

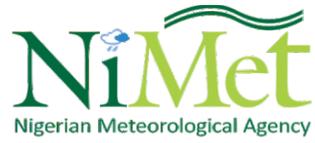
# CLIMATE AND HEALTH BULLETIN

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# Climate and Health Bulletin

October - December 2024

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Our core mandate is to observe, collate and analyze meteorological data to provide timely and accurate reporting of weather and climate information for socio-economic development and safety of lives and properties.

## Our Vision

To be a World Class provider of Weather and Climate services for safety and sustainable national socio-economic development.

## Our Mission

To observe Nigerian Weather and Climate and provide Meteorological, Hydrological, and Oceanographic Services in support of National needs and International Obligations

## Who We Serve

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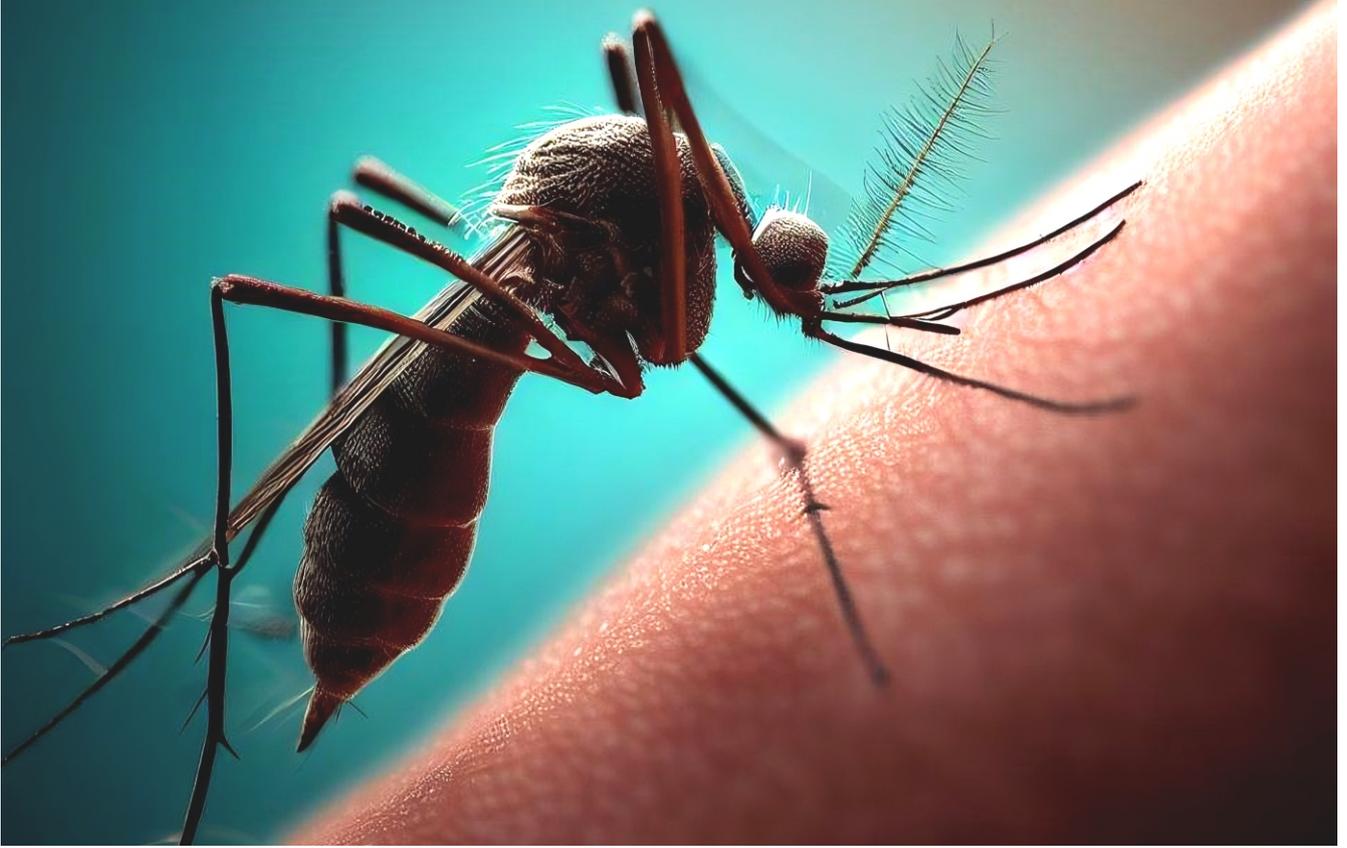
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# Introduction

**T**he dynamic interactions between public health and the weather patterns of October, November, and December 2024 in this edition of the three-month compilation of the climate and health bulletin. The contrasting meteorological forces that shape Nigeria's landscape – cold, dry, and dusty northeasterly (Harmattan) winds prevailing in the north, and warm, moist southwesterly winds dominating the south, with the health implications of these climatic disparities, are discussed in the bulletin. The challenges posed by dry conditions in the north and the potential consequences of increased humidity in the south are also examined. The complex relationship between atmospheric conditions and its impacts on public health are unraveled.

**T**his document contains advisories for health practitioners and policymakers. It is aimed to support health delivery and improved outcomes in the context of a changing climate, with a focus on some infectious and non-infectious diseases, and the public health outcomes of meteorological disasters. It serves as an advisory for experts from governments, humanitarian agencies, development organizations, international agencies, research centers, and universities.

## Criteria for Determining the Degree of Vigilance of Diseases and Medication Instability

Changes in temperature, rainfall, and relative humidity due to climate change as well as their natural variabilities are expected to influence the incidence of malaria, meningitis, cholera, as well as heat stress directly by modifying the behaviour and geographical distribution of malaria and other disease vectors by changing the length of the life cycle of the parasite. The climate is also expected to affect the occurrence of malaria indirectly by changing ecological relationships that are important to the organisms (vector, parasite, and host) involved in malaria transmission. Rainfall increases the chances of egg-laying by increasing the number of potential breeding sites for anopheles' mosquitoes. The eggs can develop and reach adulthood within nine to twelve days which is necessary for the mosquito life cycle<sup>1</sup>.

**2.1.1 Malaria Vigilance:** According to the International Research Institute for Climate and Society (IRI), seasonal climatic suitability for malaria transmission is defined as the chance of precipitation accumulation greater than 80 mm, average temperature between 18°C and 32°C, and relative humidity greater than 60%. The combined values of these climate variables at a given location or region are an indication of the lower limit for potential malaria transmission in the area. This implies that once these conditions are met, malaria cases are likely to occur. The predicted rainfall, temperature and relative humidity are used in determining the degree of vigilance for malaria. When rainfall is above 80 mm, the temperature is between

25°C and 32°C, and relative humidity is greater than 80%, the region is at high risk of malaria prevalence and is placed under High Vigilance. When the temperature is between 20°C and 25°C, relative humidity is between 70% and 80%, and rainfall is above 80 mm, then Moderate Vigilance is advised. Low vigilance for malaria is recommended for any location or region if the temperature ranges from 18°C to 20°C, relative humidity is between 60% and 70%, and rainfall is above 80 mm. No Vigilance is recommended when the temperature is lower than 18°C or above 32°C, relative humidity is lower than 60%, and rainfall is below 80 mm. This is because these climatic conditions are not conducive for mosquitoes to reproduce and multiply.

**2.1.2 Cholera Vigilance:** Vigilance for cholera is determined by the probability of high rainfall that may result in flooding and pollution of drinking water. Cholera-causing bacteria (*Vibrio cholera*) are mostly found in the faeces of an infected person, and in the event of open defecation, or broken sewage the faeces are easily transported by flowing water and deposited into water bodies such as rivers, streams, and lakes that serve as sources of water used by people for cooking, drinking and other domestic uses, especially in rural communities.

**2.1.3 Medication Stability Vigilance:** Medication or drug stability is defined as the ability of pharmaceutical dosage form to maintain the physical, chemical, therapeutic, and microbial properties during the time of storage and usage by the patient<sup>2</sup>. The

<sup>1</sup>Dave E. E., Eunice A. S., Johnson A. O., Dare A. 2023. Spatio-temporal analysis of environmental and climatic factors impacts on malaria morbidity in Ondo State, Nigeria. *Heliyon* 9 (2023) e14005. 1-11. <https://doi.org/10.1016/j.heliyon.2023.e14005>

<sup>2</sup> Afifi N.A. (2016). Drug stability. Faculty of Vet. Med. Cairo University.

composition of medicines is affected by weather conditions, especially air temperature and relative humidity. Maximum temperatures above 30°C and relative humidities higher than 75% have negative impacts on drug stability. Such conditions are therefore considered unsafe and unsuitable for the storage of medicines.

**2.1.4 Meningitis Vigilance:** Relative humidity, dust concentration in the atmosphere and mean air temperatures are used in determining the vigilance threshold for meningitis. For 'high vigilance', relative humidity of less than 20%, a temperature within the range of 25°C to 32°C and atmospheric concentration dust of 500 to 2000 µg/m<sup>3</sup> is applied. For 'moderate vigilance', relative humidity within the range of 20 to 40%, a temperature of 20°C to 25°C and dust concentration of 200 to 500 µg/m<sup>3</sup> are indicative. Low vigilance is said to prevail when relative humidity is above 40%, temperature below 25°C, dust concentration is between 50 and 200 µg/m<sup>3</sup>. With any significant amount of rainfall, the outbreak of meningitis is unlikely and therefore 'no vigilance' is required.

## 2.2 HEATINDEX

Heat Index (HI) is a parameter used in expressing the temperature felt by the human body. It is calculated by combining air temperature and relative humidity. Its unit is degrees Celsius (°C) or degrees Fahrenheit (°F). Severe conditions where the body is under stress due to high heat index are referred to as heat stress. Hot and humid conditions (or high

HI) can lead to heat stress and affect human well-being. Revealing signs of heat stress include panting, increased respiration rate, persistent thirst, loss of appetite, and fatigue. Different levels of caution are prescribed depending on the value of the Heat Index. The levels of caution for the heat stress are classified as follows:

- (i) No Caution if HI is ≤26°C.
- (ii) Caution if HI is 27°C to 32°C.
- (iii) High Caution if HI is 33°C to 39°C.
- (iv) Danger if HI is 40°C to 51°
- (v) Extreme Danger if HI is ≥52°C.

# OCTOBER 2024

## 1.1 The Climate in October 2024.

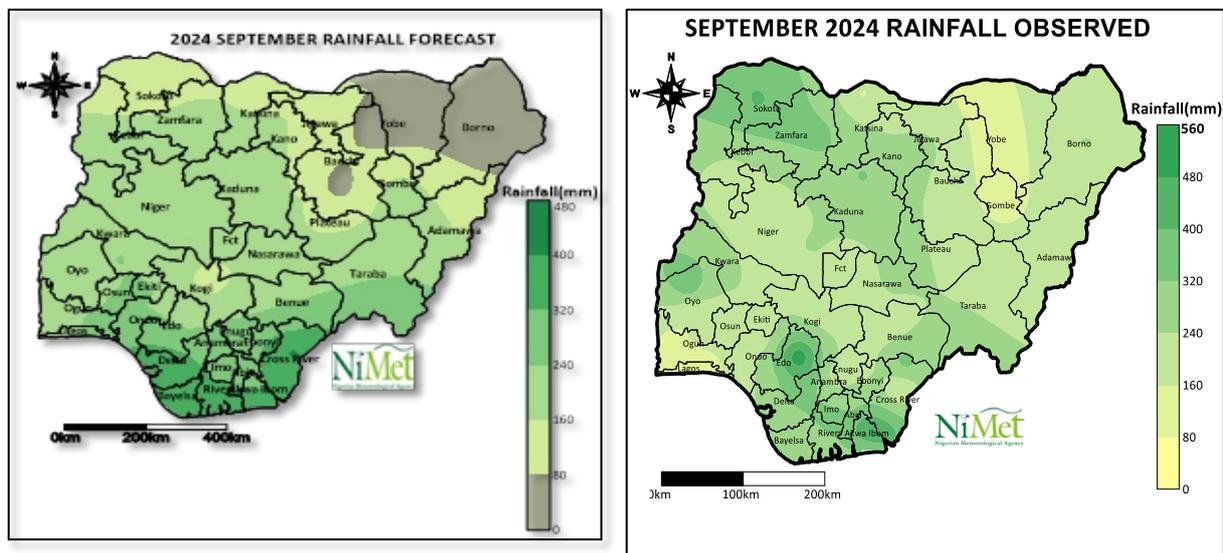
The Inter-Tropical Discontinuity (ITD) position is expected to move southwards from its mean position in September and oscillate around latitude 15.8°N in October. This southward movement will result to decrease in rainfall activities over the north.

## 1.2 The highlights of the Bulletin for October 2024 are as follows:

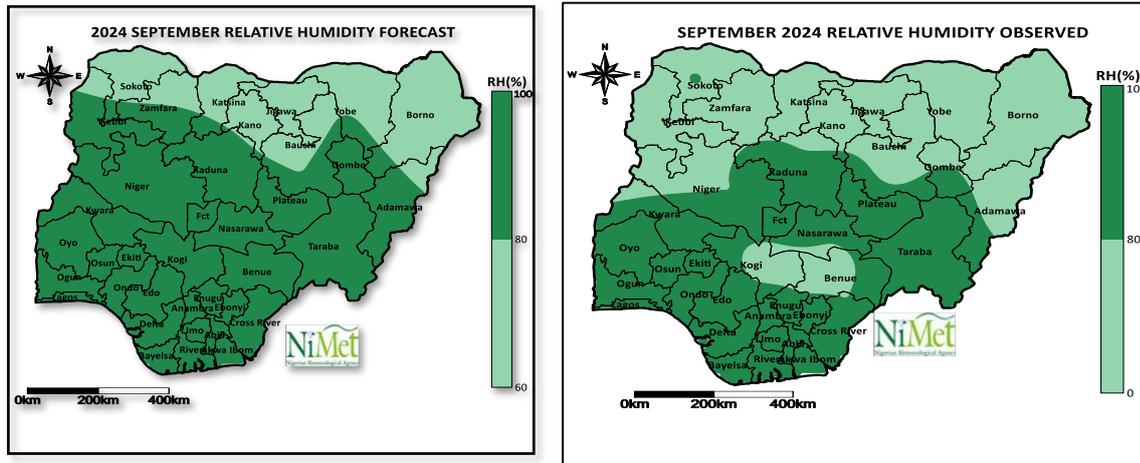
- The expected maximum (daytime) temperatures across Nigeria range from 24.5°C to 37.1°C. The highest and lowest maximum temperatures, 24.5°C and 37.1°C, are expected over Ondo State and Katsina State respectively.
- The minimum (nighttime) temperatures across the country in October 2024 are anticipated to range between 16.7°C and 25.0°C. The lowest nighttime temperature range of 16.0°C to 19.0°C is anticipated over parts of Plateau, Kaduna, and Bauchi states. At the same time, the highest nighttime temperature range of 25.0°C to 27.0°C is expected over parts of different regions. The highest and lowest maximum temperatures of 16.7°C and 25.0°C are expected over Jos (Plateau state) and Lagos Roof (Lagos state), respectively.
- The expected maximum (daytime) temperatures across Nigeria range from 24.5°C to 37.1°C. The highest and lowest maximum temperatures, 24.5°C and 37.1°C, are expected over Ondo State and Katsina State, respectively.
- The minimum (nighttime) temperatures across the country in October 2024 are anticipated to be between 16.7°C and 25.0°C. The lowest nighttime temperature range of 16.0°C to 19.0°C is anticipated over parts of Plateau, Kaduna, and Bauchi states. During the same period, the highest nighttime temperature range of 25.0°C to 27.0°C is expected over various parts of the country. The highest and lowest maximum temperatures of 16.7°C and 25.0°C are expected over Jos (Plateau state) and Lagos (Lagos state), respectively.
- The cumulative rainfall amounts across the country is predicted to be between 80.3 mm and 451.5 mm. The central, northeast, and northwest are expected to record rainfall amounts between 80.0mm and 320.0mm. Rainfall amounts of 320.0 mm to 480.0 mm are predicted over the southern parts of the country.

- The precipitation probability forecast indicates normal rainfall over the entire northern, and parts of the central states, while normal to below-normal rainfall are anticipated in the south (See Figure 7). Based on the predicted rainfall pattern, moderate vigilance for cholera cases is advised over the northern and central states. On the other hand, high vigilance is prescribed in the South.
- The expected climatic conditions in October 2024 suggest high prospects of malaria incidences in most parts of the country. High vigilance is therefore recommended for such areas. Moderate vigilance is prescribed over parts of Sokoto, Kebbi, Zamfara, Katsina, Kano, Jigawa, Plateau, Kaduna, Bauchi, Gombe and Adamawa. Low vigilance is prescribed for the northern border states.
- The temperature and humidity anticipated in October 2024 are likely to cause drug and medication instability across Nigeria. Based on the expected climatic conditions, moderate vigilance is recommended over the southern and central states. Low vigilance is prescribed over the northern states.
- Caution is advised in most parts of the country. Based on the anticipated air temperature and relative humidity, some levels of human discomfort and possibly heat stress are likely to be experienced in most parts of the country in October 2024.

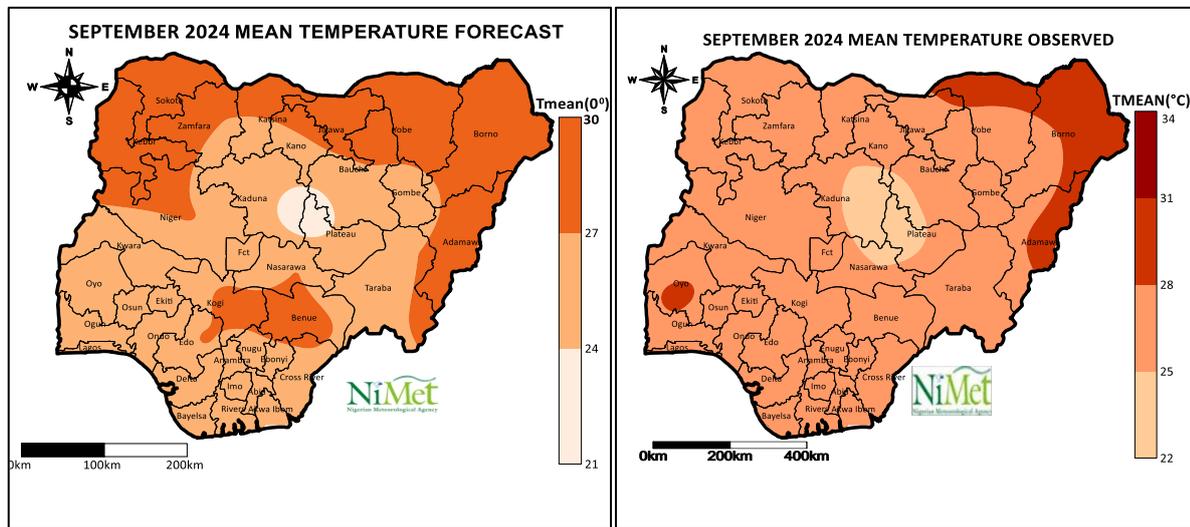
### 1.3.0 Evaluation of 2024 September Climate Prediction



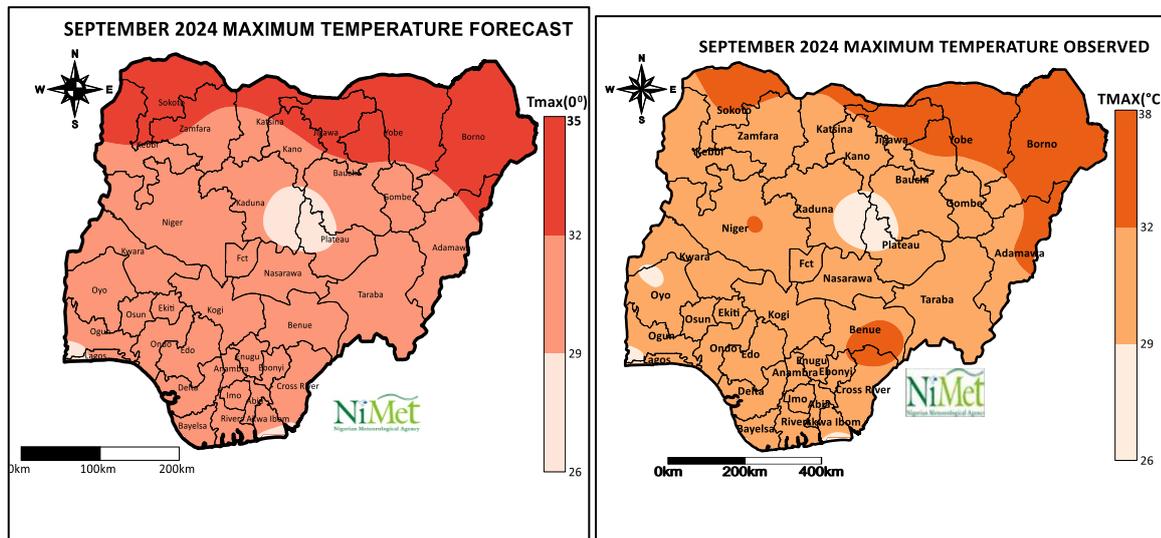
**Figure 1: Forecast and Observed 2024 September Rainfall.**



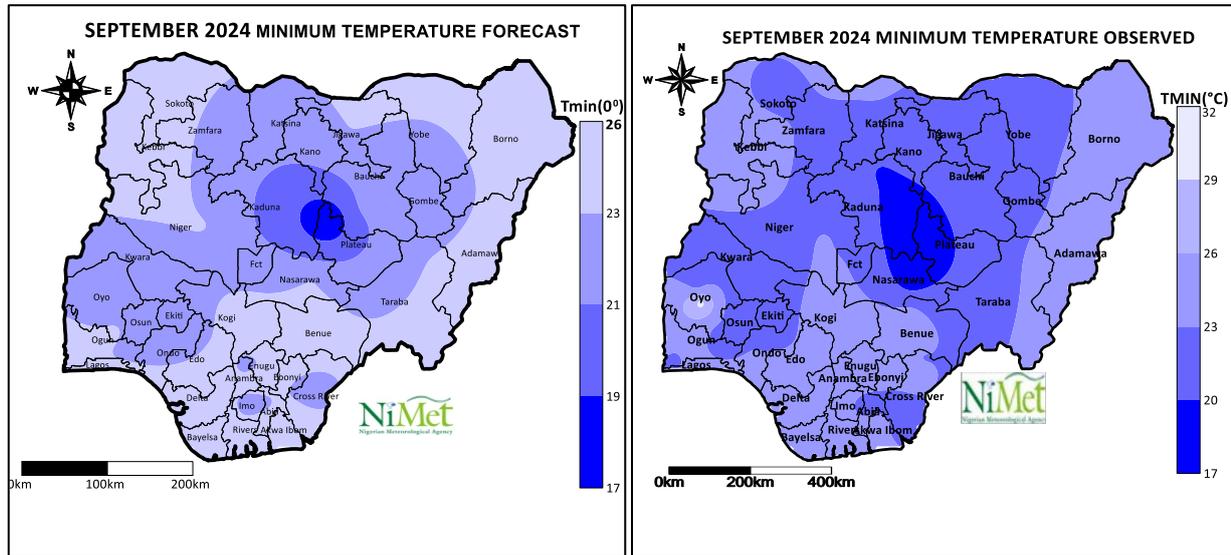
**Figure 2: Forecast and Observed 2024 September Relative humidity.**



**Figure 3: Forecast and Observed 2024 September mean temperature.**



**Figure 4: Forecast and Observed 2024 September maximum temperature.**



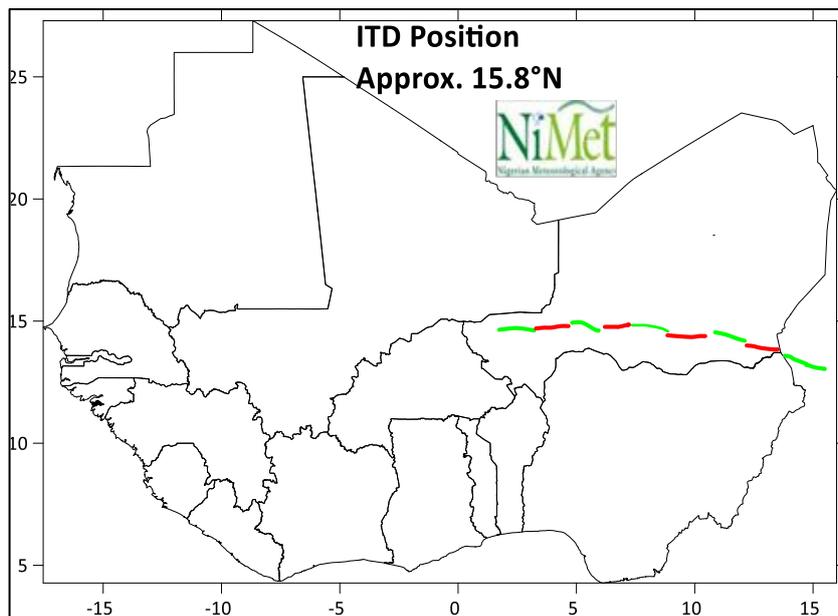
**Figure 5: Forecast and Observed 2024 September minimum temperature.**

**1.3.1 CHOLERA CASES IN THE MONTH OF SEPTEMBER 2024**

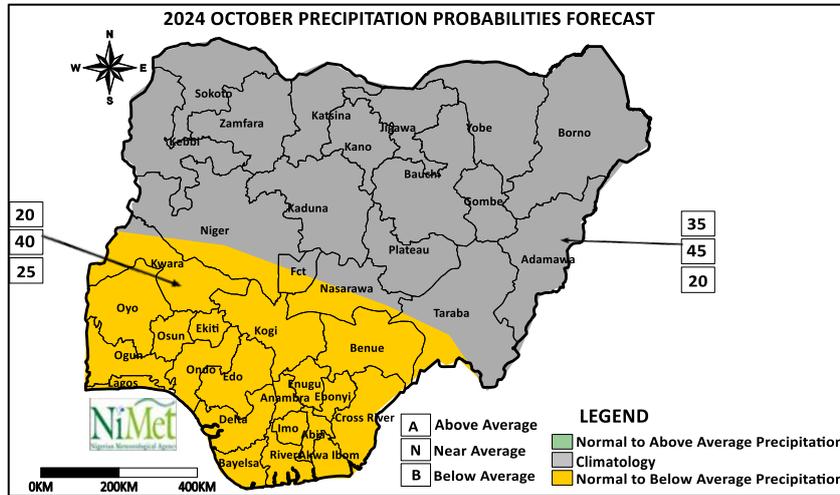
One thousand nine hundred and thirty-eight (1938) suspected cases of cholera were reported in September 2024, with 87 deaths in the country, in areas where high vigilance was recommended. (Source: ncdc.gov.ng).

**1.4.0 GENERAL OUTLOOK FOR 1<sup>ST</sup> TO 30<sup>TH</sup> OCTOBER 2024**

1.4.1 The Inter-Tropical Discontinuity (ITD) position is expected to move southwards from its mean position in September and oscillate around latitude 15.8°N in October. This southward movement will result to decrease in rainfall activities over the north.



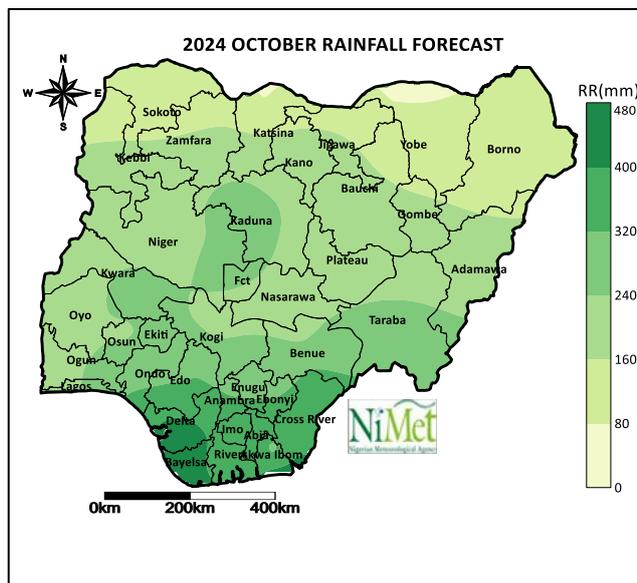
**Figure 6: Projected ITD position in October 2024.**



The precipitation probability forecast in Figure 7 predicts normal rainfall conditions over the entire north and parts of the central zone, while normal to below-normal rainfall conditions are anticipated in the southern states.

**Figure 7: NiMet rainfall forecast for October 2024.**

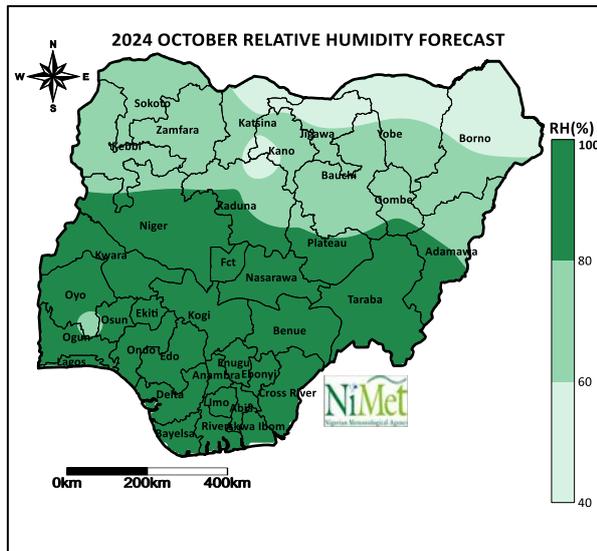
**1.4.2 Rainfall Amount**



In October 2024, the cumulative rainfall forecast amount across the country is anticipated to be between 80.3 mm and 451.5 mm. The coastal areas are expected to record rainfall amounts between 320.0mm and 480.0mm. Rainfall amounts of 80.0 mm to 160.0 mm are predicted over the north, the rainfall amounts between 240.0 mm to 320.0 mm are expected over different regions of the country (Figure 8).

**Figure 8: October 2024 rainfall amount forecast.**

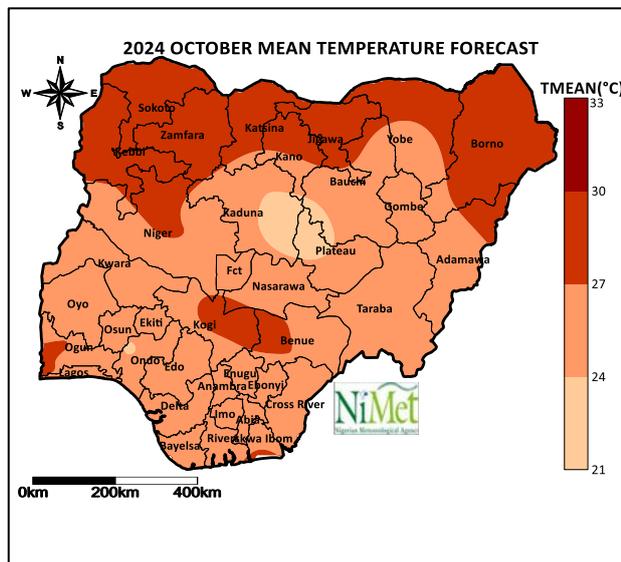
### 1.4.3 Relative Humidity (RH)



Relative humidity for September 2024 are predicted to be within 40% to 100%, as shown in Figure 9. The highest range of values (80 – 100%) is expected over most parts of the country. The extreme north is anticipated to record the lowest relative humidity within the range of (40 – 80%).

**Figure 9: October 2024 Relative humidity forecast.**

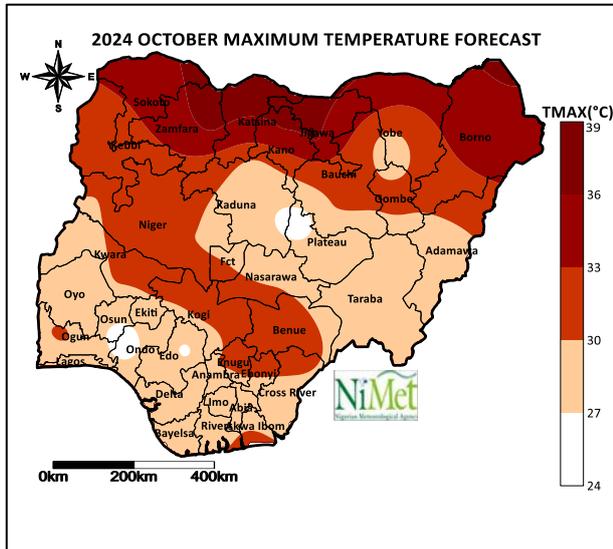
### 1.4.4 Mean Temperature



The predicted mean air temperatures for various locations across the country for August 2024 are between 21.2°C and 29.8°C. The lower range (21.0°C to 24.0°C) is expected over Plateau, Kaduna, and Bauchi states, however, the highest range (27.0°C to 30.0°C) is anticipated over parts of the northern states, as well as Kogi, Benue and Ogun state. (Figure 10).

**Figure 10: October 2024 Mean temperature forecast.**

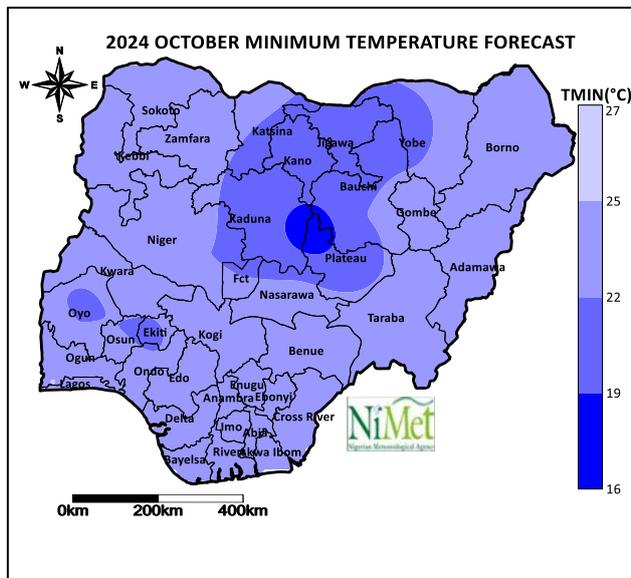
### 1.4.5 Maximum (Daytime) Temperature



Maximum temperature in August 2024 is anticipated to be 24.5°C to 37.1°C across the country, as shown in Figure 11. The lowest and highest maximum temperatures of 24.5°C and 37.1°C are predicted over the Ondo State and Katsina State.

**Figure 11: Maximum temperature forecast for October 2024.**

### 1.4.6 Minimum (Nighttime) Temperature



Nighttime temperatures across the country in August 2024 are anticipated to range between 16.7°C and 25.0°C, as shown in Figure 12. The lowest nighttime temperature range of 16.0°C to 19.0°C is anticipated over parts of Plateau, Bauchi, and Kaduna states, the next temperature range (19.0°C to 22.0°C) is expected in some parts of Oyo, Osun, Ekiti, FCT, Nasarawa, Yobe, Jigawa, Kano, Katsina states. While the highest temperature range of 25.0°C to 27.0°C is expected over the remaining parts of the country.

**Figure 12: October 2024, minimum temperature forecast.**

### 1.5.0 DISEASE VIGILANCE

#### 1.5.1 Cholera

The precipitation probability forecast for October 2024 predicts normal rainfall conditions over the northern and the central states. Normal to below-normal rainfall amounts are anticipated in the southern states. Based on this rainfall, moderate vigilance for cholera cases is advised over the northern and central states. On the other hand, the probability of occurrence of cholera is high in the southern states. High vigilance of cholera is therefore recommended for the south (Figure 13).

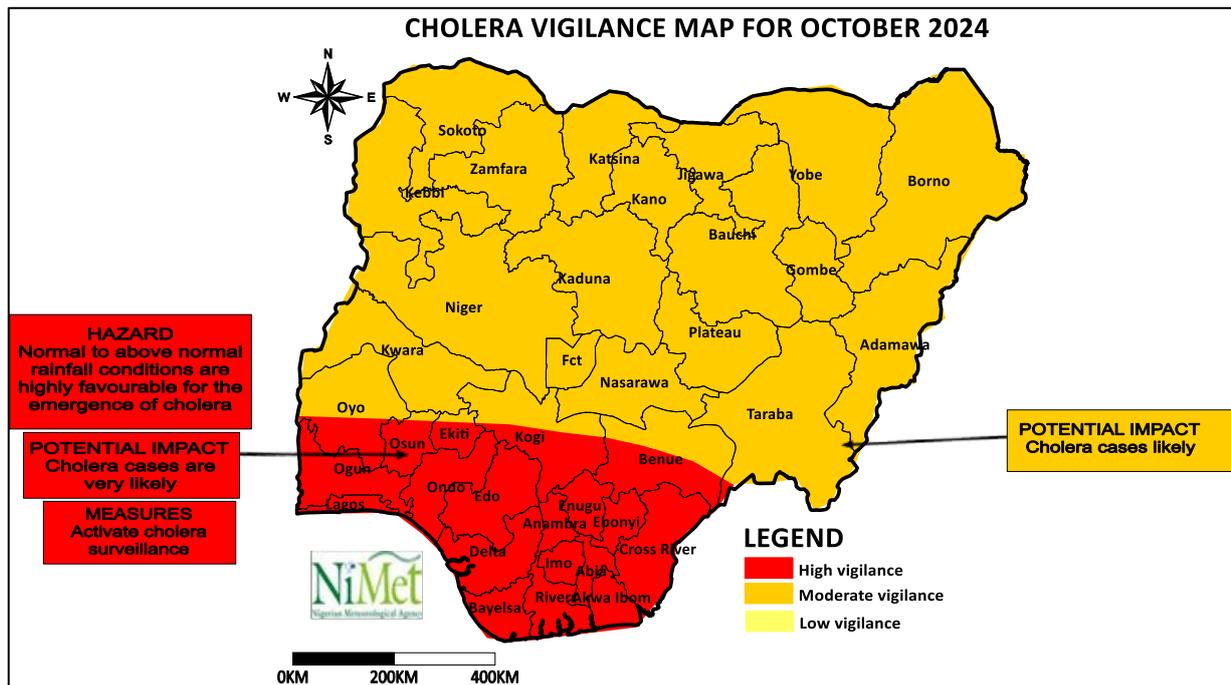


Figure 13: Cholera Vigilance for Map for October 2024

Table 1: Cholera Threshold, Epidemic Characteristics and Advisory

	Climate Conditions	Hazard	Potential Impacts	Advisory/Precautionary Measures
	Areas of above-normal rainfall probabilities	The outbreak of cholera is highly probable.	People in these areas are more susceptible to cholera infection. Infected persons will be stooling and vomiting at the same time. This could lead	(i) Frequent washing of hands with soap and clean water.  (ii) Ensure that food and water are uncontaminated, and the environment is kept clean

			to dehydration and possibly death if not treated promptly.	by ensuring proper sanitation is observed.  (iii) Fruits and vegetables should be thoroughly washed and if possible sterilized before eating.
	Areas of normal rainfall probabilities	The outbreak of cholera is moderately probable.	People in these places may also be susceptible to cholera infection leading to stooling and vomiting at the same time.	(iv) Water should always be boiled and cooled before drinking.  (v) Infected patients are advised to drink plenty of clean water so as to prevent dehydration.
	Areas of normal to below-normal rainfall probabilities	The outbreak of cholera is less likely.		
	Areas of below-normal rainfall probabilities	The outbreak of cholera is possible due to inadequate flow of water that can lead to ponding, when contaminated, it could lead to a cholera outbreak.	The chances of the occurrence of cholera and its impacts are very slim.	

### 1.5.2 Malaria

The expected climatic conditions in October 2024 suggest high prospects of malaria incidences in the southern and central states. High vigilance is therefore recommended for these areas. Moderate vigilance is prescribed over parts of Sokoto, Kebbi, Zamfara, Katsina, Kano, Jigawa, Kaduna, Plateau, Bauchi, Gombe and Adamawa, while low vigilance is prescribed for the northern border states (Figure 14).

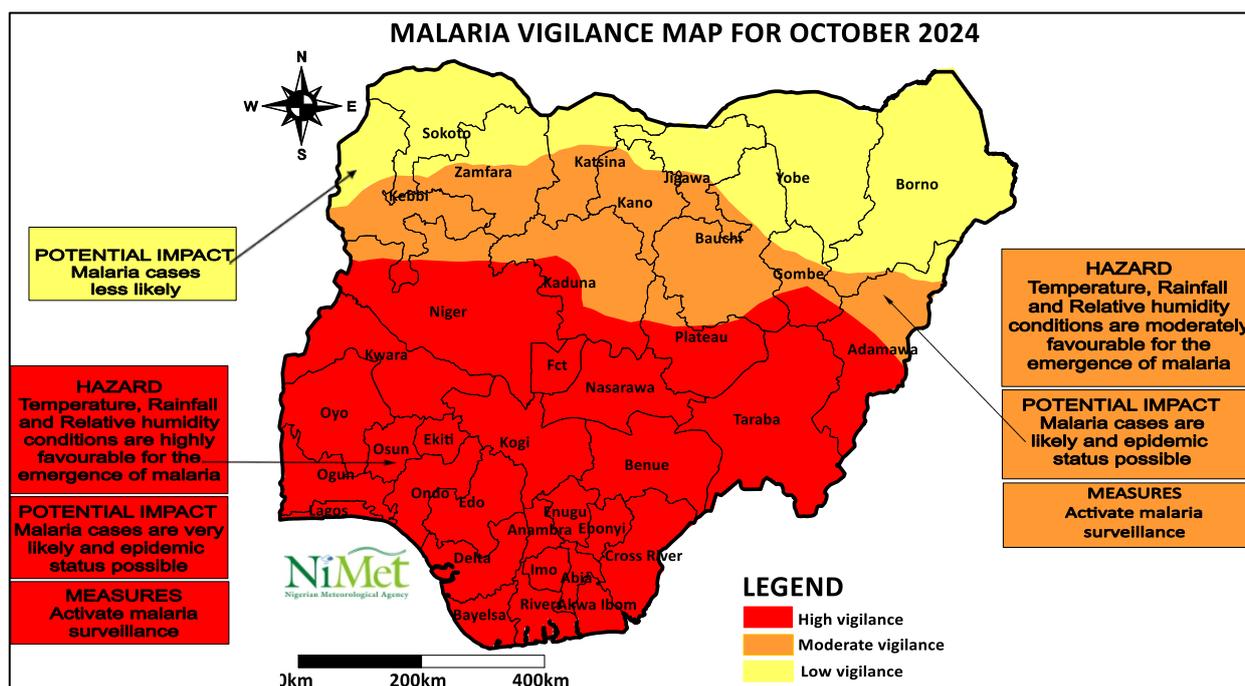


Figure 14: Malaria Vigilance for Map for October 2024

Table 2: Malaria threshold, epidemic Characteristics and Advisory

	Climate Conditions	Hazard	Potential Impacts	Advisory/Precautionary Measures
	(i) Temperature between 25°C and 32°C. (ii) Relative humidity greater than 80%. (iii) Rainfall greater than 80 mm.	High probability of occurrence of malaria cases.	(i) Malaria could be fatal if not treated promptly and properly. (ii) Procurement of drugs for the treatment of malaria is expensive and therefore has adverse impacts on the financial resources of individuals and government. (iii) Malaria is usually accompanied by headache, fever, and body aches. These health conditions	As much as possible, avoid mosquito bites by using insecticide-treated mosquito nets, fumigating the environment frequently, and clearing drainages and stagnant water around homes.
	(i) Temperature between 20°C and 25°C. (ii) Relative humidity between 70% and 80%	Moderate probability of occurrence of malaria cases.		Early diagnosis and treatment should be emphasized.

(iii) Rainfall greater than or equal to 80 mm		impact negatively on the patient's daily life.	
(i) Temperature between 18°C and 20°C  (ii) Relative humidity between 60% and 70%  (iii) Rainfall 80 mm	Low probability of occurrence of malaria cases.	(iv) Malaria patients usually feel sick with high fever and shivering chills. As a result, malaria patients cannot undertake normal economic and social activities.	To reduce the risk of contracting malaria, pregnant women are encouraged to take essential precautions such as using mosquito nets coated with pesticides when sleeping and taking anti-malaria prophylaxis.
(i) Temperature is less than 18°C or greater than 32°C;  (ii) Relative humidity is less than 60%;  (ii) Rainfall is less than 80 mm.	The occurrence of Malaria cases is unlikely.		

### 1.6.0 Medication Instability

The temperature and humidity anticipated in October 2024 are likely to cause drug and medication instability across Nigeria. Based on the expected climatic conditions, moderate vigilance is recommended over the southern and central states. Low vigilance is prescribed over the northern states (See Figure 15).



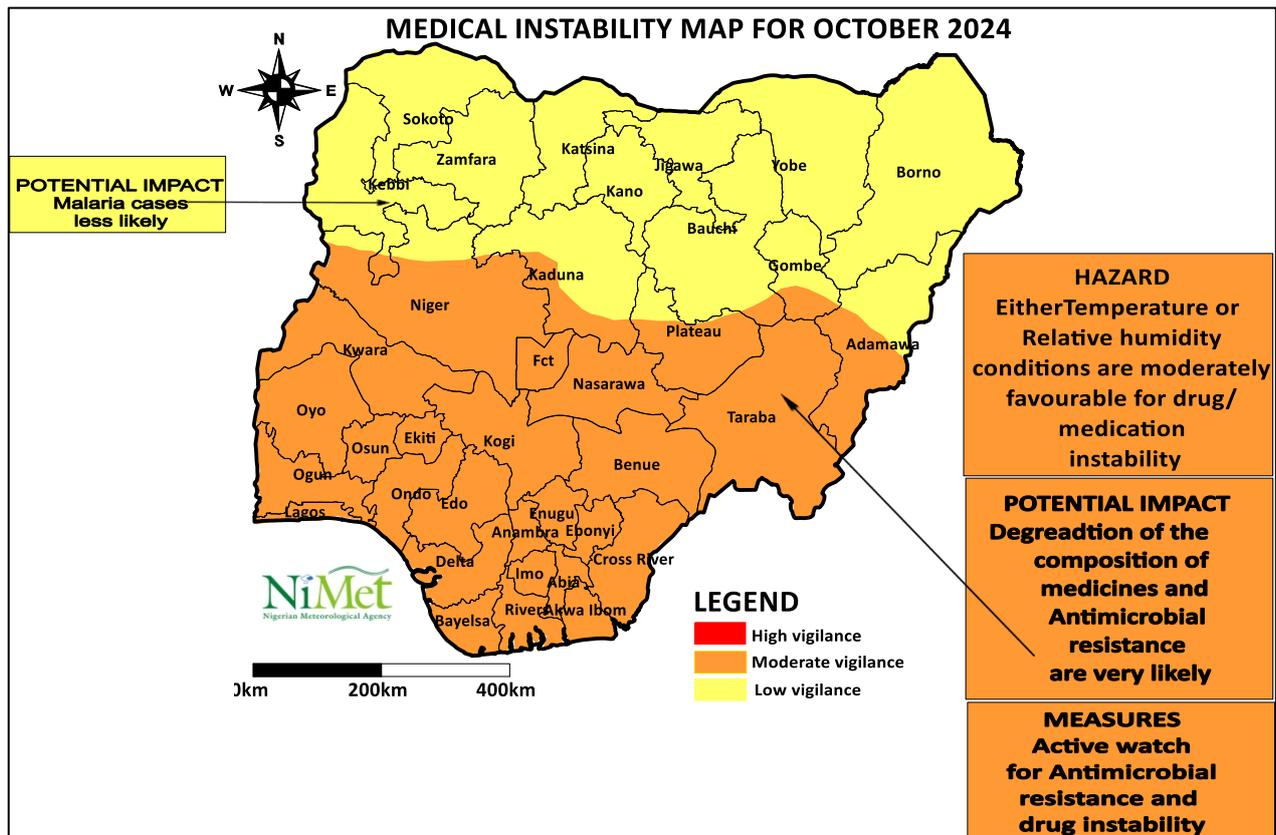


Figure 15: Medication Instability Vigilance for October 2024

Table 3: Medication Instability threshold, potential impacts and Advisory

	Climate Conditions	Hazard	Potential Impacts	Advisory/Precautionary Measures
	(i) Air temperature is greater than 30°C and, (ii) Relative humidity is greater than 75%.	These conditions are considered unsafe and unfavourable or inconducive for the storage of medicines.	(i) Drugs may lose their potency. Consequently, patients treated with such medications are not likely to recover as desired.  (ii) Microorganisms that cause some diseases may develop antimicrobial resistance (AMR).	In areas with high medication instability vigilance thresholds, there is need for greater caution when moving and storing medications.  Medicines should always be stored and transported using facilities with controlled temperature and humidity.

			(iii) Recovery of patients will be retarded when they are treated with antibiotics that have been exposed to weather conditions that affect their stability.	
	Air temperature is greater than 30°C and Relative humidity is less than 75%.  OR  Air temperature less than 30°C and Relative humidity greater than 75%.	The predicted temperatures and relative humidity are likely to cause a depreciation in the quality of medicines.	Microorganisms that cause diseases are likely to develop antimicrobial resistance (AMR) when treated with antibiotics that have lost their potency due to exposure to weather conditions that affect their stability.	Temperature and humidity monitoring systems for transporting and storing medicines are advised.
	Air temperature is between 25°C and 30°C; Relative humidity is between 70% and 75%.	Unconducive weather conditions tend to shorten the shelf life of medicines and could affect their overall potency.		Medical professionals should also advise patients on the proper storage of their medications to avoid degradation and loss of potency.

### 1.7.0 Heat Index

Caution for Heat Index is advised in most parts of the country. Based on the anticipated air temperature and relative humidity, some levels of human discomfort and possibly heat stress are likely to be experienced in most parts of the country in October 2024. (see Figure 16).

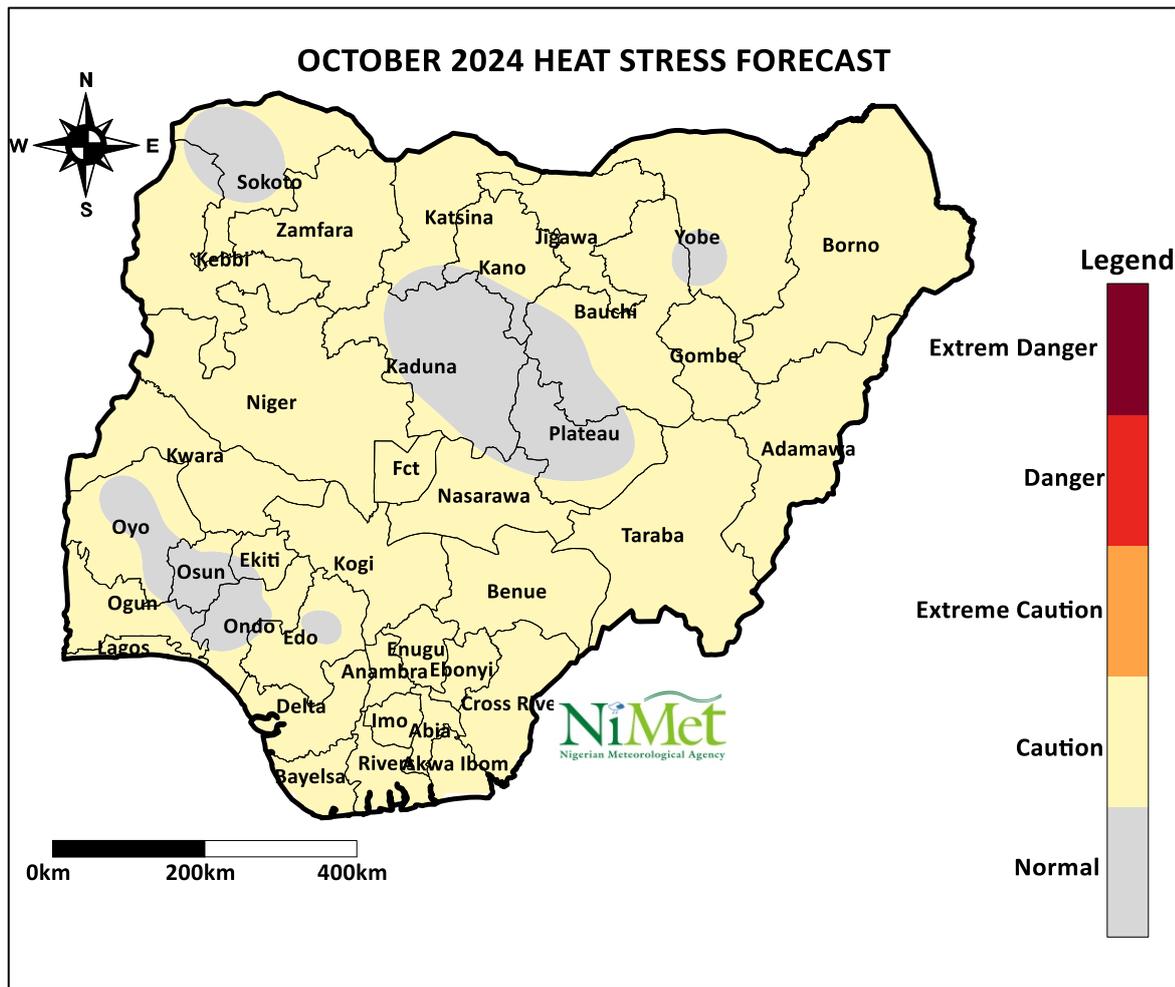


Figure 16: Heat stress Vigilance for October 2024

Table 4: Heat Index threshold, potential impacts and Advisory

	Climate Conditions	Hazard	Potential Impacts	Advisory/Measures
	Heat Index between 40°C and 52°C	The danger and extreme danger of heat stress are very likely in these areas.	People in these areas are more susceptible to heat stroke, exhaustion, loss of concentration, and possible damage to the brain, liver, and heart, which may lead to fainting.	(i) Use shades when engaging in outdoor activities to avoid direct exposure to heat from the sun.  (ii) Work and other outdoor activities should be carried out when the

	Heat Index between 33°C and 39°C	Moderate probability of heat stress.	Persistent and increased respiration rates can lead to exhaustion and fainting.	intensity of solar radiation is not severe.  (iii) Dress in hot-weather-appropriate attire.
	Heat Index between 27°C and 32°C	A low probability of heat stress is likely.	Thirst, loss of appetite, and fatigue. These may lead to other abnormal health conditions such as heat rash.	(iv) Reduce physically demanding labour when the weather is hot. (v) Keep the body hydrated by regularly drinking adequate water or other nutritious liquids.
	Heat Index equal to or lower than 26°C	Heat-related diseases and illnesses are unlikely to occur.		

# NOVEMBER 2024

## 2.1 The Climate in NOVEMBER 2024.

The Inter-Tropical Discontinuity (ITD) position is anticipated to move southwards from its mean position in October and oscillate around latitude 9.5°N in November. As a result of this, rainfall activities will be restricted to the southern parts of the country only.

### 2.2.0 The highlights of the Bulletin for November 2024 are as follows:

- The maximum temperature in November 2024 is anticipated to be 28.6°C to 37.5°C across the country. The lowest and highest maximum temperatures of 28.6°C and 37.5°C are predicted over Plateau and Sokoto States.
- The nighttime temperatures across the country in November 2024 are anticipated to range between 14.0°C and 26.0°C. The lowest nighttime temperature range of 14.0°C to 17.0°C is anticipated over parts of Plateau, Bauchi, Kaduna, Kano and, Jigawa states. The next temperature range (17.0°C to 20.0°C) is expected over the central states and parts of Sokoto, Kebbi, Gombe and Adamawa, while the highest temperature range of 23.0°C to 26.0°C is expected over the southern states and parts of Benue and Kogi.
- The cumulative rainfall amounts across the country is anticipated to be between 0.0 mm and 197.9 mm. Most parts of the country are expected to have little or no rainfall. The coastal areas are expected to record rainfall amounts between 80.0mm and 197.9mm. Rainfall amounts of 10.0 mm to 80.0 mm are predicted over the south and parts of the FCT, Nasarawa, Kaduna, Niger, Kogi, Benue, Taraba, and Adamawa states.
- The expected climatic conditions in November 2024 suggest high prospects of meningitis incidences in parts of Yobe and Borno states. High vigilance is therefore recommended for these areas. Moderate vigilance is prescribed over the northern states while low vigilance is prescribed over the remaining parts of the country.
- The precipitation probability forecast for November 2024 indicates normal rainfall conditions over the northern and the central states. Normal to below-normal rainfall conditions are anticipated in the southern states. Based on this rainfall pattern, moderate vigilance for cholera cases is advised over the northern and central states. On the other hand, the probability of occurrence of cholera is high in the southern states, hence high vigilance is therefore recommended.

- The expected climatic conditions in November 2024 suggest high prospects of malaria incidences in the southern states. High vigilance is therefore recommended for these areas. Moderate vigilance is prescribed over parts of southern and central states, while low vigilance is prescribed for the northern states and parts of the central states.
- The temperature and humidity anticipated in November 2024 are likely to cause drug and medication instability across Nigeria. Based on the expected climatic conditions, high vigilance is recommended over the southern, and parts of Kwara, Kogi, Benue and Taraba states. Moderate vigilance is prescribed over the remaining parts of the country.
- Caution for Heat Index is advised in most parts of the country. Based on the anticipated air temperature and relative humidity, high levels of human discomfort and possibly heat stress are likely to be experienced in the South-east, parts of the South-west, South-south, Kogi, Benue and Nasarawa states in November 2024.

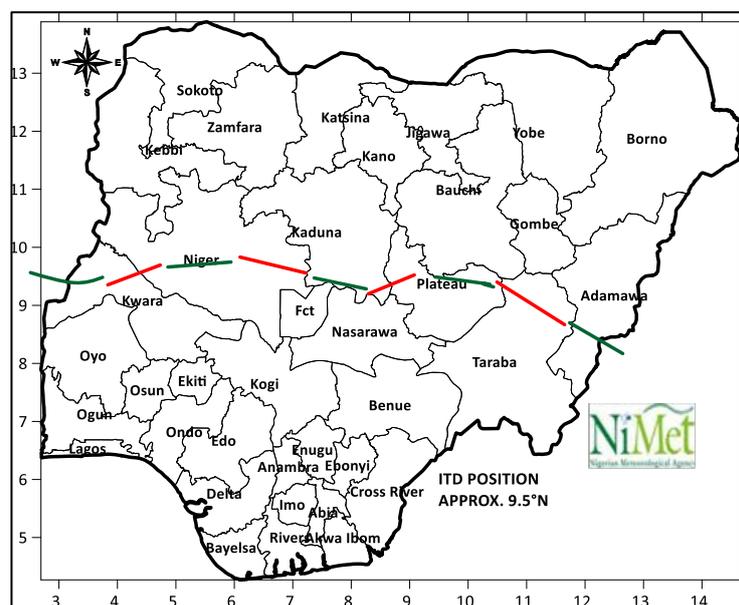
### 2.3.0 Evaluation of October 2024 Prediction of Impact of Climate on Health

#### 2.3.1 Cholera cases in the month of October 2024

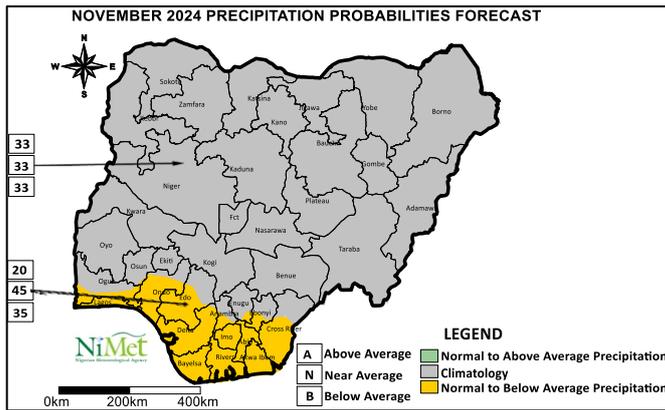
Over 14,000 suspected cases of cholera had been reported nationwide as of mid-October, with 378 fatalities. The epicenters of the outbreak were the northern states of Borno, Adamawa, Jigawa, Yobe, and Kano, where moderate vigilance was recommended in the October edition of NiMet's Climate and Health Bulletin. (Source: reliefweb.int).

### 2.4.0 GENERAL OUTLOOK FOR 1<sup>ST</sup> TO 30<sup>TH</sup> NOVEMBER 2024

**2.4.1** The Inter-Tropical Discontinuity (ITD) position is anticipated to move southwards from its mean position in October and oscillate around latitude 9.5°N in November. As a result of this, rainfall activities will be restricted to the southern parts of the country only.



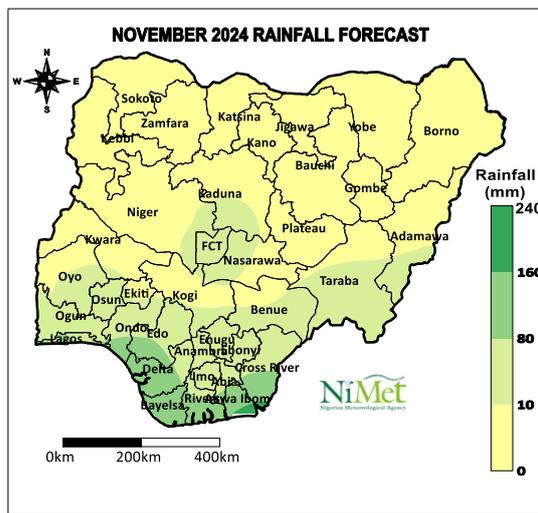
**Figure 17: Projected ITD position in November 2024.**



The precipitation probability forecast for November 2024 shows normal rainfall conditions over the entire northern and the central states, while normal to below-normal rainfall conditions are anticipated in the southern states. (see Figure 18)

**Figure 18: NiMet rainfall forecast for November 2024.**

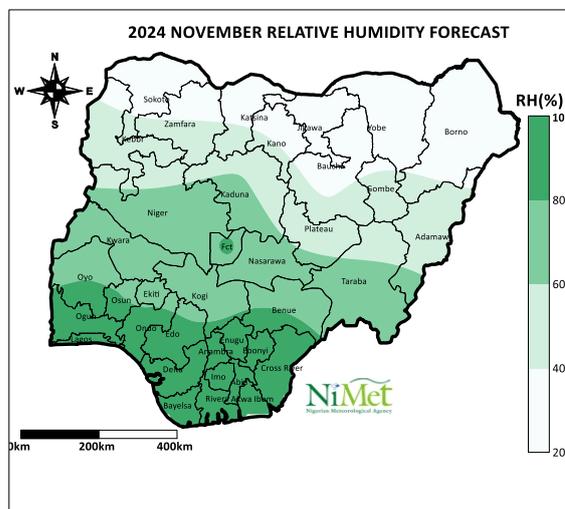
**2.4.2 Rainfall Amount**



In November 2024, the cumulative rainfall forecast amount across the country is anticipated to be between 0.0mm and 197.9 mm. Most parts of the country are expected to have little or no rainfall. Some coastal states such as Ondo, Delta, Bayelsa, Rivers, Akwa Ibom and Cross River are expected to record rainfall amounts between 80.0mm and 197.9mm. Rainfall amounts of 10.0 mm to 80.0 mm are predicted over the south and parts of the FCT, Nasarawa, Kaduna, Niger, Kogi, Benue, southern parts of Taraba and Adamawa states. (Figure 19).

**Figure 19: November 2024 rainfall amount forecast.**

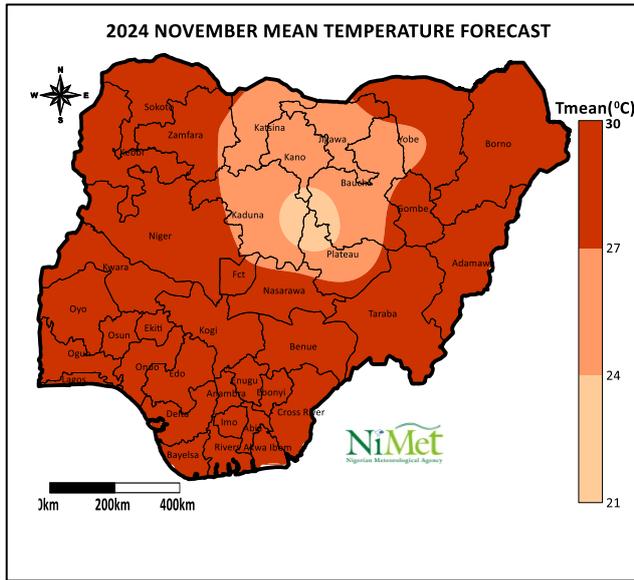
**2.4.3 Relative Humidity (RH)**



Relative humidity for November 2024 are predicted to be within 20% to 100% range across Nigeria, as shown in Figure 20. The highest range of values (80 to 100%) is expected over southern parts of the country. The extreme north is anticipated to record the lowest relative humidity within the range of (20 to 40%).

**Figure 20: November 2024 Relative humidity forecast.**

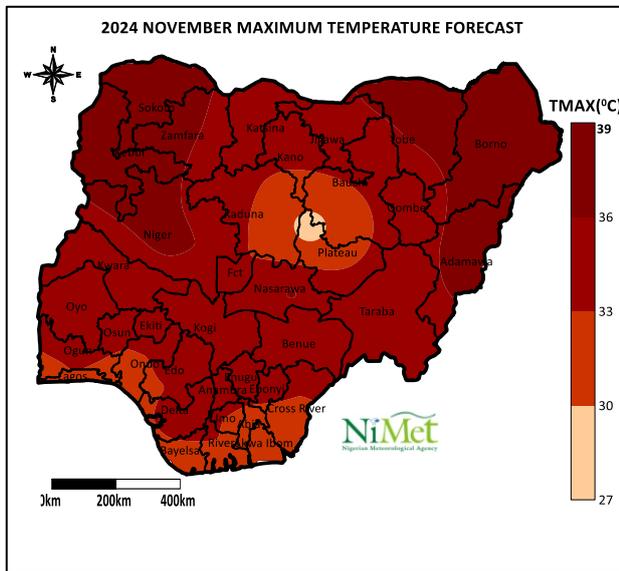
### 2.4.4 Mean Temperature



**Figure 21: November 2024 Mean temperature forecast.**

The predicted mean air temperatures for various locations across the country for November 2024 are between 21.3°C and 29.4°C. The lower range (21.0°C to 24.0°C) is expected over the borders of Plateau, Kaduna, and Bauchi states, while the remaining parts of these states and Katsina, Jigawa, Kano, western Yobe and eastern Zamfara states are anticipated to have mean temperatures between 24.0°C and 27.0°C. The highest range (27.0°C to 30.0°C) is anticipated over most parts of the country. (Figure 21).

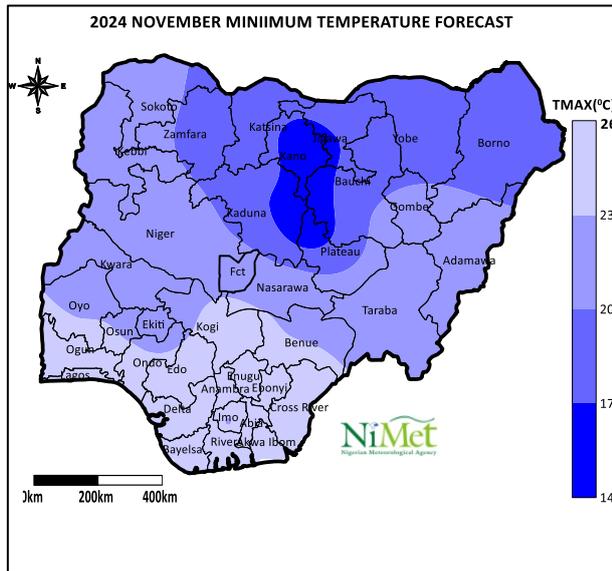
### 2.4.5 Maximum (Daytime) Temperature



**Figure 22: Maximum temperature forecast for November 2024.**

The maximum temperature in November 2024 is anticipated to be 28.6°C to 37.5°C across the country, as shown in Figure 22. The lower range (27.0°C to 30.0°C) is expected over the borders of Plateau, Kaduna, and Bauchi states, while the remaining parts of these states and, parts of Kano, Lagos, Ondo, Edo, Delta, Bayelsa, River, Imo, Abia, Cross River and Akwa Ibom are anticipated to have temperatures between 30.0°C and 33.0°C. The highest range (33.0°C to 39.0°C) is anticipated over most parts of the country.

### 2.4.6 Minimum (Nighttime) Temperature



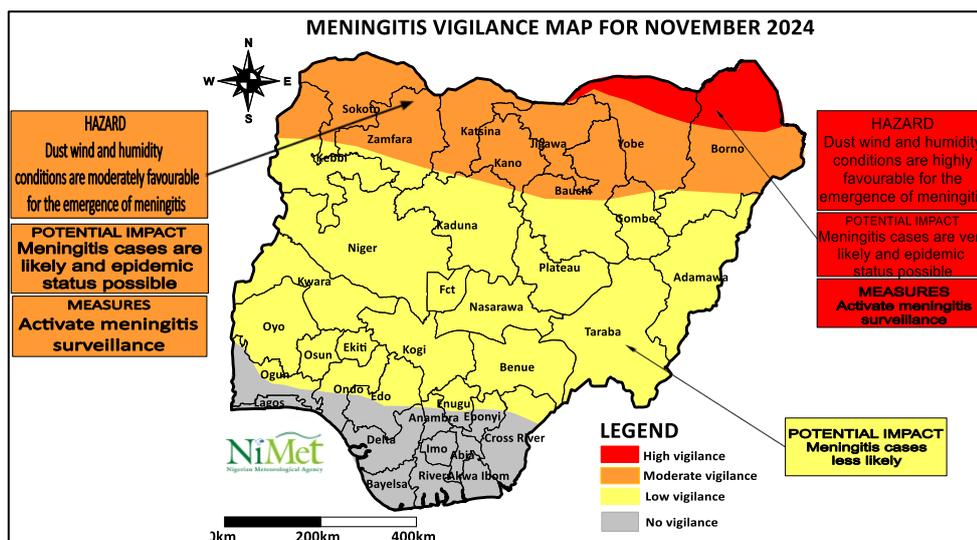
The minimum temperatures across the country in November 2024 are anticipated to range between 14.0°C and 26.0°C, as shown in Figure 23. The lowest minimum temperature range of 14.0°C to 17.0°C is anticipated over parts of Plateau, Bauchi, Kaduna, Kano and, Jigawa states, while the remaining parts of these states and, parts of western Sokoto, Western Zamfara, Gombe, Yobe and Borno are anticipated to have temperatures between 17.0°C to 20.0°C. The highest temperature range of 23.0°C to 26.0°C is expected over the southern states and parts of Benue and Kogi states.

**Figure 23: November 2024, minimum temperature forecast.**

### 2.5.0 DISEASE VIGILANCE

#### 2.5.1 Meningitis

The predicted climatic conditions in November 2024 suggest high probability of meningitis incidences in the northern parts of Yobe and Borno states. Therefore, high vigilance is recommended for these areas. Moderate vigilance is prescribed for the northern states of Sokoto, Zamfara, Katsina, Kano, Jigawa, Bauchi, Yobe and, Borno. Low vigilance is prescribed over most parts of the country; however, no vigilance is prescribed for the southern states. (Figure 24).



**Figure 24: Meningitis Vigilance for Map for November 2024.**

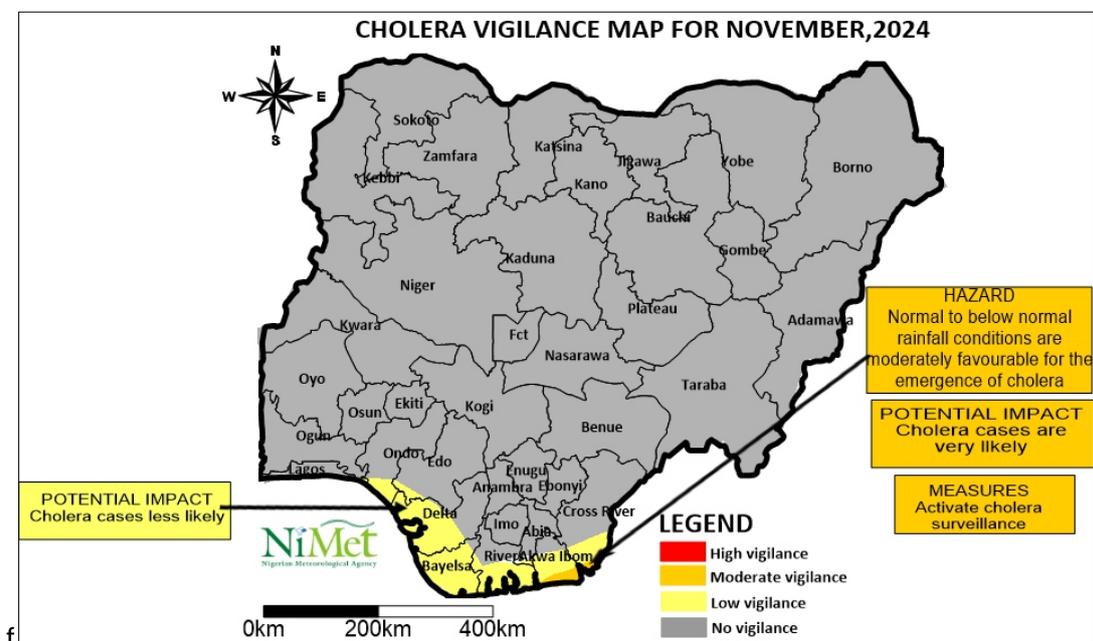
**Table 5: Climate Thresholds for Meningitis, epidemic Characteristics and Advisory**

	<b>Climate Conditions</b>	<b>Hazard</b>	<b>Potential Impacts</b>	<b>Advisory/Precautionary Measures</b>
	(i) Temperature between 25°C and 32°C. (ii) Relative humidity less than 20%. (iii) Atmospheric concentration dust of 500-2000µg/m <sup>3</sup>	High probability of occurrence of meningitis cases.	(i) Meningitis could be fatal if not treated promptly and properly. (ii) Meningitis is usually accompanied by neck stiffness, vomiting, lack of energy, sensitivity to light, lack of appetite, and confusion. (iii) Meningitis causes inflammation of the brain which in turn causes other problems like seizures, memory distress and loss of concentration. (iii) Severe meningitis leaves children with learning disabilities afterwards and even deafness.	(i) Avoid crowding and ensure adequate ventilation homes. (ii) Use disposable tissue to cover mouth and nose when coughing or sneezing. (iii) Consistently wash hands well, especially after sneezing or coughing. (iv) Seek proper diagnosis and treatment at a medical facility if a sudden high fever or neck stiffness occurs. (v) It is recommended that all health care professionals always follow universal care measures, such as wearing gloves when handling patients or caring for sick relatives.
	(i) Temperature between 20°C and 25°C. (ii) Relative humidity between 20% and 40% (iii) Atmospheric concentration dust of 200-500µg/m <sup>3</sup>	Moderate probability of occurrence of meningitis cases		
	(i) Temperature below 25°C	Low probability of occurrence		

(ii) Relative humidity greater than 40%	of meningitis cases		
(iii) Atmospheric concentration dust of 50-200µg/m <sup>3</sup>			
(i) Emergence of rainfall	The occurrence of meningitis is unlikely		

**2.5.2 Cholera**

The precipitation probability forecast for November 2024 shows normal rainfall conditions over the northern and the central states of the country. Normal to below-normal rainfall conditions are anticipated in the southern states. Based on these rainfall conditions, no vigilance for cholera cases is advised over most parts of the country. On the other hand, the probability of occurrence of cholera is moderate and low over the coastal states of Delta, Rivers, Cross River, Bayelsa and Akwa Ibom, hence moderate and low vigilance are therefore recommended for these parts of the country (Figure 25).



**Figure 25 Cholera Vigilance for Map for November 2024**

**Table 6: Climate Thresholds for Cholera, Epidemic Characteristics and Advisory**

	<b>Climate Conditions</b>	<b>Hazard</b>	<b>Potential Impacts</b>	<b>Advisory/Precautionary Measures</b>
	Areas of above-normal rainfall probabilities	The outbreak of cholera is highly probable.	People in these areas are more susceptible to cholera infection. Infected persons will be stooling and vomiting at the same time. This could lead to dehydration and possibly death if not treated promptly.	(i) Frequent washing of hands with soap and clean water.  (ii) Ensure that food and water are uncontaminated, and the environment is kept clean by ensuring proper sanitation is observed.  (iii) Fruits and vegetables should be thoroughly washed and if possible sterilized before eating.
	Areas of normal rainfall probabilities	The outbreak of cholera is moderately probable.	People in these places may also be susceptible to cholera infection leading to stooling and vomiting at the same time.	(iv) Water should always be boiled and cooled before drinking.  (v) Infected patients are advised to drink plenty of clean water so as to prevent dehydration.
	Areas of normal to below-normal rainfall probabilities	The outbreak of cholera is less likely.		
	Areas of below-normal rainfall probabilities	The outbreak of cholera is possible due to inadequate flow of water that can lead to ponding, when contaminated, it could lead to a cholera outbreak.	The chances of the occurrence of cholera and its impacts are very slim.	

### 2.5.3 Malaria

The expected climatic conditions in most parts of Nigeria in November 2024 are not favorable for malaria. Therefore, no vigilance for malaria cases is advised over most parts of the country. However, the probability of occurrence of malaria is moderate and low over the coastal states of Delta, Rivers, Cross River, Bayelsa and Akwa Ibom, hence moderate and low vigilance are therefore recommended for these states (Figure 26).

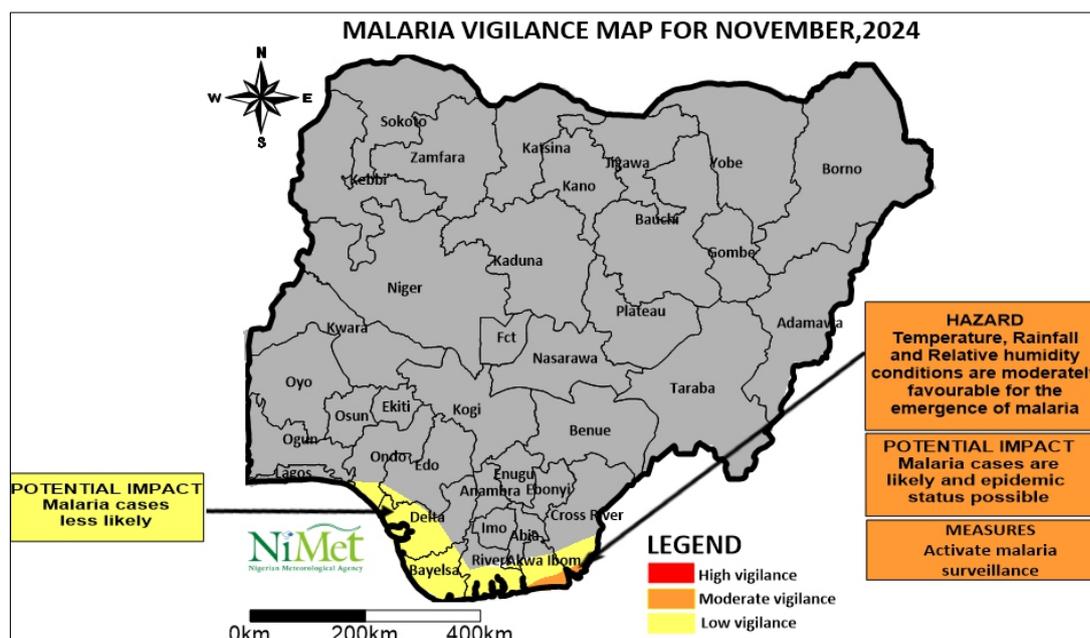


Figure 26: Malaria Vigilance for Map for November 2024

Table 7: Climate Thresholds for Malaria, Epidemic Characteristics and Advisory

	Climate Conditions	Hazard	Potential Impacts	Advisory/Precautionary Measures
	(i) Temperature between 25°C and 32°C. (ii) Relative humidity greater than 80%. (iii) Rainfall greater than 80 mm.	High probability of occurrence of malaria cases.	(i) Malaria could be fatal if not treated promptly and properly. (ii) Procurement of drugs for the treatment of malaria is expensive and therefore has adverse impacts on the financial resources	As much as possible, avoid mosquito bites by using insecticide-treated mosquito nets, fumigating the environment frequently, and clearing drainages and stagnant water around homes.



<p>(i) Temperature between 20°C and 25°C.</p> <p>(ii) Relative humidity between 70% and 80%</p> <p>(iii) Rainfall greater than or equal to 80 mm</p>	<p>Moderate probability of occurrence of malaria cases.</p>	<p>of individuals and government.</p> <p>(iii) Malaria is usually accompanied by headache, fever, and body aches. These health conditions impact negatively on the patient's daily life.</p>	<p>Early diagnosis and treatment should be emphasized.</p>
<p>(i) Temperature between 18°C and 20°C</p> <p>(ii) Relative humidity between 60% and 70%</p> <p>(iii) Rainfall 80 mm</p>	<p>Low probability of occurrence of malaria cases.</p>	<p>(iv) Malaria patients usually feel sick with high fever and shivering chills. As a result, malaria patients cannot undertake normal economic and social activities.</p>	<p>To reduce the risk of contracting malaria, pregnant women are encouraged to take essential precautions such as using mosquito nets coated with pesticides when sleeping and taking anti-malaria prophylaxis.</p>
<p>(i) Temperature is less than 18°C or greater than 32°C;</p> <p>(ii) Relative humidity is less than 60%;</p> <p>(ii) Rainfall is less than 80 mm.</p>	<p>The occurrence of Malaria cases is unlikely.</p>		

### 2.6.0 Medication Instability

The temperature and humidity anticipated in November 2024 are likely to cause drug and medication instability across Nigeria. Based on the expected climatic conditions, high vigilance is recommended over the southern, and parts of Kwara, Kogi, Benue and Taraba states. Moderate vigilance is prescribed over most parts of the country. (See Figure 27).

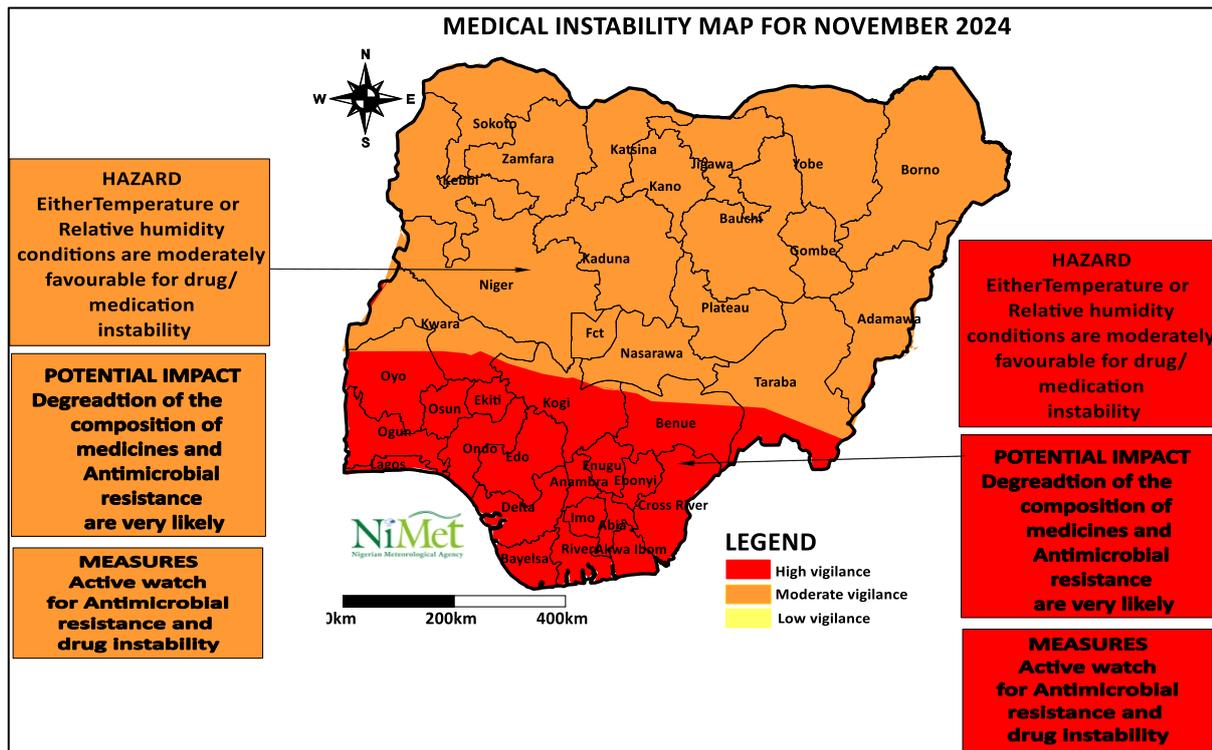


Figure 27: Medication Instability Vigilance for November 2024

Table 8: Climate conditions for Medication Instability threshold, potential impacts and Advisory

Climate Conditions	Hazard	Potential Impacts	Advisory/Precautionary Measures
(i) Air temperature is greater than 30°C and, (ii) Relative humidity is greater than 75%.	These conditions are considered unsafe and unfavourable or inconducive for the storage of medicines.	(i) Drugs may lose their potency. Consequently, patients treated with such medications are not likely to recover as desired.  (ii) Microorganisms that cause some diseases may develop antimicrobial resistance (AMR).  (iii) Recovery of patients will be	In areas with high level of medication instability vigilance, there is need for greater caution when moving and storing medications.  Medicines should always be stored and transported using facilities with controlled temperature and humidity.

			retarded when they are treated with antibiotics that have been exposed to weather conditions that affect their stability.	
	Air temperature is greater than 30°C and Relative humidity is less than 75%.  OR  Air temperature less than 30°C and Relative humidity greater than 75%.	The predicted temperatures and relative humidity are likely to cause depreciation in the quality of medicines.	Microorganisms that cause diseases are likely to develop antimicrobial resistance (AMR) when treated with antibiotics that have lost their potency due to exposure to weather conditions that affect their stability.	Temperature and humidity monitoring systems for transporting and storing medicines are advised.
	Air temperature is between 25°C and 30°C; Relative humidity is between 70% and 75%.	Unconducive weather conditions tend to shorten the shelf life of medicines and could affect their overall potency.		Medical professionals should also advise patients on the proper storage of their medications to avoid degradation and loss of potency.

### 2.7.0 Heat Index

Caution for Heat Index is advised in most parts of the country. Based on the anticipated air temperature and relative humidity, high levels of human discomfort and possibly heat stress are likely to be experienced in the south-east, parts of south-west, south-south as well as in Kogi, Benue and Nasarawa states in November 2024. (see Figure 28).

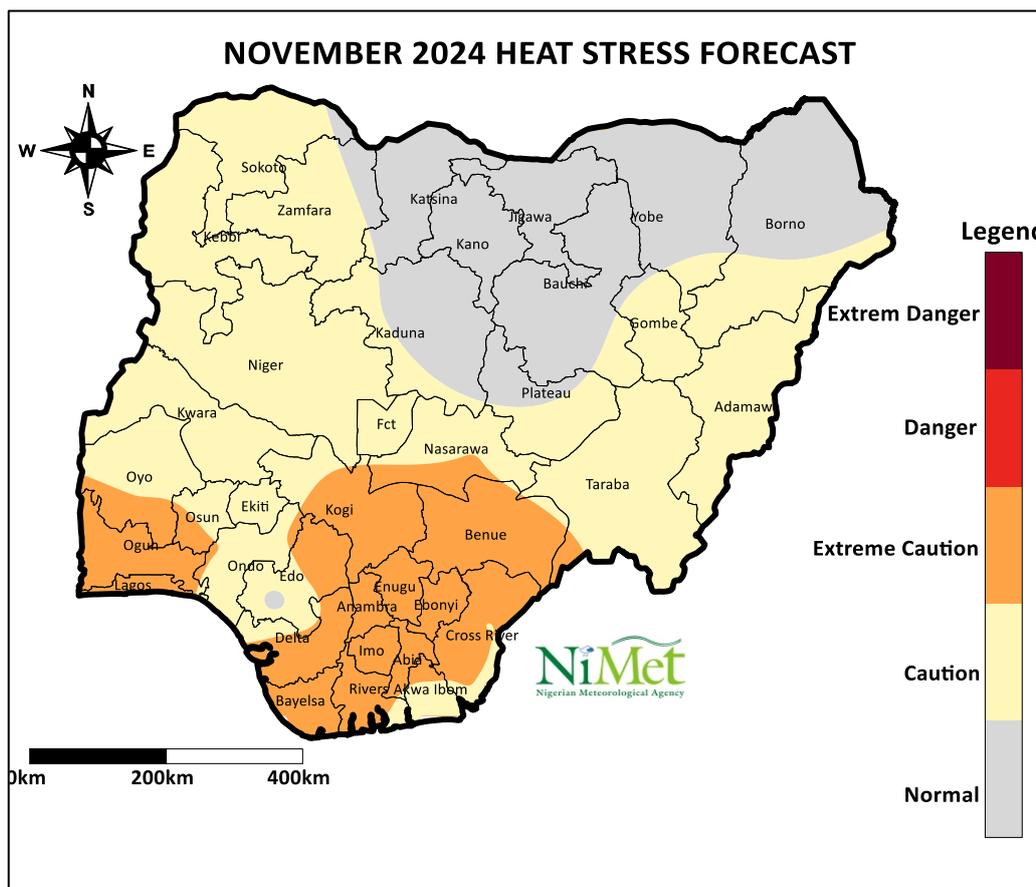


Figure 28: Heat stress Vigilance for November 2024

Table 9: Heat Index threshold, potential impacts and Advisory

	Climate Conditions	Hazard	Potential Impacts	Advisory/Measures
	Heat Index between 40°C and 52°C	The danger and extreme danger of heat stress are very likely in these areas. Heat cramps are possible. Heat cramps are the mildest form of heat-related illness. Symptoms of	People in these areas are more susceptible to heat stroke, exhaustion, loss of concentration, and possible damage to the brain, liver, and heart, which may lead to fainting. In hot weather, body cools itself mainly by sweating. The evaporation of sweat regulates body temperature. But	(i) Use shades when engaging in outdoor activities to avoid direct exposure to heat from the sun.  (ii) Work and other outdoor activities should be carried out when the intensity of solar radiation is not severe.  (iii) Dress in hot-weather-appropriate attire.

		heat cramps often include heavy sweating, fatigue, thirst and muscle cramps.	when you exercise strenuously or otherwise overexert in hot, humid weather, the body is less able to cool itself efficiently. Dehydration, which lessens body's ability to sweat is also another cause.	(iv) Reduce physically demanding labour when the weather is hot. (v) Keep the body hydrated by regularly drinking adequate water or other nutritious liquids.
	Heat Index between 33°C and 39°C	Moderate probability of heat stress.	Persistent and increased respiration rates can lead to exhaustion and fainting.	
	Heat Index between 27°C and 32°C	A low probability of heat stress is likely.	Thirst, loss of appetite, and fatigue. These may lead to other abnormal health conditions such as heat rash.	
	Heat Index equal to or lower than 26°C	Heat-related diseases and illnesses are unlikely to occur.		



# DECEMBER 2024

## 3.1 The Climate in December 2024.

The Inter-Tropical Discontinuity (ITD) is anticipated to move further southwards from its mean position in November and oscillate around latitude 5.9°N in December 2024. As a result of this, there may be isolated rainfall activities only in the coastal part of the country while the rest of the country will be dry.

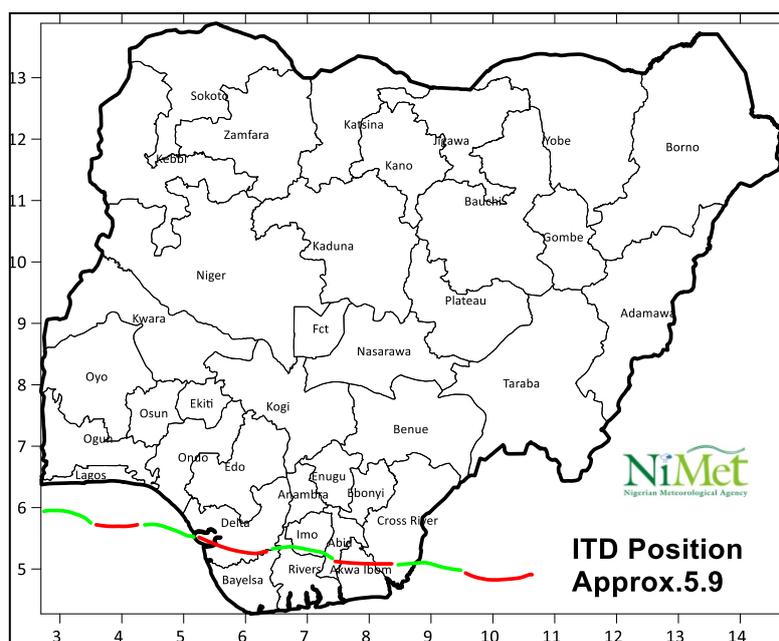
## 3.2 The highlights of the Bulletin for December 2024 are as follows:

- The expected maximum temperature in December 2024 is anticipated to be 28.2°C to 36.7°C across the country. The lowest and highest maximum temperatures of 28.2°C and 36.7°C are predicted over Osun and Niger States.
- The nighttime temperatures across the country in December 2024 are anticipated to range between 12.2°C and 26.1°C. The lowest nighttime temperature range of 12.0°C to 15.0°C is anticipated over parts of Plateau, Bauchi, Katsina, Gombe, Kebbi, Borno, Kano and, Jigawa states. Nighttime temperatures within the range 18.0°C to 21.0°C are expected over parts of the North Central and Ekiti states, while the highest nighttime temperature range of 24.0°C to 26.0°C is expected over parts of Lagos, Ogun and Niger states.
- The cumulative rainfall amounts across the country in December 2024, is anticipated to be between 0.0 mm and 62.7 mm. Most parts of the country are expected to have little or no rainfall. The coastal areas are expected to record rainfall amounts between 0.2mm and 62.7mm.
- The expected climatic conditions in December 2024 suggest high prospects of meningitis incidences in parts of Sokoto, Zamfara, Katsina, Jigawa, Yobe, Kano, Bauchi and Borno states. High vigilance is therefore recommended for these areas. Moderate vigilance is prescribed over the remaining parts of north and central states while low vigilance is prescribed over most of the southern states and parts of Kwara, Kogi, Nasarawa, Benue and the FCT. No vigilance is prescribed for parts of Rivers, Bayelsa, Delta Ondo, Ogun and Lagos states. (see Figure 7).

- The expected climatic conditions in December 2024 also suggest high prospects of malaria incidences over the coastal states. High vigilance for malaria is therefore recommended for these areas. Moderate vigilance is prescribed over most southern states and parts of central, while low vigilance is prescribed for northern states and some parts of the central states (Figure 8).
- The temperature and humidity anticipated in December 2024 are likely to cause drug and medication instability across Nigeria. Based on the expected climatic conditions, high vigilance is recommended over the southern states and parts of the central states such as Kogi and Benue States. Moderate vigilance is prescribed over the other parts of the country. (See Figure 9).
- Caution to extreme caution for Heat Index is advised over most parts of the central and southern states. Based on the anticipated air temperature and relative humidity, high levels of human discomfort and possibly heat stress are likely to be experienced in these states while danger is predicted in parts of Lagos and Ogun states. (Figure 10)

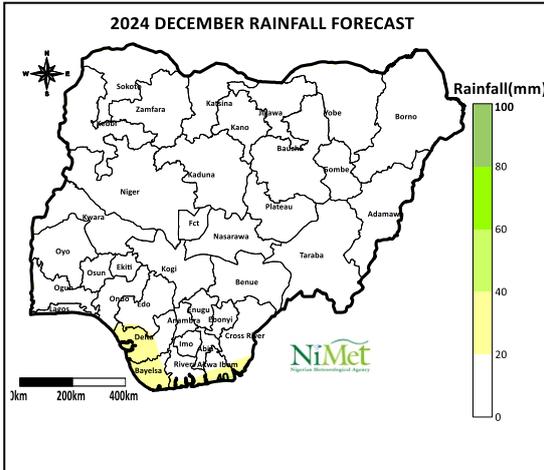
### 3.4.0 GENERAL OUTLOOK FOR 1<sup>ST</sup> TO 31<sup>ST</sup> DECEMBER 2024

**3.4.1** The Inter-Tropical Discontinuity (ITD) is anticipated to move further southwards from its mean position in November and oscillate around latitude 5.9°N in December 2024. With the ITD in this position, isolated rainfall activities may be observed only in the coastal part of the country, while the rest of the country will remain dry Figure 29.



**Figure 29: Projected ITD position in December 2024.**

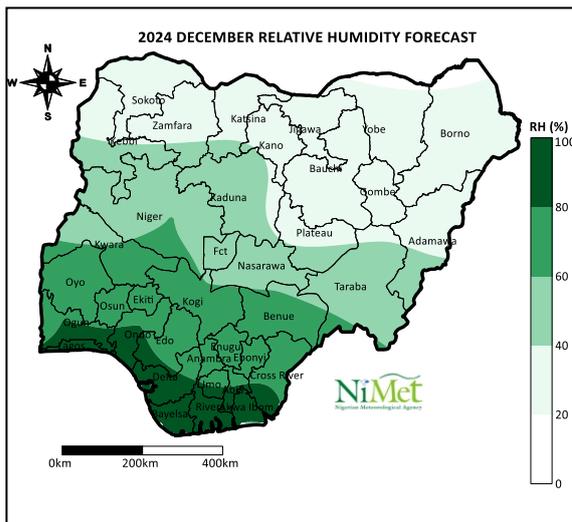
### 3.4.2 Rainfall Amount



In December 2024, the forecast cumulative rainfall amounts across the country are anticipated to be between 0 mm and 62.7 mm. Most parts of the country are expected to have little or no rainfall. Some coastal states such as Akwa Ibom, Delta, Bayelsa and Rivers are expected to record rainfall amounts between 5.2mm and 62.7 mm. (Figure 30).

**Figure 30: December 2024 rainfall amount forecast.**

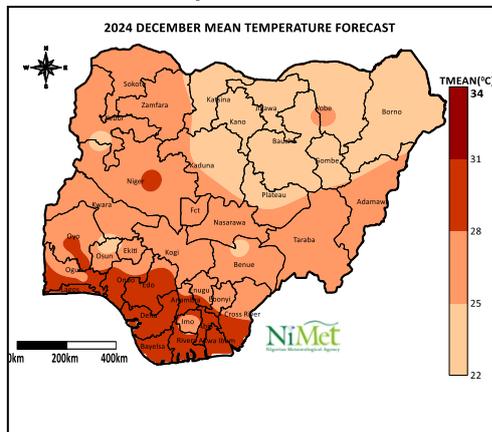
### 3.4.3 Relative Humidity (RH)



Relative humidity across the country in December 2024 is predicted to be within the range 20% to 100%, as shown in Figure 31. Relative humidity over the southern parts of the country is expected to be within the range of 80 to 100%. This is the highest range in the country during the month. The extreme north of the country is anticipated to record the lowest relative humidity within the range of 20 to 40%.

**Figure 31: December 2024 Relative humidity forecast.**

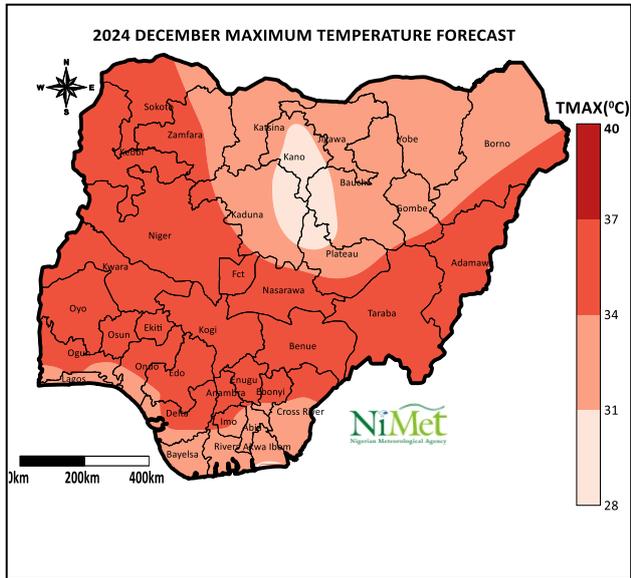
### 3.4.4 Mean Temperature



The predicted mean air temperatures for various locations across the country for December 2024 are between 23.3°C and 31.0°C. The lower range (23.0°C to 25.0°C) is expected over the Borno, Kano, Gombe, Jigawa, Katsina, and parts of Plateau, Kaduna, Adamawa, Kebbi, Niger, Benue, Osun, Ekiti, Kwara and Oyo states, while the highest range (31.0°C to 36.0°C) is anticipated over the south and parts of Niger state (Figure 32).

**Figure 32: December 2024 Mean temperature forecast.**

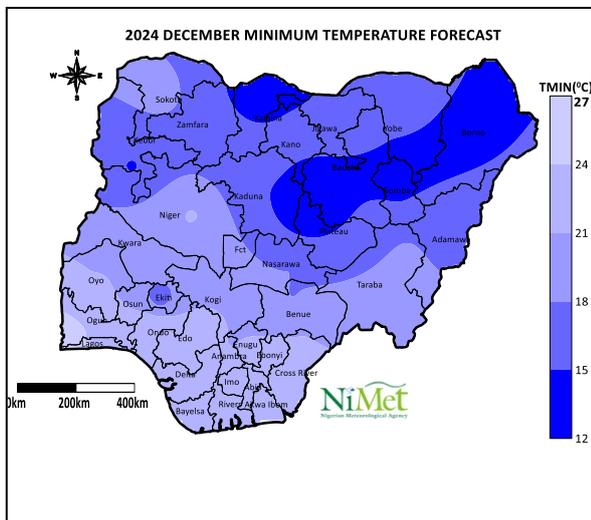
### 3.4.5 Maximum (Daytime) Temperature



Maximum temperature in December 2024 is anticipated to be 28.2°C to 36.7°C across the country, as shown in Figure 33. The lowest and highest maximum temperatures of 28.6°C and 37.5°C are predicted over Plateau and Niger states, respectively.

**Figure 33: Maximum temperature forecast for December 2024.**

### 3.4.6 Minimum (Nighttime) Temperature



Nighttime temperatures across the country in December 2024 are anticipated to range between 12.0°C and 26.0°C, as shown in Figure 34. The lowest nighttime temperature range of 12.0°C to 15.0°C is anticipated over parts of Plateau, Bauchi, Kaduna, Kano, Gombe, Yobe, Borno, Jigawa, Katsina, Zamfara and, Kebbi states. The next temperature range (18.0°C to 21.0°C) is expected over parts of the North, central and Ekiti states. The highest nighttime temperature range of 24.0°C to 27.0°C is expected over parts of Lagos, Ogun and Niger states.

**Figure 34: November 2024, minimum temperature forecast.**

### 3.5.0 DISEASE VIGILANCE

#### 3.5.1 Meningitis

The expected climatic conditions in December 2024 suggest high prospects of meningitis incidences in parts of Sokoto, Zamfara, Katsina, Jigawa, Yobe, Kano, Bauchi and Borno states. High vigilance is therefore recommended for these areas. Moderate vigilance is prescribed over the remaining parts of northern and central states, while low vigilance is prescribed over most of the southern states and parts of Kwara, Kogi, Nasarawa, Benue and the FCT. No vigilance is prescribed for Rivers, Bayelsa, Delta, Ondo, Ogun and Lagos states. (see Figure 35).

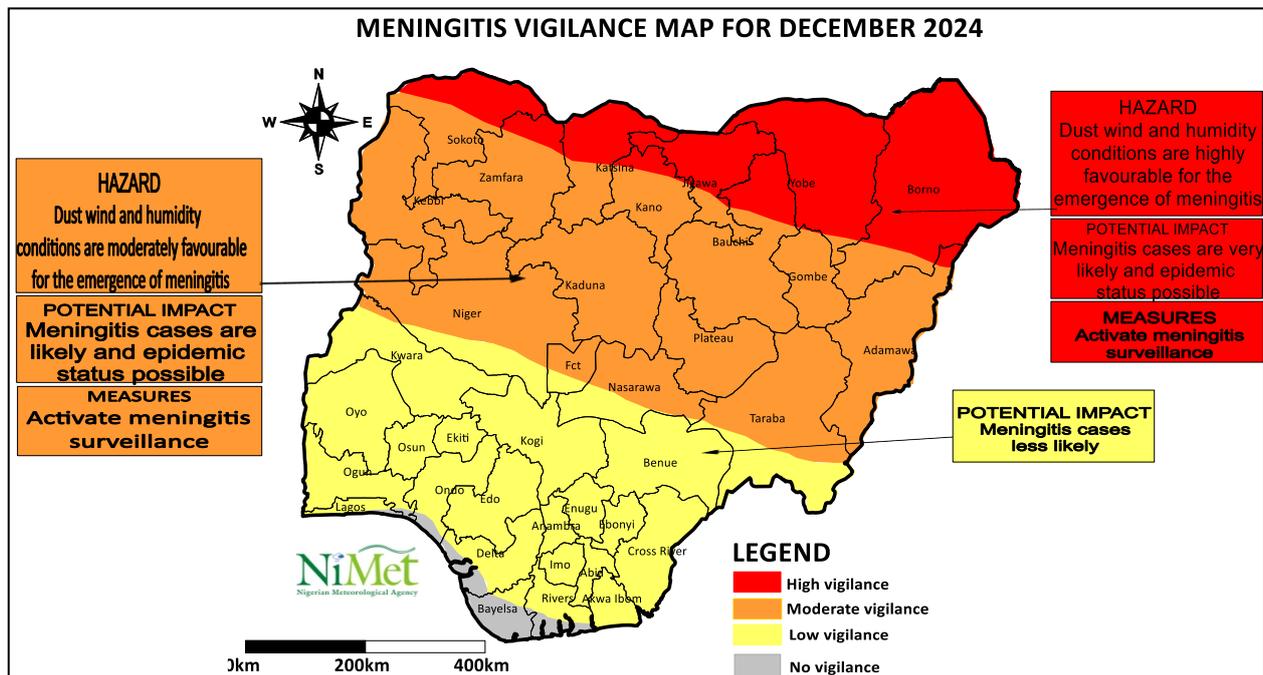


Figure 35: Meningitis Vigilance Map for December 2024.

**Table 10: Meningitis threshold, epidemic Characteristics and Advisory for December 2024**

	<b>Climate Conditions</b>	<b>Hazard</b>	<b>Potential Impacts</b>	<b>Advisory/Precautionary Measures</b>
	<p>(i) Temperature between 25°C and 32°C.</p> <p>(ii) Relative humidity less than 20%.</p> <p>(iii) Atmospheric dust concentration of 500-2000µg/m<sup>3</sup></p>	High probability of the occurrence of meningitis cases.	<p>(i) Meningitis could be fatal if not treated promptly and properly.</p> <p>(ii) Meningitis is usually accompanied by neck stiffness, vomiting, lack of energy, sensitivity to light, lack of appetite, confusion and so on.</p> <p>(iii) Meningitis causes inflammation of the brain which in turn causes other problems like seizure, memory distress and loss of concentration.</p> <p>(iii) Severe meningitis leave children with learning disabilities afterward and even deafness.</p>	<p>(i) Avoid crowding and make sure your home has enough airflow.</p> <p>(ii) Use disposable tissue to cover the mouth and nose when coughing or sneezing.</p> <p>(iii) Consistent handwashing, especially after sneezing or coughing.</p> <p>(iv) Seek proper diagnosis and treatment at medical facility if a sudden high fever or neck stiffness occurs.</p> <p>(v) It is recommended that all health care professionals always follow universal care measures, such as wearing gloves when handling patients or caring for sick relative.</p>
	<p>(i) Temperature between 20°C and 25°C.</p> <p>(ii) Relative humidity between 20% and 40%</p>	Moderate probability of occurrence of meningitis cases		

(iii) Atmospheric dust concentration of 200-500 $\mu\text{g}/\text{m}^3$			
(i) Temperature below 25°C  (ii) Relative humidity greater than 40%  (iii) Atmospheric concentration dust of 50-200 $\mu\text{g}/\text{m}^3$	Low probability of occurrence of meningitis cases		
(i) Emergence of rainfall	The occurrence of meningitis is unlikely		

### 3.5.2 Malaria

The expected climatic conditions in December 2024 suggest high prospects of malaria incidences in the coastal states. High vigilance is therefore recommended for these areas. Moderate vigilance is prescribed over most southern states and parts of central region, while low vigilance is prescribed for northern states and some other parts of the central states (Figure 36).

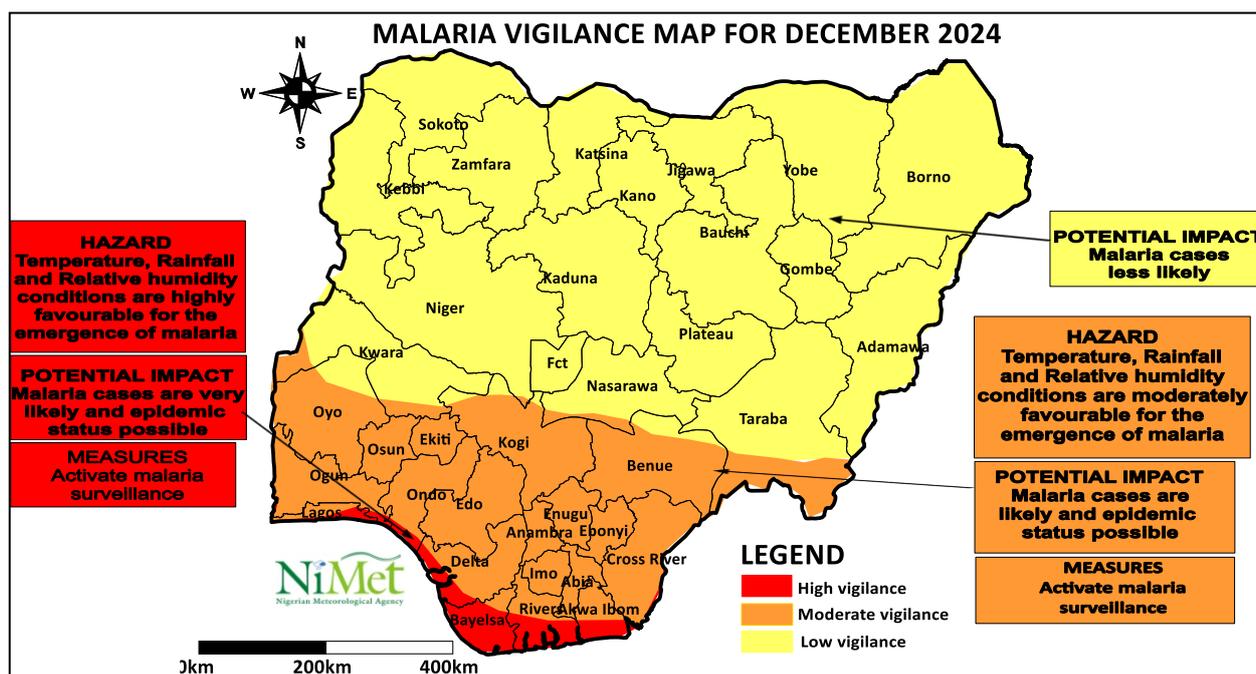


Figure 36: Malaria Vigilance for Map for December 2024

Table 11: Malaria threshold, epidemic Characteristics and Advisory

	Climate Conditions	Hazard	Potential Impacts	Advisory/Precautionary Measures
	(i) Temperature between 25°C and 32°C.  (ii) Relative humidity greater than 80%.  (iii) Rainfall greater than 80 mm.	High probability of occurrence of malaria cases.	(i) Malaria could be fatal if not treated promptly and properly.  (ii) Procurement of drugs for the treatment of malaria is expensive and therefore has adverse impacts on the financial resources of individuals and government.	As much as possible, avoid mosquito bites by using insecticide-treated mosquito nets, fumigating the environment frequently, and clearing drainages and stagnant water around homes.
	(i) Temperature between 20°C and 25°C.	Moderate probability of occurrence of malaria cases.	(iii) Malaria is usually accompanied by headache, fever, and	Early diagnosis and treatment should be emphasized.

	<p>(ii) Relative humidity between 70% and 80%</p> <p>(iii) Rainfall greater than or equal to 80 mm</p>		<p>body aches. These health conditions impact negatively on the patient's daily life.</p> <p>(iv) Malaria patients usually feel sick with high fever and shivering chills. As a result, malaria patients cannot undertake normal economic and social activities.</p>	
	<p>(i) Temperature between 18°C and 20°C</p> <p>(ii) Relative humidity between 60% and 70%</p> <p>(iii) Rainfall 80 mm</p>	<p>Low probability of occurrence of malaria cases.</p>	<p>To reduce the risk of contracting malaria, pregnant women are encouraged to take essential precautions such as using mosquito nets coated with pesticides when sleeping and taking anti-malaria prophylaxis.</p>	
	<p>(i) Temperature is less than 18°C or greater than 32°C.</p> <p>(ii) Relative humidity is less than 60%.</p> <p>(ii) Rainfall is less than 80 mm.</p>	<p>The occurrence of Malaria cases is unlikely.</p>		

### 3.6.0 Medication Instability

The temperature and humidity anticipated in December 2024 are likely to cause drug and medication instability across Nigeria. Based on the expected climatic conditions, high vigilance is recommended for the southern states and parts of the central states such as Kogi and Benue States. Moderate vigilance is prescribed for the rest of the country. (See Figure 37).

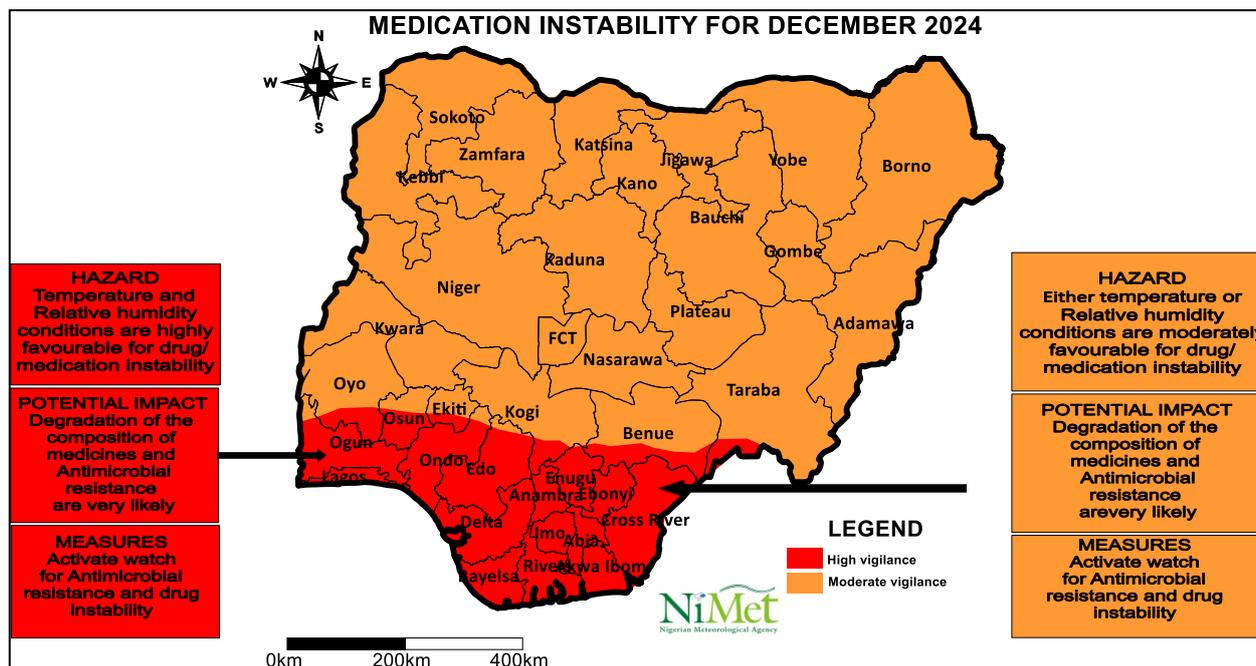


Figure 37: Medication Instability Vigilance for December 2024

Table 12: Medication Instability threshold, potential impacts and Advisory

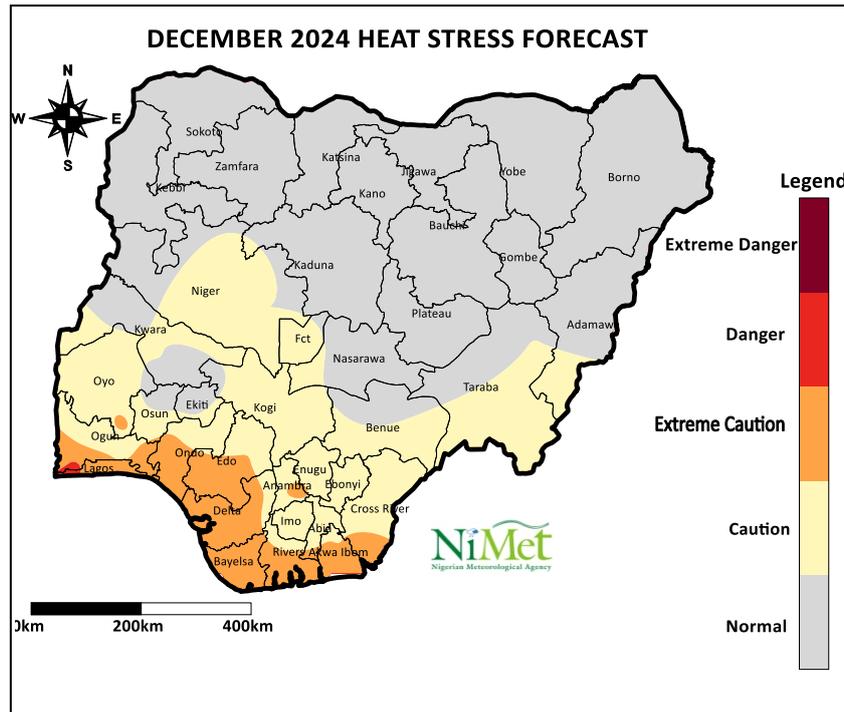
Climate Conditions	Hazard	Potential Impacts	Advisory/Precautionary Measures
(i) Air temperature is greater than 30°C and, (ii) Relative humidity is greater than 75%.	These conditions are considered unsafe and unfavourable or inconducive for the storage of medicines.	(i) Drugs may lose their potency. Consequently, patients treated with such medications are not likely to recover as desired.  (ii) Microorganisms that cause some diseases may develop antimicrobial resistance (AMR).	In areas with high medication instability vigilance thresholds, there is need for greater caution when moving and storing medications.  Medicines should always be stored and transported using facilities with controlled temperature and humidity.

			(iii) Recovery of patients will be retarded when they are treated with antibiotics that have been exposed to weather conditions that affect their stability.	
	<p>Air temperature is greater than 30°C and</p> <p>Relative humidity is less than 75%.</p> <p>OR</p> <p>Air temperature less than 30°C and</p> <p>Relative humidity greater than 75%.</p>	The predicted temperatures and relative humidity are likely to cause a depreciation in the quality of medicines.	Microorganisms that cause diseases are likely to develop antimicrobial resistance (AMR) when treated with antibiotics that have lost their potency due to exposure to weather conditions that affect their stability.	Temperature and humidity monitoring systems for transporting and storing medicines are advised.
	<p>Air temperature is between 25°C and 30°C;</p> <p>Relative humidity is between 70% and 75%.</p>	Unconducive weather conditions tend to shorten the shelf life of medicines and could affect their overall potency.		Medical professionals should also advise patients on the proper storage of their medications to avoid degradation and loss of potency.

### 3.7.0 Heat Index

### 3.7.0 Heat Index

Caution to extreme caution for Heat Stress is advised over parts of the central and southern states. Based on the anticipated air temperature and relative humidity, high levels of human discomfort and possibly heat stress are likely to be experienced in these states while danger is predicted in parts of Lagos and states, (Figure 38)



**Figure 38: Heat stress Vigilance for December 2024**

**Table 13: Heat Index threshold, potential impacts and Advisory**

	<b>Climate Conditions</b>	<b>Hazard</b>	<b>Potential Impacts</b>	<b>Advisory/Measures</b>
	Heat Index between 40°C and 52°C	The danger and extreme danger of heat stress are very likely in these areas.	People in these areas are more susceptible to heat stroke, exhaustion, loss of concentration, and possible damage to the brain, liver, and heart, which may lead to fainting.	(i) Use shades when engaging in outdoor activities to avoid direct exposure to heat from the sun.  (ii) Work and other outdoor activities should

	Heat Index between 33°C and 39°C	Moderate probability of heat stress.	Persistent and increased respiration rates can lead to exhaustion and fainting.	be carried out when the intensity of solar radiation is not severe.
	Heat Index between 27°C and 32°C	A low probability of heat stress is likely.	Thirst, loss of appetite, and fatigue. These may lead to other abnormal health conditions such as heat rash.	(iii) Dress in hot-weather-appropriate attire.
	Heat Index equal to or lower than 26°C	Heat-related diseases and illnesses are unlikely to occur.		(iv) Reduce physically demanding labour when the weather is hot.  (v) Keep the body hydrated by regularly drinking adequate water or other nutritious liquids.

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