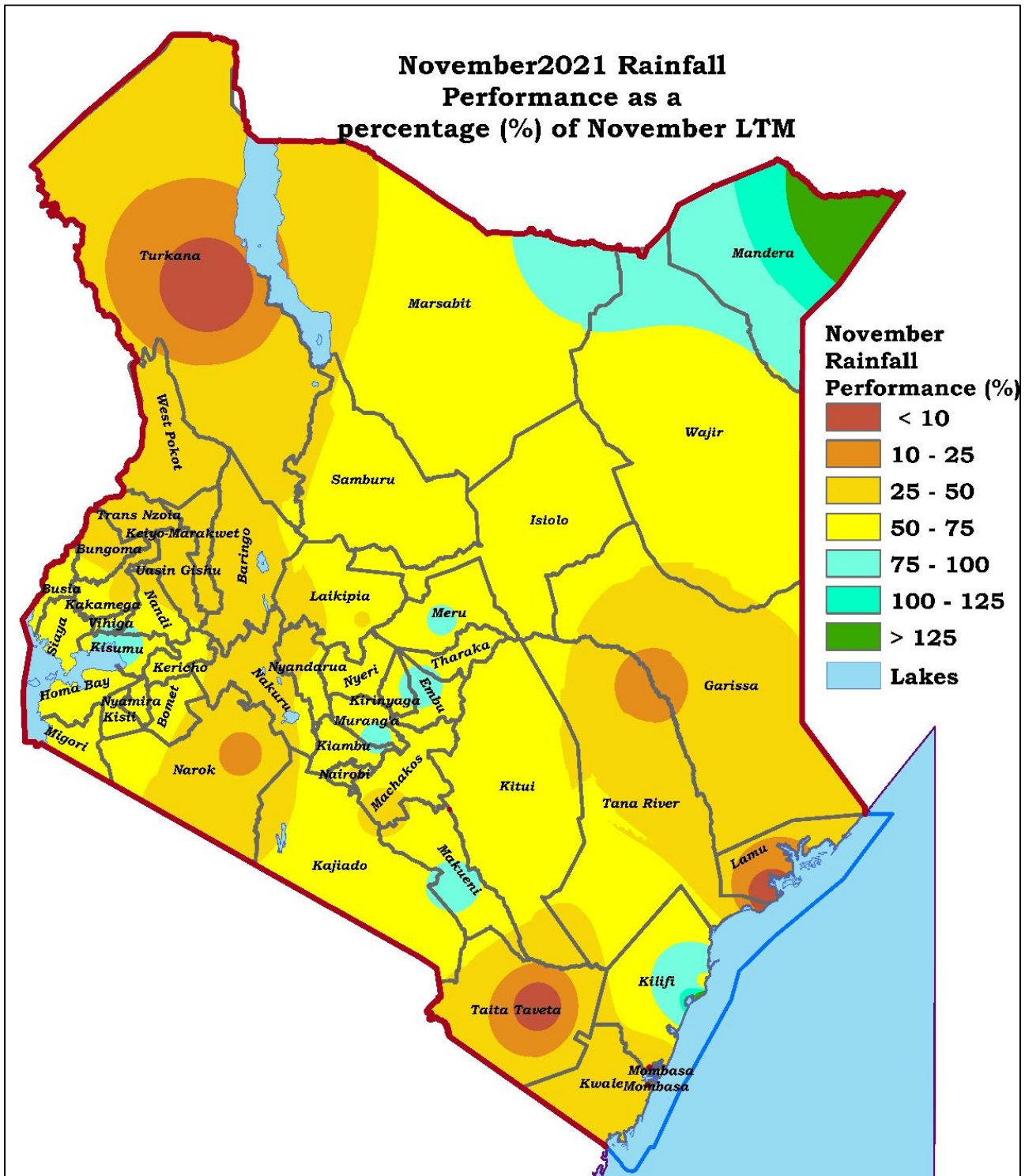


Figure 2b: November 2021 Rainfall Performance as a percentage (%) of November LTM

Listed below are rainfall reports from voluntary rainfall stations elsewhere in the country that recorded more than 100mm in November 2021

Station	Amount In mm	Station	Amount In mm	Station	Amount In mm
KASAFARI	197.3	MIAD KANDONGU	164.4	MAYORI	143.3
KIMUCHU PRIMARY SCHOOL	197.3	KIBAUNI	156.8	KYOME	139.5
WOTE-MALIVANI	192.2	IKOMBE	155.6	WENGENI	138.6
MAKWA COFFEE ESTATE	185.5	SAGANA FISH FARM	155.5	NKANINI FARM	136.0
KIRATHE	181.3	GAKOE TEA ESTATE	155.0	BUNGOMA WATER SUPPLY	128.7
MANAGIA	174.6	KIRIE	152.0	KIVINGONI	124.1
KAIRUNGU	171.1	MLENGE FARM	149.1	NABICHAKHA SECONDARY SCHOOL	122.6
NJUKI-INI FOREST STATION	167.5	KAKO-WAIA	148.1	KANDUYI AGRICULTURAL OFFICE	123.3
NDITHIN	165.2	MASII	144.2	MANGU HIGH SCHOOL	122.8
KATANGI	122.4	KALAWA	110.4	NDITHINI	102.7
MBOONI-ITHANGA	121.6	GITII-NGURA	110.3		
NYAMIRA DO OFFICE	117.5	KALUNGU	109.5		
KHALABA WARD	116.9	AHITI NDOMBA	107.0		
MUTHANTHARA	116.6	NGUU-MASUMBA	107.0		
IVUKUVUKU	111.5	ST CLAIRE GEKENDO	104.5		

4. REVIEW OF THE OCTOBER-NOVEMBER-DECEMBER (OND) 2021

The seasonal rainfall analysis from 1st October to 29th November 2021 indicates that depressed rainfall has so far been recorded over the whole country. As at 29th November 2021, most of the stations had recorded below average rainfall (less than 75% of their OND LTMs) except Laikipia, Kitale and Nyahururu stations which had recorded near average rainfall at 86.7%, 77.6% and 75.2% respectively of their OND LTM. Kisumu, Mandera, Kericho Kisii, Eldoret, Embu, Msabaha and Thika have so far recorded 70.2%, 67.6%, 63.0%, 58.6%, 58.5%, 56.8%, 56.0% and 53.7 respectively. All the other stations have recorded less than 50% of their OND LTMs. Voi, Lamu and Lodwar have recorded less than 10% of their OND LTMs.

The highest seasonal rainfall total of 347.4mm has been recorded in Meru station against an OND LTM total of 693.5mm. The lowest seasonal rainfall total of 1mm has been recorded in Lodwar station against an OND LTM of 46.9mm.

Figure 3 shows the total rainfall amount recorded in October-November 2021 (**Blue bars**) as compared to the OND LTMs (**Red bars**).

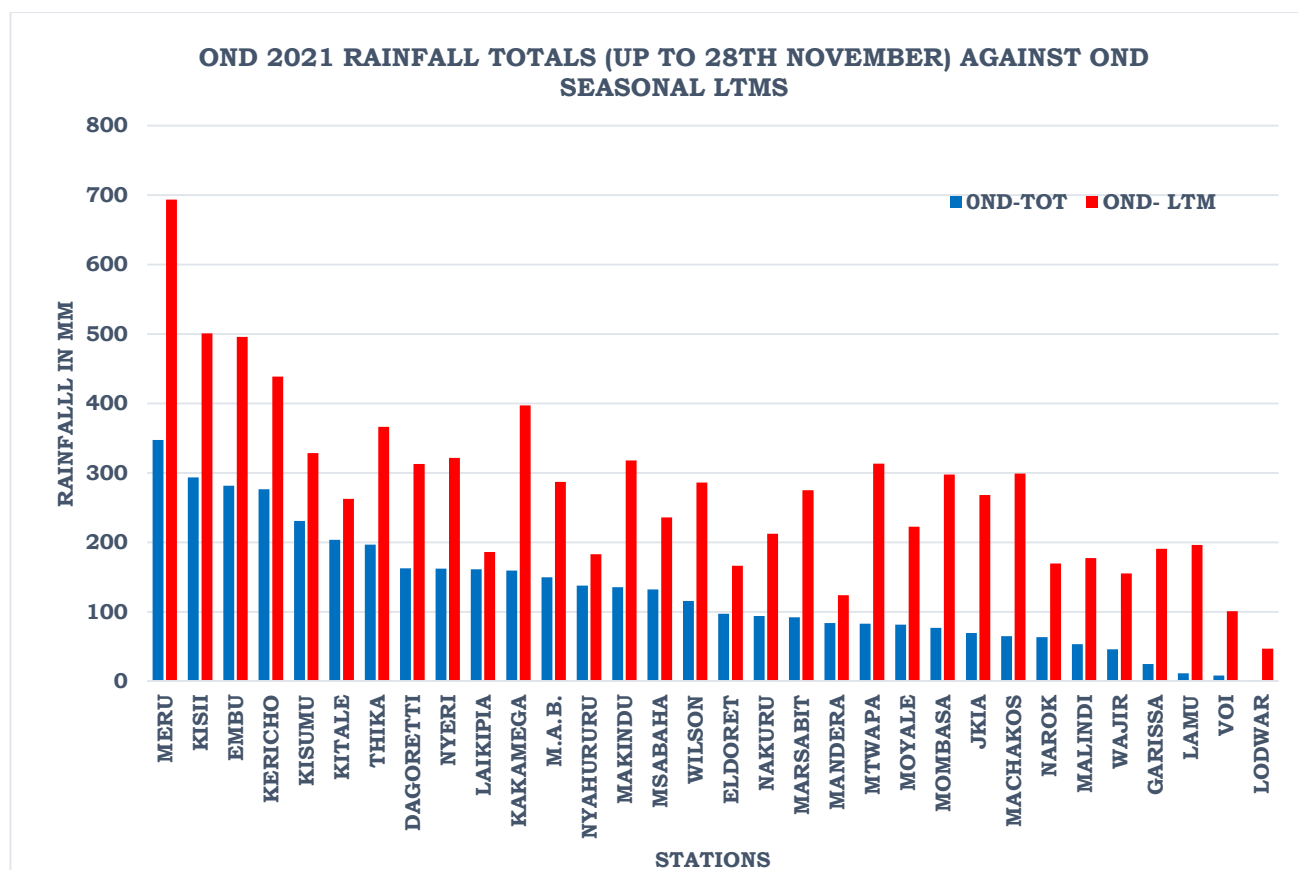


Figure 3: October-November 2021 Rainfall Totals (mm) against OND LTM (1st Oct -29th Nov, 2021)

6. Experienced Impacts in November 2021

6.1. Agriculture and Food Security

The continued dry conditions over the ASAL areas have led to diminished pasture and water for livestock and food for human consumption. More livestock deaths were reported in Taita Taveta, Kwale, Wajir, Garissa and Isiolo, Counties. Residents of Mbeere north and south sub-counties are faced with acute food shortage and are in dire need of food. In Kililfi County, residents of Ganze are going for days without food, while over 17,000 people in Taita Taveta are facing starvation. The body condition of livestock in Mbeere and Taita Taveta have continued to deteriorate and milk production in Mbeere has gone down as cattle have to walk for long distances in search of pasture and water.

6.2. Disaster Management

Drought has continued to affect more people in the country where over 2.5 million people in twenty-three counties are faced with acute food shortage. Crops and cattle were swept away in Taita Taveta County following heavy rains that pounded the area on 26th November. A man was struck and killed by lightning in Bungoma County on 26th November 2021.

6.3. Water Resources Management and Energy

Water sources in most ASAL areas have continued to dry up. For instance, residents of Mbeere north and south sub counties in Embu are faced with water stress where water pans used for domestic and irrigation purposes have reduced by more than 85%. Water pans have also dried up in Taita Taveta and Wajir Counties.

6.4. Environment

Wildlife deaths were reported in Sabuli wildlife conservancy in Wajir County.

6.5. Transport and Public Safety

Traffic was temporarily disrupted along Uhuru highway, Mombasa road and Waiyaki way in Nairobi following heavy rains that caused flooding on 27th and 28th November 2021.

NB: This outlook should be used together with the 24-hour, 5-day, 7-day, monthly, special forecasts and regular updates/advisories issued by this Department as well as Weekly and Monthly County forecasts developed and availed by County Meteorological Offices.



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