

MINISTRY OF ENVIRONMENT, CLIMATE CHANGE AND FORESTRY

STATE DEPARTMENT FOR ENVIRONMENT AND CLIMATE CHANGE

KENYA METEOROLOGICAL DEPARTMENT

CLIMATE OUTLOOK FOR THE "LONG RAINS" (MARCH-MAY) 2025 SEASON AND REVIEW OF THE OCTOBER-DECEMBER 2024 "SHORT RAINS" SEASON

1 HIGHLIGHTS

1.1 Outlook for March-April-May 2025

The Climate outlook for the March-April-May (MAM) 2025 "Long Rains" season indicates that near to above-average rainfall is expected over the Lake Victoria Basin, South Rift Valley, most of the Highlands West of the Rift Valley, the southern parts of the Southeastern lowlands and the extreme northern parts of northwestern Kenya. Near to below average rainfall is expected over Central Rift Valley, Highlands East of the Rift Valley (including Nairobi County), most of Northwest, Coastal region, Southeastern lowlands and isolated areas over the Highlands West of the Rift Valley. Below average rainfall is expected over the northeastern and over the north coast

During the season, it is likely that several areas will have a generally poor to fair distribution of rainfall in both time and space. The season is expected to be characterised by a normal to late onset with occasional dry spells. Occasional storms are likely to be experienced in some parts of the country during the season.

The peak of the rains is expected to be in April for most regions, except over the Coastal Strip where the peak is expected in May.

The temperature forecast indicates warmer than average temperatures are expected over the whole country with increased probabilities over the coastal and northern parts of the country.

1.2 Review of the October-November-December 2024 Rainfall Season and January 2025

Near to above average rainfall was received over several parts of the country. However, most stations over the Northeast, and a few stations over Southeastern lowlands, Coast and Highlands East of the Rift Valley recorded below average rainfall. Temperatures were warmer than average over the whole country.

2.1 MAM Rainfall Climatology

The March to May period is the major rainfall season (Long Rains) over most parts of Kenya and much of equatorial Eastern Africa. The highest seasonal rainfall amounts (greater than 300mm) are normally received over the Lake Victoria Basin, the Highlands West of the Rift Valley, the Central and South Rift Valley, the Highlands East of the Rift Valley (including Nairobi County) and the Coastal Strip. **Figure 1a** illustrates the rainfall climatology during the March to May rainfall season.

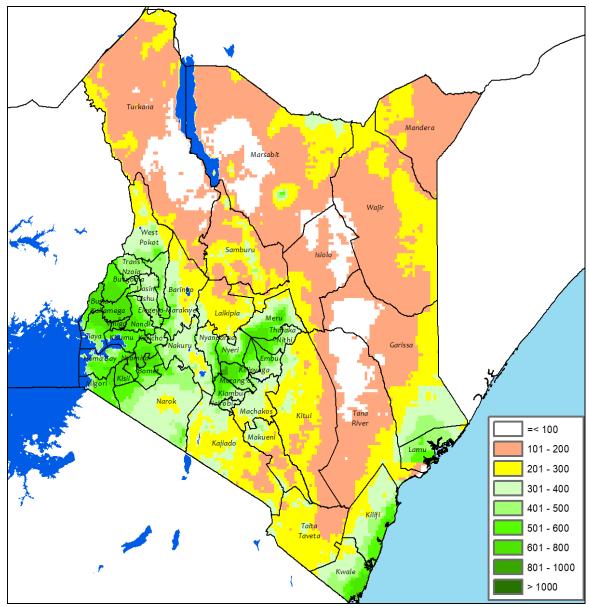


Figure 1a: Rainfall climatology during the March to May rainfall season

2.2 Rainfall Outlook for March-April-May 2025 "Long-Rains" Season

The forecast, as shown in **Figure 1b** indicates that near to above-average rainfall is expected over the Lake Victoria Basin, South Rift Valley, most of the Highlands West of the Rift Valley, the southern parts of the Southeastern lowlands and the extreme northern parts of northwestern Kenya. Near to below average rainfall is expected over Central Rift Valley, Highlands East of the Rift Valley

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(including Nairobi County), most of Northwest, Coastal region, Southeastern lowlands and isolated areas over the Highlands West of the Rift Valley. Below average rainfall is expected over the northeastern and over the north coast.

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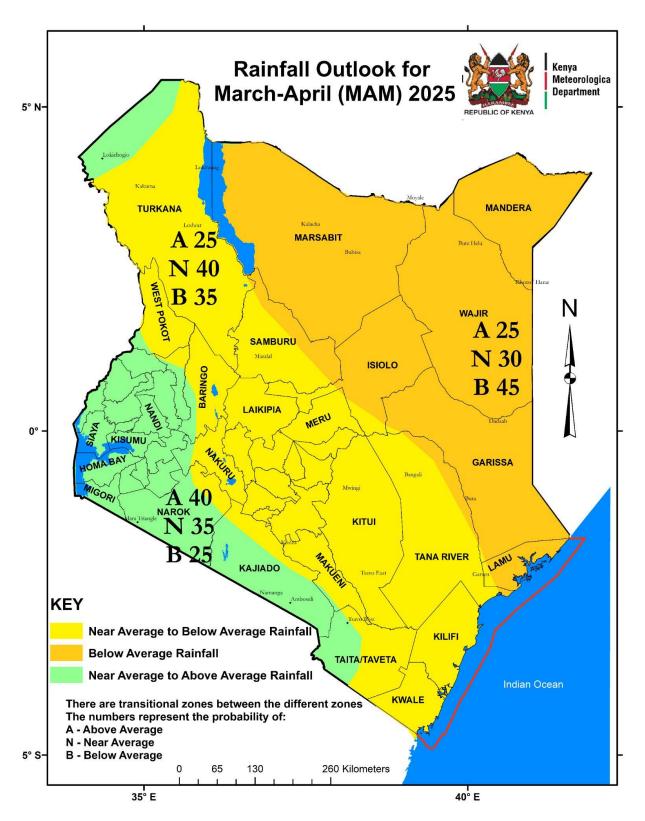


Fig. 1b: MAM 2025 'Long rains' Season Rainfall Outlook

2.3 Specific Outlook for the March to May 2025 "Long-Rains" Season

The specific outlook for March to May 2025 "Long-Rains" season is as follows:

- 2.3.1 Lake Victoria Basin, South Rift Valley and some parts of the Highlands West of the Rift Valley (Siaya, Kisumu, Homa Bay, Migori, Busia, Narok, Bomet, Kisii, Nyamira, Kericho, Nandi, Kakamega, Vihiga, Elgeyo Marakwet, Uasin Gishu, Trans Nzoia, Bungoma and Southern parts of West Pokot): Rainfall in these counties is expected to continue from February into the season, with occasional breaks and is likely to be near to above the long-term average amounts for the season..
- 2.3.2 Central and North of the Rift Valley (Nakuru, Baringo, and Western parts of Laikipia): The expected rainfall in these counties is likely to be near to below the long-term average amounts for the season. However, occasional rainfall may be experienced in February.
- 2.3.3 Northwestern Counties (Turkana and Samburu) and the Northern parts of West Pokot: The expected rainfall amounts in these counties are likely to be near to below the long-term average for the season. However, a few areas bordering South Sudan are likely to have near to above average rainfall.
- 2.3.4 The Highlands East of the Rift Valley (including Nairobi County): (Nyandarua, Nyeri, Kirinyaga, Murang'a, Kiambu, Embu, Meru, Tharaka Nithi and Eastern Laikipia): These counties are likely to receive rainfall during the season, with some breaks. The expected rainfall amounts are likely to be near to below the season's long-term average.
- 2.3.5 The Southeastern Lowlands (Kitui, Makueni, Machakos, Kajiado, Taita Taveta and Tana River): The expected rainfall amounts in these counties are likely to be near to below the long-term average for the season. However, Kajiado and parts of Taita Taveta counties are likely to receive near to above average rainfall.
- **2.3.6** The Northeast Counties (Mandera, Marsabit, Wajir, Garissa, Isiolo): These areas are expected to have occasional rainfall, whose amounts are likely to be below the long-term average for the season.
- 2.3.7 The Coastal Strip (Mombasa, Kwale, Kilifi and Lamu counties): The rainfall is likely to be near to below the long-term average amounts for the season. However, Lamu is expected to receive below normal rainfall.

2.4 Onset, Cessation, and Distribution of Rainfall

2.4.1 Distribution

The predicted onsets, cessations, and distribution of rainfall were derived from dynamical Climate Model runs as well as statistical analyses of past years which showed similar characteristics to the current year and are as indicated in Table 1. The analogue (similar) years are 2017 and 2021. The season is expected to have a normal to late onset over most parts of the country. The rainfall outcomes of the analogue years should not be interpreted as forecasts for the season. Rather, they provide a sense of the possible rainfall outcomes under broadly similar global climate conditions. They also offer indicative information on the temporal distribution associated with specific seasonal rainfall totals.

2.4.2 Onset and Cessation Dates

The expected onset and cessation dates for the various counties are as indicated in **Table 1**.

Table 1: Onset, Cessation and Distribution

	Region	Onset Dates	Cessation	Distribution
1	Counties in the Lake Victoria Basin, South Rift Valley and some parts of the Highlands West of the Rift Valley): (Homa Bay, Migori, Kisumu, Busia, Siaya, Narok, Bomet, Kisii, Nyamira, Kericho, Nandi, Kakamega, Vihiga)	Rainfall continues from February with occasional dry spells	Continues to June	Good
2	Counties in Central and North Rift Valley and parts of the Highlands West of the Rift Valley (Nakuru, Baringo, Western parts of Laikipia, Elgeyo Marakwet, Uasin Gishu, Trans Nzoia, Bungoma and Southern parts of West Pokot)	Rainfall in February followed by dry spell till the 4th week of March to 1st week of April)	Continues to June	Poor to Fair
3	Highlands East of the Rift Valley and Nairobi County: (Nyeri, Kirinyaga, Murang'a, Embu, Meru, Kiambu, Nyandarua, Nairobi, Tharaka Nithi Counties and eastern parts of Laikipia County)	Occasional rainfall in February followed by a dry spell. Onset expected during the 4th week of March to 1st week of April	3rd to 4th week of May	Fair
4	Southeastern Lowlands (Kajiado, Kitui, Makueni, Machakos, Tana River and Taita Taveta counties),	Occasional rainfall in February followed by a dry spell. Onset expected during the 4th week of March to 1st week of April	3rd to 4th week of May	Poor to Fair
5	North Coast region (Lamu, Coastal parts of Tana River, and Northern parts of Kilifi)	2nd to 3rd week of April	Continues to June	Poor
6	South Coast region (Mombasa, Kwale and Southern parts of Kilifi)	4th week of March to 1st week of April	Continues to June	Poor to Fair
7	The Northwest (<i>Turkana</i> , <i>Samburu</i>) and the Northern parts of West Pokot)	Occasional rainfall in March. Onset expected during the 1st to second week of April	Undefined	Poor
8	The Northeast (Wajir, Isiolo, Garissa, Mandera and Marsabit)	1st to 2nd week of April	Undefined	Poor

2.5 Temperature Forecast

Warmer than average temperatures are expected over the whole country, with increased probabilities over parts of the Northeastern, Coast, Southeastern, and Highlands East of the Rift Valley as shown in **Figure 2**.

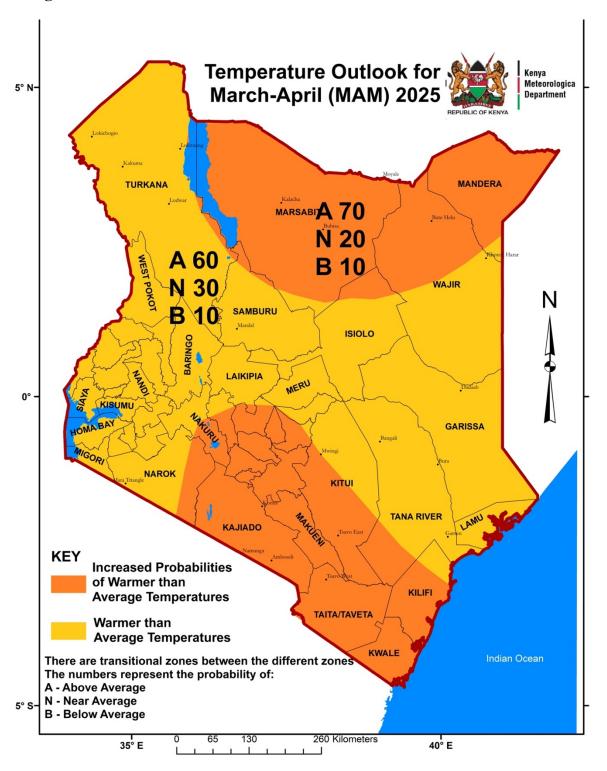


Figure 2: MAM 2025 Temperature Outlook

3.0 POTENTIAL IMPACTS OF THE MAM 2025 RAINS

The potential impacts likely to be experienced were co-produced with the various sector leads as indicated.

3.1 Agriculture, Food Security and Livestock Development Sectors Positive Impacts

- ❖ The rainfall expected over the western sector of the country is likely to enhance agricultural and livestock production, which will in turn lead to enhanced food accessibility and improvement in nourishment
- Availability of water for agricultural activities.
- ❖ Reduction in agricultural and agro-resource conflicts

Negative Impacts

- Some areas over the western sector may experience soil erosion, nutrient leaching and degradation due to floods. This may negatively affect crop and pasture growth
- ♦ High humidity coupled with warmer temperatures may lead to influx of pests and diseases that may affect crops and livestock over the western sector
- ❖ Pre and Post harvesting losses may be experienced over the western sector
- There may be proliferation of weed growth as a result of the enhanced rainfall which is likely to increase productions costs over the western sector
- ❖ Increased incidences of livestock disease outbreaks in parts of the Central and Central Rift Valley, Eastern, Northeastern and Coastal regions
- Livestock body condition may worsen due to insufficient pasture and long trekking distances to watering points. This is likely to lead to reduced agricultural production and livestock fatalities especially in the ASAL areas.
- * Reduced agricultural production in areas expected to receive depressed rainfall
- ❖ There may be an increase in agricultural based conflicts

Key mitigation and management strategies

- * Embrace livestock offtake (both government and private)
- ❖ Prevention and control of disease through routine surveillance, control and prevention
- * Restoration and recovery of pasture and rangeland management
- Diversification of agricultural enterprises
- Capacity building for farmers on coping technologies, innovations and management practices through agricultural extension and research
- ❖ Provision of insurance packages for crops and livestock (such as Index based livestock and crop insurance) to cushion farmers against adverse weather
- ❖ Adopting climate smart technologies such as minimal tillage and grazing management
- Promotion of early maturing, drought tolerant and adaptive fodder, pasture and crops
- Promote agricultural resource conflict management and peace building led by farmers organizations

3.2 Disaster Management Sector

Areas expected to receive near to above average rainfall

- ❖ Flooding is likely especially over the Lake Victoria Basin, parts of the Southeastern lowlands and Turkana County
- ❖ Landslides and mudslides may be experienced over some areas
- ❖ Floods may lead to displacement of some communities
- ❖ There may be an increase in Gender Based Violence (GBV) cases

Areas expected to receive near to below normal rainfall (ASAL areas)

- ❖ There may be an upsurge in resource-based conflicts
- Food insecurity may be experienced
- Increase in school dropouts
- Wildfires may increase
- Increase in child abuse cases

Key mitigation and management strategies

- Dissemination of early warning and advisories to all, especially the most vulnerable
- ❖ Mapping of hotspot areas and risk assessment for drought, floods and conflict areas
- Enhancing peace building initiatives
- ♦ Coordinate support for school feeding programs
- Strengthening mechanisms for coordination, partnership and collaboration among all sectors
- ❖ Coordinate drought-risk rapid assessments

3.3 Transport and Public Safety

Positive impacts

- Minimal disruption to transport systems
- The environment is likely to be favourable for implementation, construction of infrastructure and maintenance works in areas expected to receive near to below average rainfall
- ❖ Increased transport demand from increased food productivity, pastoralists laying off their livestock and for water trucking leading to increased revenue for transport operators

Negative impacts

Flash floods may still occur in Western Kenya and some parts of Central Rift Valley and Central Highlands despite the expected average to below-average rainfall in some of these areas. This might cause:

- Disruption of road transport
- Reduced visibility from heavy storms
- Delays or deviations at the airports

Other negative impacts may be experienced in parts of northeastern Kenya, where below average rainfall is expected such as :

- ❖ Increased environmental pollution as a result of dusty earth and gravel roads
- ❖ Increased risk of insecurities on roads along livestock conflict areas

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Key mitigation and management strategies

- Unblocking and desilting existing drainage structures
- Advice on alternative routes and modes of transport (Aircraft, mass rapid transit systems)
- Repair and restoration of damaged infrastructure
- Proper road marking and signage
- * Regular weather updates
- Sensitization of motorists not to overspeed
- Upgrading of existing airstrips to handle larger aircraft
- Upgrading of earth and gravel roads to bitumen standards
- ❖ Frequent watering of earth and gravel roads to abate dust

3.4 Water Resources Management Sector

Positive Impacts

- Increased inflows into water reservoirs in areas expected to receive near to above average rainfall
- ❖ Improved aquifer recharge in areas expected to receive near to above average rainfall
- Availability of water in areas expected to receive near to above average rainfall

Negative Impacts

- ❖ There may be an increase in water allocation based conflicts especially in the ASAL areas
- Over abstraction of ground water may lead to drying of boreholes and reduced aquifer recharge in areas expected to receive below average rainfall
- ❖ Water shortage may lead to contamination especially in the ASAL areas
- Drying of water pans especially in the ASAL areas
- Floods over the Lake basin may destroy water infrastructure and lead to pipeline leakages. This may in turn lead to increased maintenance costs
- ❖ Increased risk of insecurity on roads along livestock conflict areas

Key mitigation and management strategies

- ❖ Enhance conflict management strategies such as mapping of water supply disruption prone areas and community barazas
- ❖ Mapping of available water sources
- ♦ Water trucking
- Encourage water harvesting
- Public awareness on water conservation, water abstraction surveys and enforcement of water allocation plans
- Enhanced monitoring and early warning
- Mapping of flood risk areas

3.5 Health Sector

Positive Impacts:

- Reduced malnutrition cases due to improved food availability
- Increased water availability, leading to a reduction in WASH-related diseases

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Negative Impacts:

- Flooding may result in increased deaths and water contamination, causing outbreaks of waterborne diseases such as cholera, typhoid, and bilharzia
- Flooding may also lead to vector-borne diseases like malaria, chikungunya, dengue fever, and Rift Valley fever
- Health systems may face stress due to submerged facilities, impassable roads, and shortages of drugs, affecting vulnerable groups like pregnant women, under-fives, and patients on routine medication
- Water scarcity could cause waterborne diseases, heat stress, and increased respiratory diseases in areas like Mandera, Marsabit, Taita Taveta, Kilifi, Kwale, Kajiado, and Kitui
- Malnutrition may increase among under-fives, pregnant women, and lactating mothers
- Mental health stress may rise due to the compounded effects of flooding and water scarcity

Key Mitigation and Management Strategies:

- ♦ For vector-borne diseases, implement proper waste disposal, unclog drainage systems, conduct indoor residual spraying, and distribute LLITNs, malaria drugs, and testing kits
- ♦ For waterborne diseases, intensify hygiene promotion, distribute WASH commodities, separate animal and human water points, and conduct water sampling and testing
- ♦ To address malnutrition, stockpile nutrition commodities, set up screening centers, and provide nutrition counselling and education
- ♦ To reduce health system stress, stockpile drugs, organize mobile medical camps, and strengthen real-time disease surveillance systems
- ♦ For heat stress, develop climate-smart cooling systems and sensitize communities on rehydration and heat stress management
- To address mental health, establish psychosocial support programs and provide mental health services for high-risk communities

3.6 Environment and Forestry Sectors

Positive Impacts

- Enhanced business opportunities for establishment of tree nurseries to raise stock for tree growing
- ❖ Widespread afforestation, reforestation and restoration opportunities
- ❖ Improved food security through plantation establishment and livelihood improvement scheme (PELIS), Seedlings and Tree nursery establishment
- ❖ Increased forest biodiversity

Negative Impacts

- ❖ Landslides and mudslides may be experienced over the western sector
- ❖ There may be an increase in the spread of invasive alien species
- ❖ Increase in human-wildlife conflicts in areas expected to receive below average rainfall
- ❖ Increased forest fires and biodiversity loss especially in the ASAL areas
- There may be an increase in forest grazing, overdependence of forest resources in areas expected to receive below average rainfall

Key mitigation and management strategies

Create awareness and community engagement on tree growing

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- ❖ Enhance forest health monitoring and reporting
- ❖ Enhance fire management practices including community education and awareness
- Mapping of hotspots of forest fires
- Provide watering points for wild animals

3.7 Macroeconomy sector

Positive Impacts:

- Increased food production in Western Kenya, Lake Victoria Basin, and Kenya-Tanzania border areas due to near-average to above-average rainfall
- Stabilization of food prices and support for household incomes in regions with favorable rainfall conditions
- Surplus food production from 2024 expected to provide short-term food security, cushioning the impact of below-normal rainfall in other areas

Negative Impacts:

- Reduced food production in central, eastern, and northeastern regions due to below-average rainfall, leading to higher food prices and lower household incomes.
- Strain on pasture and water resources, potentially causing livestock fatalities and conflicts over scarce resources
- Increased human-wildlife conflicts in areas with limited water and pasture availability
- Reduced hydroelectricity production, increasing reliance on costly thermal electricity and raising production costs
- Slowdown in business activity, particularly in crop and livestock value chains, with spillover effects on agro processing and transport sectors
- Exacerbation of food insecurity and economic challenges in vulnerable regions already affected by previous poor rainfall seasons

Key Mitigation and Management Strategies:

- Leverage surplus food production from 2024 to boost food supply in the near term
- Government interventions, including increased spending on mitigation measures
- Food imports to address potential food shortages and enhance food security
- Destocking of livestock to prevent losses as pasture and water resources decline
- Provision of food relief to counties already vulnerable due to failed OND 2024 rains
- Expansion of irrigation schemes to support agricultural production in dry areas
- Increased monitoring and surveillance of weather conditions by key stakeholders to enable early mitigation efforts

3.8 Media

The media holds a critical role in safeguarding public preparedness during the March-April-May (MAM) 2025 season. Media organizations are urged to proactively procure, track, and promptly disseminate forecasts and cautionary details as they emerge, ensuring timely access to vital information for the populace. To enhance the reliability and relevance of weather advisories, collaboration with experts—such as meteorologists, government officials, and disaster management specialists—is essential during the formulation, production, and distribution of these alerts. This ensures the content is both scientifically accurate and actionable for end-users. Additionally, adopting plain language in communication is strongly advocated to bridge the gap between technical forecasts and public understanding, enabling communities to grasp risks and respond effectively. By prioritizing clarity, accuracy, and accessibility, the media helps families and communities stay safe, make informed choices, and support one another through the challenges of the MAM 2025 season.

4.0 OCTOBER-NOVEMBER-DECEMBER 2024 CLIMATE REVIEW

4.1 Review of October-December 2024 "Short-Rains" Seasonal Performance

An analysis of the October-November-December (OND) 2024 seasonal rainfall reveals several stations (54%) recorded near average rainfall. Most stations in Nairobi (Kabete, Dagoretti Corner and Wilson Arport) and a few areas over the Highlands west of the Rift Valley (Kakamega and Eldoret), Southeastern lowlands (Voi) and Northwestern (Lodwar) recorded above average rainfall, representing 20%. Most of the stations over Northeast (Marsabit, Moyale, Mandera and Wajir), a few stations over Southeast (Makindu and Machakos) and Highlands East of the Rift Valley (Nyeri and Meru) and the Coast (Lamu) recorded below average rainfall, representing 26%. The onset of the rains was late over several parts of the country with some areas experiencing a false onset that was followed by a dry spell. The season was characterized by poor rainfall distribution in both time and space, especially over parts of the Central, Eastern, Northern and Coastal parts of the country where prolonged dry spells were experienced especially in October and December, followed by heavy rainfall events for a few days.

The highest seasonal rainfall amounts (805.3mm) were recorded in Miyare rainfall station in Migori county 805.3mm followed by Ulanda Girls School also in Migori with 707.1mm. Other stations that recorded high amounts of rainfall are shown in Table 1. Other stations recorded less than 500 mm with several stations over the northern part of the country recording rainfall less than 100mm. Figures 3a and 3b illustrate the OND rainfall performance against the OND LTM and OND 2024 totals, respectively. Figure 3c compares the total rainfall recorded in OND 2024 (blue bars) with the OND LTMs (red bars).

Table 1: Stations that received above 500 mm

S/No	Station	County	Amount in mm
1	Trans Mara rainfall station	Narok	695.0
2	Nyaroya rainfall station	Migori	694.8
3	Kabete Meteorological Station	Nairobi	644.2
4	Koromangucha rainfall station	Migori	637.5
5	Managia rainfall station	Embu	633.3
6	Kakamega Meteorological Station	Kakamega	619.2
7	Kangema Meteorological Station	Murang'a	617.9
8	Kanga Automatic Weather station	Migori	592.9
9	Kericho Meteorological Station	Kericho	583.9
10	Kisii Meteorological Station	Kisii	571.8
11	Migori environment rainfall station	Migori	549.8
12	Dagoretti Corner Meteorological Station	Nairobi	540.6
13	Matungu rainfall station	Kakamega	525.6
14	Makwa coffee rainfall station	Kiambu	523.7
15	Kibabii University rainfall station	Bungoma	519.9
16	Kirie rainfall station	Kiambu	502.0

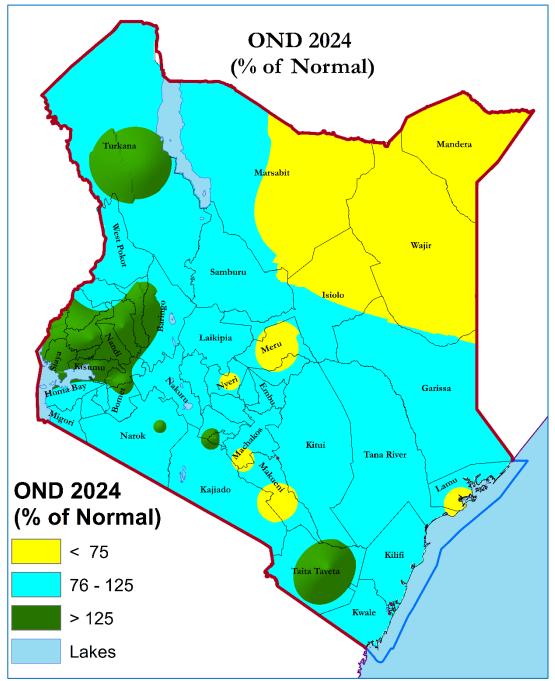


Figure 3a: October-December 2024 Rainfall Performance (%) against OND LTM

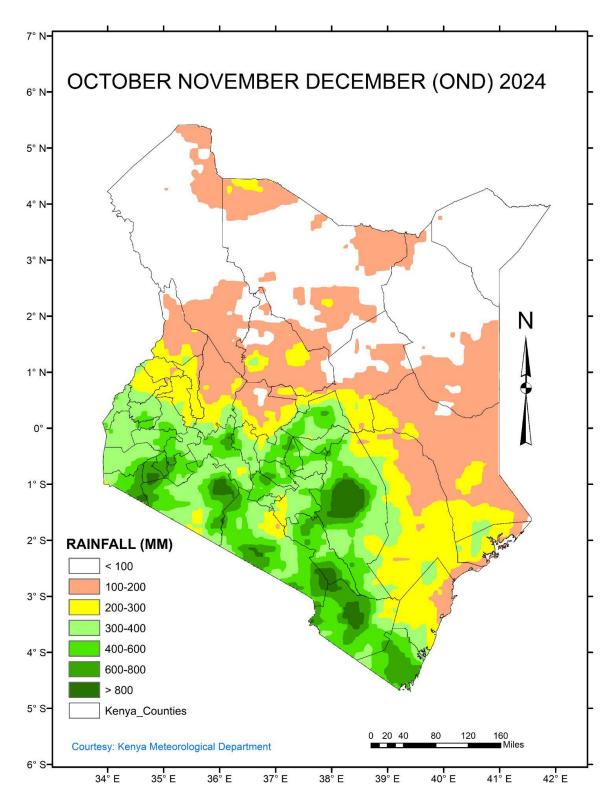


Fig. 3b: OND 2024 Rainfall Totals

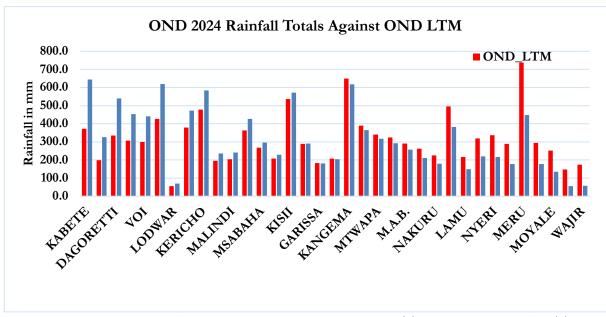


Figure 3c: October-December 2024 Seasonal Rainfall Totals against OND LTM

4.2 Temperature Review

Warmer than average over the whole country with highest temperatures being recorded over Northeast and parts of Central and Southeastern parts of the country as shown in Figure 4.

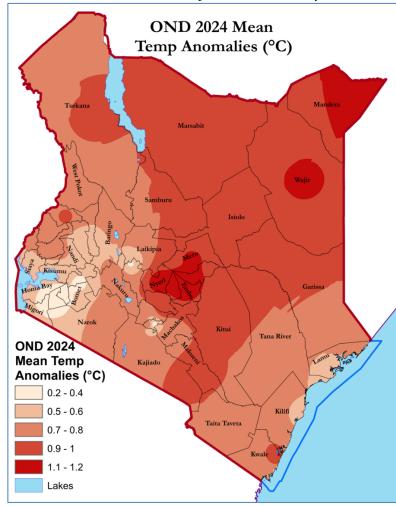


Figure 4: OND 2024 Seasonal Mean Temperature Anomalies

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NB: This outlook should be used together with the 24-hour, 5-day, 7-day, 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.

KEY OF SCIENTIFIC WORDS USED

Rainfall performance is generally categorized as follows:

- Below 75% of the LTM Below Normal (Depressed) rainfall
- Between 75% and 125% of the LTM Near normal rainfall
- Above 125% of the LTM Above Normal (Enhanced) rainfall

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