REPUBLIC OF KENYA

Kenya Meteorological Department

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THE CLIMATE OUTLOOK FOR APRIL 2024 AND REVIEW FOR MARCH 2024

1 HIGHLIGHTS

1.1 The forecast for April 2024

April is the peak month of the "Long Rains" season. The outlook indicates that near to above-average rainfall is expected across most parts of the country. Specifically, it is anticipated that the Lake Victoria Basin, Highlands West of the Rift Valley, Northern, Central, and South Rift Valley, Highlands East of the Rift Valley including Nairobi, South-Eastern Lowlands, Northwestern, Northeastern, and the Coastal region will receive increased rainfall. Additionally, it's important to note that isolated episodes of heavy rainfall may occur in various parts of the country during the month.

1.2 The Weather and Climate Outlook for April, May and June

The weather forecast for the next three months suggests that the Highlands West of the Rift Valley, Lake Victoria Basin, Central and South Rift Valley, and the Coastal region are likely to experience above-average rainfall. The Highlands East of the Rift Valley including Nairobi County, the Southeastern lowlands, northwest, and northeastern regions are expected to receive near to above average rainfall in April and May. However, there might be light rainfall in June in the Highlands East of the Rift Valley, including Nairobi County, and certain parts of the Southeastern lowlands as the cold season sets in. May is projected to be the rainfall season's peak in the coastal region. Furthermore, temperatures are anticipated to be above average across the country during the forecast period.

1.2 Weather Review for March 2024

The month of March marks the onset of the March-April-May (MAM) "Long Rains" season in the country. However, most parts of the country experienced dry weather conditions for most of the month except over the Western sector of the country where rainfall continued from February, followed by a dry spell till the fourth week of March. The rainfall onset over parts of the Highlands East of the Rift Valley and Southeastern lowlands was during the fourth week of March; a few areas are yet to realize their onset. Kitui and Voi Meteorological stations had their onset during the first and second weeks of March respectively. The Northern parts, Central Rift Valley (Nakuru) and most of the Coastal region have not yet realized their onset even though a few areas experienced light to moderate rainfall during the fourth week of March. However, a few areas in Kwale and Lamu experienced onset during the third and fourth week of March. Rainfall recorded in March over several parts of the country was near to below the Long Term Mean for March, with stations in Nairobi and a few stations over the Coast (Lamu and Mtwapa) and Voi having recorded above average rainfall.

Both maximum and minimum temperatures were warmer than usual over the whole country except over Kisumu and Narok where maximum temperatures were within the normal range.

2 WEATHER OUTLOOK FOR APRIL 2024

April is widely acknowledged as the peak of the "Long Rains" season in Kenya, where most rainfall is typically observed between March and May. To predict the rainfall amount expected in April 2024, various factors were analyzed together. The first variable of interest was the correlation between Sea Surface Temperature Anomalies (SSTAs) and Kenyan rainfall, with SSTAs being the variance from the typical temperature of the ocean surface. Additionally, Sea Surface Temperature gradients were analyzed. SST gradients pertain to the difference in temperature between certain points in the ocean as it has been proven that they can influence precipitation patterns. Moreover, the anticipated changes in global SST patterns were taken into consideration, as they can exert a substantial influence on weather conditions worldwide.

This comprehensive analysis of the aforementioned factors facilitated the creation of an all-encompassing rainfall forecast for April 2024, which holds critical importance in the realm of agricultural planning and other activities that are dependent on rainfall in Kenya and its surrounding regions.

2.1 The Rainfall Forecast for April 2024

The outlook for April 2024 indicates that the Highlands West of the Rift Valley, the Lake Victoria Basin, Central and Southern Rift Valley, Highlands East of the Rift Valley including Nairobi County, Northwest, Coastal region, the Northeast and southeastern lowlands are likely to experience near to above average rainfall.

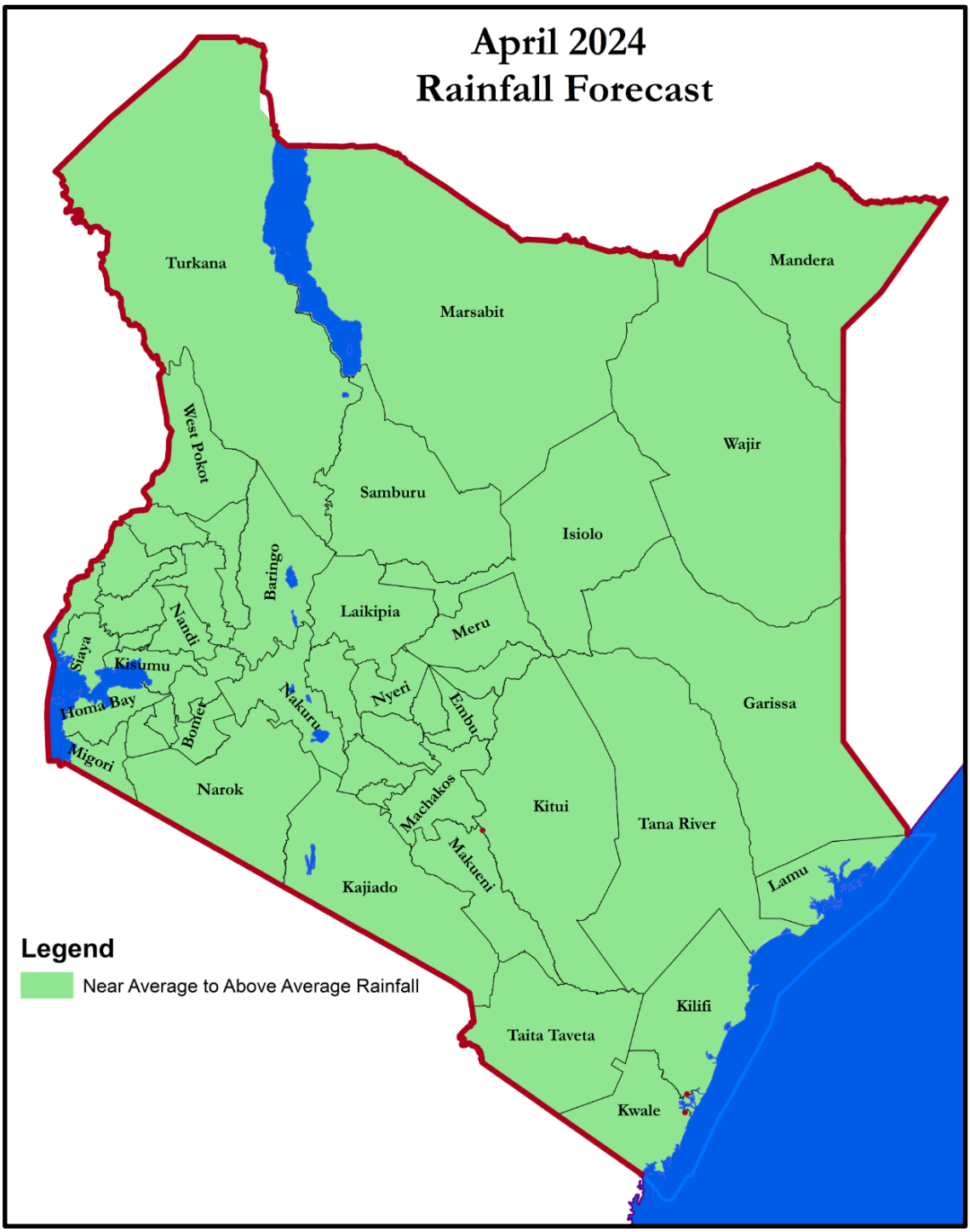

Figure 1: The expected rainfall performance during April 2024.

2.2 Specific Outlook for individual areas

2.2.1 The Lake Victoria Basin, parts of southern Rift Valley and parts of the Highlands west of the Rift Valley (Siaya, Kisumu, Homa Bay, Migori, Busia, Kisii, Nyamira, Kericho, Bomet, Kakamega, Nandi, Bungoma, Vihiga and Western parts of Narok counties): Enhanced rainfall is expected during the month. The total amounts of rainfall are likely to be **near to above average**. Occasional storms are also likely to be experienced.

2.2.2 The Central and South Rift Valley and parts of the Highlands West of the Rift Valley (Baringo, Laikipia, Nakuru, parts of Narok, West Pokot, Trans Nzoia, Uasin Gishu, and Elgeyo Marakwet counties): Rainfall is expected throughout the month. The total amounts of rainfall are likely to be **near to above-average**. Occasional storms are also likely to be experienced.

2.2.3 The Northwest (Turkana and Samburu counties): Occasional rainfall is expected throughout the month. The total amounts of rainfall are likely to be **near to above-average**. Occasional storms are also likely to be experienced.

2.2.4 The Highlands East of the Rift Valley (Nyandarua, Nyeri, Kirinyaga, Murang'a, Kiambu, Meru, Embu, Tharaka Nithi and Nairobi counties): Rainfall is expected during most of the forecast period. The total amounts of rainfall are likely to be **near to above-average for the month**. Occasional storms are also likely to be experienced.

2.2.5 The Northeast (Marsabit, Isiolo, Garissa, Wajir and Mandera counties): Occasional rainfall is expected during the month. The expected rainfall amounts are likely to be **near to above** the long-term average.

2.2.6 The South-eastern lowlands (Kajiado, Kitui, Makueni, Machakos, and Taita Taveta counties): Occasional rainfall is expected during the month. The expected rainfall amounts are likely to be **near to above** the long-term average for the month.

2.2.7 The Coastal Region (Mombasa, Tana River, Kilifi, Lamu, Coastal Tana River and Kwale counties): Occasional rainfall is expected during the month. The expected rainfall amounts are likely to be **near to above the long-term average** for the month.

2.3 Potential impacts

The following are the likely impacts during the month of April 2024 based on the rainfall forecast.

2.3.1 Agriculture and Food Security

The anticipated rainfall is expected to provide favorable conditions for agricultural endeavors in the high-potential regions encompassing the Highlands West and East of the Rift Valley, the Lake Victoria Basin, Central and South Rift Valley, as well as the Southeastern lowlands. Moreover, it is foreseen that pasturelands will undergo rejuvenation in the arid and semi-arid (ASAL) areas of the Northern, Southeastern, and Coastal regions. Farmers are encouraged to seize this opportunity to expand their crop cultivation and pasture production to fully leverage the projected increase in precipitation.

Nonetheless, it is essential to be mindful of potential challenges that may arise with enhanced rainfall, including soil erosion, waterlogging, and land degradation. To mitigate these possibilities, farmers are advised to implement soil conservation measures and embrace sustainable land management practices as part of their agricultural strategies.

2.3.2 Disaster Management

There is a possibility of isolated storms occurring, which could result in flash floods, particularly in the low-lying areas of the northern regions, the Southeastern lowlands, the Coastal region, parts of the Central and South Rift Valley, and inadequately drained urban areas. It is strongly recommended that the general public refrain from walking or driving through flooded areas or attempting to cross swollen rivers to prevent loss

of lives. It is also advisable for relevant authorities to implement measures addressing flood-related concerns, including the prepositioning of both food and non-food supplies, as well as resource mobilization.

Additionally, there is a chance of lightning strikes happening over the Lake Victoria Basin, Western parts of the country and parts of the South Rift Valley, notably in areas like Kisii, Kisumu, Nandi, Kakamega, Narok and Bungoma (specifically, Mt. Elgon areas). The public is cautioned against seeking shelter under trees or near metallic structures, particularly during rainy conditions.

2.3.3 Water Resources Management and Energy

The boosted rainfall is set to enhance water availability, benefiting both domestic and livestock use. To meet their water requirements, the public is encouraged to adopt rainwater harvesting and storage practices.

Nevertheless, the increased rainfall may have some adverse effects, including heightened siltation and sedimentation in certain rivers and dams, as well as the potential for flooding, such as river channel overflows, urban flooding, and flash floods. In light of these challenges, relevant authorities are advised to prioritize dam desilting efforts and implement measures for separating storm water and wastewater channels. These steps can help mitigate the impact of flooding on communities.

Furthermore, the increased inflow into hydropower reservoirs is expected to boost hydropower generation and contribute to groundwater recharge for geothermal power production. However, it's important to note that this heightened rainfall may also lead to disruptions of power supply, which could result in social and economic losses. Therefore, there is need to enhance power transmission and distribution infrastructure to ensure reliable and stable power supply.

2.3.4 Environment

The increased rainfall is expected to supply ample soil moisture, promoting favorable conditions for tree growth. It is recommended that the public engage in tree planting initiatives to contribute to the expansion of forest cover across the country. However, it is important to note that excessive rainfall can potentially result in environmental deterioration, particularly in the form of soil erosion.

In light of this, the public is advised to adopt sound agricultural practices, including the implementation of soil conservation measures, to help safeguard and preserve the environment.

2.3.5 Health

The increased rainfall is expected to have a positive impact on food availability, which, in turn, should help decrease nutrition-related diseases. However, there is a potential risk of higher instances of waterborne and vector-borne diseases due to water source contamination resulting from flooding and the presence of stagnant water, which can serve as breeding grounds for disease-carrying vectors like mosquitoes. The authorities should therefore be on the look out for outbreaks of malaria and Rift Valley fever oiutbreaks.

To mitigate these risks, it is advisable for relevant authorities to strengthen disease surveillance and early detection systems. Additionally, they should distribute insecticide-treated mosquito nets to areas with a higher risk of disease transmission. Furthermore, providing water treatment chemicals to communities that rely on open water sources is crucial for ensuring safe drinking water. Lastly, promoting education on Water and Sanitation Hygiene (WASH) practices can play a vital role in preventing the spread of waterborne diseases.

2.3.6 Transport and Public Safety sector

Flash floods are very likely to occur in the Lake Victoria Basin, the Highlands West of the Rift Valley, the Central and South Rift Valley, and parts of the Highlands East of the Rift Valley (including Nairobi County) due to the expected enhanced rainfall in these areas. This may lead to structural damage to roads, bridges,

and sub-standard infrastructure which may, in turn, lead to transport challenges, damage to property, and loss of lives.

To minimize the impact of flash floods, road agencies and other relevant authorities should inspect and repair roads, bridges, and drainage systems to ensure they are in good condition and can withstand heavy rains. Emergency response teams should also be set up in high-risk areas to quickly respond to any incidents that may arise. Additionally, community members should be educated on the dangers of flash floods and how to take precautions such as avoiding driving or walking through flooded areas.

Slippery roads and poor visibility during rainstorms may also pose a danger to motorists and pedestrians, especially along the Kikuyu-Kinungi stretch on the Nakuru-Nairobi Highway. The public should, therefore, take utmost care during the rainy period to minimize accidents that could result from such weather conditions. Measures such as improving road signage and traffic management, as well as encouraging motorists to use headlights during low visibility, should be implemented to enhance safety on the roads.

3 Outlook for April to June, 2024

The outlook for the next three months indicates that rainfall is expected over the Western sector and Coastal regions during the forecast period. The rest of the country is expected to receive rainfall in April and May but remain generally dry in June. However, the Highlands East of the Rift Valley including Nairobi County and parts of the Southeastern lowlands may experience occasional light rainfall in June, as the cold season sets in.

The Highlands West of the Rift Valley, the Lake Victoria Basin, Central and South Rift Valley as well as the Coastal region are expected to receive rainfall during the forecast period. This rainfall is expected to be above the April to June LTM. The Highlands East of the Rift Valley is expected to receive rainfall in April and May and the rainfall is likely to spread into the first week of June in some areas. The rest of June is expected to be generally cool and cloudy with occasional light rains as the cold season sets in. The rainfall is expected to be above the April to June LTM. The Southeastern lowlands are expected to receive rainfall in April and the first half of May and remain generally dry in the second half of May and June. However, a few areas bordering Nairobi and Central Highlands may experience cool and cloudy conditions with occasional light rains in June. The rainfall is likely to be near to slightly above the April to June LTM. The Northeastern region is expected to receive rainfall in April and the first half of May and remain generally dry in the second half of May and June. The rainfall is likely to be above the April to June LTM. The Northwestern region is expected to receive rainfall in April and the first half of May and remain generally dry in the second half of May and June. However, a few areas bordering Uganda and Southern Sudan may experience occasional rainfall in June. This rainfall is likely to be above the April to June LTM.

Temperatures are expected to be warmer than average over the whole country during the forecast period.

4 REVIEW OF THE CLIMATE DURING MARCH 2024

4.1 Review of the Rainfall Performance in March 2024

March marks the onset of the March-April-May (MAM) "Long Rains" season in the country. However, most parts of the country remained generally dry for most of the month except over the Highlands West of the Rift Valley, Lake Victoria Basin, South Rift Valley and isolated areas of the Central Rift Valley where rainfall continued from February though it was followed by a long dry spell till the fourth week of March. The onset over some parts of the Highlands East of the Rift Valley, including Nairobi County, and the Southeastern lowlands was during the fourth week of March, though in some areas the onset has not been realized.

The onset in isolated areas over Southeastern lowlands (Kitui and Voi) meteorological stations, was during the first and second weeks of March respectively. The onset over the Northeast, northwestern and some parts of the Central Rift Valley has not yet been realized but a few areas experienced light to moderate rain during the last week of March. Most parts of the Coastal region have not realized their onset except over a few areas in Lamu and Kwale where the onset was between the third and fourth weeks of March.

An analysis of rainfall up to 31st March 2024 shows that most of the stations across the country recorded rainfall that was near to below the March LTM. Voi, Mtwapa, Wilson, Dagoretti, Moi Air Base, Jomo Kenyatta International Airport and Lamu are the only stations that recorded above average rainfall. The highest monthly rainfall (219.9mm) was recorded in Voi Meteorological station, followed by Kabete Meteorological station with 194.6mm. Other stations that recorded significant amounts of rainfall are shown in **Table 1**. All the other stations recorded less than 140mm of rainfall with several stations over the Coast and Northeast having recorded no rainfall at all throughout the month.

Table 1: Stations that recorded more than 140mm of rainfall

S/NO	Station	County	Amount in mm
1	Kisii Meteorological station	Kisii	186.5
2	Ndakaini Rainfall station	Murang'a	186.0
3	Busia Ministry of water rainfall station	Busia	178.2
4	Wilson Meteorological station	Nairobi	177.5
5	Dagoretti Meteorological station	Nairobi	175.1
6	Mbooni Rainfall station	Makueni	173.9
7	Kisumu Meteorological station	Kisumu	162.1
8	Kakamega Meteorological station	Kakamega	156.7
9	Matungu Meteorological station	Kakamega	150.6
10	Kericho Meteorological station	Kericho	150.3
11	Materi Girls Rainfall station	Tharaka Nithi	149.6
12	Kangema Meteorological station	Murang'a	148.7
13	MAB Meteorological station	Nairobi	146.6
14	Miyare Rainfall station	Migori	146.6
15	Kitui Meteorological station	Kitui	145.1

During the period, isolated storms were recorded over parts of the Highlands West and East of the Rift Valley, Lake Victoria Basin, Southeastern lowlands and the Coastal region. For instance, Mbooni rainfall

station in Makueni recorded 101.0mm in twenty-four hours on 23rd March while Marungu rainfall station in Taita Taveta recorded 93.0mm on 18th March. Other stations that recorded high amounts of rainfall in twenty fours hours are shown in **Table 2**

Table 2: Stations that recorded high amounts of rainfall within twenty four hours

S/No	Station	County	Amount in mm	Date
1	Kitobo seed farm rainfall station	Taita Taveta	85.0	23-3-2024
2	Materi Girls School rainfall station	Tharaka Nithi	84.0	27-3-2024
3	Voi Meteorological station	Taita Taveta	82.5	14-3-2024
4	Mtwapa Meteorological station	Kilifi	82.3	23-3-2024
5	Kirathe rainfall station	Embu	75.5	29-3-2024
6	Chumvini rainfall station	Taita Taveta	72.0	4-3-2024
7	Nguu Masumba rainfall station	Makueni	69.8	23-3-2024
8	Kisumu Meteorological station	Kisumu	57.8	5-3-2024
9	NYS Witu rainfall station	Lamu	53.6	27-3-2024
10	Montana Farm rainfall station	Kajiado	52.1	23-3-2024
11	Matungu Meteorological station	Kakamega	51.1	7-3-2024
12	DC's Office Limuru rainfall station	Kiambu	50.0	24-3-2024

Figure 2 shows the total amount of rainfall recorded in March 2024, (**the blue bars**) as compared to the LTMs (**the red bars**), while **Figure 2b** depicts the spatial distribution.

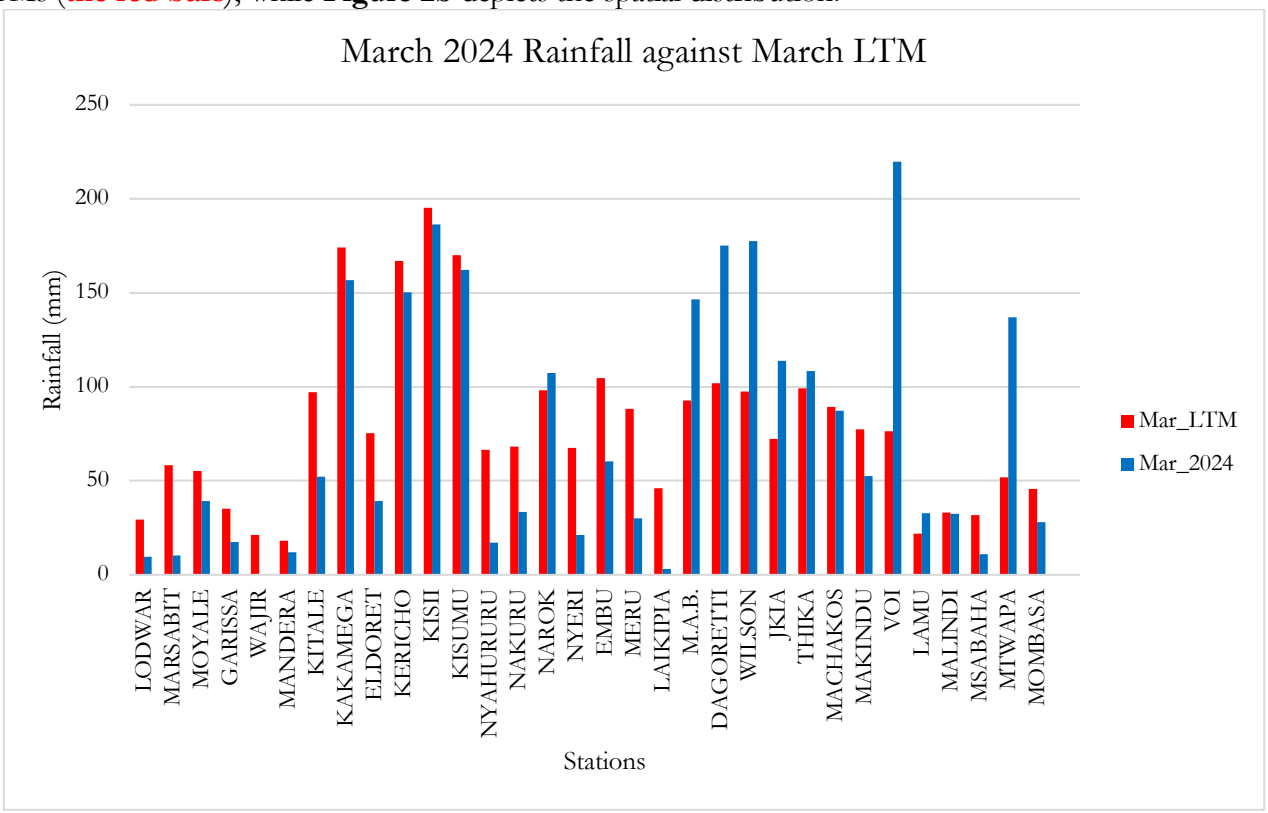

Fig. 2a: March 2024 Rainfall Totals against March LTM

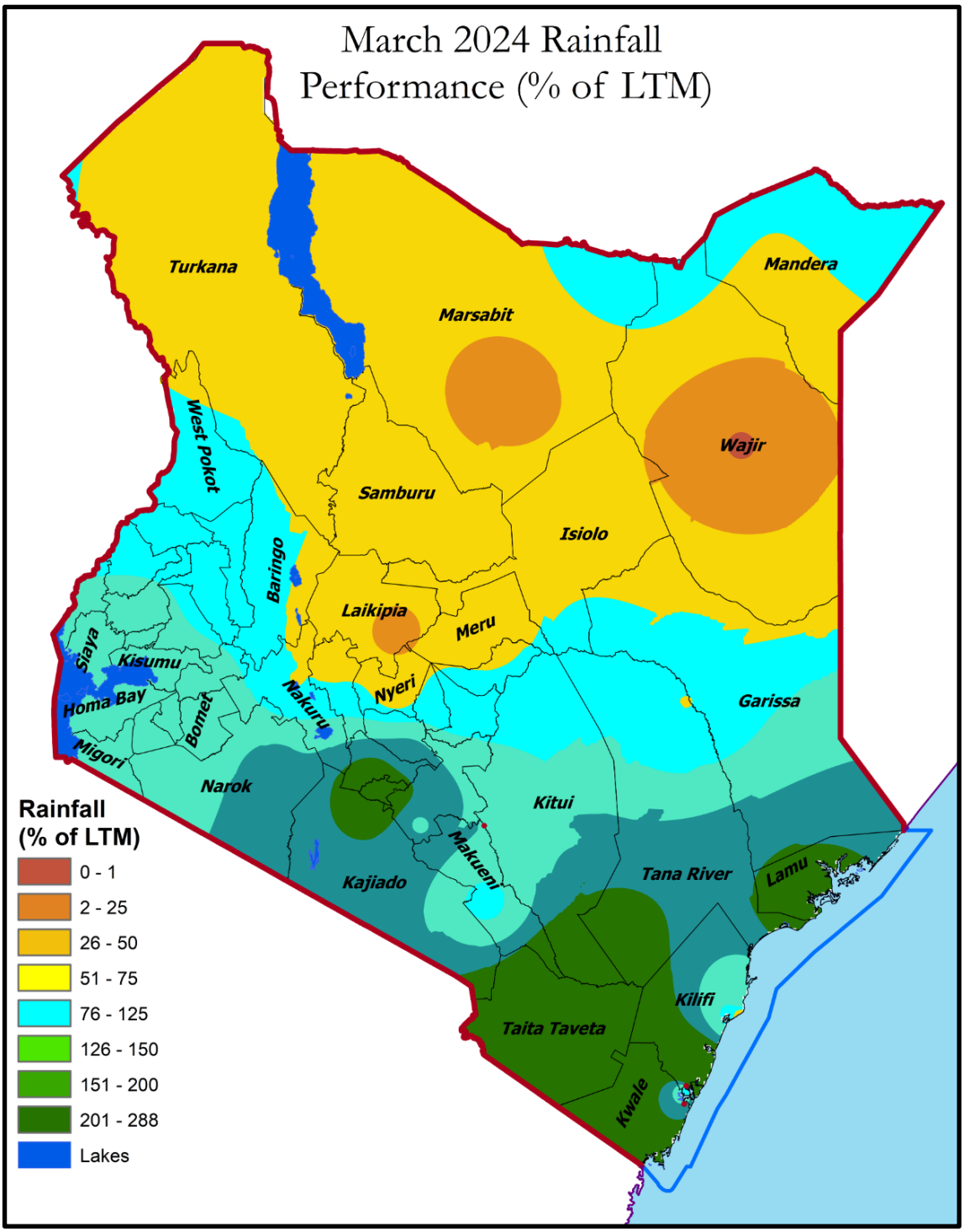

Figure 2c: March 2024 Rainfall Performance as a percentage of LTM

4.2 Temperature Review

Most parts of the country recorded daytime (Maximum) temperatures that were warmer than usual except over Kisumu and Narok where temperatures were within the normal range. The highest monthly maximum temperature (39.1^{0}C) was recorded in Mandera station, followed by Lodwar with 38.8 ^{0}C. Temperatures in these stations occasionally reached 40.0 ^{0}C. For instance, Lodwar recorded 40.1 ^{0}C on 22nd and 23rd March while Mandera recorded 40.0 ^{0}C on 23rd March. Nighttime (Minimum temperatures) were warmer than usual over the whole county. The lowest monthly minimum temperature (8.9^{0}C) was recorded in Nyahururu. Figures 3a and 3b show the maximum and minimum temperature anomalies where anomalies refer to the deviation from the mean. Positive anomalies show temperatures were warmer than usual while zero (0) indicates temperatures were within the normal range.

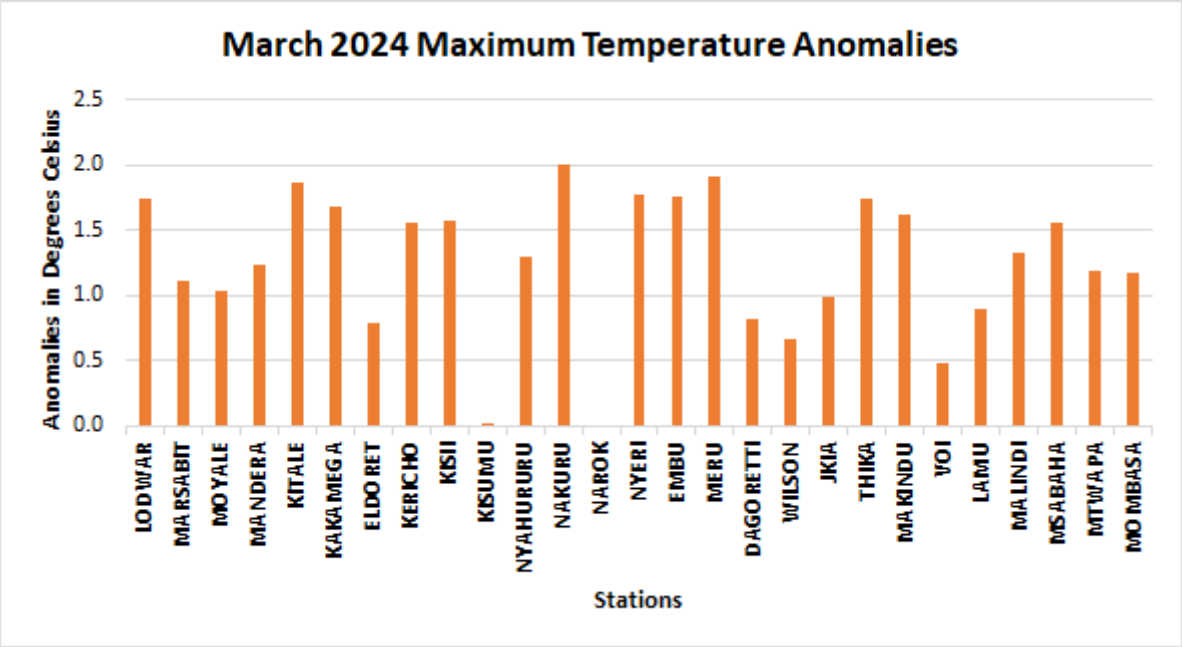

Figure 3a: March 2024 Maximum Temperature Anomalies

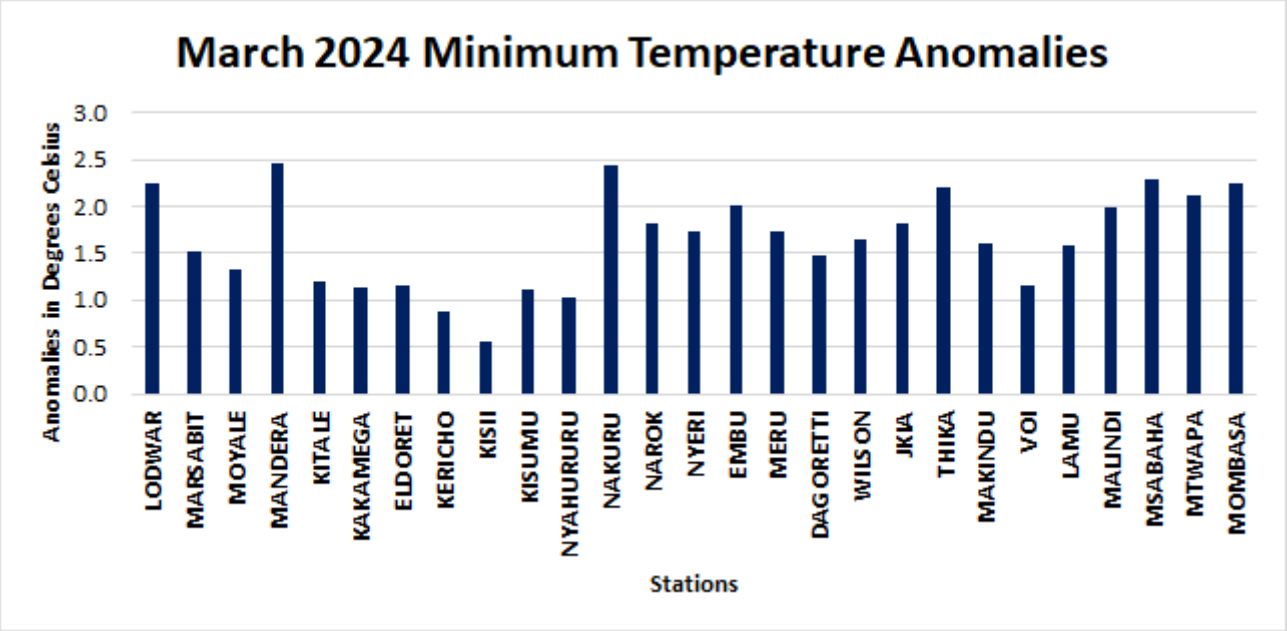

Figure 3b: March 2024 Minimum Temperature Anomalies

4.3 Experienced Impacts in March 2024

4.3.1 Agriculture and Food Security

Pawpaw trees were destroyed by heavy rains that were accompanied by strong winds in the Syungani area of Kitui East on 12th March. Twenty herds of sheep and pigs were washed away by flash floods in Kayole B3 village of Nairobi County following the heavy rains that were experienced in the region on 24th March. The rainfall experienced in some parts of the Highlands West and East of the Rift Valley, the Lake Victoria Basin, South Rift Valley and Southeastern lowlands during the fourth week of March was conducive for agricultural activities.

4.3.2 Disaster Management

The heavy rains experienced in Nairobi on 24th March had the following impacts:

- Ten people were killed by floods.
- Several households especially in the informal settlements were displaced.
- Property destroyed by floods leading to huge economic losses.
- Learning was temporarily disrupted in Ngei Primary school (Langata) after a wall collapsed following the heavy rains spilling raw sewage into the school.

4.3.3 Water Resources Management and Energy

Water availability both for human and livestock use improved over some parts of the country especially in areas that received rainfall.

4.3.4 Environment

Heavy rainfall experienced on 13th March in the Syungani area of Kitui East resulted in soil erosion and land degradation as trees were uprooted and vegetation destroyed.

3.2.5 Transport and Public Safety

Several roads in Nairobi were rendered impassable by heavy rains that were experienced in the city on 24th March. There was traffic snarl up along the Expressway and other feeder roads occasioned by flooding because of the heavy rains.

Transport was temporarily disrupted along the Kitale Lodwar road after heavy rains were experienced in the area on 28th March.

NB: This outlook should be used with 24-hour, 5-day and 7-day regular updates issued by this Department. Weekly County forecasts are available from County Meteorological Offices.

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