



2024

Seasonal Climate

Prediction (SCP)

Facilitating a Weather Resilient Economy through Early Warnings for All to Foster Renewed Hope and Sustainable Development.





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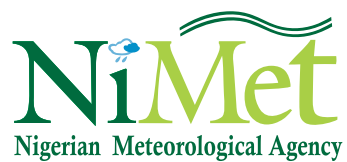


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Foreword



The quest for increased climate education and worldwide awareness gathered additional strength as the year 2023 climaxed with the United Nations Framework Convention on Climate Change's (UNFCCC's) twenty-eighth (28th) edition of its Conference of Parties (COP) took centre stage in Dubai, United Arab Emirate. Climate change which the UN Secretary General, Antonio Guterres once described as an existential threat to humanity¹. It is important that all agreements at the just concluded conference of parties should be implemented globally. The discussions at the UNFCCC Conference of Parties and their implementation are therefore vital for the survival of humans and livelihood.

Despite the record triple-dip La Niña in the last three years, the WMO Provisional State of the Global Climate report released during COP 28 projects 2023 as the warmest year on record. This is a record 1.4°C above pre-industrial (1850-1900) baseline. With 2024 projected to be an El Niño year, global temperature record may continue its positive trend. Aside from the growing uncertainties associated with predictability of atmospheric variables/weather parameters, these variables may continue in the extreme. Africa, our dear continent, although contributes least to global warming, it has been greatly impacted by extreme weather events due to climate change and variability over the years, and 2023 was no exception. For instance, tropical Storm Daniel hit the continent in September producing a rainfall amount of 414.1 mm in 24 hours resulting to extreme flooding in Libya where over four thousand deaths were recorded and several hundred still missing. Earlier in the year (February-March), tropical cyclone Freddy hit Mauritius, Madagascar, Mozambique, and Zimbabwe resulting in over 800 deaths. Severe flooding was also reported in Rwanda, Democratic Republic of Congo and South Sudan resulting in several fatalities.² The record heat wave across Europe in 2023 also extended to parts of North Africa leading to a first record of 50.4°C in Morocco. This exacerbated the drought condition over the Northwestern region of Africa³.

While 2023 wasn't a devastating year for Nigeria in terms of weather and climate extremes, we cannot forget the huge destruction due to floods in 2022. According to NEMA, about five (5) million people were affected with 1,987 deaths, 4,965 injured and 2,604,963 displaced. Over 58,000 hectares of land and 183,842 houses were damaged⁴. While lives lost cannot be regained, several billions of naira went into recovery and rehabilitations in the affected areas. Therefore, the negative impacts of weather extremes on the socio-economic lives in the country are enormous. This implies that the level of vulnerability of communities to extreme weather events is high and calls for increased effort to strengthen the climate resilience of communities.

One critical way to build resilience is adequate early warnings of imminent weather and climate disasters. Hence, the concept of Early Warning for All birthed at the 27th edition of UNFCCC COP in Egypt, with a five-year ambitious target of ensuring that all people on Earth are covered by early warning systems by

¹ WMO Provisional State of the Global Climate 2023.pdf

² Significant weather and climate events in 2023 (wmo.int)

³ Significant weather and climate events in 2023 (wmo.int)

⁴ nema.gov.ng/incidenceashboard.html

2027. The UN report: Global Status of Multi-Hazard Early Warning Systems 2023 which was launched during COP28 by the UN Secretary General shows the progress recorded by the global community since COP27. The report reveals that a lot is still needed to be done to achieve the intended goal.

An Early Warning System (EWS) is “an integrated system of hazard monitoring, forecasting and prediction, disaster risk assessment, communication and preparedness activities systems and processes that enables individuals, communities, governments, businesses and others to take timely action to reduce disaster risks in advance of hazardous events.”⁵ While effective EWS requires a multi-disciplinary approach, each actor in the value chain must not fail.

While the World and indeed Africa has taken a Multi-Hazard Early Warning System approach with situation rooms located in Addis Ababa, Niamey, and Abuja (ECOWAS), a national situation room for MHEWS is highly encouraged.

The Nigerian Meteorological Agency (NiMet) has been a key player in the value chain of MHEWS over the years, rendering quality services and providing timely products to meet the hydrometeorological needs of Nigeria and meeting international obligations. One of such products is the Seasonal Climate Prediction (SCP). The SCP is an Early Warning Tool that provides information on onset and cessation dates of rainy season; length of the rainy season; annual total amount of rainfall; dry spell occurrence; Little Dry Season (LDS) or August break; Temperature (Day & Night) forecasts; Malaria Vigilance; Meningitis Vigilance and the Socio-economic implications of the predictions.

The SCP x-rays the anticipated climatic conditions for the year in view and provides information vital for decision making and policy guidance across various sectors of the Nigerian economy; especially those sectors that are critically affected by, or dependent on weather, including aviation and aerospace development that constantly relies on and consume weather information from conceptualisation to operationalization of our airports. The SCP when utilised effectively is a vital catalyst for some key aspects of the Renewed Hope Agenda of Mr. President: food security, poverty eradication, economic growth, job creation, access to capital, improving security of life and property. While NiMet has produced and issued the SCP early in the year, the Agency continues to monitor the evolution of the weather and climate as the year progresses, provides updates on the prediction as and when necessary.

I therefore recommend the 2024 edition of the SCP to policy makers, planners and operators in all sectors of our national economy; especially those sectors that are affected by, or dependent on weather as a tool for decision making. All stakeholders and the public are also advised to follow the periodic updates to be issued by NiMet from time to time in course of the year and ensure that appropriate early actions are taken to achieve the intended goal of reducing vulnerability of our socio-economic activities to weather hazards.

Festus Keyamo | SAN, CON, FCI Arb (UK)
Honourable Minister of Aviation and Aerospace Development
(Minister in charge of Meteorology)
February, 2024

⁵ undrr-global-status-of-mhews-2023_0

Executive Summary



The Nigerian Meteorological Agency (NiMet) has produced the 2024 Seasonal Climate Prediction (SCP). The SCP provides insight on some essential climate parameters and their expected behaviour within the season. NiMet produces this publication annually in fulfilment of its mandate to provide accurate, timely, and quality weather and climate information to advise the Federal Government of Nigeria and Nigerians on weather and climate-related issues. This is mainly to boost economic growth and prevent or reduce production and infrastructure losses. The production process of the SCP involves a science-based use of long-term meteorological data, regional and global forecasting models. Furthermore, a co-production process involving relevant stakeholders from weather-sensitive sectors such as agriculture, aviation, blue economy, water resources, health, transportation, and power, amongst others was implemented to achieve these remarkable user-tailored forecasts.

The predictions in this edition of the SCP were based on a strong El Niño phase of the El Niño Southern Oscillation (ENSO) in the first half of 2024, and the projection that the Neutral phase will most likely persist for the later part of the year. The ENSO has a major influence on climate patterns globally. The strong El Niño phase was used for the onset of rains, length of the season, end of the season, and total seasonal rainfall amount. Moreover, rainfall, temperature, soil moisture data, water balance, farm management practices, and other phenological and soil type information were factored into this forecast.

Rainfall Onset Dates

The 2024 onset of rains is predicted to be delayed in the central states of the country. A normal onset is likely to occur over the northern states. Borno, Abia and Akwa Ibom states are predicted to have an early onset when compared to their long-term averages.

Rainfall Cessation Dates

An early end of season is predicted for parts of Yobe, Jigawa, Sokoto, Kebbi, Kano, Kaduna, Plateau, Nasarawa Taraba, Gombe, Bauchi, Cross River, Ebonyi, Ogun, and Lagos states. A late cessation is predicted over the southern states of Bayelsa, Rivers, Akwa Ibom, Ondo, Ekiti, and parts of Edo, Delta, Ogun, Oyo, Kogi, Kwara, FCT, Niger, and Kaduna.

Rainfall Amounts

The annual rainfall amount is predicted to be below normal over parts of Yobe, Jigawa, Bauchi, Kano, Kebbi, Gombe, Plateau, Taraba, Nasarawa, Benue, Enugu, Ebonyi, Cross River, Delta and Bayelsa states when compared to their long-term averages. However, other parts of the country are likely to observe normal to above normal annual rainfall amount.

Length of Growing Season

Most parts of the country are expected to experience shorter length of season, while Bayelsa, Rivers, Akwa-Ibom are likely to experience a longer length of season when compared with their climatological mean. Normal to shorter length of season will likely occur in other parts of the country.

Temperature

Both day and night time temperatures are predicted to be warmer than the long-term average over most parts of the country in January, March, and May 2024. However, February day and night time temperatures are predicted to be cooler than normal. Moreover, most of the north is also anticipated to be cooler in March.

Dry Spells

The 2024 Prediction shows that in July there is likelihood of a severe dry spell that may persist for more than 15 days after the establishment of rainfall in the northern states of Nigeria and northern Oyo. Moderate (16 days) dry spell in central and mild dry spell in Ogun, Osun, Edo, Enugu, Anambra and northern Cross River are anticipated during the period.

Little Dry Season (LDS)

The occurrence of 2024 LDS is projected to start from the 22nd of July – 2nd of August 2024, a longer break in rainfall (LDS) is predicted over Kwara and Lagos states with a duration of more than 27 days. Some parts of Oyo, Ogun, Ekiti, and Lagos are likely to have a low to moderate event with a coverage of about 18-27 days. Ondo, Edo and some adjoined areas in Kogi states may experience shorter LDS.

This prediction serves as an early warning tool to stakeholders and the general public for timely preparedness and anticipatory action against weather and climate-related hazards down to local and hard-to-reach communities.

Professor Charles Anosike

Director General/CEO &
Permanent Representative of Nigeria with WMO
Nigerian Meteorological Agency (NiMet)
February, 2024

Chapter One

The Scientific Basis for the Prediction

1.0 Climate Drivers

1.1 ENSO Synopsis

The El Niño Southern Oscillation (ENSO), like every other year, is one of the major drivers of the seasonal atmospheric changes and the basis upon which the NiMet's seasonal climate prediction was produced. This phenomenon simply describes the state of the sea surface temperature over the central pacific region (NINO 3.4) defined by latitude 5°N to 5°S and longitude 170°W to 120°W. ENSO exhibits three phases: a cold phase (La-Niña) which implies cooler than normal sea surface temperature condition, a warm phase (El Niño) which is warmer than normal condition and thirdly, and a neutral phase. Although, ENSO is a major driver, there are other supporting drivers such as the Madden Julian Oscillation (MJO) and the Indian Ocean Dipole (IOD) which combine with the ENSO phenomenon to drive the seasonal climate over Nigeria. Information about these drivers is therefore used in combination with Nigeria's soil and climatic data acquired for a period of 30 years and above to predict the rainfall characteristics of the 2024 season.

Latest ENSO prediction by the global centres in the USA and Australia: The Institute of Research for Climate and Society (IRI)/Climate Prediction Centre, and Bureau of Meteorology (BoM) revealed from multiple model ensembles that a warm phase of ENSO (El Niño) is most likely to drive the 2024 season after the triple La-Niña events experienced in the last three years.

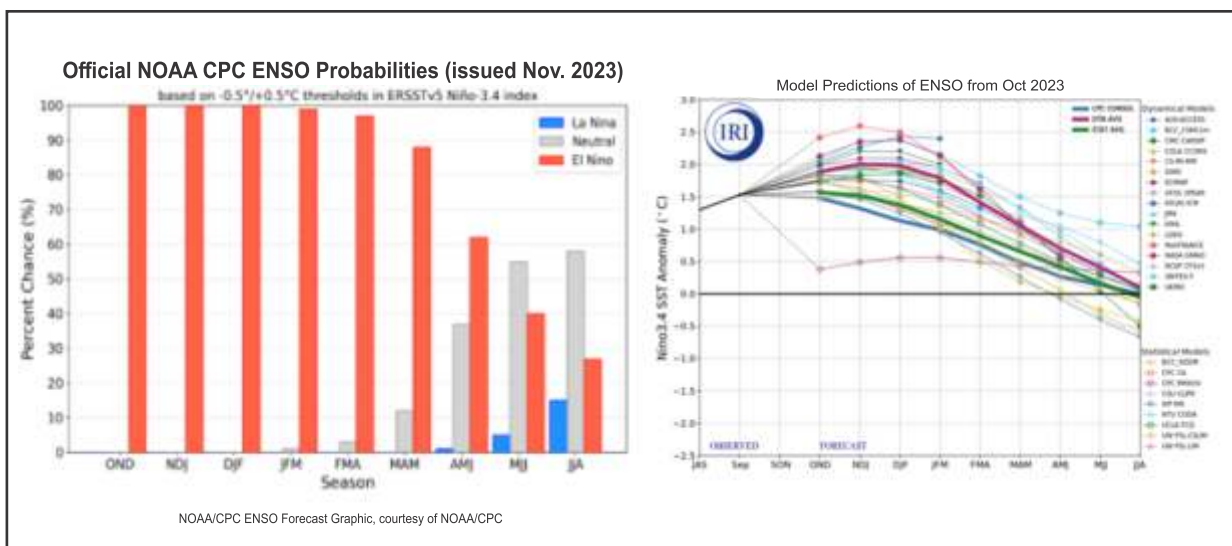


Figure 1: IRI/CPC and Bureau of Meteorology Australia Consensus ENSO Forecast

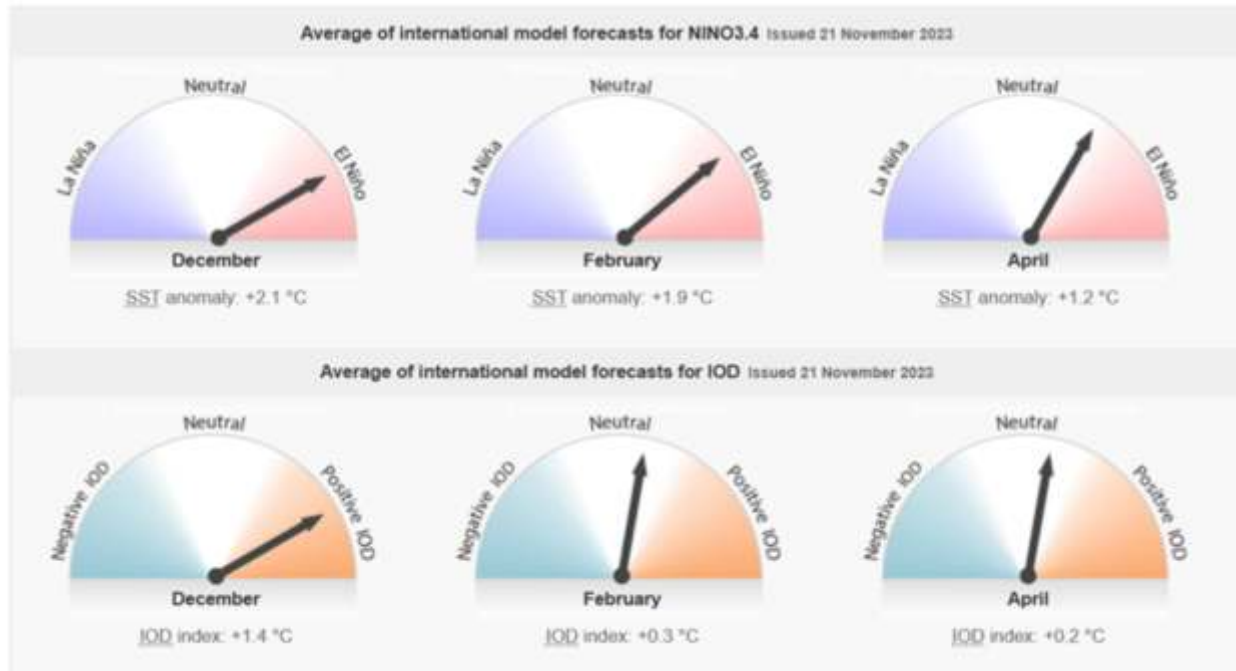


Figure 2: IRI/CPC/BoM Consensus ENSO Forecast

Chapter Two

2024 Seasonal Climate Predictions

The 2024 SCP is based on El- Niño (warm) phase of ENSO which is characterized by late onset, warmer-than-normal temperatures, lower-than-normal rainfall, shorter length of season and widespread dry spell for most parts of the country.

2.1 Rainfall Predictions

2.1.1 Onset Dates of Rainy Season & Departure from Normal

The 2024 prediction shows that the earliest onset date is likely to occur around the 9th of March and this would be along the coastal zone of the south-south states of Bayelsa, Rivers and Akwa Ibom (see Figure 3a).

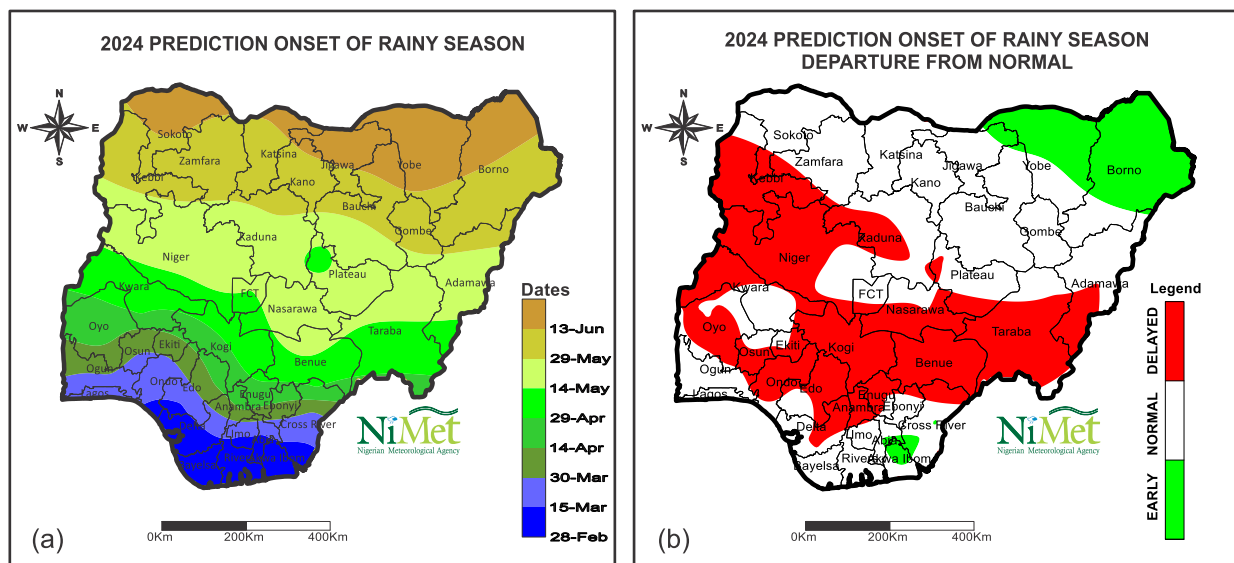


Figure 3a and b: Predicted onset dates of the raining season and Departure from normal.

Thereafter, the onset dates for higher latitudes are expected to progressively occur later as the ITD continues its northward oscillatory movement over the country. The prediction indicates that the onset dates of 2024 rainy season in the inland states of the south are likely to occur between March and April; and in the central states it is expected to be in May. The onset dates of the rainy season in Sokoto, Kebbi, Zamfara, Kano, Katsina, Jigawa, Yobe and Borno states are likely to be between June and July, with their fringes predicted to likely have rainy season onset dates between 13th June and 6th of July 2024.

The 2024 onset of rains is predicted to be delayed in the central states of the country. Also parts of Ekiti, Oyo, Ondo, Edo, Delta, Anambra, Enugu and Ebonyi states are likely to experience delayed onset.

Normal onset is likely to occur over the northern states. Borno, Abia and Akwa Ibom states are predicted to have an early onset when compared to their long-term averages (Figure 3b).

It is important to note that strong windstorms across the country and sandstorms in the extreme northern states are precursor to the onset period. Safety precautions are advised.

2.1.2 End of Growing Season for 2024

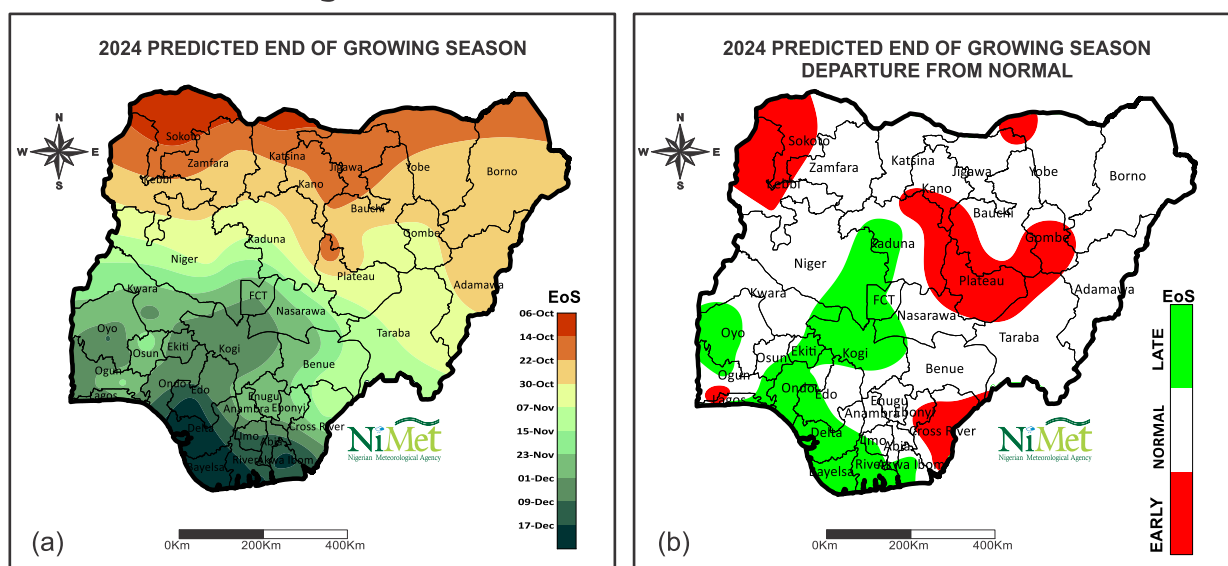


Figure 4a and b: Predicted End of growing season and Departure from normal.

The 2024 rainfall cessation dates across the country are shown in Figure (4a) and Cessation of rainfall in Nigeria is predicted to start in the north from early October and last until mid-November. This is expected to progressively move southwards, starting in mid-November around the central states and ending in the mid-December in the southernmost states of the country. Parts of Yobe, Jigawa, Sokoto, Kebbi, Kano, Kaduna, Plateau, Nasarawa, Taraba, Gombe, Bauchi, Cross River, Ebonyi, Ogun, and Lagos states are expected to experience an early End of Season (EoS). Late (or delayed) cessation is predicted for the southern states of Bayelsa, Rivers, Akwa Ibom, Ondo, Ekiti, and parts of Edo, Delta, Ogun, Oyo, Kogi, Kwara, FCT, Niger, and Kaduna.

The end of season is predicted to begin from the northern parts of the country from around 6th October over Katsina, Zamfara, Sokoto and Kebbi states, from around 14th of October over Borno, Yobe, Jigawa, and Kano states, while over the central states the end of season is predicted to occur from 30th October to 15th November. The southern parts are expected to experience end of season from about the 23rd of November 2024.

2.1.3 Predicted Length of Rainy Season (LoS) & the Departure from Normal

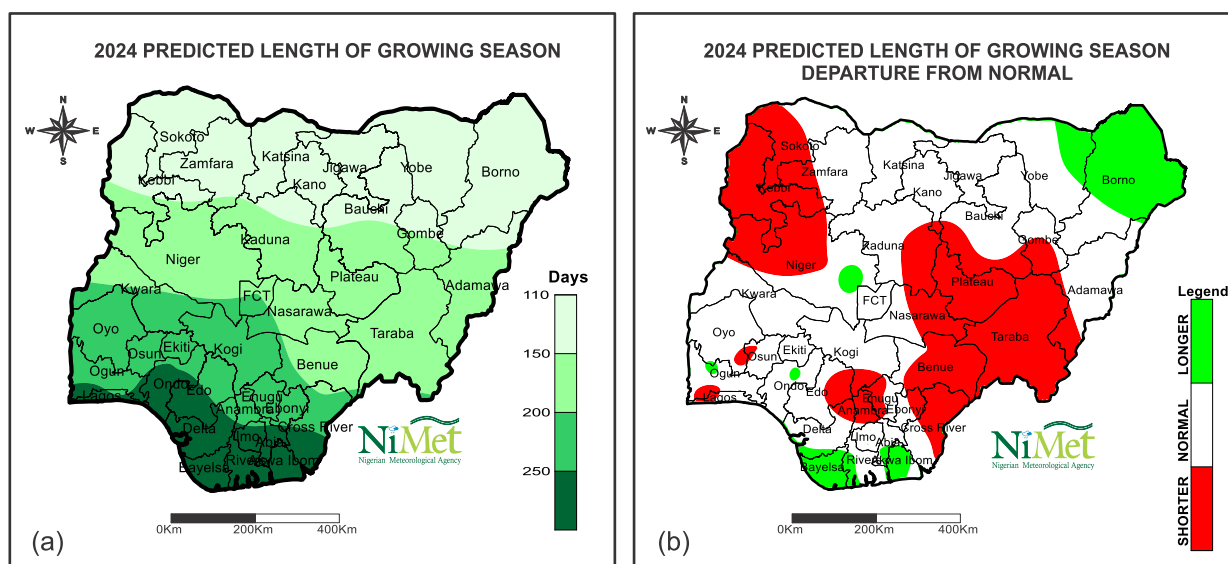


Figure 5a and b: Predicted Length of growing season and Departure from normal.

The length of season prediction across the country is shown in Figure 5a. It is expected to range from about 110 to 292 days. Lagos, Delta, Edo, Bayelsa, Rivers States and other coastal areas in the south and their adjoining states are expected to have the length of growing season ranging from 250 to 292 days. The inland areas comprising Ogun, Oyo, Osun, Ekiti, Kogi, Abia, Ebonyi and Enugu states are expected to have length of growing season between 200 and 250 days. Niger, Kaduna, Plateau, Benue, Taraba and some parts of Adamawa states are expected to have length of growing season between 150 and 200 days. In the northernmost states, the length of growing season is expected between 110 and 150 days. Details of this prediction for the states and local government areas of the country are contained in Table 4

The prediction show that some parts of the country are expected to experience shorter length of season while parts of Borno, Bayelsa, Rivers and Akwa-Ibom states are likely to experience a longer length of season when compared with their climatological mean. The remaining parts of the country will likely have normal length of season (Figure 5b).

2.1.4 Predicted Annual rainfall Amounts & the Departure from Normal

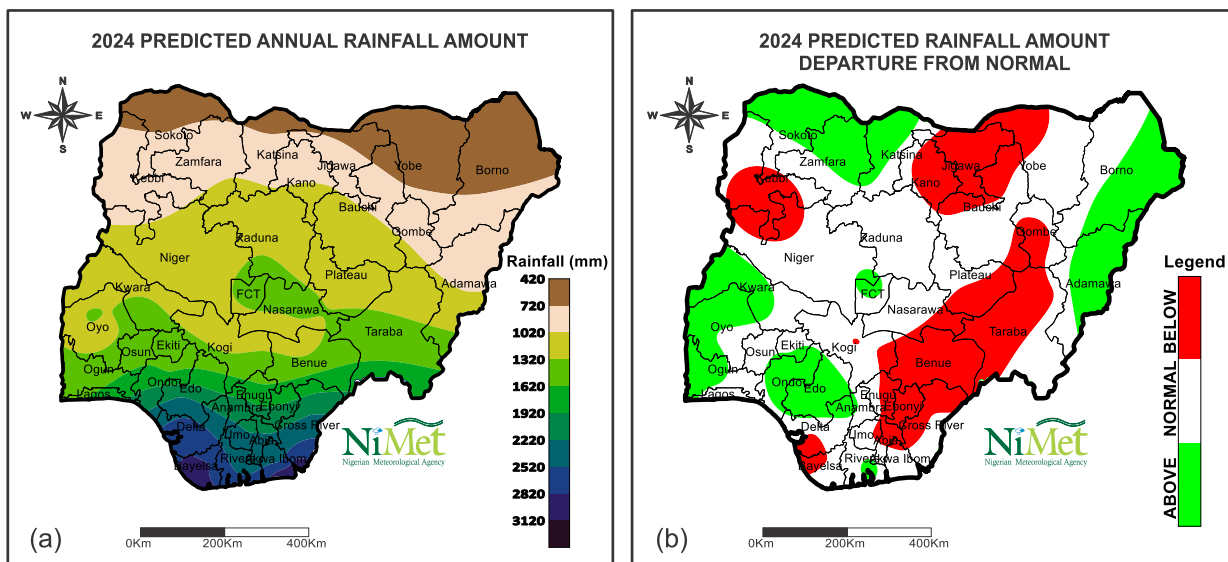


Figure 6a and b: Predicted Annual rainfall amount and Departure from normal.

In 2024, the annual rainfall amount is likely to range between 418 millimetres (mm) in the far northern states and over 3000 mm in the coastal states as shown in Figure 6a. Annual rainfall below 750 mm is predicted in parts of Borno, Yobe, Katsina, Jigawa, Zamfara and Sokoto states. Some coastal states such as Delta, Bayelsa, Cross River and Akwa Ibom are expected to have annual rainfall totals ranging between 2770 and 3021 mm.

The annual rainfall amount for the year is predicted to be below normal over parts of Yobe, Jigawa, Bauchi, Kano, Kebbi, Gombe, Plateau, Taraba, Nasarawa, Benue, Enugu, Ebonyi, Cross River, Delta and Bayelsa states when compared to their long-term averages. However, other parts of the country are likely to observe normal to above normal annual rainfall amount (Figure 6b).

Detailed updates and advisories will be available on the Agency's website
(www.nimet.gov.ng)

2.1.5 Dry Spell Prediction for 2024 Rainy Season

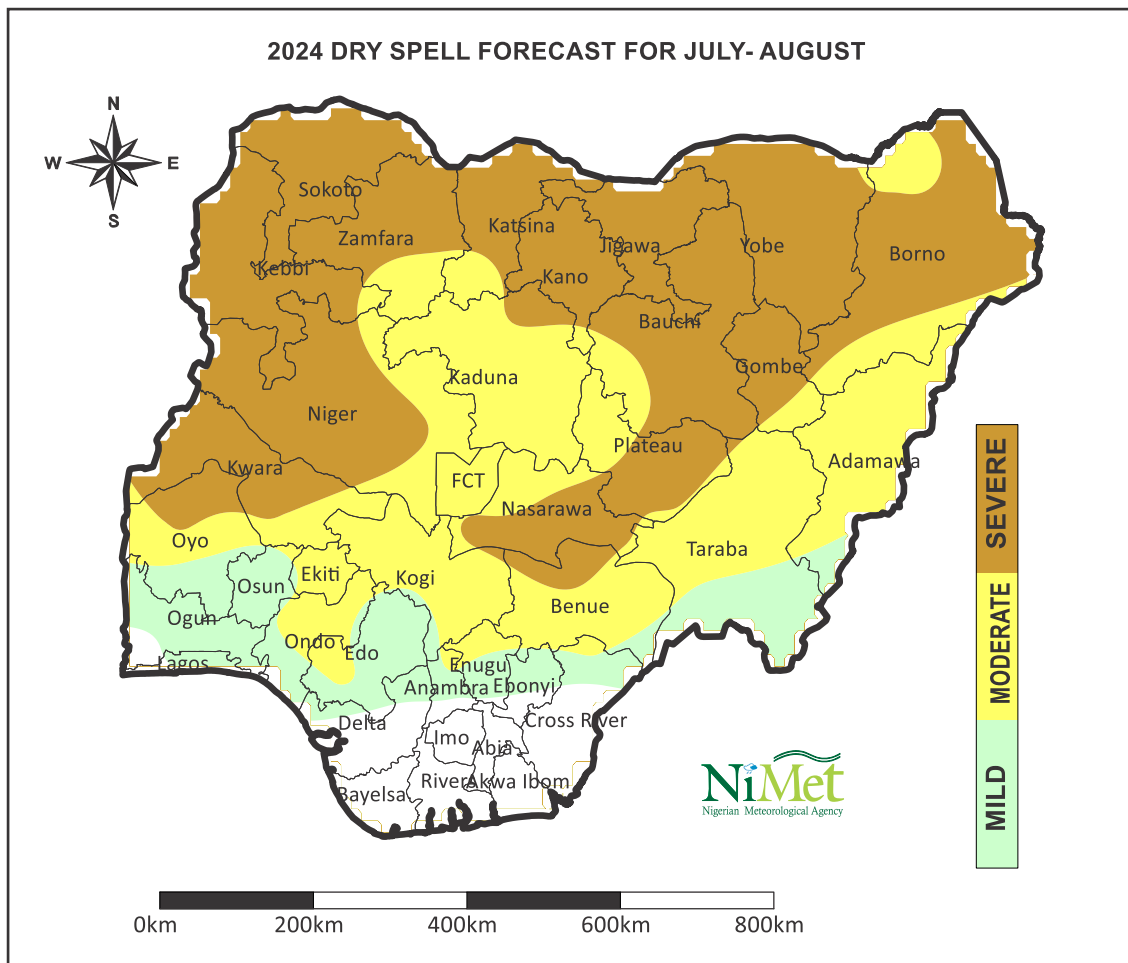


Figure 7: Predicted areas of occurrence of dry spell in July-August 2024

The 2024 Prediction shows that in July there is likelihood of occurrence of a severe dry spell that may persist for up to 15 or more days after the establishment of rainfall in the northern states of Nigeria and northern Oyo. Moderate dry spell of about 16 days duration is predicted for the central states and mild dry spell (less than 8 days) is expected in Ogun, Osun, Edo, Enugu, Anambra and northern Cross River states.

The following places are likely to experience the severe dry spell:

Borno state: Abadam, Bama, Mobbar, Kukawa, Guzamala, Gubio, Nganzai, Monguno, Marte, Ngala, Bama, Gwoza, Kaga, Mafa, Magumeri

Yobe state: Barde, Bursari, Damaturu, Fika, Potiskum, Geidam, Machina, Nguru, Karasuwa,

Yunusari, Yusufari, Jakusko, Tarmuwa

Katsina state: Baure, Batsari, Bindawa, Batagarawa, Daura, Charanchi, Kankia, Jibia, Rimi, Mani, Mashi, Mai'Adua, Matazu, Katsina, Dutsi, Sandamu, Ingawa, Zango

Jigawa state: Babura, Birniwa, Gwiwa, Garki, Roni, Kazaure, Gumel, Guri, Yankwashi, Kirkasama, Maigatari, Kaugama, Sule-Tankarkar, Malam Madori

Bauchi state: Damban, Darazo, Gamawa, Giade, Itas/Gadau, Jama'are, Katagum, Misau, Ningi, Shira, Warji, Zaki

Yobe state: Barde, Bursari, Geidam, Machina, Nguru, Karasuwa, Yunusari, Yusufari, Jakusko, Tarmuwa

Kebbi state: Arewa Dandi, Aleiro, Kalgo, Bunza, Birnin Kebbi, Argungu, Augie, Jega, Maiyana

Zamfara state: Anka, Bakura, Birnin Magaji, Bukkuyum, Bungudu, Gummi, Kaura Namoda, Shinkafi, Talata Mafara, Tsafe

Sokoto state: Binji, Bodinga, Dange-Shuni, Gada, Gwadabawa, Illela, Isa, Rabah, Shagari, Silame, Tambuwal, Yabo

Gombe state: Nafada, Yamaltu-Deba, Dukku, Funakaye

2.1.6 Little Dry Season Prediction for 2024

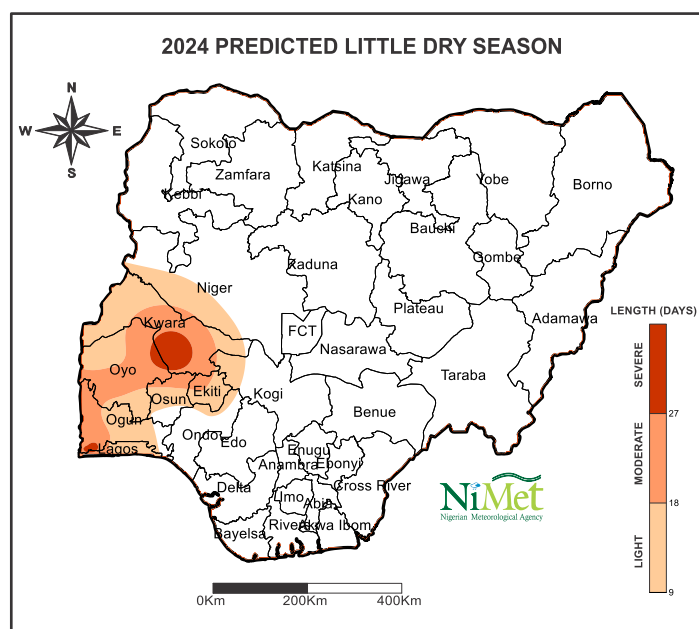


Figure 8: Predicted 2024 little dry season.

The little dry season is characterized by reduced rainfall activities over the south-western region of Nigeria after the first peak of rains have been reached in the months of May and June. The occurrence of this phenomenon on average is noticeable within the 3rd dekad in July and 1st dekad of August. The energy

level in the lower atmosphere (troposphere) is usually low at this time and it is always cloudy with cool daytime surface temperature and a below 18°C at 850hPa level (1500m). Most literatures have linked this event with some upwelling of ocean current around the Gulf of Guinea which develops into a high-pressure system that suppresses the usual atmospheric ascent of moist air.

Using statistical analysis, the 2024 occurrence of LDS is projected to start between 22nd July and 2nd August 2024 with a severe manifestation over Kwara and Lagos states as shown Figure 8, with a duration of more than 27 days. Some parts of Oyo, Ogun, Ekiti, and Lagos mainland are likely to have a low to moderate LDS with a duration of about 18 to 27 days (Figure 8). Ondo, Edo and some adjoining areas in Kogi states may experience light to no effect of the LDS.

2.2 Temperature Predictions for 2024

The predicted day and night-time temperatures, and the departures from normal for the five critical months – January, February, March, April, and May are presented in this section. The impact of temperature is mostly felt in the country during these months, i.e., the cold season during the month of January while the hot season occurs in March, April and May, depending on location within the country. Temperatures in parts of the country are expected to be warmer-than-normal (i.e., hotter than the average seasonal temperature).

2.2.1 Predicted January 2024 Day and Night time Temperature Forecast and Anomalies

2024 PREDICTED JANUARY DAYTIME (MAXIMUM) TEMPERATURE

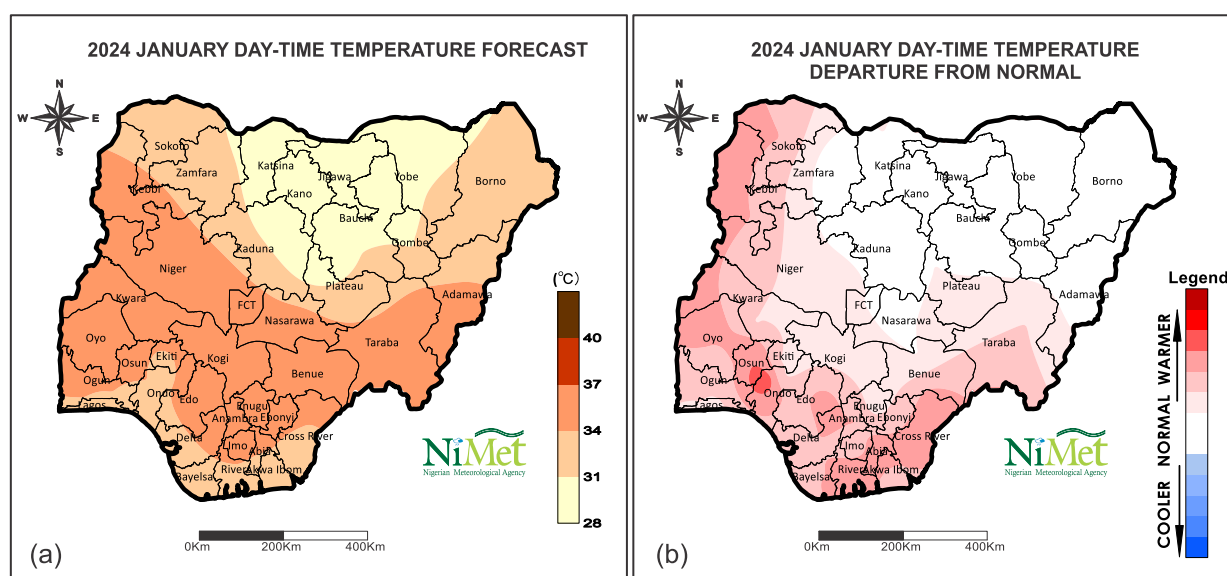


Figure 9a and b: Predicted January 2024 Daytime temperature and departure from normal.

The January day-time temperature prediction for 2024 is expected to range between 28.2 °C and 35.6 °C across the country. The central, southeast, parts of the southwest, and northeastern states are expected to have a maximum temperature of above 35 °C. Coastal areas are anticipated to have a temperature between 31 °C to 34 °C as shown in Figure 9a, while Plateau, Kano, Jigawa and parts of Yobe, Kaduna, Bauchi and Katsina states are anticipated to record the lowest maximum temperature between 28 °C and 31 °C (Figure 9b).

The departure from normal as shown in Figure 9b above indicates that most parts of the country are likely to experience warmer than normal daytime temperatures. However, parts of the northwest and northeastern states are expected to experience normal condition temperatures.

2024 PREDICTED JANUARY NIGHTTIME (MINIMUM) TEMPERATURES

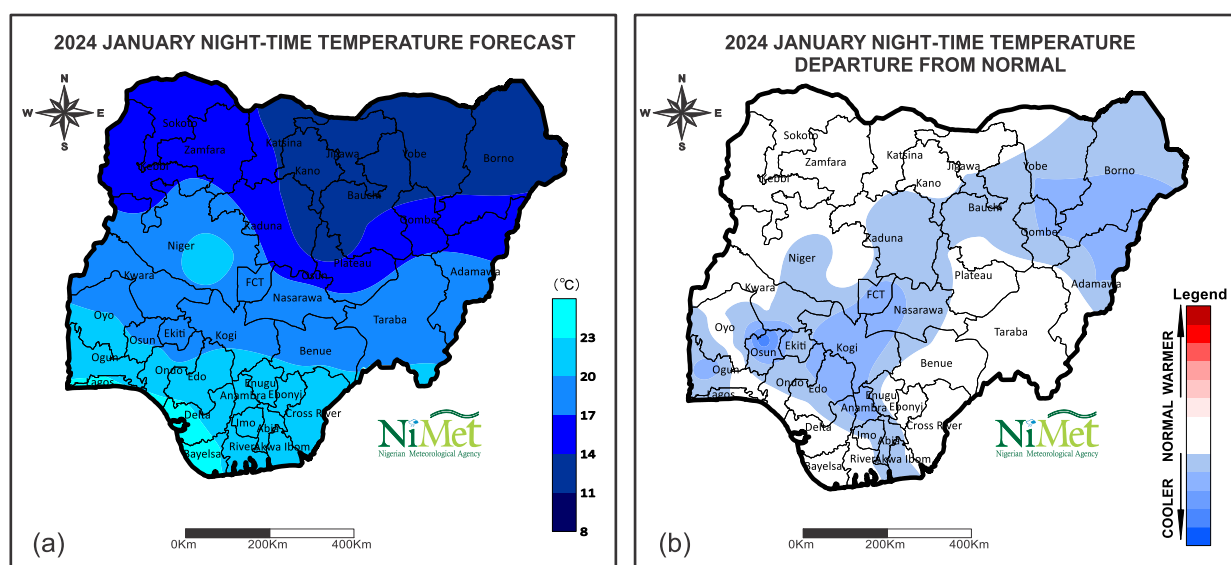


Figure 10a and b: Predicted January 2024 Night-time temperature and departure from normal.

January nighttime temperatures in 2024 are expected to vary from 11 °C to 17 °C in the northern part of the country, as can be seen in Figure 10a. Nighttime temperatures in the central cities and parts of Oyo, Osun, Ekiti, and Adamawa states are likely to be between 17 °C and 20 °C. The Southern states and parts of Niger state are to expect temperatures in the range of 20 °C to 23 °C at night during the forecast period. Nighttime temperatures between 20 °C and 23 °C are predicted for Lagos, Bayelsa and Delta states.

Nighttime temperature is expected to be normal in most states of the country and cooler than normal in states such as Borno, Adamawa, Bauchi, Gombe, Kogi, Nasarawa, Anambra, Ekiti and Rivers.

2.2.2 Predicted February 2024 Day and Night time Temperature Forecasts and Anomalies

2024 PREDICTED FEBRUARY DAYTIME (MAXIMUM) TEMPERATURES

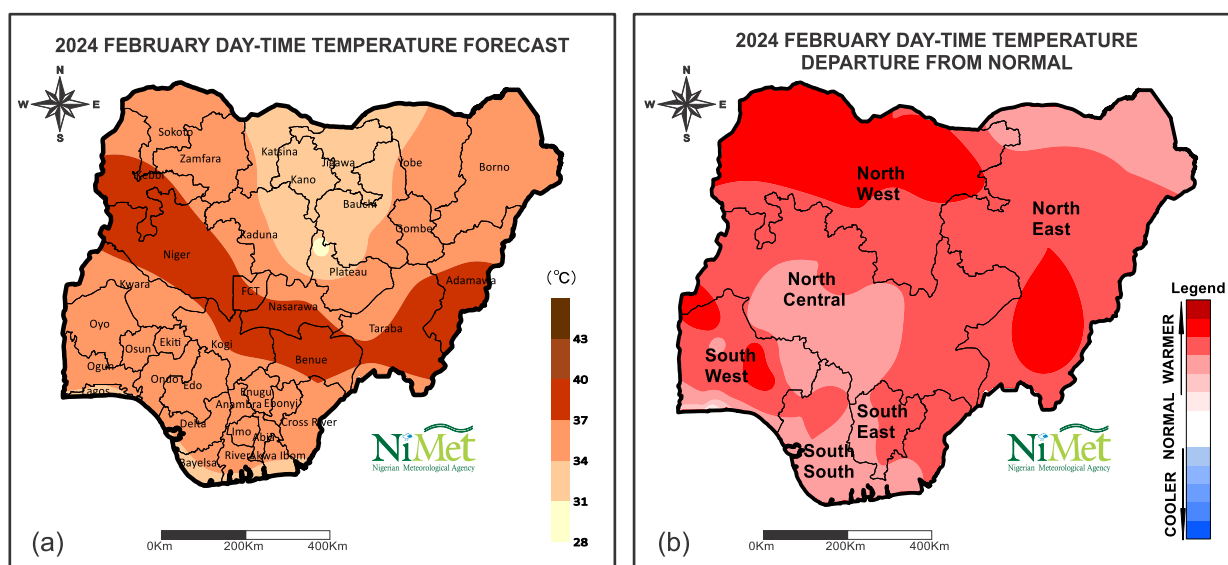


Figure 11 a and b: Predicted February 2024 Daytime temperature and departure from normal.

The February daytime temperature forecast for the year 2024 as shown in Figure 11 a shows temperature distribution to range between 31°C and 40°C. The lowest daytime temperature of below 31°C is likely to be observed over plateau state while parts of Kebbi, Niger, Kogi, Nasarawa, Benue, Taraba, Adamawa states and the FCT are predicted to have the highest temperature between 37°C and 40°C.

Daytime temperatures in the month of February are expected to be predominantly warmer than the long-term normal over the entire country, as depicted in Figure 11b.

2024 PREDICTED FEBRUARY NIGHTTIME (MINIMUM) TEMPERATURE

The minimum (nighttime) temperature for February 2024, is predicted to range from 14°C to 26°C across the country. From the North central zone down to the coastal parts of the country will likely record nighttime temperatures between 20°C to 26°C while the North is expected to have temperatures below 20°C. Minimum temperatures ranging from 14°C to 17°C are expected over Jigawa, Borno, Yobe, Bauchi and Kano states during the period.

It is predicted that warmer-than-normal nighttime temperatures are likely to be experienced in most parts of the country in February 2024. It is anticipated that nighttime temperatures in parts of Borno, Yobe and Jigawa states would be cooler than normal (Figure 12b).

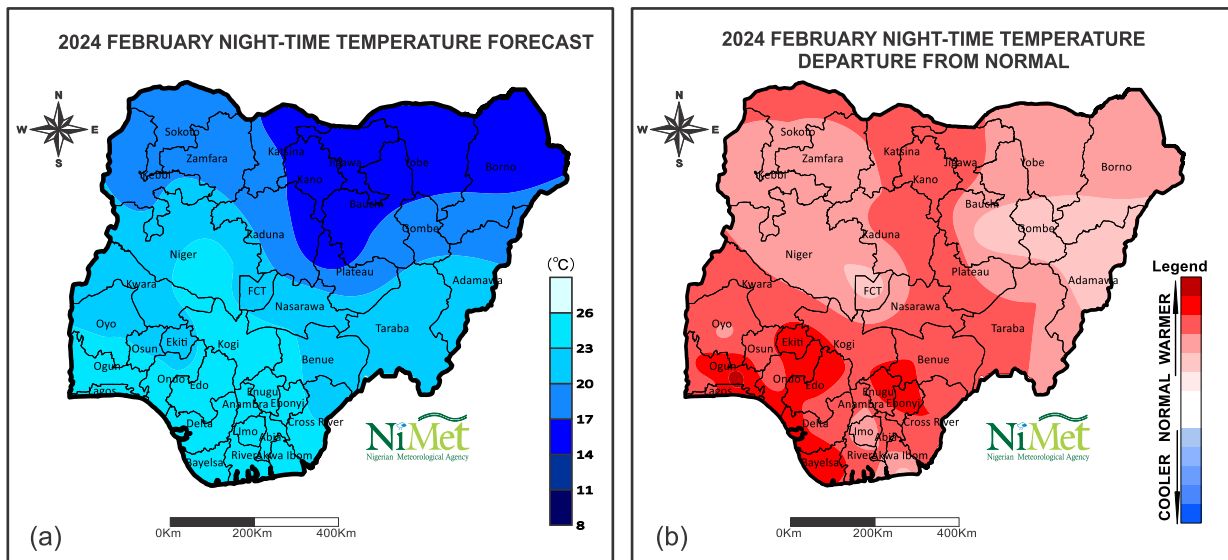


Figure 12a and b: Predicted February 2024 Night-time temperature and departure from normal.

2.2.3 Predicted March 2024 Day and Night time Temperature Forecast and Anomalies

2024 PREDICTED MARCH DAYTIME (MAXIMUM) TEMPERATURE

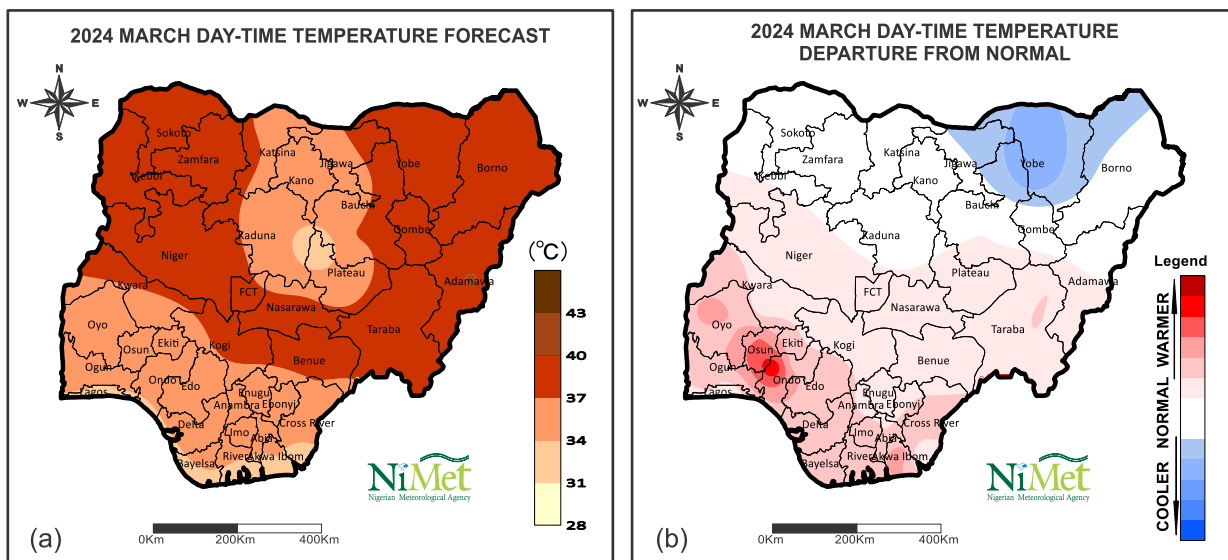


Figure 13a and b: Predicted March 2024 Day-time temperature and departure from normal.

Daytime (maximum) temperatures across Nigeria in March 2024 are predicted to range between 31°C and 40°C. The lowest range of 31°C to 34°C is expected over Plateau and parts of Bayelsa, Rivers and Akwa Ibom states. The highest values in the range of 37°C to 40 °C are likely to occur over the central and the northern part of the country except Kano, Jigawa, Katsina, Kaduna, Plateau, Bauchi states and the southern states are likely to experience daytime temperatures ranging from 34°C to 37°C (Figure 13a).

The prediction shows that a greater portion of the country will experience warmer-than-normal conditions in March 2024. The warmest temperatures are however expected over Osun and Ondo states. Normal conditions are expected over the North except Yobe, northern Bauchi and eastern Jigawa states where daytime temperatures in the month are expected to be cooler than long term normal conditions (Figure 13b).

2024 PREDICTED MARCH NIGHTTIME (MINIMUM) TEMPERATURE

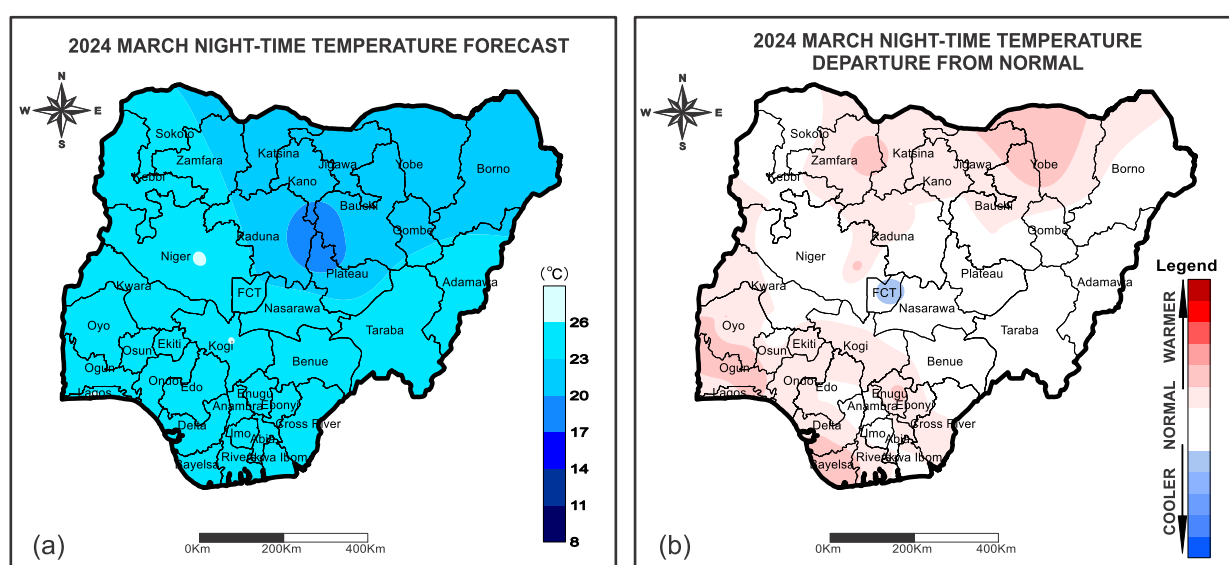


Figure 14a and b: Predicted March 2024 Night-time temperature and departure from normal.

Nighttime temperatures across Nigeria in March 2024 are expected to range from 17°C to 26°C, as shown in Figure 14a. The lowest nighttime temperature of 17°C is expected over Plateau State, while the highest value of more than 23°C is expected over most parts of the country.

Warmer than normal nighttime temperatures are expected in various parts of the country in the northern as well as southern states. The north-central states are expected to experience normal night-time temperatures, while the FCT and its environs are expected to be cooler than normal in the nighttime.

2.2.4 Predicted April 2024 Day and Night time (Minimum) Temperature Forecasts and Anomalies

2024 PREDICTED APRIL DAYTIME (MAXIMUM) TEMPERATURE

The maximum temperature in April 2024, is predicted to be in the range of 31°C to 43°C for all the states of the country. Plateau, Oyo, Osun and the coastal states are anticipated to record the least maximum

temperatures of 31°C to 34°C.

Warmer-than-normal daytime temperatures are expected over the country, except for parts of Jigawa, Bauchi, and Borno states where normal daytime temperatures are expected. Also, below-normal temperature is expected over Yobe state.

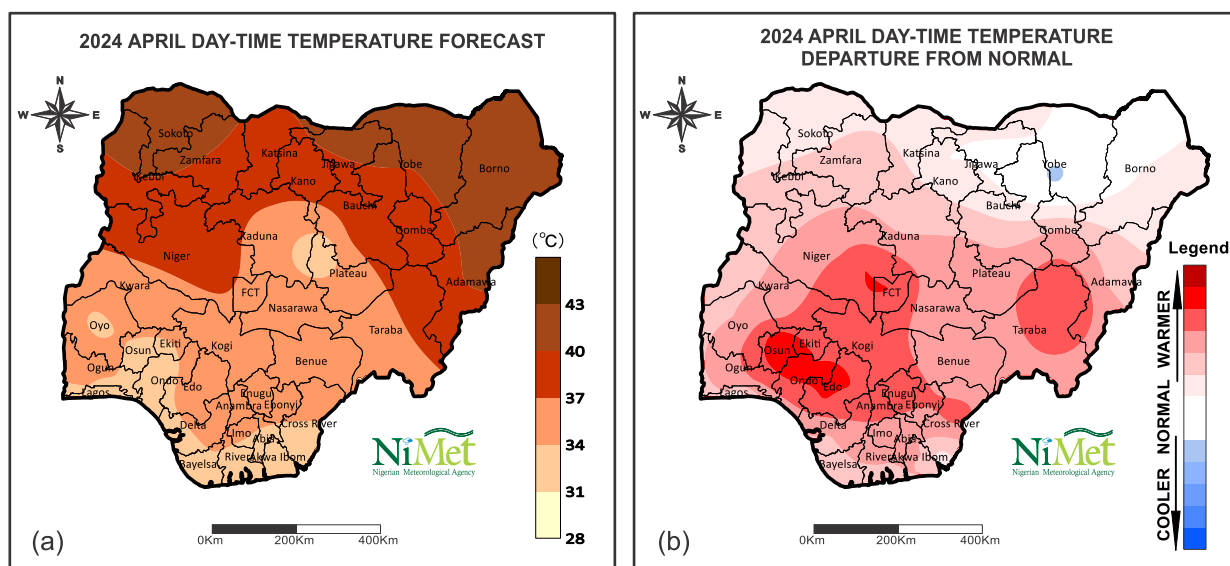


Figure 15a and b: Predicted April 2024 Daytime temperature and departure from normal.

2024 PREDICTED APRIL NIGHTTIME (MINIMUM) TEMPERATURE

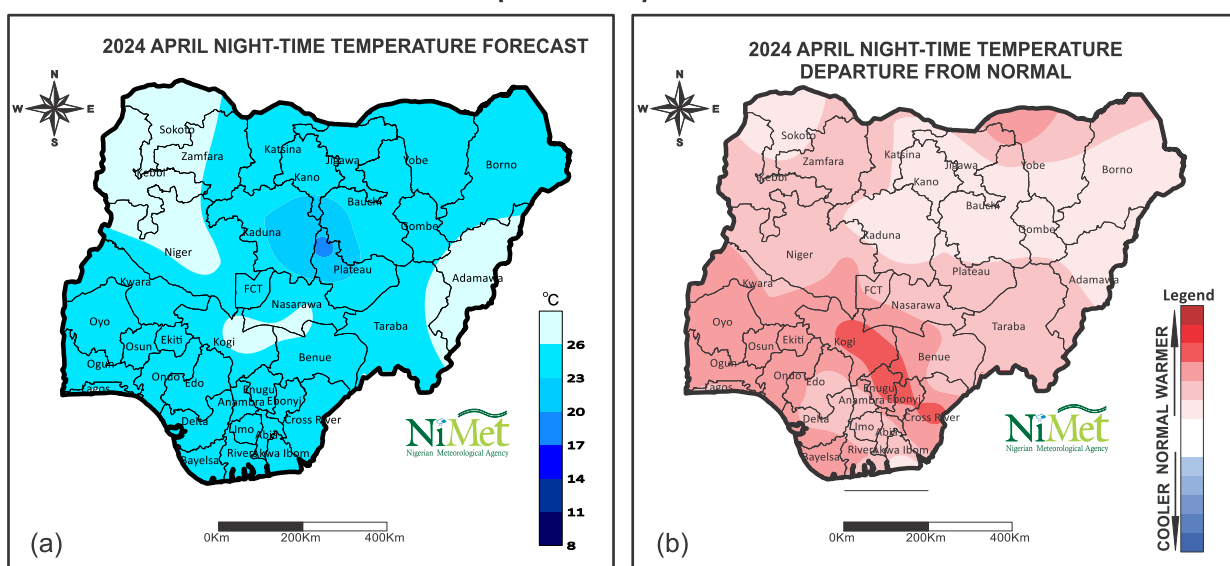


Figure 16a and b: Predicted April 2024 Night-time temperature and departure from normal.

In April 2024, the minimum temperature is expected to range between 17°C and 28°C across the country. The prediction indicates that most parts of the country are expected to experience nighttime temperatures between 20°C and 23°C. Parts of Sokoto, Kebbi, Zamfara, Adamawa, Niger, Kogi and Nasarawa states are to expect temperatures above 26°C. Plateau and its environs are to expect temperatures between 17°C and 20°C.

Warmer-than-normal nighttime temperatures are expected across the country in April 2024 (Figure 16b)

2.2.5 Predicted May 2024 Day and Night time Temperatures Forecast and Anomalies

2024 PREDICTED MAY DAYTIME (MAXIMUM) TEMPERATURE

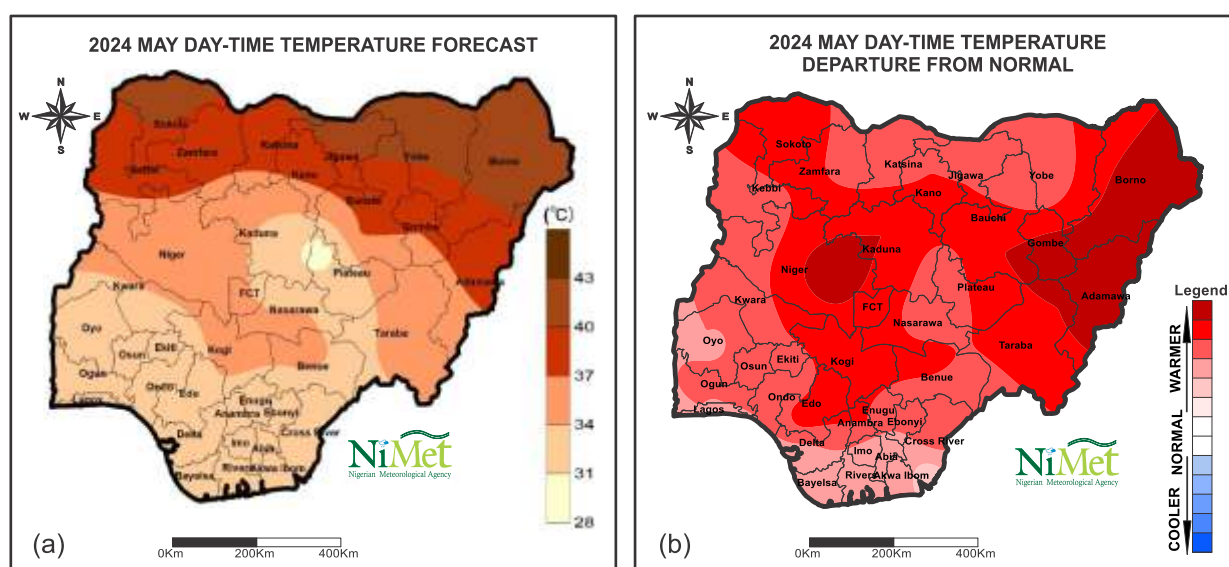


Figure 17a and b: Predicted May 2024 Daytime temperature and Departure from normal.

Figure 17a shows the maximum (daytime) temperature forecast across Nigeria for May 2024. The highest daytime temperature of 40°C to 43°C is expected in parts of Yobe, Borno, Jigawa, Kebbi, and Sokoto states. Temperatures between 37°C and 40°C are expected over parts of Zamfara, Katsina, Kano, Bauchi, Gombe, and Adamawa. Daytime temperatures ranging from 34°C to 37°C are expected over parts of Kaduna, Niger, Plateau, Kogi, Nasarawa, Benue, Taraba states, as well as the FCT. The Southern states are likely to experience temperatures between 31°C to 34°C. The lowest daytime temperatures of 28°C to 31°C are expected over Plateau state.

Figure 17b shows the departure of the predicted May 2024 daytime temperature from the normal. Warmer than normal temperatures are predicted for the whole country in May 2024

2024 PREDICTED MAY NIGHT-TIME (NIGHTTIME) TEMPERATURE

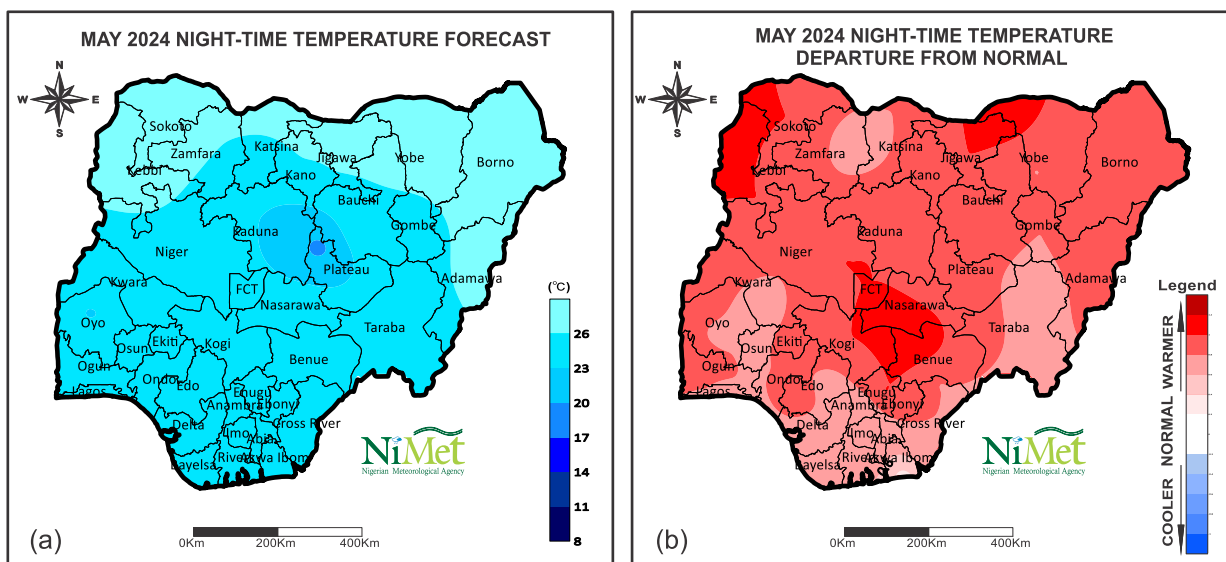


Figure 18a and b: Predicted May 2024 Night-time temperature and Departure from normal.

The predicted May 2024 nighttime temperatures for various locations across the country are expected to range between 17°C and 27°C. The lowest temperatures in the range of 17°C to 20°C are expected over parts of Plateau, Bauchi, and Kaduna states. Maximum temperatures ranging from 23°C to 26°C are expected over the rest of the country.

Generally, the nighttime temperatures are predicted to be warmer than normal over most parts of the country as shown in Figure 18b.

2.3 Climate and Health

The 2023 edition of the WMO's Annual State of Climate Services (WMO-No1335) Report focuses on health. It highlights the need for tailored climate information and services to support the health sector in the face of more extreme weather and poor air quality, shifting infectious disease patterns, and food and water insecurity. While there are many good examples of how countries are successfully using climate information and services to detect, monitor, predict, and manage climate-related health risks, there is huge potential for enhancing the impact of climate science and services for health.

Climatic conditions affect the outbreak and transmission of some diseases. Malaria, cerebrospinal meningitis, and heat stress are common health challenges in Nigeria. The World Malaria Report 2023 published by the World Health Organization (WHO) shows that in 2022, there were 249 million cases of malaria worldwide and Nigeria accounted for 27% of the cases and 38.5% of malaria deaths in children

aged under 5 years. The Nigerian Centre for Disease Control (NCDC) also reported that in 2022, Nigeria recorded 2,765 suspected meningitis cases with 190 deaths in 140 local government areas across 30 states and the FCT. The outbreak and transmission of malaria and meningitis are influenced by temperature, relative humidity, and rainfall. The predicted climatic conditions are used in determining the likelihood of outbreak and severity of malaria and meningitis.

A recent Scientific Report on Meningitis stated that there is knowledge about the impact of climate and weather patterns on the disease. Meningitis epidemics are more common in sub-Saharan Africa and is associated with high temperatures and airborne dust than in other parts of the world. This stretch of Africa is traversed by a region known as the "Meningitis Belt" because of the high number of cases reported. The Meningitis Belt stretches from Senegal to Ethiopia. Parts of Nigeria lies within the African Meningitis Belt (Figure 19).

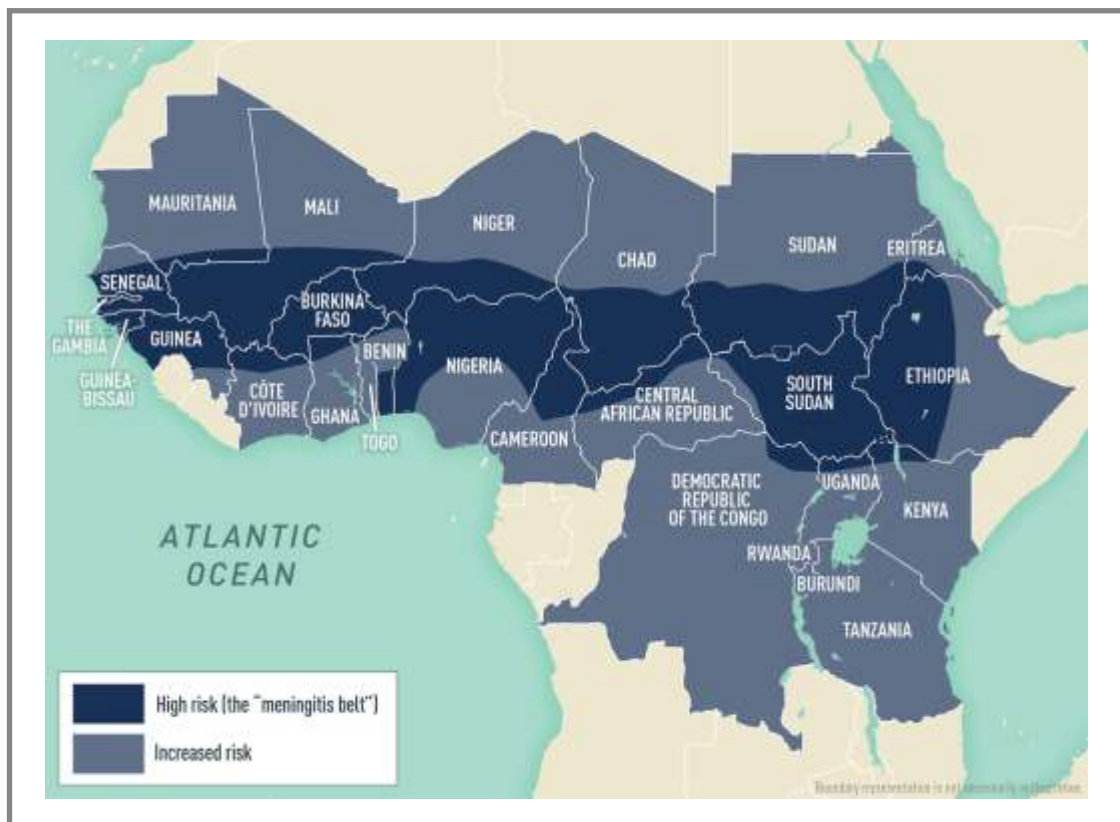


Figure 19: African Meningitis Belt

(Source: Centre for Disease Control and Prevention (CDC). CDC Health Information for International Travel 2014)

During the widespread meningitis epidemics of the 1990s, this region saw hundreds of thousands of cases of the disease. The meningitis belt in Africa is already expanding and is expected to continue to spread due to climate change.

2.3.1 Malaria Vigilance Forecast for Nigeria 2024



Figure 20. Anopheles mosquito

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 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.

2.3.2 Malaria Vigilance Maps for January 2024

The predicted climatic conditions for January 2024 are conducive for mosquitos to breed during the month. Various levels of malaria prevalence are anticipated across the country, hence different levels of malaria vigilance are therefore recommended across the country as shown in Figure 21.

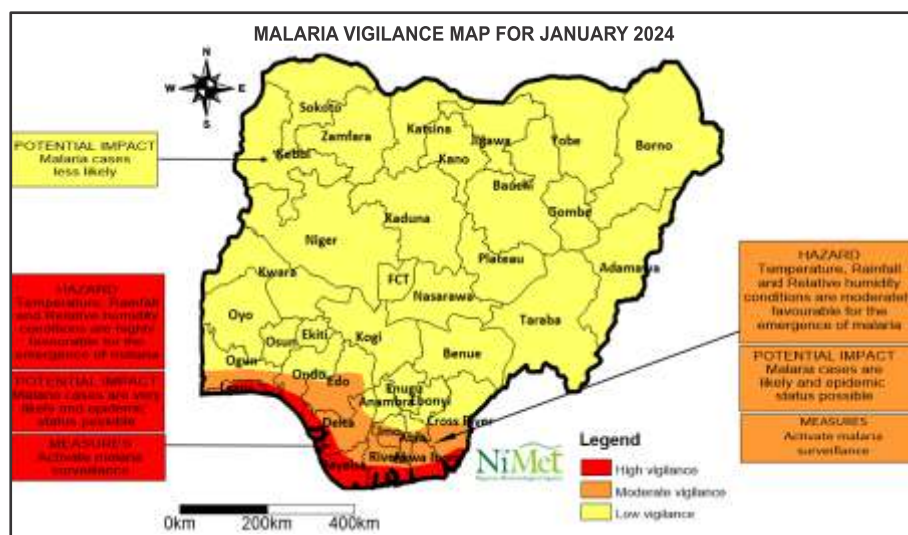


Figure 21. January 2024 Malaria Vigilance

High malaria vigilance is advised over the coastal states such as Lagos, Ondo, Delta, Bayelsa, Rivers, Akwa Ibom, and Cross River, **Moderate malaria vigilance** in parts of Ogun, Imo, and Anambra states. **Low malaria vigilance** is advised over the rest of the country.

2.3.3 February 2024 Malaria Vigilance Map

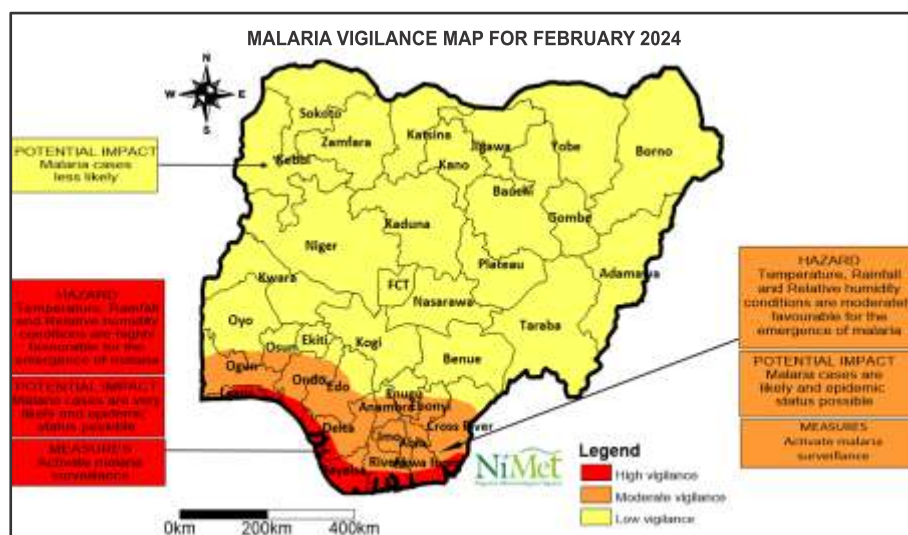


Figure 22. February 2024 Malaria Vigilance

Based on the predicted climatic conditions for February 2024, Lagos, Ondo, Delta, Bayelsa, Rivers, Akwa Ibom, and Cross River have high prospects of emergence of malaria cases as shown in Figure 22.

Consequently, **High malaria vigilance** is advised for these states, **Moderate malaria vigilance** over Ogun, Osun, Imo, Enugu, Ebonyi, Abia, and Anambra states. The predicted temperature, rainfall and relative humidity for the central and northern state in February are not conducive for mosquitos to breed. This implies **Low malaria vigilance** is advised over the north and central states.

2.3.4 March 2024 Malaria Vigilance Map

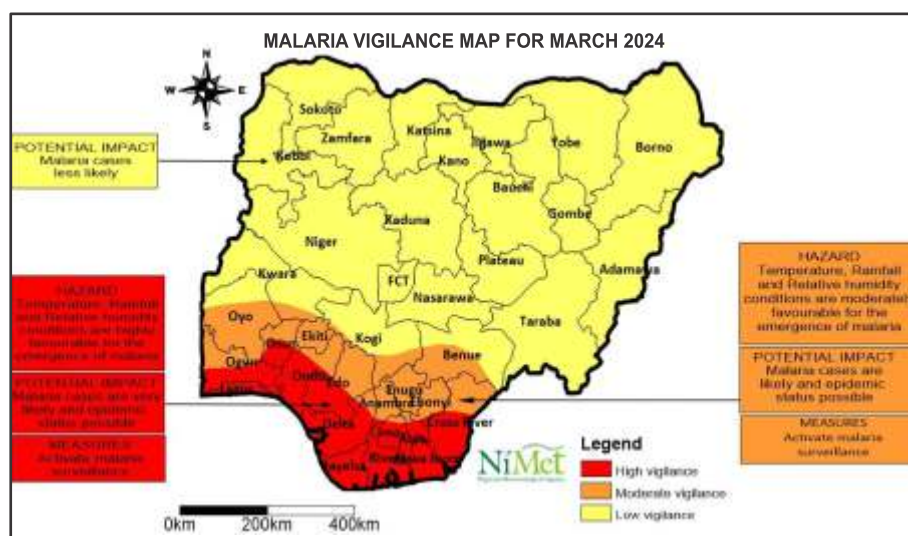


Figure 23. March 2024 Malaria Vigilance

The predicted weather conditions for March 2024 will favour the breeding of mosquitos in southern part of Nigeria as well as parts of Benue. It is therefore very likely that the prevalence of malaria will be high in those parts of the country (Figure 23). Therefore, **High malaria vigilance** is advised over Benue and the southern states.

Moderate malaria vigilance is recommended for Oyo, Ekiti, Anambra, Enugu, Ebonyi and parts of Kwara, Kogi and Benue states. **Low malaria vigilance** is recommended over the North.

2.3.5 April 2024 Malaria Vigilance Map

As shown in Figure 24, the April 2024 prediction suggests high probability of the emergence of malaria cases over the southern states and lower chances over the central states.

High malaria vigilance is therefore advised over the south, **Moderate malaria vigilance** for the central states, and **Low malaria vigilance** for places in the north.

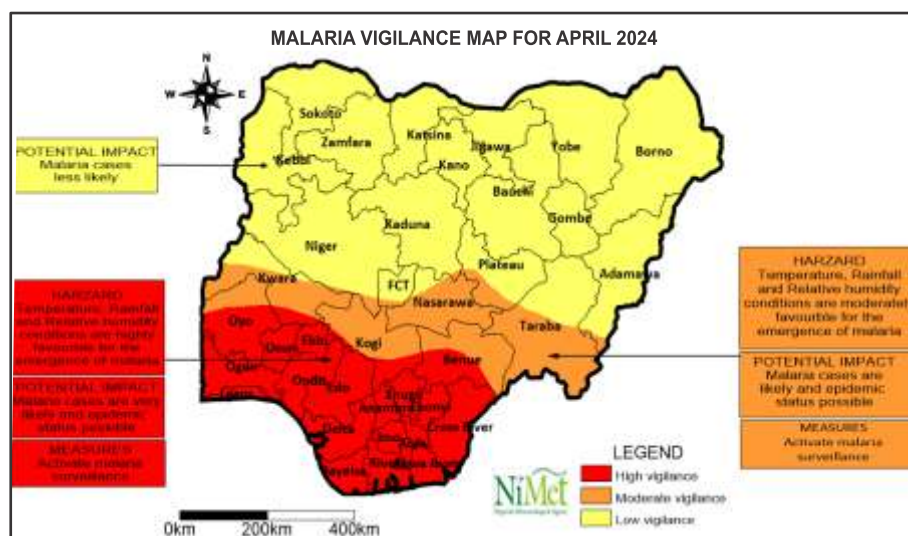


Figure 24. April 2024 Malaria Vigilance

2.3.6 May 2024 Malaria Vigilance Map

In May 2024, with the northward progression of rainfall, the south and central states have high chances of occurrence of malaria cases as shown in Figure 25. Based on this fact, **High malaria vigilance** is advised over those areas, **Moderate malaria vigilance** over parts of Adamawa, Taraba, Gombe, Bauchi, Plateau, Kaduna, Kano, Katsina, Zamfara, Kebbi, Niger, and Kwara states. **Low malaria vigilance** is however recommended over the rest of the country.

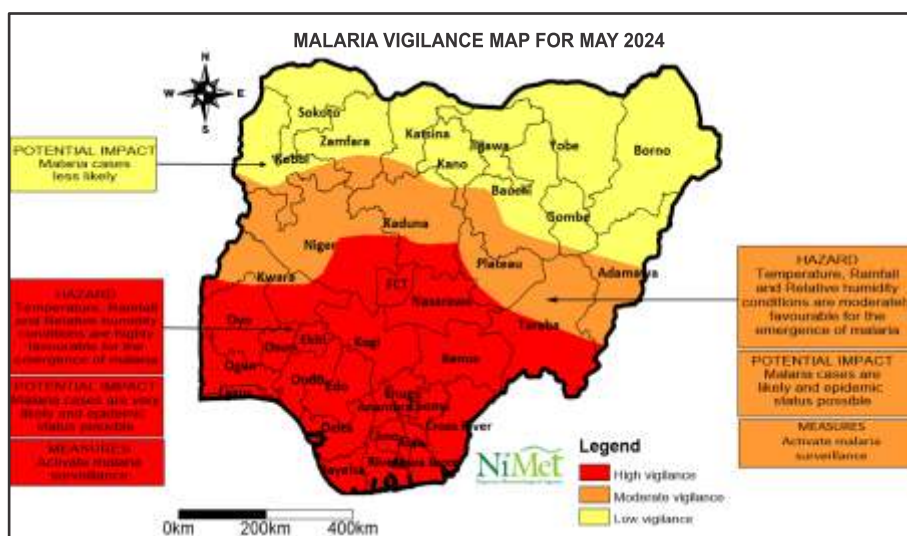


Figure 25. May 2024 Malaria Vigilance

2.4 Meningitis

Temperature, relative humidity, and concentration of dust in the atmosphere are major risk factors for meningitis. NiMet predicts the probability of meningitis and its geographical distribution across Nigeria using these three variables.

Meningitis Vigilance forecast: The vigilance threshold for meningitis is determined by Relative humidity, dust concentration and mean air temperatures. 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 $\mu\text{g}/\text{m}^3$ 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 $\mu\text{g}/\text{m}^3$ 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 $\mu\text{g}/\text{m}^3$. Meningitis outbreaks are unlikely to occur with any significant amount of rainfall, and therefore 'no vigilance' is required.

2.4.1 January 2024 Meningitis Vigilance

The predicted climatic conditions for January 2024 suggest high probability of the emergence of meningitis cases over parts of Sokoto, Jigawa, Yobe, Bauchi, Gombe, and Borno states; as such **high vigilance** is advised for these areas.

Moderate vigilance is advised over the north; Plateau, Nasarawa and Taraba States in the central. Slim prospects of meningitis cases are expected over the inland states of the south, Benue, Niger, Kwara states, and the FCT, hence **Low vigilance**. Occurrence of meningitis is unlikely over the coastal areas. Therefore, for those states, no vigilance is advised (Figure 26).



Figure 26: January 2024 Meningitis Vigilance

2.4.2 February 2024 Meningitis Vigilance



Figure 27: February 2024 Meningitis Vigilance

Figure 27 shows that states in the north are predicted to be **under high and moderate** meningitis vigilances due to the favourable predicted weather condition for February 2024. **Low vigilance** is recommended for FCT, Benue, Kwara, Kogi, Oyo, Osun, Ekiti, Enugu, Parts of Ogun, Ondo, Edo, Anambra, Ebonyi, and Cross River states. The emergence of meningitis is unlikely in the remaining parts of the south, therefore no vigilance is advised for those parts of the country.

2.4.3 March 2024 Meningitis Vigilance



Figure 28 March 2024 Meningitis Vigilance

For March 2024, **high vigilance** is recommended for Sokoto, Katsina, Zamfara, Kano, Jigawa, Bauchi, Yobe and Borno state, as shown in Figure 28 based on the predicted climatic conditions.

In parts of Kebbi, Niger, Zamfara, Kaduna, Taraba, Adamawa, Plateau, Benue, Kwara, Kogi, Nasarawa states, and the FCT **moderate to low vigilance** is advised. It is improbable that meningitis will spread through the southern states in March 2024. Therefore, no vigilance is advised for states in the south.

2.4.4 April 2024 Meningitis Vigilance

The predicted rainfall, temperature, relative humidity and dust concentration in the atmosphere suggest a high probability of emergence of meningitis over parts of Sokoto, Zamfara, Katsina, Jigawa, Yobe and Borno states. **High meningitis vigilance** is therefore recommended for those states.

Moderate meningitis vigilance is advised over parts of Gombe, Kebbi, Adamawa, Kano, Kaduna and Kebbi states. Low vigilance is advised over Niger, Kaduna, Adamawa, Taraba, and Plateau states, while **No vigilance** is advised for the remaining parts of the country as shown in Figure 29.

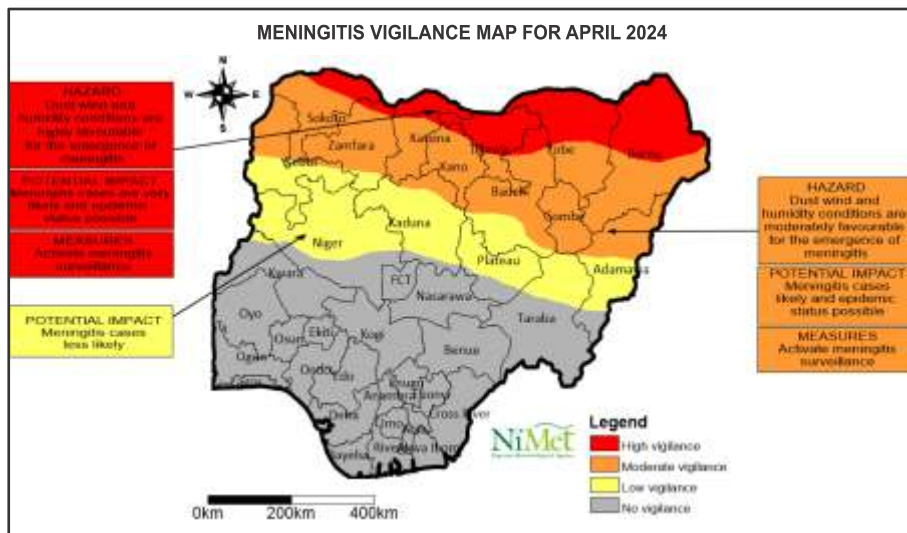


Figure 29: April 2024 Meningitis Vigilance

2.4.5 May 2024 Meningitis Vigilance

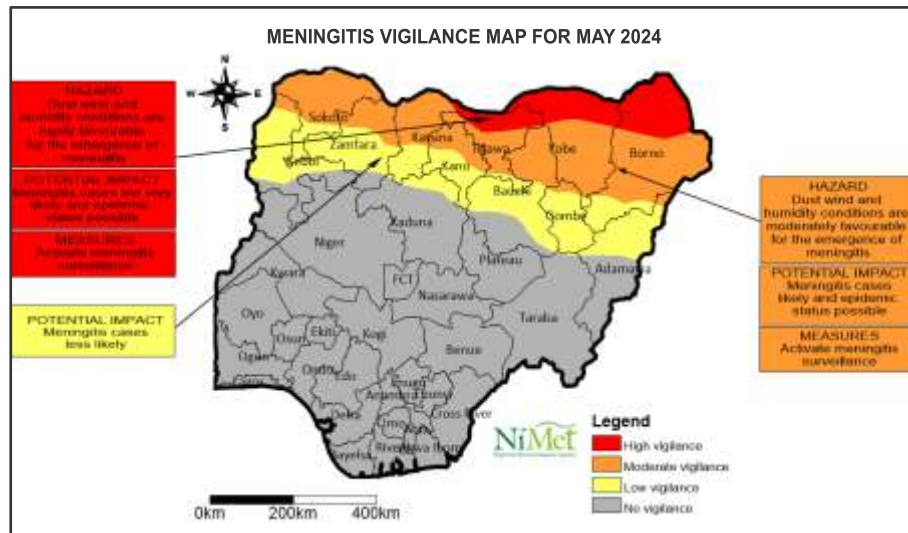


Figure 30: May 2024 Meningitis Vigilance

The predicted climatic conditions for May 2024, indicate that the occurrence of meningitis is unlikely in most of the states of the country, therefore, **no vigilance** is advised for those states. However, conditions are still favourable for the emergence of meningitis in the far north and therefore **low to high vigilance** is recommended (Figure 30).

Chapter Three

3.0 Implications of the 2024 Seasonal Climate Prediction for Some Key Economic Sectors

Weather and climate affect every sector of the economy and aspects of human activities. The predicted conditions of the climate in Nigeria for 2024 will affect various sectors of the economy in different ways and to different extents, and the response by operators will vary from one sector to another. The key sectors of the economy that are particularly sensitive to climate include agriculture, water resources, power generation and distribution, transportation (air, land and sea), health, blue economy and telecommunication.

3.1 Agriculture

The prediction for the year 2024 shows that the onset of the growing season is likely to vary from normal to delayed in most parts of the country. Earlier than normal onset dates are expected over parts of northern Borno, Yobe, Jigawa, Abia, Akwa-Ibom, and Cross-River states.

Below-normal rainfall amounts (418mm-750mm) are predicted for Jigawa, parts of Katsina, Kano, Kebbi, Yobe, Bauchi, Gombe, Taraba, and Benue states. This may likely create water stress in and around these areas.

Advisory

(a) Crop Farming

- Farmers in the areas predicted to have normal to short length of the growing season are encouraged to plant early and use early-maturing varieties of crops.
- Drought tolerant and early maturing varieties should be planted in the whole north
- Where an early dry spell is expected, planting should be delayed.
- In the areas predicted to experience moderate to severe dry spells farmers are advised to use drought-tolerant crop varieties. Where drought-tolerant varieties are not available, farmers should adopt soil water conservation techniques such as mulching, water harvesting, tied ridge, organic fertilizer and supplementary irrigation.
- Farmers should avoid fertilizer application just before it rains, in order to prevent leaching and runoff of the applied nutrient.
- Farmers in coastal and wetland areas should adopt alternative and additional livelihood activities to mitigate the effect of possible flooding.
- Diversification of cultivated crops is advised in the Central region of Nigeria.
- Input distribution before onset is very important. Procurement of inputs as early as possible is encouraged depending on locations.
- Crop farmers are advised to irrigate in the morning and evening when necessary.
- Each state should seek professional advice from relevant agencies (NiMet and National Agricultural Research Institutes – NARIs etc.).
- Farmers should avoid planting before the predicted onset dates.

- Reinforce the practice of farmers' traditional bimodal farming in the affected areas.
- Farmers in the Southwest should end the 1st season in July and start the 2nd season in late August for the small season.



Figure 31: Millet farm in Nigeria

3.1.2 Livestock Production

Poultry Farming

- Farmers should lower stocking density during the stress period (February - May) due to the predicted warmer than normal temperatures.



Figure 32: Poultry farm in Nigeria

- Farmers are advised to also take into consideration the predicted warmer-than-normal temperatures when building chicken enclosures to enhance ventilation. However, regular rehydration of the birds is encouraged.
- Sanitizing poultry cages during the rainy season is advised to prevent the outbreak of diseases.
- The floor should be kept dry always to prevent the growth and spread of bacteria and fungi common during the wet season.
- Little dry season (August break) in the south comes with lower temperatures, that normally affects day-old chicks, it is important to provide warming during that period.
- Proper management is very important.

Ruminant

- Farmers need to routinely deworm their livestock.
- To prevent mould growth, animal feeds should be stored in a clean and dry place throughout the rainy season.
- Clean water should be given frequently during the anticipated high temperatures.
- Antibiotics should be administered to milking cows to prevent udder mastitis (swelling of the udder and stop producing milk).
- Pests (such as ticks) spread more quickly during the rainy season. It is therefore important to treat the animals often.

Piggery

There is possibility of African swine fever during the Little dry Season (August break) therefore Farmers should engage biosecurity.



Figure 33. A Typical Cattle Market in Nigeria

Aquaculture

- Fish farmers are advised to minimise feeding the fish in areas where warmer than normal temperatures are predicted.
- Farmers should construct earthen ponds one to two months before the onset of rain to achieve maximum result.
- Dredging the pond to deepen it and increase its capacity so that it can hold a lot of water throughout the season is advisable.
- During the predicted high temperatures, cleaning of fishpond should be done systematically and frequently.



Figure 34. Fish Farm

3.2 Water Resources Management

Effective water resources management systems are directly dependent on rainfall, and how the available amount of water is used and stored. Precipitation, temperature, runoff, groundwater and streamflow are the key variables that determine water availability. With increasing population, changing climate, and the expansion of human activity, water management has unique and evolving challenges. The ability to adapt and respond to climate variability and change depends on the understanding of the climate and how this understanding is incorporated into water resource management decisions by tracking, anticipating and responding to the changes.

For these reasons, there is a need to equip the country, communities, households who will be most

vulnerable to the projected impacts of the 2024 rainfall season through the NiMet's annual Seasonal Climate Prediction (SCP).

The 2024 Climate Prediction shows that the year will be characterized by the following features:

1. Normal – to - Delayed onset of the raining season
2. Normal – to - Earlier Cessation
3. Shorter length of season
4. Lower-than-Normal Rainfall Amounts and
5. Higher than normal temperatures for most parts of the country between January and May 2024.

With this prediction, it would be important that adequate measures be put in place in terms of adaptation, **mitigative** and **response** mechanisms where such does not exist and strengthened where necessary to forestall the eventualities of the season.

Advisories

The measures underlisted should be considered by Dam Managers, Water boards' Management, National Emergency Management Agency (NEMA), State Emergency Management Agency (SEMAs), Rural Water Supply and Sanitation Agency (RUWASSAs), National Orientation Agency (NOA) etc.

- Checking and putting up appropriate plans by the Management personnel of Hydrological areas I to VIII in the eventuality of extreme situations.
Situations such as the predicted delayed onset, earlier cessation and shorter length of season, would necessitate careful holding and release of water from sources.
- Strengthening sensitisation on the benefits of clearing of drainages, better waste disposals, as cases of flash floods may not be ruled out as a result of the predictions.
- Identifying suitable sites for relocating evacuees, while also improving on the search and rescue techniques for areas predicted to have above normal rainfall amounts and in flood-prone areas of the country.
- Proper planning on water treatment before supply is encouraged as water temperature affects all physical, chemical, microbiological, and biochemical processes to some extent. These in turn, affect treatment efficacy and water quality and can result in issues related to health-based contaminants and/or aesthetics.
- Maintaining regular contacts with the health authorities and the Water, Sanitation and Hygiene in Emergencies (WASHiE) team to adequately contain and provide relief respectively in the event of any outbreak of water borne diseases.
- Employing, improving and strengthening of integrated water resources management such as effective water budget plans commensurate with the forecasts.
- Making alternative but highly regulated arrangements for water availability e.g. groundwater exploration, and water harvesting for regulated release especially for irrigation purposes but adequate treatment be maintained during storage to prevent contamination for especially

- domestic purposes.
- Adequate provision of community boreholes by the Government to regulate the indiscriminate ground water abstractions.
- Strengthening collaboration with supporting donors at the National and International levels (philanthropists, NGOs, Government, etc.), and also evaluating roles and synergizing efforts through Regional Water Planning like Niger Basin Authorities (NBA) with member countries to ensure that there are resilient water resources available to meet the needs of the environment, the growing population and the regional economy.



Figure 35: Dams and Locations in Nigeria

3.3 Transportation sector

Nigeria's transportation sector is the gateway to the nation's economy. It is the backbone of trade and very strategic in the facilitation and sustenance of movement of people, goods, and services. Weather elements like fog and mist, heavy rainfall, long rainy season, dust haze, extreme temperatures all affect the basic and several modes of transportation.

(a) Road Transportation

The 2024 seasonal outlook predicts a short rainy season, with prospects of normal to below normal rainfall amount and a warmer than normal temperature. This implies less rains in some places. However, changes in frequency of storm events, accelerating patterns of erosion can disrupt travel and movement in various places.

Predicted warmer than normal temperatures can cause contraction and expansion of pavements, thereby creating potholes in high-traffic areas while also putting stress on bridge joints.

High temperatures can also limit construction activities, particularly in areas with high humidity. Also, this high temperature can make motor vehicle engines susceptible to overheating and tyre bursts.

Advisory

- The Federal Ministry of Works/Federal Road Maintenance Agency (FERMA) and state ministries should ensure compliance to procedures and standards on road design, maintenance and rehabilitation.
- Relevant government agencies are advised to ensure that all road traffic signs are in place and their uses enforced.
- The Federal Road Safety Corps (FRSC) and car owners should ensure tyres are well checked and in good condition to prevent risk of tyre burst especially during the hot season.

(b) Air Transportation

Air transport is one of the most widely used and advantageous modes of transport. It is the safest and fastest mode of transportation. Weather conditions affect all aspect of aerodrome operations such as aircraft fueling, maintenance, baggage handling, movement of passengers and the scheduling of flights. Weather hazards such as thunderstorms, fog, dust haze, wind shear and squalls are common during the forecast period and can cause air turbulence and poor visibility which can lead to flight delay, diversion or cancellation. Also, the increased temperatures may cause reduction of aircraft lift due to less dense air and thrust produced by the engines requiring more energy which translates into increased fuel consumption and cost.



Figure 36. Nigeria Air Force

Advisory

- Airline operators are encouraged to abide by Standard and Recommended Practices (SARPs) for safety guidelines of aerodrome and flight operations, they should also leverage on technology and innovation to enhance safety.
- Pilots and crew are advised to regularly attend the flight weather briefing at all NiMet forecast offices nationwide to ensure the entire crew comply with the Civil Aviation Regulations as applied to aero-meteorological information.

(c) Rail Transport

To keep pace with the rising mobility demands accompanying population and economic growth, the rejuvenation of the railways has in recent years gained priority. The strategic development of railways offers prospects in contributing to the socio-economic growth of the nation. The Federal government aims at making rail transport an efficient transport system to increase economic activities, promote development and provide both primary and secondary job opportunities. To support the Federal Government's effort in rail transport, it is paramount to adhere to certain measures which include the use of weather and climate information.

The predicted climatic conditions in 2024 are likely to affect rail transportation in the following ways:

1. High temperatures could cause thermal expansion and buckling of the rail tracks, and this can lead to derailment.
2. Rainfall may cause flooding of rail tracks, erosion of track beds and rail embankments, and pose the risk of subsidence and heave.
3. Increased wind speeds can damage infrastructure along railway lines such as signals posts, sensors, lights as well as electric power poles and overhead cables.



Figure 37. Nigeria Railway Corporation

Advisory

- The Nigerian Railway Corporation (NRC) is advised to sustain the regular inspection and monitoring of rail tracks for structural damages. This practice should be stepped up during high temperatures and high intensity rainfall in flood-prone areas.
- The reduction of train speeds at particularly hot days or days above 30°C to prevent accidents and passengers may need to prepare for additional travel time due to reduction of speed limits.
- Regular inspection of rail tracks for debris and trees falling on the rail tracks especially during rainstorms.
- Provision for cooling equipment's and shades to protect from the heat should be made in and around the train terminals.

NiMet's forecasts will be a very useful tool for planning and implementation of the above and other operational activities in the rail transport sector.

(d) Marine Transportation and Blue Economy.

The maritime transportation industry in Nigeria is that which is undeniably important to the economic growth of the country. Nigeria is endowed with up to 10,000 km of inland waterways of which 38,000 km of which is seasonally. Up to 28 out of the 36 states of Nigeria can be accessed via rivers and creeks. Proper harnessing and management of the rivers and waterways can contribute significantly in the mobility of goods and services (especially agricultural) among states in the country.

The predicted short rainy season and normal to below normal rainfall over most parts of the country and coastal states, are expected to affect the flow of inland waters. With normal rainfall amounts, the flow of rivers and streams are also likely to be normal. This will be a favorable condition for inland transportation as it will favor ease of access to the inland river ports in the country and also help with favorable movements of passengers and cargo vessels. Nonetheless, there may be siltation and contamination of the water ways from silt and other debris (mostly garbage) that are washed into the rivers from the banks. These could impede smooth navigation by boats and other vessels on the waterways.

The predicted rainfall pattern implies that there are chances of stormy weather and low visibility especially at the beginning of the rainy season. These are some of the main factors that contribute to boat mishaps on our Nigeria's waterways. Another marine hazard associated with the high temperatures is the enhancement of the growth of water hyacinth, which poses severe problems to the fishing and transportation industries by clogging major waterways. It also prevents navigation of boats and other vessels; it can also damage bridges and clog dams. Its optimum growth temperature is between 25°C to 30°C and its maximum growth temperature is between 33°C to 35°C making it suitable to thrive under high temperatures.

Advisory

- The National Inland Waterways Authority (NIWA) and the Nigerian Maritime Administration and Safety Agency (NIMASA) should regularly obtain daily marine weather forecast (Inshore and



Figure 39: Nigerian marine and waterways

Shipping Forecast) and marine bulletins issued by NiMet, and ensure they are properly disseminated to stakeholders in the marine sector and operators on Nigeria's rivers and inland waterways to help mitigate their exposure to weather hazards during their navigation.

- NIWA and NIMASA are advised to strengthen their collaboration with NiMet to provide regular stakeholders forums to get proper feedback from stakeholders and inland operators on how marine services to them can be improved and regular proper enlightenment on weather hazards to operators and stakeholders in the marine sector.
- Installation of more floating barriers at strategic locations on our water ways to forestall the invasion of water hyacinth is encouraged.
- The Nigerian Railway Corporation should embark on regular inspection and monitoring of rail tracks for structural damages during high temperatures.
- Offshore Oil and Gas exploration companies should make it their mandate to contact and liaise with NiMet because weather conditions influence the exploration, production, transportation, and distribution of oil and gas as well as the safety and environmental performance of the industry. Oil and gas companies need to be aware of the weather advisories and forecasts for their areas of operation.
- Illegal, Unreported, and Unregulated (IUU) fishing is a key issue so curtailing illegal fishing activities through effective regulation and punitive measures will help safeguard Nigeria's marine resources for sustained economic gains.
- The Federal Ministry of Works/FERMA and state ministries should ensure compliance with procedures on road design, maintenance, and rehabilitation.
- Inland waterways will need to be dredged to make inland transport more robust.

3.4 Power Sector



Figure 38. Power Generation and distribution

Meteorological experts have predicted an El Niño event in 2024 which will usher in warmer-than-normal temperatures, below-normal rainfall, early onset, late cessation, and a shorter length of the rainy season in Nigeria. These climatic conditions are expected to have a profound impact on various sectors, including the power industry. The likely implications of the 2024 seasonal climate predictions on Nigeria's power sector is therefore discussed, emphasizing the effects on solar, wind, and hydroelectric power generation.

(a) Solar Power

The predicted El Niño conditions indicate potentials for an increase in optimal solar energy generation during dry days throughout the year with a peak during the dry season. Generally, solar power generation thrives with reduced cloud cover and extended periods of sunshine experienced during dry days. The prediction for 2024 presents a significant opportunity for the power sector to exploit the abundance of solar resources for enhanced energy production in the country. It is crucial for stakeholders to ensure that solar energy infrastructure is well installed and maintained to harness these increased solar potentials offered by the anticipated projection. The temperature prediction aligns with optimal conditions for solar power generation and presents an opportunity for the power sector to leverage on and augment high energy demand during warmer periods. Strategic public, private sector partnership, investments in solar infrastructure and advancements in technology can further enhance the efficiency of solar power generation in the country.

(b) Wind Power

The wind strength is anticipated to be stronger during the dry periods associated with El Niño. While this may pose challenges in terms of potential damage to infrastructure, it also offers an opportunity to boost wind power generation. Wind turbines can harness the increased wind speeds to generate more electricity for use. While warmer temperatures may intensify wind speeds, potentially boosting wind power generation, careful consideration must be given to the balance between increased wind strength and potential stress on wind turbines. Adequate maintenance and monitoring of wind energy facilities become paramount to ensure that the equipment can withstand the heightened environmental conditions. The power sector should harness the benefits of increased wind speeds during the season while implementing measures to safeguard the integrity of wind power infrastructure.

(c) Hydroelectric Power

In contrast to solar and wind power, hydroelectric power generation may face some challenges during the predicted El Niño year. The decreased and erratic rainfall patterns, coupled with the shorter length of the rainy season, may lead to reduced water levels in dams. This, in turn, could impact the overall capacity for hydroelectric power generation. Stakeholders in the power sector should diligently harvest and store rainwater, closely monitor water reservoir levels, and implement measures to optimize efficiency during periods of water scarcity. Warmer temperatures combined with water shortage may intensify the challenges facing hydroelectric power generation as high temperatures and energy consumption especially during the hot season may lead to frequent melting of electric cable installations. To address this, the power sector should explore adaptive strategies, such as optimizing water management systems, implementing water-saving technologies, and investing in alternative energy source during periods of water scarcity.

3.5 Telecommunication Sector

Nigeria Telecom Market has witnessed strong growth in recent years and is expected to have continuous growth over the forecast period to 2025. The growth in the industry is mainly due to increasing urban population with rising adoption of the mobile phones that supports 3G, 4G and 5G services across the country.

For sustainable expansion in operations and services, the industry needs good atmospheric environment to aid the anticipated expansion in this sector. The seasonal climate forecast can help tremendously in this pursuit with expected climate and weather information that could support a profitable experience.

In 2024, the seasonal rains are expected to begin in the south in March. Prior to this, severe storms are expected across most southern cities as a herald event to the rains. Global temperatures have been on the increase while locally, there has been an average increase of about 0.5°C in our annual temperature. This is expected to engender more seasonal storms.

The high intensity rainstorms and windstorms which may occur shortly before the season itself can pose

myriads of challenges to telecommunication masts and service delivery as a result.

Advisory

- To sustain the innovation of “IoT” (internet of things) and use of artificial intelligence in the industry in 2024, all private and national telecommunication facilities have to be serviced and consolidated with cooling systems to minimize disruptions as a result of high temperatures in the hot months of January, February, March, April and May.
- The telecom operators are also advised to schedule their routine maintenance activities early in the year most especially in the northern states before the high temperatures start to kick-in in March in the south and February to May in the north.
- The telecom industry is currently championing the stride in information and data technology with the evolution of “IoT” (Internet of things), mobile based applications, cloud-based application and other high-capacity activities solely reliant on the increase in signal bandwidth. The robust infrastructure needed to host these bandwidths will depend on the suitability of good weather and climate atmospheric conditions else the challenges of constant interruption of radio signals during active use of these facilities will limit progress and effectiveness of these services. Hence, the importance of following closely the monthly and weekly release of NiMet's high impact weather forecast (HIW) and Seasonal climate prediction and corresponding updates.

3.6 Disaster Risk Reduction

The prediction for the year 2024 indicates a normal to below normal rainfall activity across most parts of the country. Coastal cities and low-lying areas of Niger, Benue, Kogi, Rivers, Bayelsa and Anambra states are at higher risk of flooding. Several disasters can occur during the onset and cessation period of the rainy season due to the violent storms associated to that period. Flash flood cannot be ruled out because of excessive rainfall expected in some areas. Places within the urban cities of the country with poor drainages are also vulnerable to floods during the rainy season.

The predicted warmer than normal condition can result in drier than normal atmosphere which may support fire outbreaks especially over the north where dry, windy conditions with higher temperature are common in the month of February, March and April.

Emergency managers are advised to help prepare disasters-prone communities for possible flooding and to educate communities to reduce their vulnerability and possible losses to severe weather.

Advisory:

- I. Early education and awareness should be provided to communities that are vulnerable to flooding.
- II. Clear clogged gutters to ensure the flow of water during heavy rainfall.
- III. State authorities should stockpile food and non-food items in anticipation of any emergencies that may arise.



Figure 40: Disasters in Nigeria

- IV. Risk mapping should be conducted in areas that are likely to be affected by flooding, such as farmlands, built-up areas, poor drainage areas, and illegal structures.
- V. Policies and regulations that promote resilience and reduce vulnerability, such as land use planning, building codes, environmental protection, and social protection, should be developed and implemented.
- VI. Preparedness and response capacities of governments, communities, and individuals should be enhanced by early warning systems, emergency plans, drills, shelters, and relief supplies.
- VII. Relevant stakeholders, including NEMA, SEMA, NOA, the Ministry of Environment, the Ministry of Land and Housing, traditional and community leaders, fire services, security agencies, and others, should be engaged.
- VIII. Federal, state, and local authorities should ensure that sufficient funds are available and released on time for proactive measures.
- IX. Research and innovation that can enhance the understanding and management of disaster risks, such as hazard mapping, risk assessment, and forecasting models, should be supported.

3.7 Health

Climate change impacts a wide range of health factors, from heat-related illnesses to the spread of infectious diseases and air pollution-related health issues. The onset of El Niño in October 2023 significantly increased the likelihood of breaking temperature records further, triggering more extreme heat in many parts of the world and in the ocean – and making the challenge of adaptation even greater. As we highlight in this document, climate services and information are vital to saving lives and protecting livelihoods. The climate and health section of this document discusses how health sector partners can successfully use climate information and services to detect, monitor, predict and manage climate-related health risks.

The warming climate contributes to an increase in the frequency and intensity of extreme weather events. Rising temperatures lead to more frequent heatwaves, more intense storms, floods, and droughts impacting human health. Sea level rise, driven by melting ice caps and glaciers exacerbate coastal flooding during storms. These climate-related events pose significant risks to human health and well-being.

The 2024 SCP forecast is based on El-Nino phase on ENSO projection which is characterized by warmer-than-normal temperatures, lower-than-normal rainfall, and shorter length of season for most parts of the country. High intensity rainfall could trigger floods despite the predicted normal to below normal rainfall. This can lead to the spread of waterborne diseases, such as cholera, diarrhea and vector borne disease such as malaria from stagnant water that could serve as breeding grounds. Flood-related injuries, drowning, and mental health challenges can also arise, emphasizing the need for preparedness and public health measures. Floods and waterlogging may contaminate drinking water, elevating the risk of waterborne illnesses. Damp conditions (i.e., increased humidity) also promote the growth of mold and fungi, exacerbating respiratory issues. Displacement and damage to infrastructure during heavy rainfall may disrupt access to healthcare facilities. Adequate public health measures, sanitation, and disaster preparedness are crucial to mitigate these health risks in regions experiencing increased rainfall.

Temperatures across the country for January to May 2024 are predicted to be warmer than normal. This implies that during this period of the year, heat-related illnesses, such as heat stress, heatstroke, and dehydration, could escalate and pose direct threat to human health. Extended periods of high temperatures can worsen cardiovascular and respiratory conditions, and air quality, impacting those with pre-existing health issues. Increased heat also contributes to the spread of infectious diseases carried by vectors like mosquitoes. Additionally, heatwaves can strain healthcare systems and disproportionately affect vulnerable populations.

January nighttime temperatures are expected to be lower than normal. This period coincides with the harmattan season which is characterized by dry and dusty winds that may put people at risk for respiratory tract infections like bronchitis, asthma, cough, as well as cardiovascular illnesses. In addition, it is anticipated that the meningitis outbreak will be signaled by the dusty conditions of the harmattan season. Measles incidence is also influenced by weather parameters. The number of measles cases is found to increase during the hot season. Addressing the health implications of rising temperatures

requires proactive public health measures, and global efforts to mitigate climate change.

Advisory on malarial risk

- Preventing mosquito bites, for example, by using insect repellent and covering the arms and legs
- Taking antimalarial tablets under the guidance of a health professional when traveling to an area where malaria occurs.
- Seek prompt medical attention if the disease is suspected.
- Administering the vaccine to children who live in places where malaria is endemic.

Advisory on the Meningitis risk

- Frequent thorough hand washing is advised. This helps to prevent the spread of germs.
- Practice good hygiene. Don't share drinks, foods, straws, eating utensils, lip balms, or toothbrushes with anyone else.

Advisory on Heat Stress

- Know how hot and humid it is going to get today, this week, and this month to help plan outside activities.
- Keep an emergency kit at home that contains oral rehydration salt (ORS) packets, a thermometer, water bottles, towels or cloths to wet for cooling, a handheld fan or mister with batteries, and a checklist to identify and treat symptoms of heat stress.
- Know how to get help.

Keep your home cool

- When possible, close the curtains during the hottest parts of the day and open windows at nighttime to cool down the house.
- Use fans and coolers if available.

Stay out of the heat

- Do not go outside during the hottest times of the day if you can avoid it. Try to arrange your activities earlier or later in the day when it is cooler.
- When outside, wear sunscreen and try to stay in the shade or use hats and umbrellas for protection.

Stay cool and hydrated

- Drink water at regular intervals before you are thirsty.
- Overdressing in the heat can make you dehydrated and hotter faster, so wear light and loose clothes. Cotton is ideal during hot days to help reduce heat rashes and absorb sweating.
- Carry a water bottle and a small towel, so you can hydrate and cool down by placing a wet towel on your neck.



Figure 39: Parents/care givers waiting for their babies to be immunize during Measles campaign/routine immunization for children under 0 – 5 years at Town Hall clinic Gwagwalada FCT-Abuja on Tuesday 12th December 2023.

Chapter Four

4.0 Evaluation of 2023 Seasonal Climate Prediction

The 2023 Temperature and Rainfall forecasts evaluation results are discussed in this section. The performance (or skills) of the 2023 Predictions across the country are shown in Figures 40 to 46. Areas highlighted in green indicate good performance, whereas those in red indicate a low forecast performance.

4.1 Rainfall Evaluation (Onset and Annual Rainfall Amount)

The forecast of the Onset of the growing season over the country performed well with an accuracy of 95%. However, parts of northern Yobe and Plateau recorded a low performance. Some places in the northern part of Plateau recorded a late onset of the growing season with a variation of 3-4 days from the normal while the northern part of Yobe recorded an earlier onset of the growing season with a variation of 7-21 days from the normal. Apart from these two areas, the forecast performed satisfactorily.

Figure (40b) depicts an evaluation of the 2023 annual rainfall amount in Nigeria. Areas in green colour represent where the model recorded high performance, while places in red colour such as parts of Sokoto, Oyo, Delta and Anambra were missed by the model. Generally, the forecast performance was 85%.

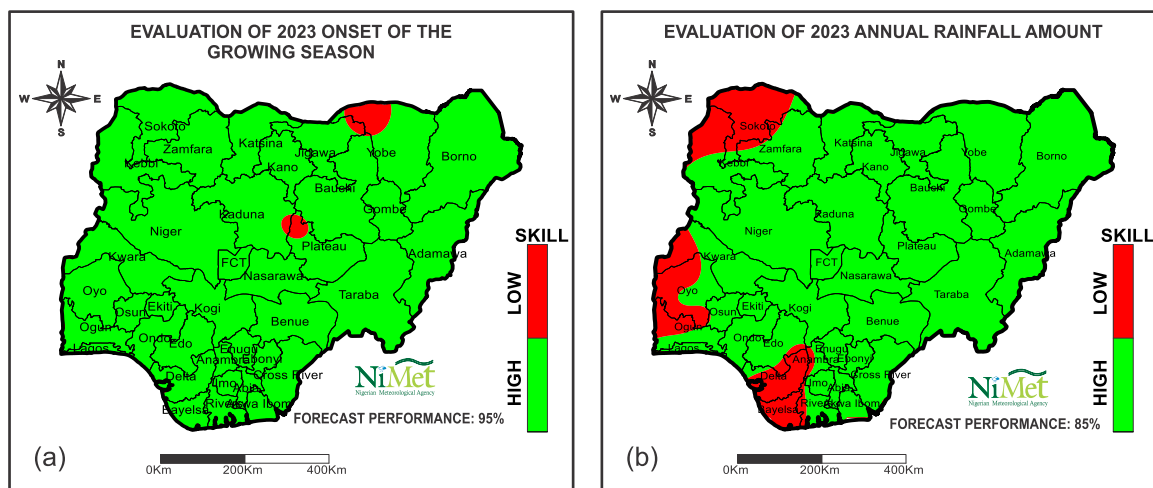
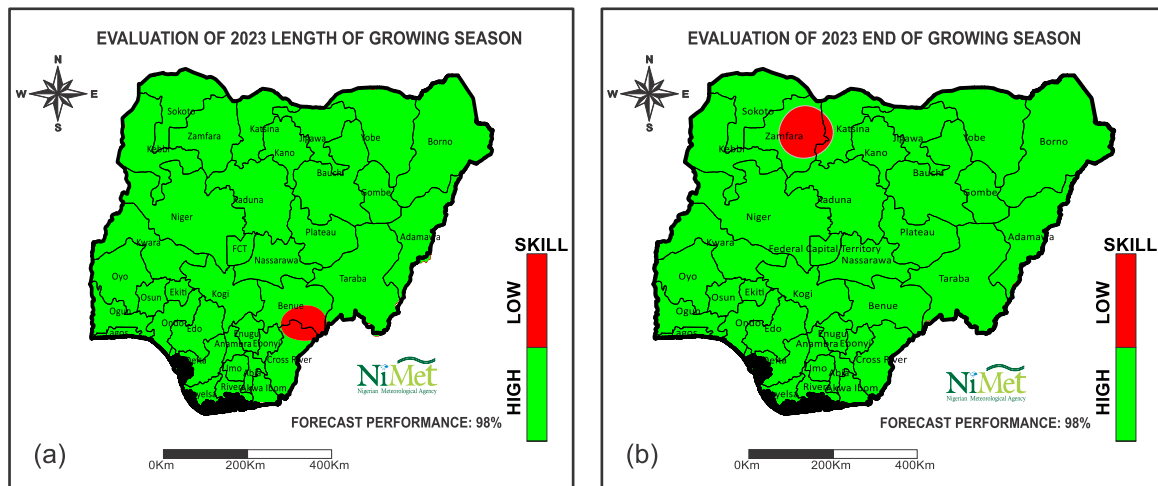


Figure 40a and b:: Evaluation of 2023 Onset of the Growing Season and Annual Rainfall Amount.

The Figure 41a shows the evaluation of the 2023 end of the growing season. A high-performance skill of 98% was attained in the forecast made. Places coloured in red indicates where the model skill performance was low while areas in green represent places where the model recorded high skill performance.

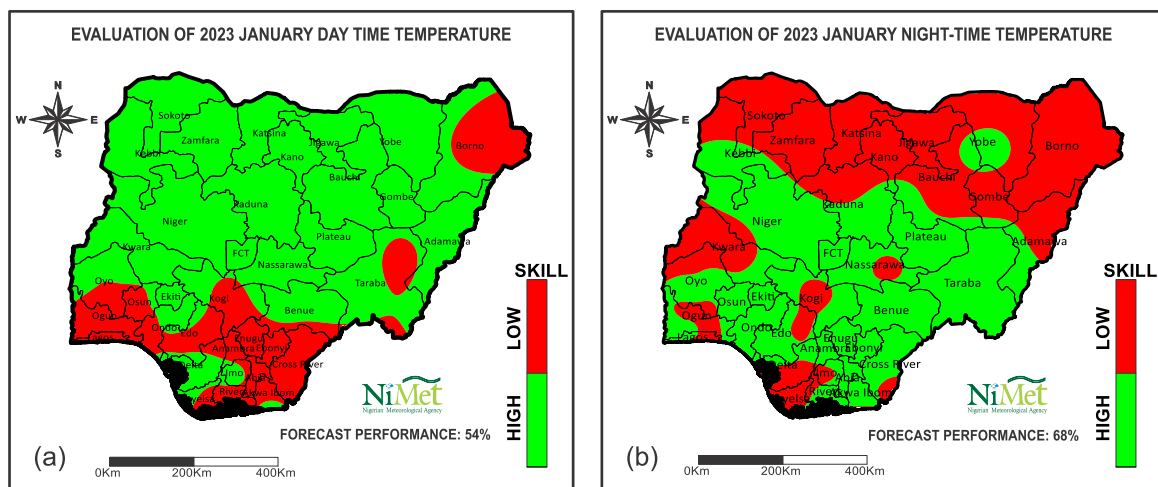
While for the 2023 length of the growing season as shown in Figure 41 b, indicates a high level of precision of 98% forecast performance as shown in green colour. Places in red colour indicate where the model failed



4.2 Temperature Evaluation (Daytime and Night-time Temperatures)

The Figure 42a shows evaluation of 2023 January day-time temperature. The result revealed 54% forecast performance. Places coloured in red indicate where the model skill performance was low while areas in green represent places where the model recorded high skill performance.

However, for the night-time temperatures (Fig. 42b), most parts of the extreme north show low-skill performance, except for Yobe. On the other hand, the central and southern states show high-skill performance, except for parts of Kwara, Kogi, Nasarawa, Ogun, Imo, Bayelsa, and Akwa Ibom states, which show low-skill performance. Overall, the forecast for night-time temperatures in January has a performance rate of 68%.



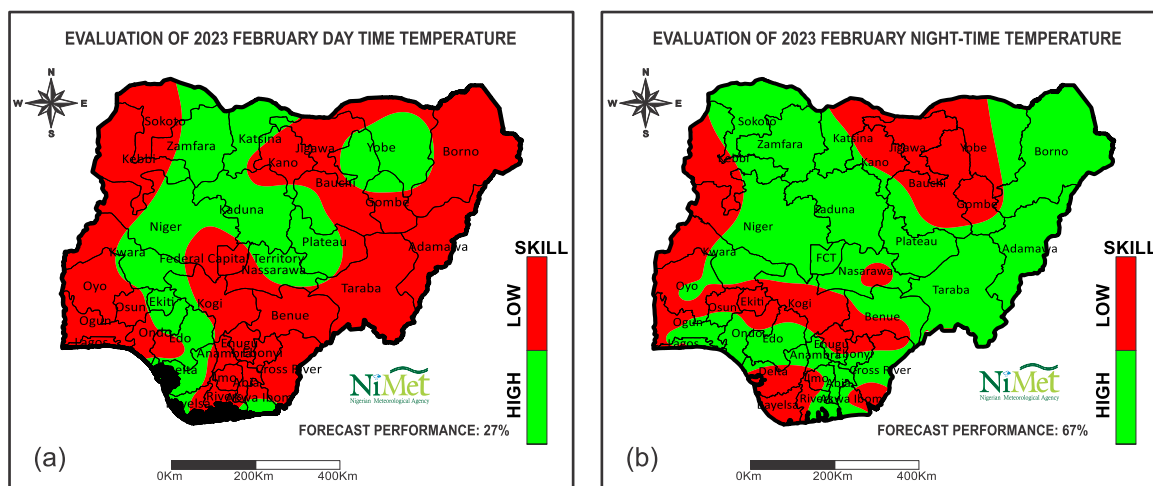


Figure 43a and b: Evaluation of February Day and Night Temperatures

The forecast performance for daytime temperatures in February 2023 (Fig. 43a) showed a low score of 27%. Observed daytime temperatures were warmer than the predicted, deviating by 1 °C to 2.3 °C.

On the other hand, the February night temperature forecast performance showed a better performance of 67%. The results of the evaluation indicate that the prediction agreed with the observed in parts of Borno, Lagos, Ondo, parts of Ogun, Anambra, Ebonyi, Abia, Cross river and Rivers State. The area where the prediction agrees with the observed are shaded in green on the map. While the areas where the observed deviated from the predicted are shaded in red. These areas include Jigawa, Bauchi, Gombe, Yobe, Kano, Katsina, Ekiti, Kogi, Benue, Enugu, parts of Osun, Delta, Bayelsa, Ogun, Oyo, Kwara, Niger and Kebbi.

Figure 44a shows that March 2023 daytime temperature forecast had a 77% accuracy. The forecast performed well with high skill in most parts of the country except over Kano, Yobe, Gombe States, and some areas of Benue, Cross River, Anambra, Edo, Ekiti, and Kebbi States where the observed temperatures differed from the predicted.

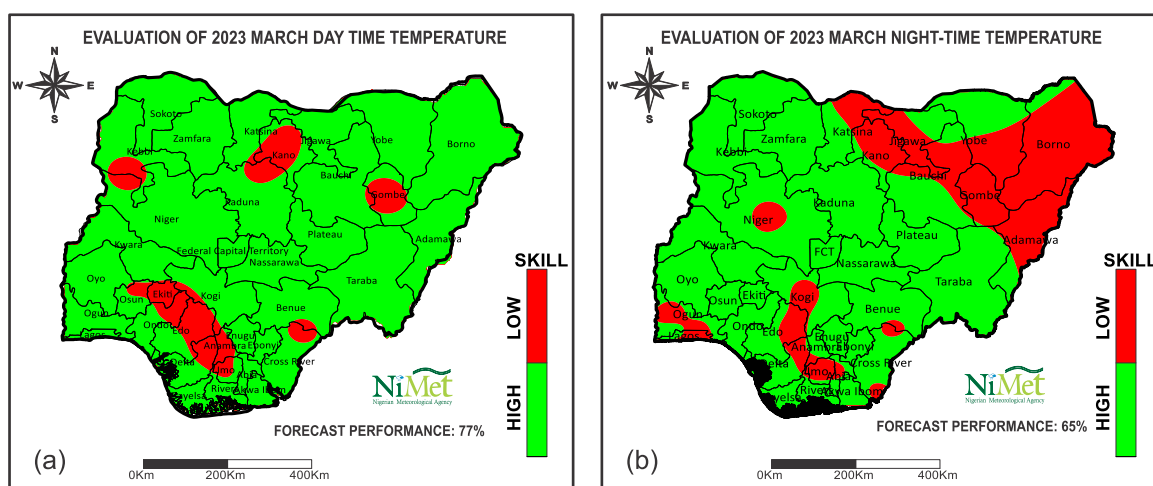


Figure 44a and b: Evaluation of March Day and Night Temperatures

For the nighttime temperature evaluation in March (Fig. 44b), the north-eastern axis, Jigawa, Kano, and parts of Katsina, Niger, Ogun, Kogi, Edo, Anambra, Benue, most of Lagos and Imo had performed poorly. The prediction was 65% accurate over the rest of the country.

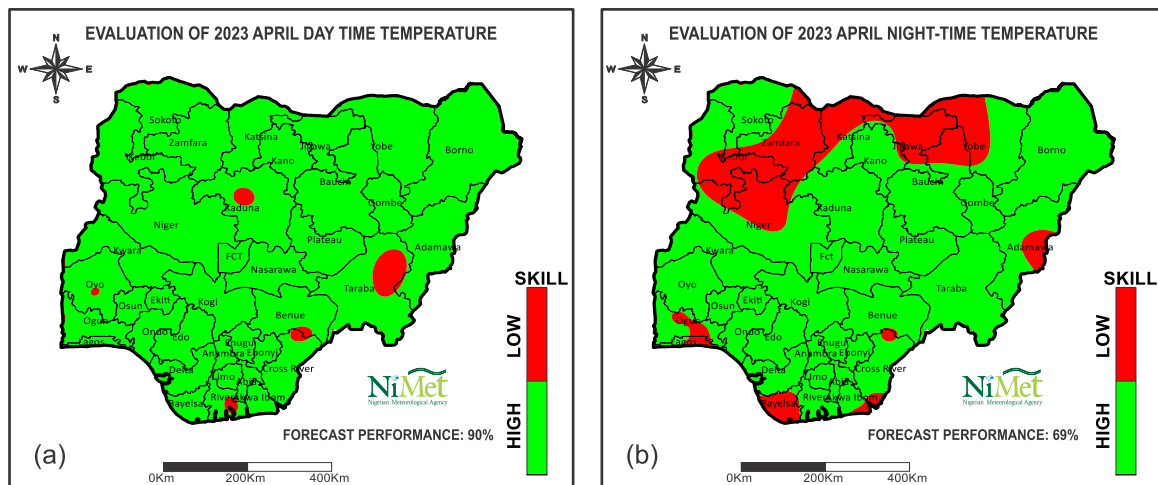


Figure 45a and b: Evaluation of March Day and Night Temperatures

The day-time maximum temperature forecast for the month of April in 2023, shows that the forecast model recorded a performance of 90%, signifying that the model performed accurately as predicted over most places. However, the level accuracy in states like Kaduna, Taraba, Oyo, Rivers and Taraba were low as shown in Figure 45a.

The 2023 April night-time temperature puts the forecast performance at 69% with the high skill recorded over most parts of the central and southern states. The model performance was however low, particularly over parts of Kebbi, Zamfara, Niger, Katsina, Jigawa, Yobe, Adamawa, Benue, Taraba, Cross River, Bayelsa, Lagos and Ogun state.

Figure 46a shows the evaluation of the May 2023 daytime temperature forecast, which had a forecast performance of 79% compared to the observed temperature, indicating a high level of accuracy.

On the other hand, the night-time temperature prediction for May had a performance of 67% accuracy. The forecast model had high accuracy over the southern states (West, South, and East), but it missed most of the northern and parts of central States.

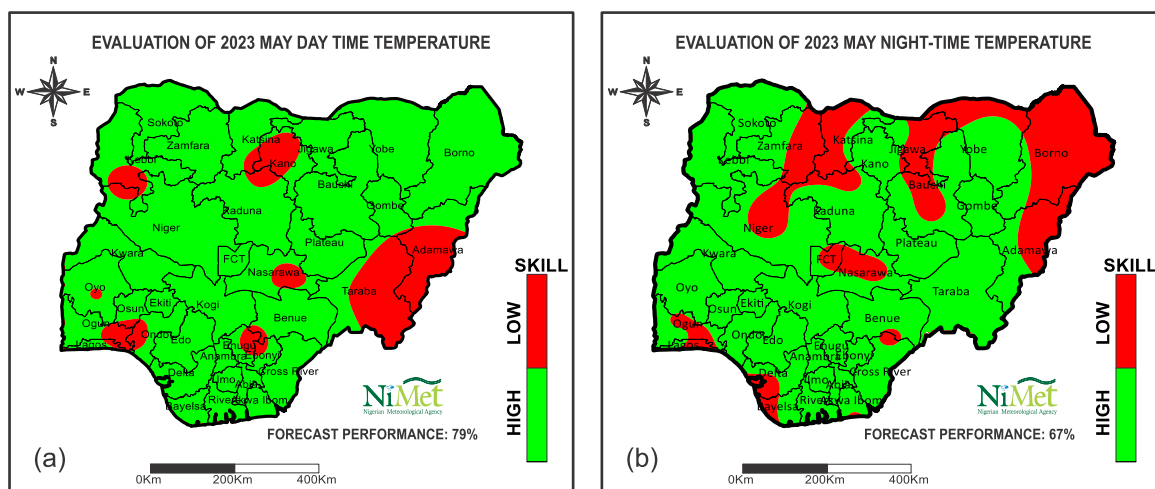


Figure 46a and b: Evaluation of May Day and Night Temperatures

Table 1 shows a summary of the 2023 daytime and night-time Temperature forecast performance.

S/N	Month	Day-time Performance (%)	Night-time Performance (%)
1	January	54	68
2	February	27	67
3	March	77	65
4	April	90	69
5	May	79	67

Chapter Five

5.0 Daytime and Nighttime Temperature Predictions

This chapter highlights the forecasted day and night temperatures from January to May 2024 for selected locations in the 36 states of the country and the FCT.

Table 2: Predicted 2024 Day Time Temperatures

State	Location	January	February	March	April	May
Abia	Arochukwu	29.6	31.0	30.7	30.5	29.6
	Ukwa West	30.5	31.5	31.0	30.6	29.8
	Umuahia	33.6	35.2	34.3	33.6	32.3
	Umunneochi	29.9	31.5	31.1	30.8	29.8
Adamawa	Ganye	29.7	33.0	34.3	33.2	30.1
	Madagali	32.3	35.8	38.3	39.5	38.1
	Numan	33.8	37.0	38.1	36.8	34.0
	Yola	33.9	37.6	39.8	40.1	37.5
Akwa-ibom	Eket	31.0	32.4	31.8	31.6	30.7
	Oni	29.6	31.0	30.7	30.5	29.6
	Oron	29.0	29.4	29.1	28.8	28.2
	Oruk	30.5	31.5	31.0	30.6	29.8
	Uyo	33.2	34.8	33.9	33.1	32.1
Anambra	Anambara West	30.4	31.9	31.5	31.0	29.9
	Awka	34.3	35.8	35.3	34.6	32.9
	Idemi South	29.7	31.2	30.8	30.6	29.6
	Ogbaru	29.7	31.2	30.8	30.6	29.6
Bauchi	Bauchi	30.3	33.8	36.9	38.5	36.7
	Bogoro	31.1	33.8	35.0	34.7	32.4
	Darazo	31.7	35.4	37.8	39.1	37.8
	Zaki	31.2	35.1	38.0	40.5	40.2
Bayelsa	Brass	29.7	30.7	30.2	29.4	28.7
	Ekeremor	29.6	30.5	30.2	29.8	29.0
	Southern Ijaw	29.7	30.7	30.2	29.4	28.7
	Yenegoa	33.2	34.4	34.1	33.7	32.7
Benue	Katsina Ala	30.9	33.5	33.7	32.9	31.2
	Makurdi	34.8	37.5	37.5	36.2	33.7
	Oturkpo	31.7	34.1	34.4	33.6	31.6
	Vandeikya	30.4	32.5	32.3	31.8	30.4
Borno	Abadam	30.7	34.6	38.0	41.5	42.2
	Dikwa	33.7	37.1	40.0	42.1	41.6
	Maiduguri	30.9	34.8	38.2	41.2	40.9

	Nganzai	32.0	35.7	38.8	41.5	41.3
Cross-river	Abi	29.9	31.5	31.2	30.9	29.8
	Calabar	32.6	34.1	32.7	32.2	31.3
	Ikom	33.3	35.6	35.1	34.0	32.9
	Obudu	30.4	31.9	31.6	31.0	29.8
	Ogoja	35.0	37.0	36.6	35.4	33.3
Delta	Asaba	34.5	36.2	35.7	35.1	33.4
	Ndoka East	31.0	32.5	32.0	31.7	30.7
	Patani	30.0	31.1	30.7	30.1	29.4
	Warri	29.3	30.4	30.1	29.6	28.7
	Warri North	33.2	34.4	34.1	33.7	32.7
Ebonyi	Abakaliki	30.4	32.2	31.9	31.3	30.1
	Afikposi South	29.9	31.5	31.1	30.8	29.8
	Ishielu	30.4	32.2	31.9	31.3	30.1
Edo	Akoko Edo	32.2	34.1	33.9	33.1	31.0
	Benin	33.6	35.2	34.5	34.2	33.0
	Esan East	30.4	31.8	31.2	30.6	29.6
	Ovia Southwest	29.7	31.1	30.5	29.9	28.8
Ekiti	Ado Ekiti	33.2	34.9	34.2	33.4	31.7
	Ide Orun	31.4	33.0	32.5	31.5	29.6
	Ijero	32.1	34.0	33.5	32.2	30.2
	Ikole	33.0	35.0	34.8	34.0	31.5
Enugu	Aninri	29.9	31.5	31.1	30.8	29.8
	Enugu	33.7	35.8	35.3	34.5	32.6
	Igboeze North	30.4	32.3	31.9	31.3	29.9
	Uzo Uwani	30.4	31.9	31.5	31.0	29.9
FCT	Abaji	33.0	34.5	34.7	33.8	31.5
	Abuja	34.8	37.0	37.0	36.3	33.6
	Bwari	32.7	34.6	35.1	33.7	31.0
	Kuje	32.9	34.8	35.1	34.1	31.5
Gombe	Balanga	34.7	37.8	39.1	37.8	34.8
	Dukku	31.7	35.4	37.8	39.1	37.8
	Gombe	30.5	34.4	37.1	38.6	36.5
	Shomgom	32.9	36.4	37.6	36.3	33.3
Imo	Ideato North	29.7	31.2	30.8	30.6	29.6
	Ngorokpala	29.9	31.3	31.0	30.7	29.8
	Obowo	29.6	31.0	30.7	30.5	29.6
	Owerri	33.7	35.2	34.5	33.9	32.4
Jigawa	Dutse	31.0	32.4	31.8	31.6	30.7
	Gwaram	29.7	33.8	36.6	39.0	38.8

	Gwiwa	31.5	35.1	37.5	39.0	38.0
	Suletankarkar	30.5	34.5	37.5	40.2	40.0
Kaduna	Bimin Gwari	30.0	33.8	35.5	35.6	33.0
	Kachia	32.7	35.4	36.2	35.0	31.9
	Kaduna	30.6	34.4	35.6	36.2	33.8
	Lere	31.2	34.1	35.6	35.8	33.9
	Zaria	29.2	33.1	35.5	37.0	34.8
Kano	Dambatta	30.1	34.2	37.1	39.8	39.8
	Gwarzo	29.6	33.7	36.3	38.2	37.6
	Kano	28.6	33.4	36.4	39.4	38.8
	Sumaila	30.0	33.9	36.4	38.1	37.2
Katsina	Danmusa	29.5	33.5	35.9	37.6	36.5
	Katsina	29.1	33.0	36.2	39.3	38.9
	Sabuwa	29.8	33.7	35.7	36.5	34.4
	Zango	29.7	33.9	36.9	39.9	40.1
Kebbi	Arewa	33.1	36.9	39.2	40.7	39.1
	Dokonwasagu	32.4	36.0	37.7	37.8	35.1
	Suru	33.5	37.0	38.9	39.3	37.0
	Yelwa	34.9	37.9	39.4	39.2	36.4
Kogi	Ibaji	31.4	32.9	32.5	31.8	30.4
	Lokoja	34.8	37.3	37.6	36.5	34.1
	Yagba West	33.0	35.0	34.8	34.0	31.5
Kwara	Baruten	34.1	36.2	35.7	34.2	32.0
	Ekiti	32.1	34.0	33.5	32.2	30.2
	Ilorin	33.8	35.9	35.9	34.8	32.7
	Pategi	34.0	36.2	36.3	35.9	33.4
Lagos	Badagry	29.8	30.7	30.3	29.8	29.1
	Ikeja	33.0	34.1	33.9	33.5	32.2
	Ikorodu	29.4	30.4	30.1	29.6	28.9
	Lagos Island	31.0	31.5	31.7	31.4	30.6
Nasarawa	Akwanga	34.1	36.2	36.6	34.9	31.6
	Awe	31.6	34.5	34.9	33.7	31.8
	Doma	32.4	34.8	35.4	34.5	32.2
	Lafia	35.1	37.8	37.9	36.5	33.7
Niger	Bida	34.9	37.8	38.3	37.8	35.0
	Borgu	32.1	35.4	37.0	37.1	35.1
	Lapai	33.0	34.5	34.7	33.8	31.5
	Magama	32.5	35.8	37.2	36.7	34.2
	Mashigi	34.0	36.5	37.0	36.5	34.1
	Minna	34.7	37.5	38.1	37.6	34.5

	Rijaw	26.5	26.5	27.2	28.4	29.3
Ogun	Abeokuta	35.1	36.9	35.9	35.0	33.3
	Ijebu Ode	33.5	35.1	34.4	33.7	32.3
	Imeko Afon	31.4	33.0	32.5	31.3	30.2
	Ipokia	30.8	31.6	31.0	30.1	29.3
	Ogun Waterside	29.2	30.4	30.1	29.5	28.7
Ondo	Akoko Northwest	31.4	33.0	32.5	31.5	29.6
	Akure	33.3	34.9	34.1	33.4	31.7
	Ilaje Eseodo	29.3	30.4	30.1	29.6	28.7
	Ondo	33.5	35.0	34.5	33.0	31.5
	Ose	30.9	32.1	31.3	30.4	29.3
Osun	Atakumosa East	30.7	32.3	31.8	30.6	29.0
	Ifedayo	32.1	34.0	33.5	32.2	30.2
	Ife North	30.3	31.9	31.3	30.2	29.1
	Oshogbo	34.0	35.7	35.1	33.8	32.1
Oyo	Ibadan	33.7	35.7	35.2	34.1	32.4
	Iseyin	34.2	35.6	35.0	33.6	31.8
	Iwajowa	32.0	33.8	33.5	32.0	30.6
	Oluyole	30.5	31.7	31.1	30.3	29.4
	Shaki	33.8	35.8	35.4	33.6	31.7
Plateau	Bokkos	33.8	35.9	36.2	34.4	31.1
	Jos	27.7	30.2	31.5	31.3	28.8
	Langtang South	33.6	36.6	37.1	35.0	32.4
	Wase	34.9	37.5	38.1	36.1	33.0
Rivers	Akukutor	29.8	30.7	30.1	29.4	28.6
	Ogba Egbe	29.9	31.3	31.0	30.7	29.8
	Opobo Nkoro	29.6	30.2	29.7	29.1	28.4
	Port Harcourt	33.3	34.5	33.5	33.1	32.1
Sokoto	Gudu North	31.8	35.9	38.5	41.0	40.4
	Illala	31.5	35.6	38.4	40.9	40.2
	Isa	31.5	35.4	38.0	40.1	39.1
	Kebbe	33.0	36.7	38.7	39.3	37.0
	Sokoto	32.4	36.0	38.7	41.0	40.0
Taraba	Bali	34.1	37.1	37.5	35.4	31.7
	Jalingo	34.7	37.7	38.6	37.7	34.6
	Sardauna	29.6	31.9	32.2	30.7	28.2
Yobe	Gulani	32.9	36.2	38.5	39.4	37.3
	Nguru	29.8	33.7	37.0	40.8	41.1
	Potiskum	30.3	34.3	37.0	39.6	39.2
	Tarmuwa	30.8	34.7	37.8	40.7	40.7

	Yunusari	30.3	34.2	37.5	40.8	41.3
Zamfara	Gummi	33.0	36.7	38.7	39.3	37.0
	Gusau	30.9	34.9	37.8	39.4	37.5
	Maru	31.4	35.2	37.0	37.3	34.9
	Shinkafi	31.5	35.4	38.0	40.1	39.1

Table 3: Predicted 2024 Night-Time Temperatures

State	Location	January	February	March	April	May
Abia	Arochukwu	19.3	22.2	23.4	24.0	23.7
	Ukwa West	20.1	22.9	23.9	24.2	23.9
	Umuahia	21.9	24.1	24.4	24.2	23.7
	Umunneochi	18.6	21.8	23.3	24.0	23.7
Adamawa	Ganye	14.4	17.6	20.3	21.8	21.6
	Madagali	13.6	17.3	21.4	24.2	25.3
	Numan	15.9	19.8	23.5	25.4	25.2
	Yola	17.6	20.9	25.0	27.3	26.4
Akwa-Ibom	Eket	22.6	24.0	24.3	24.1	23.5
	Oni	19.3	22.2	23.4	24.0	23.7
	Oron	25.2	26.8	27.2	27.3	26.9
	Oruk	20.1	22.9	23.9	24.2	23.9
	Uyo	21.8	23.9	24.2	24.2	23.7
Anambra	Anambara West	18.5	22.0	23.4	24.1	23.9
	Awka	21.2	24.5	25.0	24.7	24.0
	Idemi South	19.0	22.2	23.5	24.1	23.9
	Ogbaru	19.0	22.2	23.5	24.1	23.9
Bauchi	Bauchi	13.9	16.8	21.4	24.0	24.6
	Bogoro	14.7	18.0	20.6	21.7	21.7
	Darazo	13.5	17.2	21.5	24.3	25.2
	Zaki	13.1	16.6	20.8	23.8	25.5
Bayelsa	Brass	22.2	24.6	25.1	25.3	24.9
	Ekeremor	21.9	24.7	25.3	25.5	25.1
	Southern Ijaw	22.2	24.6	25.1	25.3	24.9
	Yenegoa	20.9	23.7	24.4	24.6	24.3
Benue	Katsina Ala	17.2	20.8	23.0	24.2	23.9
	Makurdi	18.5	22.7	25.4	25.7	24.5
	Oturkpo	17.3	21.2	23.3	24.4	24.0
	Vandeikya	17.4	20.8	22.9	24.0	23.8
Borno	Abadam	13.1	16.7	21.2	25.1	27.5
	Dikwa	14.8	18.4	22.5	25.7	27.4
	Maiduguri	12.5	16.0	20.6	24.7	26.8
	Nganzai	13.9	17.6	21.9	25.3	27.1

Cross-river	Abi	18.8	21.9	23.5	24.3	24.0
	Calabar	22.6	24.3	24.1	24.0	23.7
	Ikom	20.2	22.7	23.8	24.0	23.2
	Obudu	18.4	21.3	23.0	23.9	23.7
	Ogoja	20.4	22.5	23.8	24.0	23.4
Delta	Asaba	21.5	24.3	24.8	24.7	24.0
	Ndoka East	19.9	23.0	24.0	24.4	24.1
	Patani	20.9	23.7	24.4	24.6	24.3
	Warri	23.2	24.9	25.2	25.0	24.2
	Warri North	21.9	24.8	25.6	25.8	25.4
Ebonyi	Abakaliki	18.0	21.3	23.1	24.1	23.9
	Afikposi South	18.6	21.8	23.3	24.0	23.7
	Ishielu	18.0	21.3	23.1	24.1	23.9
Edo	Akoko Edo	18.3	21.6	23.2	23.8	23.3
	Benin	22.7	24.9	24.8	24.7	24.3
	Esan East	18.6	21.9	23.2	23.7	23.5
	Ovia Southwest	19.8	23.1	24.1	24.5	24.1
Ekiti	Ado Ekiti	19.0	22.3	23.1	23.2	22.6
	Ide Orun	18.1	21.2	22.5	23.1	22.7
	Ijero	17.6	21.1	22.6	23.0	22.6
	Ikole	18.0	21.4	23.0	23.7	23.1
Enugu	Aninri	18.6	21.8	23.3	24.0	23.7
	Enugu	21.0	23.9	25.1	25.0	23.9
	Igboeze North	17.5	20.9	22.6	23.7	23.4
	Uzo Uwani	18.5	22.0	23.4	24.1	23.9
FCT	Abaji	16.8	20.2	22.6	24.2	23.9
	Abuja	17.9	21.4	23.4	24.5	23.7
	Bwari	16.5	19.7	22.1	23.3	23.0
	Kuje	17.5	20.9	23.2	24.4	23.9
Gombe	Balanga	16.1	20.0	23.5	24.8	24.6
	Dukku	13.5	17.2	21.5	24.3	25.2
	Gombe	15.2	18.4	22.3	24.7	24.4
	Shomgom	15.2	19.2	22.9	24.6	24.4
Imo	Ideato North	19.0	22.2	23.5	24.1	23.9
	Ngorokpala	19.7	22.6	23.7	24.2	23.9
	Obowo	19.3	22.2	23.4	24.0	23.7
	Owerri	21.7	23.8	24.3	24.2	23.6
Jigawa	Dutse	13.0	16.5	20.8	24.3	25.8
	Gwaram	13.3	16.9	21.1	24.1	25.1
	Gwiwa	12.3	15.6	19.7	22.7	24.5
	Suletankarkar	12.7	16.1	20.5	23.8	25.8

Kaduna	Bimin Gwari	13.2	16.6	20.0	22.0	22.6
	Kachia	14.9	18.3	20.8	21.7	21.8
	Kaduna	13.2	16.6	20.9	24.4	25.7
	Lere	13.1	16.4	19.6	21.3	21.7
	Zaria	14.1	17.3	21.2	23.3	23.0
Kano	Dambatta	12.3	15.6	20.0	23.2	25.3
	Gwarzo	11.9	15.2	19.4	22.3	24.0
	Kano	13.2	16.6	20.9	24.4	25.7
	Sumaila	11.9	15.3	19.5	22.5	24.1
Katsina	Danmusa	12.4	15.7	19.7	22.2	23.5
	Katsina	13.3	16.4	20.6	24.6	26.0
	Sabuwa	13.1	16.5	20.1	22.2	22.9
	Zango	12.6	16.1	20.4	23.9	26.0
Kebbi	Arewa	15.7	18.9	22.7	26.3	27.1
	Dokonwasagu	14.6	18.1	21.8	24.0	24.2
	Suru	15.5	19.0	22.9	26.0	26.2
	Yelwa	16.0	19.6	24.1	26.7	25.9
Kogi	Ibaji	18.4	21.8	23.3	24.1	23.8
	Lokoja	19.4	24.0	26.1	26.3	25.1
	Yagba West	18.0	21.4	23.0	23.7	23.1
Kwara	Baruten	17.7	20.9	22.8	23.4	23.1
	Ekiti	17.6	21.1	22.6	23.0	22.6
	Ilorin	19.5	22.6	23.8	24.0	23.0
	Pategi	18.1	21.9	24.0	24.9	24.3
Lagos	Badagry	23.0	25.3	26.0	26.1	25.7
	Ikeja	23.1	25.1	25.5	25.4	24.6
	Ikorodu	22.9	25.4	26.1	26.3	25.9
	Lagos Island	24.4	26.3	26.5	26.2	25.4
Nasarawa	Akwanga	17.4	20.7	22.9	23.7	23.3
	Awe	17.1	20.9	23.4	24.7	24.4
	Doma	17.5	21.3	23.7	24.8	24.4
	Lafia	18.6	22.7	25.6	26.0	24.8
Niger	Bida	20.9	24.2	26.2	26.3	24.9
	Borgu	16.2	20.0	23.9	26.0	25.8
	Lapai	16.8	20.2	22.6	24.2	23.9
	Magama	15.0	18.6	22.5	24.7	24.8
	Mashigi	16.7	20.6	23.7	25.1	24.8
	Minna	20.7	23.3	25.6	25.7	24.3
	Rijau	25.9	25.9	26.6	27.8	28.7
Ogun	Abeokuta	21.6	24.6	25.3	25.2	24.4
	Ijebu Ode	21.9	24.3	24.9	24.8	23.9
	Imeko Afon	19.0	22.3	23.5	23.7	23.4

Ondo	Ipokia	23.1	25.4	25.9	26.0	25.6
	Ogun Waterside	21.8	24.6	25.4	25.7	25.3
	Akoko Northwest	18.1	21.2	22.5	23.1	22.7
	Akure	18.9	22.4	23.2	23.3	22.7
	Ilaje Eseodo	21.9	24.8	25.6	25.8	25.4
	Ondo	21.6	23.5	24.0	23.8	23.3
	Ose	18.8	21.8	23.0	23.6	23.2
Osun	Atakumosa East	18.1	21.2	22.5	23.0	22.6
	Ifedayo	17.6	21.1	22.6	23.0	22.6
	Ife North	19.5	22.6	23.6	24.0	23.6
	Oshogbo	17.9	22.0	23.1	23.3	22.6
Oyo	Ibadan	22.2	24.3	24.6	24.3	23.6
	Iseyin	20.7	22.5	23.6	23.5	22.8
	Iwajowa	18.4	21.7	23.2	23.5	23.2
	Oluyole	20.0	23.1	24.0	24.3	23.9
	Shaki	19.6	22.2	23.2	23.2	22.4
Plateau	Bokkos	17.6	20.5	22.3	22.8	22.4
	Jos	11.5	14.3	17.0	18.6	18.6
	Langtang South	17.3	21.2	24.2	25.1	24.7
	Wase	18.3	21.7	24.2	24.9	24.5
Rivers	Akukutor	22.2	24.6	25.2	25.4	25.0
	Ogba Egbe	19.7	22.6	23.7	24.2	23.9
	Opobo Nkoro	23.6	25.9	26.4	26.5	26.1
	Port Harcourt	21.1	23.3	23.9	24.0	23.6
Sokoto	Gudu North	14.8	18.0	21.7	25.6	27.6
	Illela	14.3	17.6	21.6	25.2	27.2
	Isa	14.0	17.3	21.4	24.6	26.2
	Kebbe	15.2	18.6	22.4	25.3	25.8
	Sokoto	17.0	19.9	23.8	27.0	27.8
Taraba	Bali	17.7	21.2	23.6	24.3	23.4
	Jalingo	19.1	22.4	25.0	26.0	24.3
	Sardauna	15.3	17.8	19.4	19.8	19.4
Yobe	Gulani	14.9	18.4	22.2	24.4	24.7
	Nguru	13.7	16.3	20.8	24.5	26.1
	Potiskum	12.8	16.3	21.0	24.5	26.0
	Tarmuwa	13.3	16.9	21.2	24.9	26.7
	Yunusari	12.9	16.4	20.8	24.6	26.7
Zamfara	Gummi	15.2	18.6	22.4	25.3	25.8
	Gusau	15.5	18.4	22.5	25.1	25.2
	Maru	14.1	17.6	21.1	23.2	23.7
	Shinkafi	14.0	17.3	21.4	24.6	26.2

Chapter Six

6.1 Detailed 774 Local Government Area Seasonal Rainfall Prediction

Nigeria is a country with vast expanse of land, with different climatic and agroecological zones. Most states have about 2 or 3 agroecological zones and this has implications on the rainfall distribution such as onset, cessation, length of season and annual rainfall amount over each state. Below is a detailed breakdown of the forecast over the 774 local government areas of the country.

Table 4: Summary of Predicted Onset Date, Cessation Date, Length of Season and Annual Rainfall Amounts for States and Local Government Areas of Nigeria

State	City	Onset date	Season end	Season Length Days	Annual Rainfall mm
Abia	Aba North	15-Mar	16-Dec	277	2556
	Aba South	14-Mar	16-Dec	277	2569
	Arochukw	20-Mar	12-Dec	268	2354
	Bende	22-Mar	12-Dec	266	2309
	Ikwuano	18-Mar	14-Dec	271	2427
	Isiala Ngwa North	18-Mar	14-Dec	272	2439
	Isiala Ngwa South	17-Mar	14-Dec	273	2475
	Isuikwua	24-Mar	10-Dec	263	2247
	Oboma Ngwa	15-Mar	16-Dec	276	2544
	Ohafia Abia	22-Mar	11-Dec	265	2301
	Osisioma Ngwa	16-Mar	15-Dec	275	2519
	Ugwunagbo	14-Mar	17-Dec	279	2596
	Ukwa East	13-Mar	17-Dec	280	2632
	Ukwa West	13-Mar	17-Dec	280	2619
	Umuahia North	21-Mar	12-Dec	267	2343
	Umuahia South	20-Mar	13-Dec	269	2388
	Umu-Nneochi	26-Mar	9-Dec	259	2173
Adamawa	Demsa	23-May	11-Nov	186	1097
	Fufore	8-May	13-Nov	190	1143
	Ganye	28-Apr	19-Nov	206	1320
	Girie	21-May	5-Nov	169	965
	Gombi	11-May	11-Nov	185	1095
	Guyuk	16-May	8-Nov	177	1020
	Hong	22-May	4-Nov	167	951
	Jada	1-May	17-Nov	201	1258
	Jimeta	9-May	12-Nov	189	1127
	Lamurde	13-May	10-Nov	182	1068
	Madagali	30-May	31-Oct	155	881
	Maiha	16-May	8-Nov	176	1016

	Mayo-Bel	3-May	16-Nov	198	1220
	Michika	26-May	2-Nov	160	909
	Mubi North	23-May	4-Nov	166	943
	Mubi South	21-May	5-Nov	169	961
	Numan	11-May	11-Nov	184	1084
	Shelleng	18-May	7-Nov	174	1001
	Song	16-May	8-Nov	177	1021
	Toungo	5-May	15-Nov	195	1188
	Yola North	23-May	21-Oct	188	1124
	Yola South	22-May	22-Oct	190	1138
Akwa Ibom	Abak	13-Mar	17-Dec	279	2605
	Eastern Obolo	7-Mar	21-Dec	289	2853
	Eket	9-Mar	20-Dec	287	2792
	Esit - Eket	9-Mar	20-Dec	287	2783
	Essien Udim	15-Mar	16-Dec	277	2558
	Etim Ekpo	13-Mar	17-Dec	280	2620
	Etinan	11-Mar	18-Dec	283	2695
	Ibendo	8-Mar	20-Dec	288	2831
	Ibesikpo Asutan	12-Mar	17-Dec	281	2648
	Ibiono Ibom	16-Mar	15-Dec	275	2507
	Ika	14-Mar	17-Dec	279	2597
	Ikono	16-Mar	15-Dec	275	2507
	Ikot Abasi	8-Mar	20-Dec	288	2830
	Ikot Ekpene	16-Mar	15-Dec	275	2511
	Ini	18-Mar	14-Dec	271	2431
	Itu	15-Mar	16-Dec	276	2544
	Mbo	8-Mar	20-Dec	287	2795
	Mkpat Enin	8-Mar	20-Dec	288	2809
	Nsit Atai	11-Mar	18-Dec	283	2689
	Nsit Ibom	12-Mar	18-Dec	281	2658
	Nsit Ubium	10-Mar	19-Dec	284	2726
	Obot Akara	17-Mar	15-Dec	274	2488
	Okobo	11-Mar	18-Dec	283	2702
	Onna	9-Mar	20-Dec	287	2792
	Oron	10-Mar	19-Dec	285	2738
	Oruk Anam	11-Mar	18-Dec	283	2691
	Udung Uko	10-Mar	19-Dec	284	2729
	Ukanafun	12-Mar	17-Dec	281	2649
	Uruan	13-Mar	17-Dec	279	2612
	Urue-Offong/Oruko	10-Mar	19-Dec	285	2750
	Uyo	13-Mar	17-Dec	279	2604
Anambra	Aguata	26-Mar	9-Dec	258	2158
	Anambra East	31-Mar	6-Dec	251	2028

	Anambra West	2-Apr	5-Dec	247	1947
	Anaocha	28-Mar	8-Dec	256	2115
	Awka North	31-Mar	6-Dec	251	2016
	Awka South	29-Mar	7-Dec	254	2074
	Ayamelum	3-Apr	4-Dec	246	1933
	Njikoka	30-Mar	7-Dec	253	2059
	Ekwusigo	26-Mar	9-Dec	258	2155
	Idemili North	28-Mar	8-Dec	255	2101
	Idemili South	27-Mar	8-Dec	256	2124
	Ihiala	25-Mar	10-Dec	261	2214
	Dunukofia	29-Mar	7-Dec	254	2074
	Nnewi North	27-Mar	9-Dec	258	2154
	Nnewi South	26-Mar	9-Dec	259	2177
	Ogbaru	25-Mar	10-Dec	260	2202
	Onitsha North	28-Mar	8-Dec	255	2102
	Onitsha South	28-Mar	8-Dec	256	2114
	Orumba North	28-Mar	8-Dec	256	2111
	Orumba South	27-Mar	9-Dec	258	2153
	Oyi	29-Mar	7-Dec	253	2062
Bauchi	Alkaleri	17-May	7-Nov	164	904
	Bauchi	22-May	4-Nov	156	851
	Bogoro	14-May	9-Nov	169	950
	Damban	8-Jun	25-Oct	128	674
	Darazo	2-Jun	28-Oct	138	705
	Dass	19-May	6-Nov	162	890
	Gamawa	14-Jun	21-Oct	119	657
	Ganjuwa	29-May	31-Oct	145	786
	Giade	7-Jun	26-Oct	131	681
	Itas/Gadau	12-Jun	22-Oct	123	662
	Jama'are	10-Jun	24-Oct	126	669
	Katagum	9-Jun	24-Oct	128	672
	Kirfi	24-May	3-Nov	153	780
	Misau	6-Jun	26-Oct	132	683
	Ningi	1-Jun	29-Oct	140	713
	Shira	7-Jun	25-Oct	131	680
	Tafawa-Balewa	17-May	7-Nov	164	903
	Toro	23-May	4-Nov	154	839
	Warji	2-Jun	28-Oct	138	704
	Zaki	17-Jun	19-Oct	114	603
Bayelsa	Brass	6-Mar	21-Dec	291	2890
	Ekeremor	12-Mar	18-Dec	282	2668
	Kolokuma/Opokuma	14-Mar	16-Dec	278	2575
	Nembe	7-Mar	21-Dec	290	2860

	Ogbia	10-Mar	19-Dec	285	2740
	Sagbama	15-Mar	15-Dec	276	2535
	Southern Ijaw	8-Mar	20-Dec	288	2818
	Yenegoa	15-Mar	16-Dec	277	2562
Benue	Ado	27-Apr	2-Dec	189	1824
	Agatu	10-May	24-Nov	168	1487
	Apa	7-May	25-Nov	172	1549
	Buruku	4-May	27-Nov	178	1630
	Gboko	3-May	28-Nov	179	1646
	Guma	10-May	24-Nov	168	1482
	Gwer East	4-May	27-Nov	178	1629
	Gwer West	7-May	25-Nov	172	1546
	Katsina-Ala	4-May	28-Nov	178	1639
	Konshisha	29-Apr	30-Nov	185	1752
	Kwande	27-Apr	2-Dec	189	1822
	Logo	8-May	25-Nov	170	1521
	Makurdi	20-May	27-Nov	161	1168
	Obi	29-Apr	1-Dec	186	1764
	Ogbadibo	29-Apr	1-Dec	186	1760
	Ohimini	2-May	29-Nov	181	1684
	Oju	27-Apr	2-Dec	188	1806
	Okpokwu	29-Apr	1-Dec	186	1760
	Oturkpo	2-May	28-Nov	180	1669
	Tarka	7-May	26-Nov	173	1559
	Ukum	7-May	26-Nov	172	1551
	Ushongo	29-Apr	30-Nov	185	1748
	Vandeikya	27-Apr	2-Dec	189	1817
Borno	Abadam	4-Jul	9-Oct	85	495
	Askira/Uba	28-May	1-Nov	145	848
	Bama	8-Jun	25-Oct	127	477
	Bayo	25-May	3-Nov	150	873
	Biu	28-May	31-Oct	144	842
	Chibok	29-May	31-Oct	142	733
	Dambo	3-Jun	28-Oct	136	703
	Dikwa	13-Jun	22-Oct	118	459
	Gubio	23-Jun	16-Oct	103	456
	Guzamala	25-Jun	14-Oct	99	461
	Gwoza	3-Jun	28-Oct	135	702
	Hawul	25-May	2-Nov	150	771
	Jere	12-Jun	22-Oct	120	462
	Kaga	9-Jun	24-Oct	126	473
	Kala/Balge	16-Jun	20-Oct	114	455

	Konduga	10-Jun	24-Oct	124	469
	Kukawa	27-Jun	13-Oct	96	466
	Kwaya Kusar	24-May	3-Nov	151	779
	Mafa	14-Jun	21-Oct	116	457
	Magumeri	16-Jun	20-Oct	113	454
	Maiduguri	12-Jun	22-Oct	120	461
	Marte	19-Jun	18-Oct	109	453
	Mobbar	30-Jun	12-Oct	92	475
	Monguno	21-Jun	17-Oct	106	454
	Ngala	18-Jun	19-Oct	111	453
	Nganzai	20-Jun	17-Oct	107	453
	Shani	21-May	5-Nov	155	806
Cross River	Abi	25-Mar	9-Dec	260	2191
	Akamkpa	18-Mar	14-Dec	272	2439
	Akpabuyo	11-Mar	18-Dec	283	2705
	Bakassi	10-Mar	19-Dec	285	2737
	Bekwarra	5-Apr	3-Dec	243	1881
	Biase	21-Mar	12-Dec	267	2347
	Boki	30-Mar	6-Dec	252	2035
	Calabar Municipal	13-Mar	17-Dec	279	2611
	Calabar South	11-Mar	18-Dec	283	2702
	Etung	25-Mar	10-Dec	261	2219
	Ikom	27-Mar	8-Dec	256	2123
	Obanliku	2-Apr	5-Dec	247	1953
	Obubra	27-Mar	9-Dec	258	2151
	Obudu	3-Apr	4-Dec	245	1916
	Odukpani	16-Mar	15-Dec	275	2521
	Ogoja	2-Apr	5-Dec	247	1944
	Yakurr	24-Mar	10-Dec	261	2225
	Yala	3-Apr	4-Dec	246	1928
Delta	Aniocha North	31-Mar	6-Dec	251	2015
	Aniocha South	28-Mar	8-Dec	255	2094
	Bomadi	16-Mar	15-Dec	274	2499
	Burutu	18-Mar	14-Dec	272	2457
	Ethiope East	25-Mar	9-Dec	260	2187
	Ethiope West	23-Mar	11-Dec	264	2284
	Ika North East	30-Mar	7-Dec	253	2057
	Ika South	29-Mar	7-Dec	254	2074
	Isoko North	20-Mar	13-Dec	268	2367
	Isoko South	19-Mar	13-Dec	270	2412
	Ndokwa East	22-Mar	12-Dec	266	2311
	Ndokwa West	24-Mar	10-Dec	262	2231
	Okpe	22-Mar	11-Dec	265	2295

	Oshimili North	31-Mar	6-Dec	251	2028
	Oshimili South	28-Mar	8-Dec	256	2113
	Patani	16-Mar	15-Dec	275	2506
	Sapele	25-Mar	10-Dec	261	2213
	Udu	20-Mar	13-Dec	269	2377
	Ughelli North	20-Mar	12-Dec	268	2360
	Ughelli South	18-Mar	14-Dec	271	2426
	Ukwuani	24-Mar	10-Dec	262	2228
	Uvwie	21-Mar	12-Dec	267	2339
	Warri North	24-Mar	10-Dec	262	2232
	Warri South	22-Mar	12-Dec	266	2317
	Warri South West	21-Mar	12-Dec	267	2343
Ebonyi	Abakaliki	30-Mar	7-Dec	252	2044
	Afikpo North	25-Mar	10-Dec	260	2201
	Afikpo South	25-Mar	10-Dec	261	2209
	Ebonyi	2-Apr	5-Dec	248	1959
	Ezza North	30-Mar	7-Dec	253	2049
	Ezza South	28-Mar	8-Dec	255	2099
	Ikwo	28-Mar	8-Dec	256	2118
	Ishielu	1-Apr	5-Dec	249	1989
	Ivo	25-Mar	9-Dec	260	2191
	Izzi	2-Apr	5-Dec	247	1952
	Ohaozara	26-Mar	9-Dec	258	2161
	Ohaukwu	2-Apr	5-Dec	248	1966
	Onicha	28-Mar	8-Dec	256	2117
Edo	Akoko-Edo	14-Apr	28-Nov	229	1633
	Egor	31-Mar	6-Dec	250	2007
	Esan Central	5-Apr	3-Dec	243	1866
	Esan North East	6-Apr	2-Dec	242	1847
	Esan South East	3-Apr	4-Dec	245	1916
	Esan West	4-Apr	3-Dec	244	1885
	Etsako Central	8-Apr	1-Dec	237	1775
	Etsako East	12-Apr	29-Nov	232	1684
	Etsako West	9-Apr	1-Dec	237	1767
	Igueben	2-Apr	5-Dec	247	1950
	Ikpoba-Okha	29-Mar	7-Dec	254	2071
	Oredo	30-Mar	7-Dec	253	2051
	Orhionmwon	29-Mar	7-Dec	255	2090
	Ovia North East	1-Apr	5-Dec	248	1971
	Ovia South West	1-Apr	5-Dec	248	1972
	Owan East	10-Apr	30-Nov	235	1738
	Owan West	8-Apr	1-Dec	239	1795

	Uhunmwonde	2-Apr	5-Dec	248	1954
Ekiti	Ado-Ekiti	17-Apr	26-Nov	224	1556
	Efon	18-Apr	25-Nov	222	1539
	Ekiti East	19-Apr	25-Nov	221	1513
	Ekiti South West	16-Apr	26-Nov	225	1579
	Ekiti West	18-Apr	25-Nov	222	1531
	Emure/Ise/Orun	15-Apr	27-Nov	227	1607
	Aiyekire (Gbonyin)	17-Apr	26-Nov	223	1553
	Ido/Osi	20-Apr	24-Nov	218	1476
	Ijero	20-Apr	24-Nov	219	1493
	Ikere	15-Apr	27-Nov	226	1593
	Ikole	20-Apr	23-Nov	218	1472
	Ilejemeji	21-Apr	23-Nov	217	1456
	Irepodun/Ifelodun	18-Apr	25-Nov	222	1528
	Ise/Orun	15-Apr	27-Nov	227	1607
	Moba	22-Apr	23-Nov	216	1445
	Oye	20-Apr	24-Nov	218	1477
Enugu	Aninri	27-Mar	8-Dec	257	2132
	Awgu	29-Mar	7-Dec	254	2083
	Enugu East	3-Apr	4-Dec	246	1922
	Enugu North	2-Apr	5-Dec	248	1965
	Enugu South	1-Apr	5-Dec	249	1983
	Ezeagu	1-Apr	5-Dec	249	1986
	Igbo-Etiti	5-Apr	3-Dec	243	1880
	Igbo-Eze North	9-Apr	30-Nov	236	1751
	Igbo-Eze South	8-Apr	1-Dec	237	1776
	Isi-Uzo	5-Apr	3-Dec	242	1860
	Nkanu East	30-Mar	6-Dec	252	2034
	Nkanu West	31-Mar	6-Dec	251	2013
	Nsukka	7-Apr	2-Dec	240	1815
	Oji-River	29-Mar	7-Dec	254	2076
	Udenu	7-Apr	2-Dec	239	1811
	Udi	2-Apr	5-Dec	248	1966
	Uzo-Uwani	5-Apr	3-Dec	243	1868
FCT	Abaji	12-May	16-Nov	198	1220
	Abuja Municipal	14-May	15-Nov	194	1186
	Bwari	17-May	13-Nov	190	1141
	Gwagwalada	15-May	14-Nov	193	1169
	Kuje	10-May	17-Nov	201	1258
	Kwali	11-May	17-Nov	200	1242
Gombe	Akko	30-May	22-Oct	133	717

	Balanga	27-May	24-Oct	139	761
	Billiri	27-May	24-Oct	138	755
	Dukku	8-Jun	17-Oct	118	632
	Funakaye	8-Jun	17-Oct	118	633
	Gombe	2-Jun	21-Oct	129	693
	Kaltungo	27-May	24-Oct	138	755
	Kwami	5-Jun	19-Oct	124	663
	Nafada	12-Jun	14-Oct	112	606
	Shomgom	25-May	26-Oct	142	789
	Yamaltu/Deba	1-Jun	4-Nov	143	696
Imo	Aboh-Mbaise	19-Mar	13-Dec	270	2396
	Ahiazu-Mbaise	21-Mar	12-Dec	267	2348
	Ehime-Mbano	22-Mar	11-Dec	265	2289
	Ezinihitte	20-Mar	13-Dec	269	2380
	Ideato North	25-Mar	10-Dec	261	2212
	Ideato South	24-Mar	10-Dec	262	2238
	Ihitte/Uboma	22-Mar	11-Dec	265	2305
	Ikeduru	21-Mar	12-Dec	267	2347
	Isiala Mbano	22-Mar	11-Dec	265	2289
	Isu	22-Mar	11-Dec	264	2287
	Mbaitoli	21-Mar	12-Dec	266	2329
	Ngor-Okpala	18-Mar	14-Dec	272	2449
	Njaba	23-Mar	11-Dec	264	2273
	Nkwerre	23-Mar	11-Dec	263	2264
	Nwangele	23-Mar	11-Dec	264	2276
	Obowo	21-Mar	12-Dec	267	2350
	Oguta	22-Mar	11-Dec	265	2305
	Ohaji/Egbema	19-Mar	13-Dec	270	2407
	Okigwe	24-Mar	10-Dec	262	2233
	Orlu	24-Mar	10-Dec	262	2234
	Orsu	25-Mar	10-Dec	261	2208
	Oru East	23-Mar	11-Dec	263	2264
	Oru West	23-Mar	11-Dec	263	2254
	Owerri-Municipal	20-Mar	13-Dec	269	2377
	Owerri North	19-Mar	13-Dec	269	2393
	Owerri West	19-Mar	13-Dec	270	2403
	Unuimo	24-Mar	10-Dec	263	2247
Jigawa	Auyo	18-Jun	19-Oct	104	603
	Babura	23-Jun	16-Oct	97	605
	Biriniwa	24-Jun	15-Oct	95	608
	Bimi Kudu	7-Jun	25-Oct	122	828
	Buji	8-Jun	25-Oct	121	827

	Dutse	11-Jun	23-Oct	116	814
	Gagarawa	20-Jun	17-Oct	101	603
	Garki	19-Jun	18-Oct	103	603
	Gumel	22-Jun	16-Oct	99	605
	Guri	22-Jun	16-Oct	98	605
	Gwaram	4-Jun	27-Oct	127	745
	Gwiwa	23-Jun	16-Oct	96	606
	Hadejia	20-Jun	18-Oct	102	603
	Jahun	15-Jun	21-Oct	110	606
	Kafin Hausa	16-Jun	20-Oct	108	604
	Kaugama	20-Jun	17-Oct	101	603
	Kazaure	22-Jun	16-Oct	98	605
	Kiri Kasamma	21-Jun	17-Oct	100	604
	Kiyawa	12-Jun	22-Oct	115	712
	Maigatari	23-Jun	15-Oct	96	607
	Malam Madori	21-Jun	17-Oct	100	604
	Miga	17-Jun	20-Oct	107	604
	Ringim	16-Jun	20-Oct	108	605
	Roni	22-Jun	16-Oct	98	605
	Sule-Tankarkar	23-Jun	16-Oct	97	606
	Taura	17-Jun	19-Oct	106	604
	Yankwashi	23-Jun	15-Oct	96	607
Kaduna	Bimin-Gwari	30-May	16-Oct	132	879
	Chikun	24-May	20-Oct	164	931
	Giwa	2-Jun	14-Oct	149	856
	Igabi	27-May	18-Oct	159	901
	Ikara	4-Jun	13-Oct	146	844
	Jaba	11-May	28-Oct	184	1086
	Jema'a	9-May	29-Oct	188	1116
	Kachia	16-May	25-Oct	177	1022
	Kaduna North	26-May	19-Oct	161	912
	Kaduna South	25-May	19-Oct	162	919
	Kagarko	11-May	28-Oct	186	1097
	Kajuru	22-May	21-Oct	167	947
	Kaura	13-May	26-Oct	181	1055
	Kauru	21-May	22-Oct	169	964
	Kubau	30-May	16-Oct	154	875
	Kudan	4-Jun	13-Oct	146	846
	Lere	23-May	21-Oct	166	945
	Markafi	5-Jun	13-Oct	145	841
	Sabon-Gari	3-Jun	14-Oct	148	852
	Sanga	8-May	30-Oct	190	1143
	Soba	1-Jun	15-Oct	152	867

	Zango-Kataf	16-May	25-Oct	177	1024
	Zaria	2-Jun	15-Oct	150	860
Kano	Ajingi	13-Jun	22-Oct	118	709
	Albasu	9-Jun	24-Oct	125	720
	Bagwai	15-Jun	21-Oct	115	506
	Bebeji	8-Jun	25-Oct	127	726
	Bichi	17-Jun	19-Oct	112	503
	Bunkure	9-Jun	24-Oct	125	720
	Dala	14-Jun	21-Oct	117	607
	Dambatta	19-Jun	18-Oct	109	503
	Dawakin Kudu	11-Jun	23-Oct	122	714
	Dawakin Tofa	16-Jun	20-Oct	115	505
	Doguwa	31-May	30-Oct	140	840
	Fagge	14-Jun	21-Oct	117	708
	Gabasawa	15-Jun	20-Oct	115	505
	Garko	8-Jun	25-Oct	126	624
	Garum Mallam	9-Jun	24-Oct	125	620
	Gaya	11-Jun	23-Oct	122	614
	Gezawa	14-Jun	21-Oct	116	507
	Gwale	14-Jun	21-Oct	118	608
	Gwarzo	13-Jun	22-Oct	119	610
	Kabo	12-Jun	22-Oct	120	611
	Kano Municipal	13-Jun	22-Oct	118	609
	Karaye	11-Jun	23-Oct	122	615
	Kibiya	7-Jun	25-Oct	128	628
	Kiru	9-Jun	24-Oct	126	622
	Kumbotso	13-Jun	22-Oct	119	610
	Kunchi	19-Jun	18-Oct	108	503
	Kura	11-Jun	23-Oct	122	615
	Madobi	12-Jun	23-Oct	121	613
	Makoda	19-Jun	18-Oct	109	503
	Minjibir	17-Jun	20-Oct	113	504
	Nasarawa	14-Jun	21-Oct	117	507
	Rano	7-Jun	25-Oct	128	628
	Rimin Gado	13-Jun	22-Oct	119	610
	Rogo	8-Jun	25-Oct	127	626
	Shanono	15-Jun	21-Oct	116	506
	Sumaila	6-Jun	26-Oct	130	635
	Takai	7-Jun	26-Oct	129	631
	Tarauni	14-Jun	21-Oct	118	608
	Tofa	14-Jun	21-Oct	117	607
	Tsanyawa	17-Jun	19-Oct	112	503
	Tudun Wada	4-Jun	27-Oct	133	642

	Ungogo	14-Jun	21-Oct	116	507
	Warawa	13-Jun	22-Oct	119	610
	Wudil	11-Jun	23-Oct	123	616
Katsina	Bakori	9-Jun	24-Oct	123	722
	Batagarawa	26-Jun	14-Oct	96	512
	Batsari	24-Jun	15-Oct	98	509
	Baure	25-Jun	15-Oct	98	509
	Bindawa	23-Jun	16-Oct	100	507
	Charanchi	22-Jun	16-Oct	102	505
	Dandume	6-Jun	26-Oct	128	733
	Danja	6-Jun	26-Oct	128	734
	Dan Musa	17-Jun	19-Oct	111	554
	Daura	27-Jun	13-Oct	94	466
	Dutsi	26-Jun	14-Oct	96	463
	Dutsin-Ma	20-Jun	18-Oct	106	553
	Faskari	9-Jun	24-Oct	123	670
	Funtua	7-Jun	26-Oct	127	820
	Ingawa	22-Jun	16-Oct	102	455
	Jibia	27-Jun	13-Oct	94	466
	Kafur	9-Jun	24-Oct	123	721
	Kaita	29-Jun	12-Oct	91	474
	Kankara	13-Jun	21-Oct	116	558
	Kankia	20-Jun	17-Oct	105	453
	Katsina	27-Jun	13-Oct	94	466
	Kurfi	23-Jun	15-Oct	100	457
	Kusada	20-Jun	17-Oct	105	553
	Mai'adua	29-Jun	12-Oct	91	473
	Malumfashi	12-Jun	22-Oct	119	562
	Mani	26-Jun	14-Oct	96	462
	Mashi	29-Jun	12-Oct	91	473
	Matazu	17-Jun	19-Oct	110	453
	Musawa	15-Jun	21-Oct	114	456
	Rimi	25-Jun	14-Oct	97	460
	Sabuwa	5-Jun	27-Oct	129	588
	Safana	21-Jun	17-Oct	104	454
	Sandamu	26-Jun	14-Oct	96	463
	Zango	27-Jun	13-Oct	95	465
Kebbi	Aleiro	25-Jun	19-Oct	96	603
	Arewa-Dandi	30-Jun	16-Oct	88	605
	Argungu	30-Jun	16-Oct	88	605
	Augie	4-Jul	14-Oct	82	613
	Bagudo	6-Jun	26-Oct	123	636

	Birnin Kebbi	28-Jun	18-Oct	92	603
	Bunza	23-Jun	20-Oct	99	605
	Dandi	12-Jun	23-Oct	113	613
	Danko Wasagu	7-Jun	26-Oct	121	630
	Fakai	7-Jun	25-Oct	120	628
	Gwandu	28-Jun	18-Oct	92	603
	Jega	23-Jun	20-Oct	99	605
	Kalgo	17-Jun	19-Oct	104	603
	Koko/Besse	6-Jun	26-Oct	121	633
	Maiyama	13-Jun	22-Oct	110	609
	Ngaski	27-May	1-Nov	139	706
	Sakaba	3-Jun	28-Oct	127	650
	Shanga	4-Jun	27-Oct	125	645
	Suru	10-Jun	24-Oct	115	617
	Yauri	31-May	30-Oct	131	669
	Zuru	8-Jun	25-Oct	119	627
Kogi	Adavi	25-Apr	25-Nov	189	1547
	Ajaokuta	23-Apr	27-Nov	193	1607
	Ankpa	22-Apr	27-Nov	194	1618
	Bassa	27-Apr	25-Nov	187	1516
	Dekina	24-Apr	26-Nov	191	1582
	Ibaji	14-Apr	2-Dec	207	1834
	Idah	18-Apr	30-Nov	201	1739
	Igalamela-Odolu	18-Apr	30-Nov	202	1741
	Ijumu	28-Apr	24-Nov	185	1491
	Kabba/Bunu	30-Apr	22-Nov	181	1429
	Kogi	3-May	21-Nov	177	1380
	Lokoja	3-May	21-Nov	177	1382
	Mopa-Muro	2-May	21-Nov	179	1402
	Ofu	21-Apr	28-Nov	196	1647
	Ogori/Magongo	23-Apr	27-Nov	193	1600
	Okehi	26-Apr	25-Nov	188	1529
	Okene	23-Apr	27-Nov	193	1605
	Olamabolo	19-Apr	29-Nov	199	1700
	Omala	27-Apr	24-Nov	186	1509
	Yagba East	2-May	21-Nov	179	1399
	Yagba West	3-May	20-Nov	176	1368
Kwara	Asa	6-May	19-Nov	172	1317
	Baruten	16-May	13-Nov	156	1136
	Edu	12-May	15-Nov	162	1202
	Ekiti	1-May	22-Nov	180	1416
	Ifelodun	8-May	18-Nov	169	1276
	Ilorin East	8-May	18-Nov	169	1285

	Ilorin South	6-May	19-Nov	172	1314
	Ilorin West	6-May	19-Nov	171	1307
	Irepodun	2-May	21-Nov	178	1388
	Isin	3-May	21-Nov	176	1368
	Kaiama	18-May	11-Nov	152	1102
	Moro	12-May	15-Nov	163	1211
	Offa	2-May	21-Nov	178	1394
	Oke-Ero	2-May	21-Nov	178	1397
	Oyun	2-May	21-Nov	178	1392
	Pategi	9-May	17-Nov	167	1260
Lagos	Agege	4-Apr	3-Dec	244	1891
	Ajeromi-Ifelodun	2-Apr	5-Dec	248	1959
	Alimosho	4-Apr	4-Dec	245	1905
	Amuwo-Odofin	1-Apr	5-Dec	249	1975
	Apapa	1-Apr	5-Dec	249	1977
	Badagry	1-Apr	5-Dec	249	1978
	Epe	2-Apr	5-Dec	247	1952
	Eti-Osa	1-Apr	5-Dec	248	1970
	Ibeju/Lekki	1-Apr	5-Dec	249	1973
	Ifako-Ijaye	5-Apr	3-Dec	243	1876
	Ikeja	4-Apr	4-Dec	245	1900
	Ikorodu	4-Apr	4-Dec	245	1903
	Kosofe	4-Apr	4-Dec	245	1906
	Lagos Island	3-Apr	4-Dec	247	1936
	Lagos Mainland	2-Apr	4-Dec	247	1942
	Mushin	3-Apr	4-Dec	246	1925
	Ojo	2-Apr	5-Dec	248	1967
	Oshodi-Isolo	3-Apr	4-Dec	246	1920
	Shomolu	3-Apr	4-Dec	246	1924
	Surulere	2-Apr	5-Dec	247	1944
Nasarawa	Akwanga	14-May	14-Nov	184	1171
	Awe	3-May	20-Nov	201	1368
	Doma	2-May	21-Nov	203	1392
	Karu	15-May	13-Nov	182	1152
	Keana	3-May	21-Nov	202	1382
	Keffi	11-May	16-Nov	189	1218
	Kokona	13-May	15-Nov	186	1193
	Lafia	9-May	17-Nov	192	1251
	Nasarawa	5-May	20-Nov	199	1338
	Nassarawa Egon	10-May	17-Nov	191	1241
	Obi	5-May	20-Nov	199	1340
	Toto	4-May	20-Nov	200	1354
	Wamba	14-May	14-Nov	185	1174

Niger	Agaie	12-May	10-Nov	182	1200
	Agwara	6-Jun	26-Oct	143	889
	Bida	14-May	9-Nov	178	1161
	Borgu	1-Jun	29-Oct	151	934
	Bosso	21-May	5-Nov	168	1060
	Chanchaga	21-May	4-Nov	167	1055
	Edati	13-May	9-Nov	180	1177
	Gbako	17-May	7-Nov	174	1122
	Gurara	17-May	7-Nov	174	1115
	Katcha	14-May	9-Nov	178	1161
	Kontagora	1-Jun	29-Oct	150	929
	Lapai	12-May	10-Nov	183	1208
	Lavun	15-May	8-Nov	177	1146
	Magama	31-May	29-Oct	151	937
	Mariga	4-Jun	27-Oct	144	899
	Mashegu	24-May	3-Nov	164	1026
	Mokwa	15-May	8-Nov	177	1147
	Muya	24-May	3-Nov	163	1025
	Paikoro	20-May	6-Nov	170	1081
	Rafi	29-May	31-Oct	155	965
	Rijau	9-Jun	24-Oct	137	863
	Shiroro	26-May	1-Nov	159	992
	Suleja	16-May	8-Nov	176	1139
	Tafa	17-May	7-Nov	175	1124
	Wushishi	22-May	4-Nov	166	1049
Ogun	Abeokuta North	12-Apr	29-Nov	231	1675
	Abeokuta South	11-Apr	29-Nov	233	1699
	Ado-Odo/Ota	4-Apr	4-Dec	245	1901
	Egbado North	11-Apr	29-Nov	234	1713
	Egbado South	6-Apr	2-Dec	241	1829
	Ewekoro	8-Apr	1-Dec	237	1774
	Ifo	6-Apr	2-Dec	241	1845
	Ijebu East	7-Apr	1-Dec	239	1802
	Ijebu North	6-Apr	2-Dec	241	1843
	Ijebu North East	9-Apr	30-Nov	236	1755
	Ijebu Ode	6-Apr	2-Dec	241	1837
	Ikenne	8-Apr	1-Dec	238	1786
	Imeko-Afon	18-Apr	25-Nov	223	1541
	Ipokia	4-Apr	4-Dec	245	1901
	Obafemi-Owode	8-Apr	1-Dec	237	1775
	Odeda	13-Apr	28-Nov	230	1658
	Odogbolu	7-Apr	2-Dec	240	1824
	Ogun waterside	1-Apr	5-Dec	249	1988

	Remo North	9-Apr	30-Nov	236	1759
	Shagamu	6-Apr	2-Dec	240	1825
Ondo	Akoko North-East	16-Apr	26-Nov	225	1571
	Akoko South-East	15-Apr	27-Nov	227	1605
	Akoko South-West	14-Apr	27-Nov	228	1621
	Akoko North-West	18-Apr	25-Nov	222	1534
	Akure North	12-Apr	29-Nov	231	1678
	Akure South	12-Apr	29-Nov	232	1687
	Ese-Odo	30-Mar	6-Dec	252	2035
	Idanre	9-Apr	1-Dec	237	1768
	Ifedore	14-Apr	28-Nov	229	1639
	Ilaje	28-Mar	8-Dec	256	2113
	Ile-Oluji-Okeigbo	13-Apr	28-Nov	230	1662
	Irele	3-Apr	4-Dec	246	1931
	Odigbo	5-Apr	3-Dec	242	1862
	Okitipupa	3-Apr	4-Dec	246	1921
	Ondo East	10-Apr	30-Nov	235	1736
	Ondo West	9-Apr	30-Nov	236	1756
	Ose	10-Apr	30-Nov	235	1735
	Owo	11-Apr	29-Nov	234	1714
Osun	Atakumosa East	13-Apr	28-Nov	229	1642
	Atakumosa West	16-Apr	26-Nov	225	1577
	Aiyedade	13-Apr	28-Nov	229	1644
	Aiyedire	16-Apr	26-Nov	225	1571
	Boluwaduro	21-Apr	23-Nov	217	1458
	Boripe	20-Apr	24-Nov	218	1481
	Ede North	18-Apr	25-Nov	221	1522
	Ede South	17-Apr	25-Nov	223	1542
	Egbedore	19-Apr	24-Nov	220	1503
	Ejigbo	19-Apr	24-Nov	220	1500
	Ife East	13-Apr	28-Nov	229	1641
	Ife North	12-Apr	29-Nov	231	1675
	Ife South	12-Apr	29-Nov	231	1676
	IfeCentral	15-Apr	27-Nov	227	1601
	Ifedayo	22-Apr	23-Nov	216	1450
	Ifelodun	21-Apr	23-Nov	217	1462
	Ila	21-Apr	23-Nov	216	1451
	Ilesha East	17-Apr	26-Nov	224	1560
	Ilesha West	17-Apr	25-Nov	223	1545
	Irepodun	20-Apr	24-Nov	218	1478
	Irewole	14-Apr	27-Nov	228	1625
	Isokan	13-Apr	28-Nov	231	1663
	Iwo	17-Apr	25-Nov	223	1545

	Obokun	19-Apr	24-Nov	220	1505
	Odo-Otin	22-Apr	23-Nov	216	1442
	Ola-Oluwa	19-Apr	25-Nov	221	1515
	Olorunda	20-Apr	24-Nov	219	1483
	Oriade	16-Apr	26-Nov	225	1580
	Orolu	21-Apr	23-Nov	218	1470
	Osogbo	19-Apr	24-Nov	220	1509
Oyo	Afijio	19-Apr	24-Nov	219	1508
	Akinyele	16-Apr	26-Nov	224	1578
	Atiba	25-Apr	20-Nov	209	1365
	Atigbo	27-Apr	20-Nov	207	1339
	Egbeda	14-Apr	27-Nov	227	1627
	Ibadan North	14-Apr	27-Nov	227	1617
	Ibadan North East	14-Apr	27-Nov	228	1630
	Ibadan North West	14-Apr	27-Nov	227	1620
	Ibadan South East	13-Apr	28-Nov	228	1642
	Ibadan South West	14-Apr	28-Nov	228	1635
	Ibarapa Central	15-Apr	27-Nov	226	1607
	Ibarapa East	17-Apr	26-Nov	222	1551
	Ibarapa North	17-Apr	25-Nov	222	1543
	Ido	16-Apr	26-Nov	225	1589
	Irepo	5-May	14-Nov	193	1178
	Iseyin	20-Apr	24-Nov	218	1484
	Itesiwaju	25-Apr	21-Nov	210	1383
	Iwajowa	22-Apr	23-Nov	215	1443
	Kajola	23-Apr	22-Nov	213	1424
	Lagelu	15-Apr	27-Nov	225	1595
	Ogbomosho North	24-Apr	21-Nov	211	1392
	Ogbomosho South	23-Apr	22-Nov	213	1412
	Ogo Oluwa	21-Apr	23-Nov	215	1450
	Olorunsogo	3-May	16-Nov	198	1228
	Oluyole	12-Apr	29-Nov	231	1690
	Ona-Ara	12-Apr	28-Nov	230	1666
	Orelope	3-May	16-Nov	197	1221
	Ori Ire	26-Apr	20-Nov	207	1345
	Oyo East	21-Apr	23-Nov	217	1472
	Oyo West	21-Apr	23-Nov	216	1464
	Saki East	1-May	17-Nov	199	1248
	Saki West	30-Apr	18-Nov	202	1275
	Surulere	23-Apr	22-Nov	213	1414
Plateau	Barikin Ladi	18-May	2-Nov	168	861
	Bassa	24-May	29-Oct	159	788
	Bokkos	13-May	5-Nov	176	936

	Jos East	21-May	31-Oct	163	818
	Jos North	22-May	30-Oct	161	806
	Jos South	20-May	31-Oct	164	829
	Kanam	17-May	2-Nov	170	878
	Kanke	16-May	3-Nov	172	897
	Langtang North	11-May	6-Nov	179	969
	Langtang South	5-May	9-Nov	188	1070
	Mangu	16-May	3-Nov	172	896
	Mikang	11-May	6-Nov	179	973
	Pankshin	14-May	4-Nov	175	926
	Qua'an Pan	8-May	8-Nov	184	1018
	Riyom	18-May	2-Nov	168	866
	Shendam	8-May	8-Nov	184	1021
	Wase	11-May	6-Nov	179	965
River	Abua/Odual	11-Mar	18-Dec	281	2678
	Ahoada East	14-Mar	16-Dec	277	2585
	Ahoada West	14-Mar	17-Dec	278	2597
	Akuku Toru	7-Mar	20-Dec	288	2841
	Andoni	7-Mar	20-Dec	288	2840
	Asari-Toru	10-Mar	19-Dec	284	2735
	Bonny	7-Mar	20-Dec	288	2845
	Degema	8-Mar	20-Dec	287	2811
	Eleme	10-Mar	19-Dec	284	2740
	Emohua	11-Mar	18-Dec	282	2689
	Etche	14-Mar	16-Dec	277	2582
	Gokana	9-Mar	19-Dec	286	2778
	Ikwerre	14-Mar	16-Dec	277	2584
	Khana	9-Mar	20-Dec	286	2789
	Obia/Akpor	11-Mar	18-Dec	282	2704
	Ogba/Egbema/Ndoni	19-Mar	14-Dec	270	2422
	Ogu/Bolo	9-Mar	19-Dec	286	2778
	Okrika	9-Mar	19-Dec	286	2780
	Omumma	15-Mar	16-Dec	276	2564
	Opobo/Nkoro	7-Mar	21-Dec	288	2846
	Oyigbo	11-Mar	18-Dec	281	2681
	Port-Harcourt	10-Mar	19-Dec	284	2729
	Tai	10-Mar	19-Dec	284	2736
Sokoto	Binji	30-Jun	29-Sep	79	525
	Bodinga	25-Jun	1-Oct	86	510
	Dange-Shuni	25-Jun	1-Oct	86	511
	Gada	6-Jul	25-Sep	69	558
	Goronyo	2-Jul	27-Sep	75	535
	Gudu	3-Jul	26-Sep	73	543

	Gwadabawa	3-Jul	27-Sep	73	541
	Illela	6-Jul	25-Sep	69	557
	Isa	30-Jun	28-Sep	78	527
	Kebbe	13-Jun	9-Oct	106	509
	Kware	29-Jun	29-Sep	80	522
	Rabah	28-Jun	30-Sep	82	518
	Sabon Birni	4-Jul	26-Sep	72	546
	Shagari	21-Jun	4-Oct	93	504
	Silame	27-Jun	30-Sep	83	516
	Sokoto North	28-Jun	30-Sep	81	519
	Sokoto South	28-Jun	30-Sep	82	518
	Tambuwal	19-Jun	5-Oct	96	503
	Tangaza	4-Jul	26-Sep	72	545
	Tureta	21-Jun	4-Oct	93	504
	Wamako	28-Jun	30-Sep	82	518
	Wurno	1-Jul	28-Sep	77	530
	Yabo	24-Jun	2-Oct	88	508
Taraba	Ardo-Kola	3-May	8-Nov	173	966
	Bali	23-Apr	14-Nov	190	1165
	Donga	18-Apr	17-Nov	199	1291
	Gashaka	15-Apr	19-Nov	203	1360
	Gassol	27-Apr	11-Nov	183	1083
	Ibi	26-Apr	12-Nov	185	1098
	Jalingo	4-May	7-Nov	172	950
	Karim-Lamido	8-May	5-Nov	166	891
	Kurmi	11-Apr	21-Nov	210	1459
	Lau	7-May	5-Nov	167	897
	Sardauna	7-Apr	24-Nov	216	1564
	Takum	15-Apr	19-Nov	203	1363
	Ussa	8-Apr	23-Nov	214	1540
	Wukari	22-Apr	14-Nov	191	1186
	Yorro	4-May	7-Nov	172	955
	Zing	4-May	7-Nov	172	952
Yobe	Bade	24-Jun	1-Oct	86	507
	Bursari	23-Jun	2-Oct	87	506
	Damaturu	12-Jun	9-Oct	105	512
	Fika	6-Jun	12-Oct	113	532
	Fune	12-Jun	8-Oct	105	512
	Geidam	23-Jun	2-Oct	87	506
	Gujba	6-Jun	12-Oct	115	537
	Gulani	31-May	15-Oct	123	568
	Jakusko	20-Jun	4-Oct	92	503
	Karasuwa	26-Jun	30-Sep	82	513

	Machina	28-Jun	29-Sep	78	519
	Nangere	12-Jun	9-Oct	105	513
	Nguru	26-Jun	30-Sep	81	514
	Potiskum	10-Jun	10-Oct	107	517
	Tarmua	18-Jun	5-Oct	96	503
	Yunusari	29-Jun	28-Sep	77	523
	Yusufari	30-Jun	27-Sep	75	527
Zamfara	Anka	14-Jun	7-Oct	101	607
	Bakura	21-Jun	3-Oct	90	604
	Birnin Magaji	21-Jun	3-Oct	91	603
	Bukkuyum	14-Jun	7-Oct	102	608
	Bungudu	16-Jun	6-Oct	98	604
	Gummi	13-Jun	8-Oct	102	708
	Gusau	13-Jun	8-Oct	103	710
	Kaura Namoda	21-Jun	3-Oct	90	604
	Maradun	24-Jun	1-Oct	85	608
	Maru	10-Jun	9-Oct	107	717
	Shinkafi	27-Jun	29-Sep	80	616
	Talata Mafara	19-Jun	4-Oct	93	603
	Tsafe	13-Jun	8-Oct	103	610
	Zurmi	26-Jun	30-Sep	82	612

GLOSSARY

1. **Anti-microbial resistance:** The WHO defines antimicrobial resistance as a microorganism's **resistance** to an antimicrobial drug that was once able to treat an infection by that microorganism.
2. **Antibiotic:** any of a large group of chemical substances, as penicillin or streptomycin, produced by various microorganisms and fungi, having the capacity in dilute solutions to inhibit the growth of or to destroy bacteria and other microorganisms, used chiefly in the treatment of infectious diseases.
3. **Aquaculture:** The rearing of aquatic animals or cultivation of aquatic plants for food.
4. **Agro-meteorological information:** Weather and climate information that, if applied to guide agricultural activities, improves yields, and enhances coping strategies against adverse impact of climate related hazards in the sector.
5. **Annual rainfall amount:** is the total amount of rainfall observed and recorded in the year under reference.
6. **Cessation-date of rainy season:** Cessation date is determined when the available water content at the root zone has dropped to 50%.
7. **Cessation date:** Postulated period when conditions such as soil moisture availability is below 50% requirements of plants need.
8. **Cooler than normal:** Mostly associated with temperatures below long-term average.
9. **Climate change:** Is a non-random change in climate that is measured over several decades or longer, which may be due to natural or human-induced causes.
10. **Climate variability:** refers to variations in the mean state and other statistics such as standard deviations, the occurrence of extremes, climate on all spatial and temporal scales beyond that of the individual events. Variability may be due to natural internal processes within the climate system or anthropogenic external forcing.
11. **Comfort Index:** An index of air temperature that provides daily satisfaction with the thermal environment or an index, which combines air temperature and relative humidity to determine satisfaction with the thermal environment.
12. **Decision Support System for Agro Technology Transfer (DSSAT):** Simulation model
13. **Dehydration:** is lack of fluid in the body
14. **Departure:** Difference from long term average.
15. **Diarrhoea:** Is the passage of 3 or more loose or liquid stools per day, or more frequently than is normal for the individual
16. **Dry season farming-** Farming practices sustained by irrigation during period of little or no rainfall.
17. **Ecological zones:** They are dependent on and defined by precipitation intensity, variability and annual amounts.
18. **Escherichia coli:** Gram-negative, facultative anaerobic, rod-shaped, coliform bacterium of the genus *Escherichia* that is commonly found in the lower intestine of warm-blooded organisms
19. **El- Nino:** A warming of the Pacific Ocean water near the equator, off the coast of Peru, that typically occurs every 3 – 7 years, and which dictates a shift in normal weather patterns.
20. **ENSO (El- Nino – Southern Oscillation):** a combination of El-Niño features and strength of surface air pressure between the tropical eastern and western Pacific Ocean waters, which is usually computed from fluctuation in the surface air pressures between Tahiti and Darwin in Australia.
21. **ENSO – Neutral:** normal temperature conditions in the ocean water of the equator off the coast of Peru in South America.
22. **Extreme weather:** is an event that is rare at a particular place and time of the year. Extreme weather event would normally be as rare as or rarer than the 10 or 90 percentiles of the observed probability density function.
23. **Flash floods:** Flooding that begins within 6 hours, and often within 3 hours, of the heavy rainfall (or other cause).
24. **Global warming:** An overall increase in the world temperatures, which is often caused by additional heat being trapped by greenhouse gases mostly because of human activities.
25. **Green House Effect:** The warming generated by the trapping of long-wave radiation (heat) by Green House Gases in the atmosphere.
26. **Harmattan:** Cold, dry, dusty north easterly wind from the Sahara predominant during the winter season over West Africa.
27. **Heat stress:** can occur when you are exposed to extreme heat and your body is unable to cool itself properly.
28. **Heat stroke:** is a life-threatening condition with symptoms of high body temperature, rapid pulse, difficulty breathing,

confusion, and coma.

29. **Heat waves:** is generally defined as a period of several days to weeks of abnormally hot weather.
30. **High-intensity rainfall:** Rainfall that is characterised by high amount of precipitation and often time last more 10 hours and may be accompanied by strong winds above 20 knots.
31. **Hydroelectricity: Hydroelectric** power, electricity produced from generators driven by turbines that convert the potential energy of falling or fast-flowing water into mechanical energy.
32. **IPCC:** Inter-Governmental Panel on Climate Change.
33. **Indian Ocean Dipole (IOD):** Indian Ocean Dipole (IOD) refers to the temperature difference between the eastern and western parts of the Indian ocean.
34. **Intra-seasonal rainfall patterns:** Variation in rainfall intensity and duration within the rainy season itself.
35. Klebsiella pneumonia is a bacterial organism that is responsible for causing **pneumonia**, sepsis, and urinary tract infection (UTI). The organism resides in the upper respiratory tract and gastrointestinal tract of healthy individuals.
36. **La-Nina:** An extensive cooling of the waters in the upper section of the tropical eastern Pacific Ocean.
37. **Length of rainy season:** is the number of days between the onset and cessation dates of the rainy season.
38. **Madden Julian Oscillation (MJO):** The **MJO** can be **defined** as an eastward moving 'pulse' of clouds, rainfall, winds and pressure near the equator that typically recurs every 30 to 60 days.
39. **Meningitis:** is an inflammation of the membranes (meninges) surrounding your brain and spinal cord. The swelling from meningitis typically triggers symptoms such as headache, fever and a stiff neck.
40. **Mid-Latitude Wave:** This wave is usually embedded in the passage of frontal systems over the mid-latitude region. It occurs along a frontal belt traversing from East to West. It is associated with deep level convection in form of atmospheric concentric force which pulls moisture to itself from as far West Africa.
41. **Modulators:** These are atmospheric forcing functions.
42. **SDG:** Sustainable Development Goals.
43. **North-easterly winds:** Winds from the Sahara Desert from a north-easterly direction
44. **Normal:** A long term average calculated over a minimum of thirty years.
45. **Near Normal:** Values of parameters under observation in the tolerance neighbourhood of Normal values.
46. **Neutral signal:** When El-Nino Southern Oscillation signal emanating from sea surface temperature over the pacific vary between $\pm 0.5^{\circ}\text{C}$.
47. **Onset-date of rainy season** is the date at which the available water content of the root zone at the beginning of the cropping season reaches 50%.
48. **Pathogens:** are disease-causing viruses, bacteria, fungi, or protists, which can infect animals and plants.
49. **Pre-season rainfall:** Rainfall events prior to the seasonal events. They are usually short-lived and could come because of periodic incursion of extra-tropical modulators.
50. **Perishable goods:** Agricultural goods that lose considerable value if delayed in conveyance from the produce point to the desired place of sale. They are goods that go bad rapidly if a weather-controlled preservation technique is not employed
51. **Ruminant animal:** Animals with four compartmentalized stomachs
52. **Sea Surface Temperature (SST) anomalies** refers to the deviations from long-term averages in the mean temperature of the ocean in the upper few metres.
53. **Seasonal Rainfall Prediction (SRP):** Forecast of weather or climate condition for a period or season ranging from about three months to one year.
54. **Short-duration rainfall:** Rainfall events within 30minutes duration.
55. Staphylococcus aureus: is a Gram-positive, round-shaped bacterium that is frequently found in the upper respiratory tract and on the skin
56. **Tele-connection:** describes statistical correlations between weather events that occur at different parts of the world.
57. **Vision 20:20:20:** Nigeria's Vision to become one of the top twenty (20) advanced Nations' economies by the year 2020.
58. **Warmer than normal:** Mostly pertaining to temperature values higher than the long-term average.

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2024
SEASONAL CLIMATE
PREDICTION (SCP)

Certech Registration Inc.



Certificate of Registration

Learning services for non-formal education and training — Basic requirements for service providers – ISO 29990:2010

This is to certify that:

The Nigerian Meteorological Agency Regional Training Centre

Oshodi Complex Cappa, Oshodi, Lagos, Nigeria

Has earned certificate number: **19/2365**

The Nigerian Meteorological Agency Regional Training Centre management system conforms to the requirements of ISO 29990:2010 for the following scope:

The training of meteorologists and meteorological technicians

Signed for and on behalf of Certech Registration Inc.

Director

ISO 29990:2010 Certificate granted on: August 1, 2019

Last scope change: N/A

Last Revision: August 21, 2023

Valid through: August 15, 2024

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