

MARINE

RAIL & ROAD

POWER

HEALTH

AGRICULTURE

2015

SEASONAL RAINFALL
PREDICTION (SRP)

NiMet
Nigerian Meteorological Agency



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OSITA CHIDOKA *OFR, NPOM*
HONOURABLE MINISTER OF AVIATION
FEDERAL REPUBLIC OF NIGERIA

FOREWORD

Every year, NiMet produces and presents the Seasonal Rainfall Prediction (SRP) to the general public, policy and decision makers both in Government, public and the private sectors. This provides the weather and climate outlook for the country for informed decision-making in the various rainfall- and temperature-sensitive sectors of the economy. The SRP projects how temperature and rainfall and other related environmental parameters will vary during the course of the year for effective socio-economic planning. It also aims at reducing climate and weather related risks to vulnerable communities and sectors of the economy through provision of the necessary advisory components to enhance preparedness against associated hazards.

“The provided early warnings reduced the number of deaths and financial losses to the two extreme events.”

In the last 5 years, the SRP has gained national recognition particularly in the agricultural and water resources sectors because of the recorded impact by practitioners such as improvement of the sector's contribution to the Gross Domestic Product (GDP). The SRP has contributed significantly in ensuring food and water security by providing valuable information such as the onset and cessation dates, length of rainy season, periods of dry spells and comfort index, as well as in reducing the number of lives and property lost during extreme weather and climate events such as floods, drought and heat stroke through provision of early warnings on expected hazards.

Over the years, NiMet has continued to improve on the quality and quantity of the content of the prediction by increasing the number of stations and bringing innovations such as comfort index, dry spells and flood forecasts. The Agency has also invested in the development of both the manpower and infrastructural capacity. The scientific and technical officers have received general and tailor-made trainings on modelling and product interpretations, installation and operation of modern

weather instruments and equipment. These include the Doppler weather radars, satellite receiving equipment, automatic weather stations etc. This strategic investment in different parts of the country has ensured that the ever growing need for timely and accurate weather & climate data and services by the various user communities and stakeholders are adequately met.

NiMet predicted with good accuracy levels, the devastating flood disaster that affected the whole country in year 2012 and the dry spells experienced in some northern cities in year 2014. The provided early warnings reduced the number of deaths and financial losses to the two extreme events. This achievement has contributed to the increased confidence in acceptability of the SRP as an important tool for planning and early warning by stakeholders. NiMet will continue to improve on the quality of this product for the satisfaction of the numerous stakeholders. The Agency's commitment to improvement of service has been further demonstrated by the recently completed Quality Management Systems audit and the ISO 9001:2008 certification of the Agency's aeronautical services.

The application of the SRP cuts across several socio-economic sectors such as:

- Agriculture,
- Building and road construction,
- Water resources,
- Energy and power,
- Transportation, tourism,
- Environmental disaster management,
- Health,
- Oil and gas,
- National planning and statistics etc.

Planners and practitioners in these sectors continually utilize the SRP to improve their productivity.

The 2015 edition of the SRP has incorporated new innovations comprising an increase in city-forecasts from 372 cities to 560 cities and inclusion of malaria and flood forecasts. The results are presented in tabular and graphical formats to meet the needs of different stakeholders.

This year's SRP document constitutes a vital resource for members of the Nigerian public, decision makers, institutions and all rain sensitive sectors who will find it necessary for effective planning and optimization of products, as well as a reference material for climate and weather risk reduction.

The SRP is therefore recommended to all Nigerians, relevant government, public and private sector organizations in climate and weather related issues as both working tool and reference material.

Chief Osita Chidoka OFR, NPOM
Honourable Minister of Aviation

March 12th, 2015



EXECUTIVE SUMMARY

“ *The SRP is released early in the year to create good lead-time for policy makers to factor in the critical information and advisories contained in the SRP into decision-making processes.* ”

EXECUTIVE SUMMARY

The Nigerian Meteorological Agency (NiMet) has produced the 2015 **Seasonal Rainfall Prediction (SRP)** in fulfilment of its mandate to provide relevant meteorological information, forecasts, advisory and early warnings to ensure informed decisions in all climate-and weather-sensitive sectors of the economy. The prediction is done annually and customarily presented to major stakeholders for their inputs on the socio-economic implications before its public presentation. The SRP is released early in the year to create good lead-time for policy makers in order to factor in the critical information and advisories contained in the SRP into decision-making processes. The Agency therefore contributes to risk reduction associated with extreme weather and climate events, as well as safety of lives and property. The product contributes significantly to the sustainable socio-economic development of Nigeria.

Each year, NiMet strives to improve the content and delivery of the SRP to enhance its understanding by all users. The 2015 edition contains the following improvements:

- **Addition of three new stations** namely Eket, Lagos and Ado Ekiti to further increase the number of weather stations used in the preparation of 2015 SRP from 42 to 45. Additionally, **5 new cities in every State** have been included in the cities forecast with a resulting increase in number of cities covered in the prediction from **372 to 560**.
- Mosquito Bites and Malaria severity indices forecast
- A '**Summary Map**' detailing key critical points in the 2015 seasonal rainfall prediction including delays in the onset and cessation dates, shorter-than-normal length of season and seasonal amount of rainfall forecast to facilitate immediate understanding of the 2015 SRP, and
- **Tabular presentation of the Temperature forecasts for January-April** for ease of reference and understanding by all users of the SRP.

The input data for the production of the 2015 SRP include the following;

- (i) Historical daily rainfall, maximum and minimum temperatures,
- (ii) Daily solar radiation data
- (iii) Phenological and soil information data,
- (iv) El Nino/Southern Oscillation (ENSO) phase as defined by the Sea Surface Temperature anomalies and
- (vi) Rain-bearing synoptic systems over Nigeria.

2015 ENSO PHASE PROJECTION

In December 2014, oceanic and atmospheric features, which earlier showed persistence of a weak El-Nino, (i.e. slight warming of the sea surface temperature over the Pacific Nino 3.4 region), suddenly developed into a full blown El-Nino as shown by the IRI/CPC Plume-based Probabilistic ENSO Forecast released on December 18, 2014. According to IRI ensemble forecast, in **2015, there exists an 83 percent probability that the emerging warm phase (El-Nino) in January/February 2015, will decrease to about 61 percent by June, and further to 51 percent during July-September.** All through January - October 2015, there is only a 14 percent chance of La-Nina and 40 percent of ENSO neutral occurrence as revealed by all the dynamic and statistical models used. **It is therefore expected that in 2015, rainfall in Nigeria will be influenced by a warm phase from January-October.**

The 2015 prediction was therefore based on the El-Nino phase following dominance of the warm phase throughout the rainfall season. The El-Nino phase brings increased temperatures and drier-than-normal conditions particularly in the northern parts of the country. NiMet will continue to closely monitor the evolutions of the ENSO phenomenon as the year progresses and will review the predictions if necessary.

The 2015 SRP is released with a 2 month lead-time containing the following predictions:

- (i) Day and Night Temperature trend for January-April;
- (ii) Onset and cessation dates of growing season;
- (iii) Length of the growing season;
- (iv) Annual amount of rainfall;
- (v) Malaria Forecast
- (vi) Socio-economic implications of the predictions in the key rainfall sensitive sectors of the economy.

“The 2015 prediction was therefore based on the El-Nino phase following dominance of the warm phase throughout the rainfall season.”

The evaluation of the 2014 predictions is one of the highlights contained in this edition. The performance of the prediction for each of the parameters is presented in terms of skills, which shows either "**good forecast**" or "**forecast out**". There was excellent performance for the temperature with skill ranging from 88-100 percent mostly during the January-April period. Rainfall performance was also generally good with few exceptions in areas where delayed onset and cessation of rains were experienced. A recorded performance of 74 percent was achieved for the rainfall forecast in 2014.

In consideration of the impact of the warm ENSO phase prevailing during January-April 2015, a normal-to-moderate harmattan season, and warmer-than-normal February and April are predicted for year 2015. The warmer-than-normal conditions in February and April will bring a lot of discomfort to the citizenry

and will be responsible for predicted health hazards associated with such conditions, particularly with the high level of dust in suspension during the period. In January, the north-western cities of Sokoto and Yelwa are expected to be warmer during the day and night. However, the southwest is predicted to be colder-than-normal both during the day and night. The other significant feature is that most parts of the South are projected to be warmer-than-normal during the day and night in March. The northern parts will be colder-than-normal.

In 2015, the earliest onset date of rainfall is expected to be March 6 over Brass, Bayelsa State, moving progressively northward, and June 25 for Danboka, Sokoto State. The rainfall is predicted to cease at Sokoto from 8 October and over Akwa Ibom and Bayelsa States on 21 December. ***In all, rainfall will be generally delayed by between 2-13 days in many parts of the country in 2015.*** The delay will be most pronounced by ***8-13 days in and around Ondo, Imo, Anambra, Kogi, Yobe, northern Cross River, Rivers, Delta, Oyo, Lagos, Niger and Ogun States.*** However, the onset of rainfall is expected to be normal in Akwa Ibom, Adamawa, parts of northern Yobe, Katsina and Sokoto.

An early cessation of rainfall is predicted for most parts of the northwest, north central, Enugu, Awka, Ikom and Ijebu Ode. It is expected to be well pronounced in Sokoto State. Areas such as Bida, Abeokuta, Ibadan, Ondo, Akure, Benin, Warri, Uyo and Calabar are predicted to have later-than-normal end of growing season in 2015.

The length of the growing season is predicted to range from 98 days over Danboka, Sokoto State to 292 days at Brass, Bayelsa State. ***A shorter than normal length of growing season is predicted for most places. It is predicted to be significantly reduced in Sokoto, Awka, Ibi, Bauchi, Potiskum, Kano, Zaria, Gusau, Kaduna, Gombe, Minna, Makurdi and Ikom.*** A longer than normal length of season is expected over Uyo and Maiduguri. The season is expected to be normal in and around Abeokuta, Warri, Calabar and Eket.

The annual rainfall amount is predicted to range from 388mm at Yobe to about 2962mm in Brass, Bayelsa States during 2015. Annual rainfall is predicted to be below-normal in several places and significant in and around ***Yelwa, Potiskum, Nguru, Bauchi, Ibi and Gombe. Others include Eket, Enugu, Lokoja, Ibadan, Ogoja, Owerri, Uyo, Warri and Asaba.*** Above-normal rainfall is expected in parts of the northwest, Adamawa and inland of the southwest. The rest of the country is predicted to experience a normal rainfall regime in 2015.

The socio-economic implications of the 2015 SRP are summarised and presented in the next section.



AGRICULTURE

Agriculture is one of the most vulnerable sectors to variations of weather and climate. NiMet products and services guide farmers to reduce risk and achieve better yields.

AGRICULTURE



Dry spells are likely to occur as a result of the El-Nino conditions prevailing throughout the season. Consequently, farmers in the extreme northern states of Sokoto, Zamfara, Katsina, Jigawa, Bauchi, Yobe and Borno are advised to:

- Note that the length of the growing season is expected to be shorter;
- Plant drought resistant crop varieties;
- Request relevant government agencies to source them the appropriate seed varieties, cuttings and seedlings for all crops;
- Make serious effort to harvest a lot of the rain-water;
- Request government to subsidize farm inputs such as fertilizers, agro-chemicals, and hiring of tractors and other services,
- Apply to Financial institutions to provide credit facilities in good time.

To ensure adequate and sufficient good yield of cereal, root crops and other crop-types in 2015, farmers will need to be supported with sufficient irrigation. Increased sensitization will need to be embarked upon by all stakeholders to disseminate this information early enough to ensure that adequate measures are put in place by the MDAs in the agriculture sector to reduce losses.

Livestock production would most likely be negatively affected by the combined effect of the predicted warmer-than-normal temperatures, delayed onset and early cessation of the rains, and below normal rainfall expected in many parts of the country. Rain harvesting in the North and South using field ponds should be encouraged and supported to avoid early livestock water starvation.

The predicted warmer than normal temperatures in the month of February and April in the country will negatively impact storage, packaging and transportation of perishable agricultural products. Therefore, the use of climate-controlled warehouses for storage and night time transportation of perishable products is strongly advised. NiMet's short-range forecast (daily and weekly) is available for stakeholders in the perishable cargo industry and other sectors to supplement the 2015 forecast.



WATER RESOURCES

WATER RESOURCES MANAGEMENT



In 2015 prediction, rainfall amount is expected to be above normal in parts of the northwest, Adamawa and inland of the southwest but it will be below normal in many areas in the North, Central and southern areas. ***Therefore, there is a prospect of less water available for all domestic and industrial use, groundwater recharge for inland waterway transportation, and also for agricultural activities across the country.*** Adequate support through irrigation to improve agricultural activities in the States is advised. NiMet will regularly issue updates on the rainfall trend using the **Monthly Drought and Flood Monitoring Bulletin**.





POWER

Extreme weather event is a high risk factor in the construction industry. Efficient and effective construction management requires timely and accurate weather information which NiMet provides.

HYDROPOWER GENERATION & DAM MANAGEMENT



Above-normal rainfall amount predicted for areas in the northwest will positively impact hydropower generation activities in the area. There will be water stress elsewhere as a result of the below-normal rainfall expected in many places. Low water flows into dams are projected in 2015.

DAM MANAGEMENT



Dams located in the areas with prospects of above-normal rainfall may witness high water inflow from increased run-off. Managers need to closely monitor the season and avail themselves of weather updates released by NiMet as the season evolves. For several other areas where low rainfall amount is predicted, dams in such areas may not get enough water for various services.



Weather is a critical factor in Aviation Safety. NiMet therefore provides timely and accurate weather information to ensure that the skies are safe.

AVIATION



The expected moderate harmattan conditions in 2015 will result in increased prospects of reduced visibility caused by dust haze. This will likely disrupt air navigation, cause flight delays and cancellations. Increased hazardous weather conditions for aviation operations are also expected during the onset and cessation periods. The months of February/March in the southern parts and May/June in the North are therefore critical for safety in the air and on the road across the country. Flight operators are advised to take advantage of the daily weather forecasts and alerts issued regularly by NiMet for all airports and air-strips for safety of the flying public. Pilots are advised to take additional measures during take-off and landing to avoid weather hazards caused by wind shear, slippery runways and reduced visibility.



Bad weather increases the risk of delays, disruptions, damage and failure of infrastructure in the different transportation systems. In 2015, warmer-than-normal temperatures are expected in areas such as Ado Ekiti, Abuja, Akure, Asaba, Awka, Ibadan, Ibi, Ijebu Ode, Makurdi, Minna, Ogoja, Ondo, Oshogbo, Enugu and Lokoja. This may likely cause tarred road surfaces to soften and expand. High temperatures expected during the months of February to April over Gusau and Kano may adversely affect rail tracks and cause them to expand and buckle.



MARINE

Oil & Gas, Shipping, Fishing and Maritime activities are highly dependent on timely and accurate weather forecast. NiMet provides marine meteorological services to support safe, efficient and cost effective operation in this sector.



MARINE & COASTAL ACTIVITIES



Inland water ways transportation may be enhanced in the southwest where above-normal rainfall is predicted for 2015. There will however be challenges in most areas where below-normal rainfall is predicted. Fishing activities, as well as coastal recreation will also be favoured by the below-normal rainfall. However, the increased thundery activities, which herald the onset and cessation of the rains may lead to disruptions in the operations of the maritime sector, including exploration activities of oil companies. Marine transport operators should regularly obtain NiMet's marine weather forecast for safety.





HEALTH

Weather and Climate conditions are major considerations for the proper planning and implementation of health events. NiMet provides weather forecasts to guide the choice of timing and venue for optimum athletic performance.

HEALTH



Moderate harmattan is predicted for 2015 and this will create large plumes of dust suspension during January and February. Common ailments during this period such as upper respiratory track infection (pneumonia, catarrh and asthma) are expected to increase in frequency, particularly in parts of the North. Warmer-than-normal temperature conditions predicted in places such as Ado Ekiti, Abuja, Akure, Asaba, Awka, Ibadan, Ibi, Ijebu Ode, Makurdi, Minna, Ogoja, Ondo, Oshogbo, Enugu and Lokoja will likely lead to hotter days, heat stress and dehydration. Young children, the elderly, people with medical conditions and the poor will be the most vulnerable.



Extreme weather and climate events are responsible for about 90% of natural disaster. Most parts of the country are vulnerable to these weather induced phenomena. NiMet provides early warning information for disaster risk reduction and emergency management.

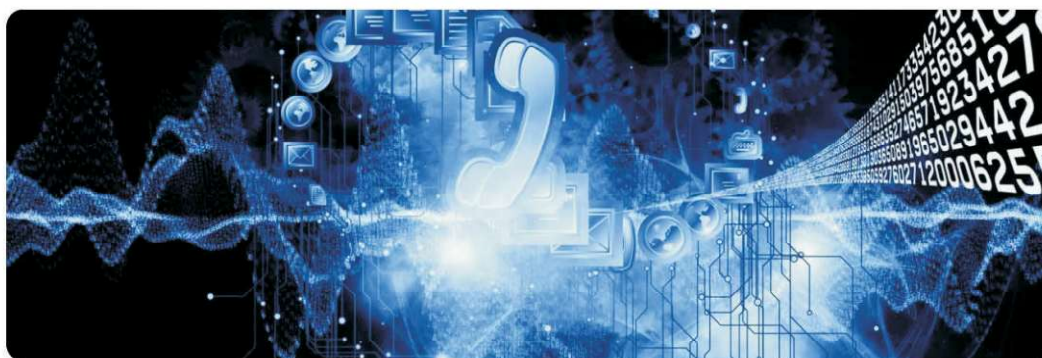


Health-related hazards are predicted in 2015 following the predictions of warmer-than-normal temperatures and less rainfall in the majority of areas. Despite this, thunderstorms accompanied by strong winds usually herald the start and cessation of the rains. These cause destruction of infrastructure. The frequency and intensity of these storms are predicted to be moderate in parts of the northwest, inland of the southwest and high-ground areas such as Plateau, Taraba, and Kaduna States, in 2015. There is also strong possibility of domestic fire outbreaks affecting the North where temperatures are expected to be high in April and May,

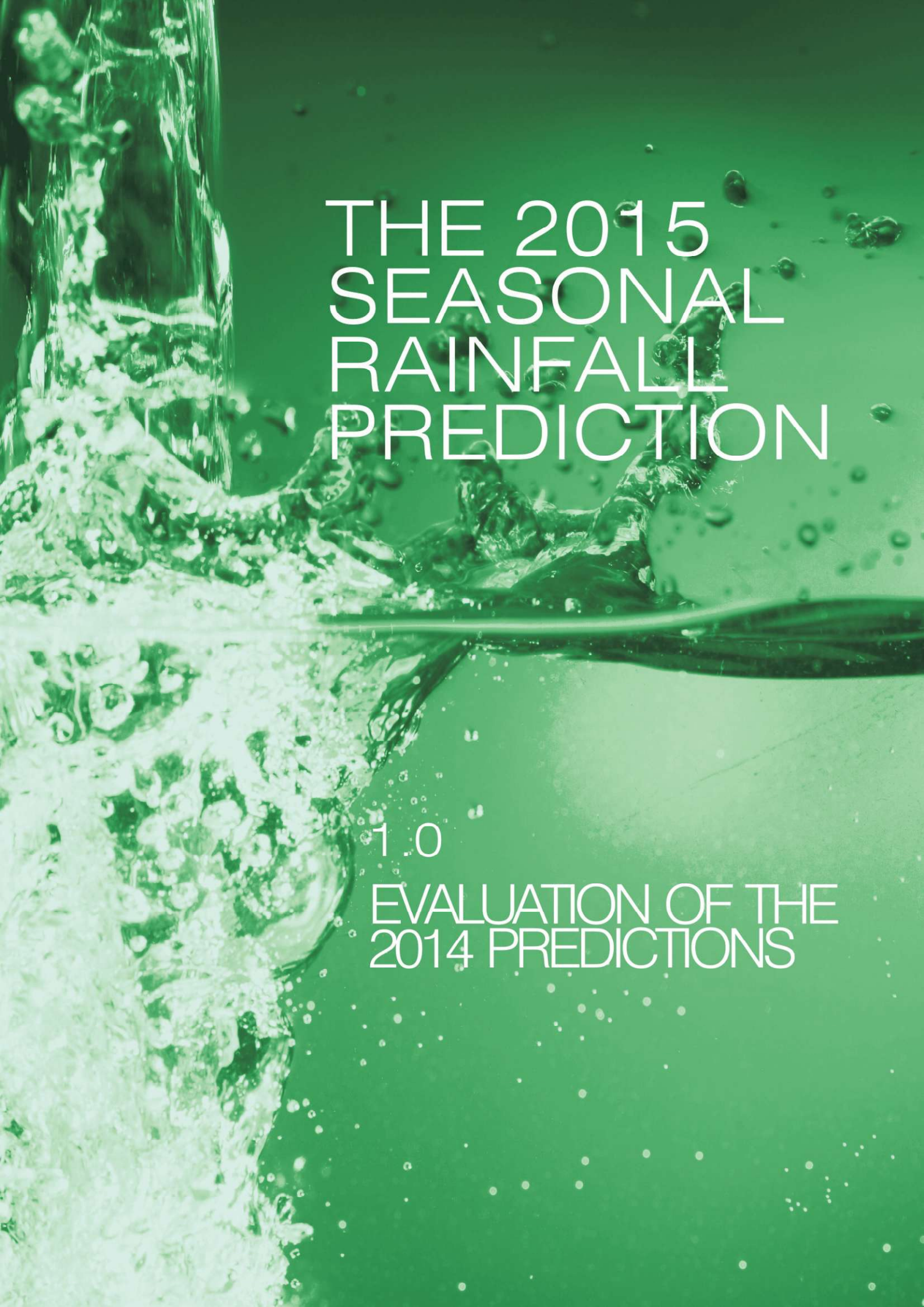


Weather affects the transmission of telecommunication signals. NiMet's services are vital for design, installation and operation of Telecommunication Networks.

TELECOMMUNICATIONS



Warmer-than-normal temperatures during the beginning of the rainy season, and the prospects of more intense rainstorms accompanied by strong winds will affect communication signal quality and infrastructure in 2015. The Nigerian Communication Commission (NCC) and other communication companies need to take all necessary precautionary measures in order to minimize the negative impact on the sector.



THE 2015 SEASONAL RAINFALL PREDICTION

1.0

EVALUATION OF THE
2014 PREDICTIONS

1.1 TEMPERATURE FORECAST EVALUATION

The 2014 actual data, updated up to November, was used for the evaluation of 2014 predictions. The outcome of the evaluation is presented below for the temperature and rainfall forecasts:

(a) January Day and Night Temperatures

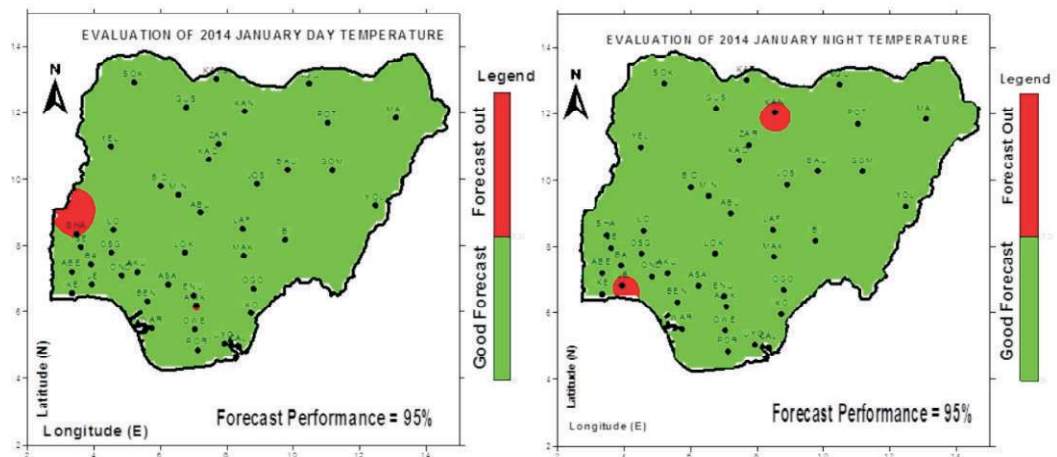


Fig. 1: January day and night temperature evaluation

There was good performance in the January day and night temperature prediction for 2014. The skill achieved was 95 percent in both forecasts.

(b) February Day and Night Temperatures

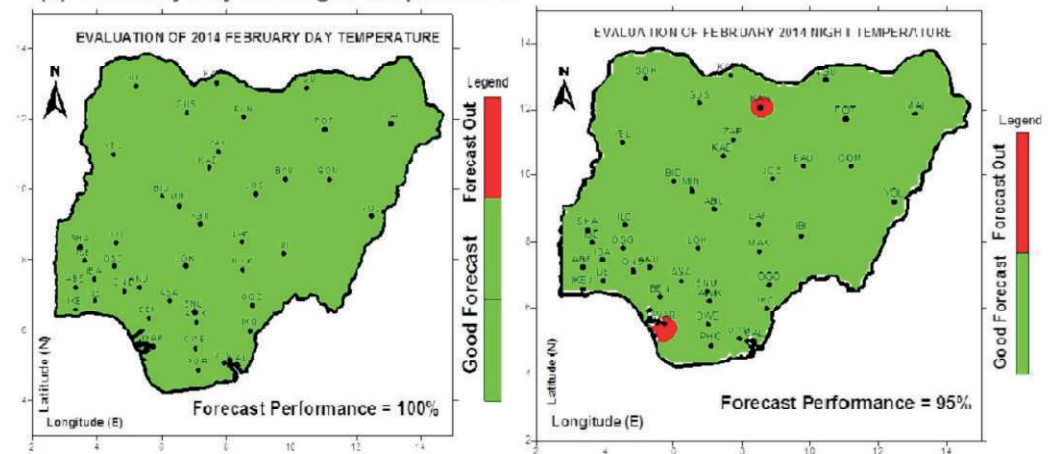


Fig. 2: February day and night temperature evaluation

In February 2014, the result of the evaluation for day and night (Figure 2) shows that the forecast performance was very good, at 100 and 95 percent skills

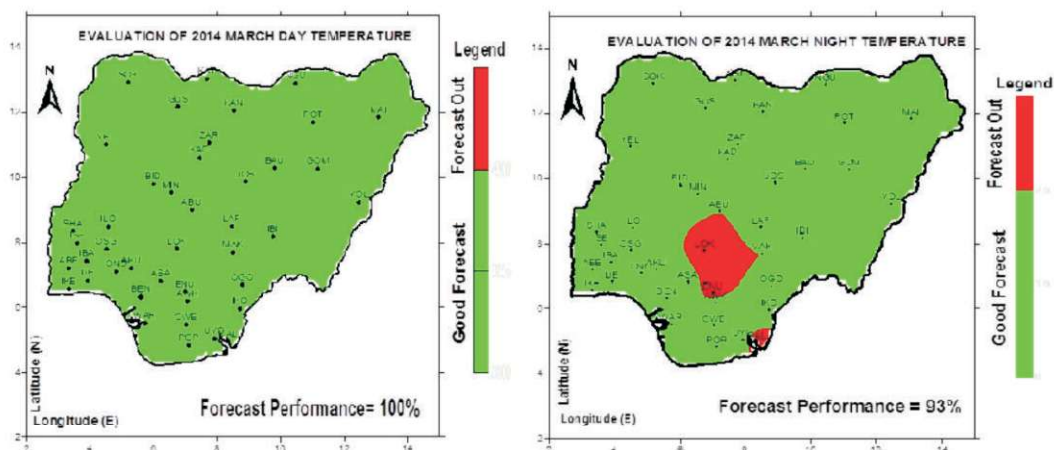
(c) March Day and Night Temperatures

Fig. 3: March day and night temperature evaluation

The forecast performance in March day and night for 2014 was very good, at 100 and 93 percent skill respectively.

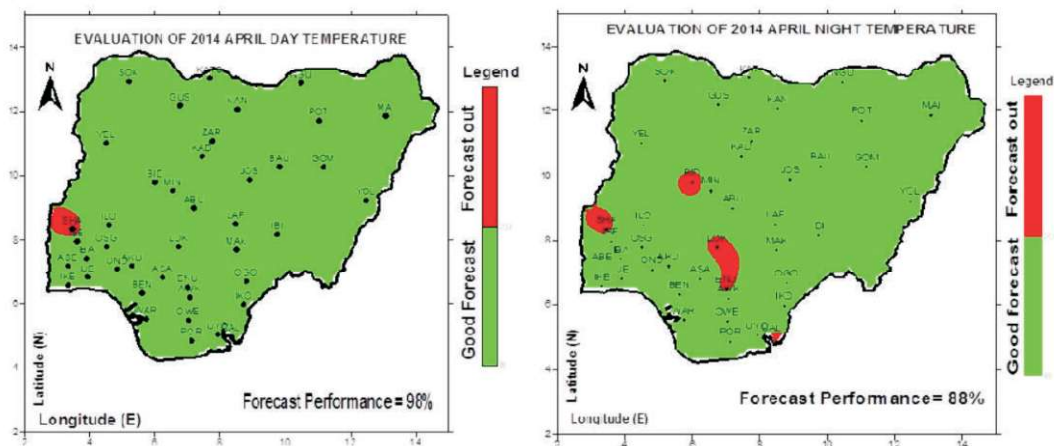
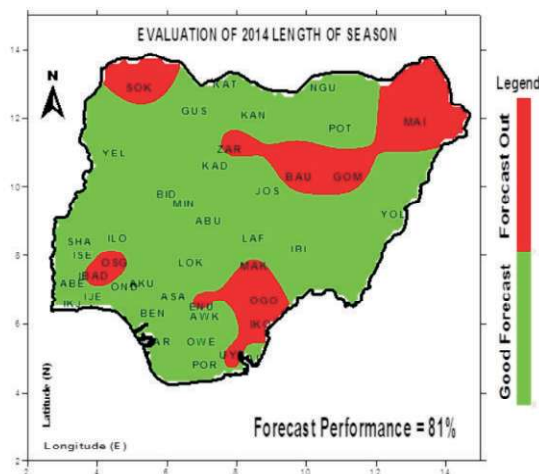
(d) April Day and Night Temperatures

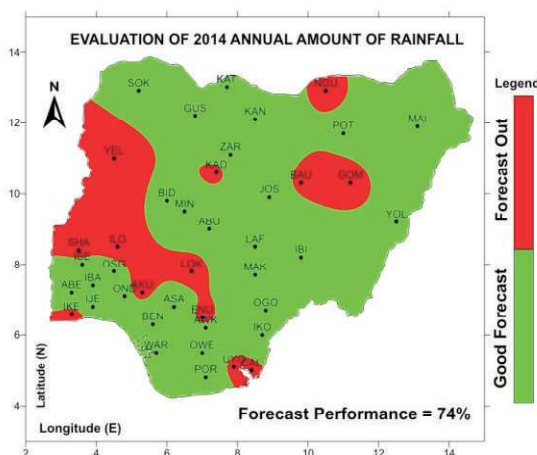
Fig. 4: Forecast performance in April for the day and night were 98% and 88% respectively

There was good performance in both the day and night temperature forecasts for April 2014, as shown in the 98 and 88 percent skills achieved respectively (Figure 4 above)

(c) Length of Growing Season

The performance of the predicted 2014 length of the growing season was effective in most parts of the country except in the areas coloured red (figure 7). Forecast skill reached is 81 percent.

Fig. 7: Length of Growing Season Performance = 81%

(d) Seasonal Rainfall Amount

There were more rains than predicted in all the areas in red (figure 8). This accounted for the "Forecast out" category in the performance of the amount of rainfall in 2014. In the other areas, the prediction was good. Forecast skill is 74%

Fig. 8: Seasonal amount of rainfall performance = 74%



2.0

2015 SEASONAL
PREDICTIONS

2.1 TEMPERATURE PREDICTIONS FOR JANUARY TO APRIL 2015

Day and night temperature forecast in the 2015 SRP covers the period January-April and addresses the issue of how the environment would be comfortable or otherwise for human and animal habitation in time and location. The first part presents maximum daytime and minimum night-time temperatures expected for each month of January-April 2015 on tables 1 and 2 respectively. From table 1 (Daytime conditions), areas with predicted temperatures “**above 39°C**” are expected to be highly uncomfortable.

Apart from this, the other important variable which describes whether a region or place will be “warmer”, “normal” or “colder” in 2015 January-April than its long-term average conditions is the ***predicted deviation from long-term means in the temperatures*** at day and night. The forecasts provide critical temperature trend information for well-informed decisions in those weather-and-climate-sensitive sectors such as agriculture, water resources and environmental management among others. The day and night temperature forecasts are now presented below for the 2015 season, followed by the rainfall predictions.

2.1.1 TEMPERATURE FORECASTS

2.1.1.1 January Day and Night Temperatures

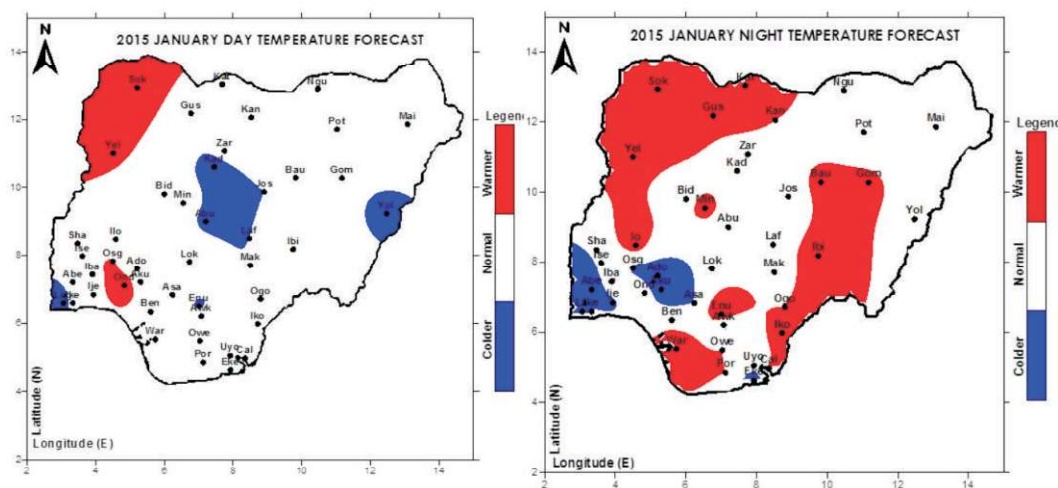


Fig. 9a & 9b: Predicted deviations of day and night temperatures from long-term means in January

From table 1, day-time temperatures in January are predicted to range from 27.6°C at Jos to 35.1°C at Lafia and Lokoja, while it will range from 12.1-24.0°C at night. On the deviation maps, Sokoto, Kebbi, Osun and Ondo States are expected to be warmer-than-normal by the range of 0.3 - 0.6°C during the day. Adamawa, parts of the central areas, Enugu and Lagos (blue in Figure 9a) are expected to be colder. Normal condition is predicted for the rest of the country.

During the night, places in blue are predicted to be colder than long-term averages with the coldest effect expected around Abeokuta (0.8°C below average). The areas in red are expected to be warmer by the range of $0.3 - 0.7^{\circ}\text{C}$. Sokoto is predicted to have the warmest effect at 0.7°C . The areas in white are expected to be normal.

2.1.1.2 February Day and Night Temperatures

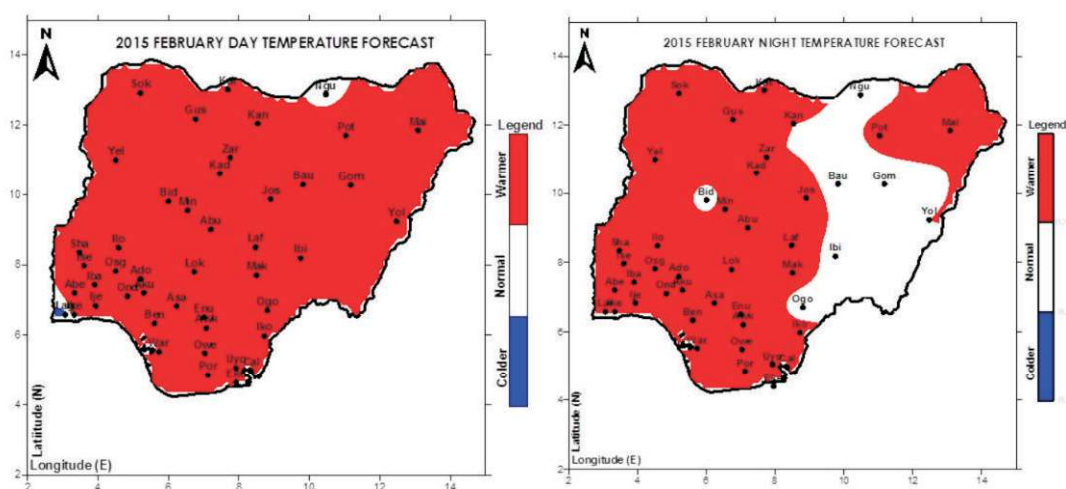


Fig. 10a & 10b: Predicted deviations of day and night temperatures from long-term means in February

The day and night temperatures in February 2015 is predicted to range from 30.0 to 38.0°C and from 15.0 to 25.0°C respectively (Table 1). Warmer than normal conditions are expected over most parts of the country with the highest effect over Makurdi at 0.9°C . Lagos Island is expected to be colder than normal while Nguru, Bauchi, Gombe, Ibi, Bida, Yola and Ogoja will be normal.

Cities in the South are expected to experience the warmest effect by the range of $0.6 - 0.8^{\circ}\text{C}$.

2.1.1.3 March Day and Night Temperatures

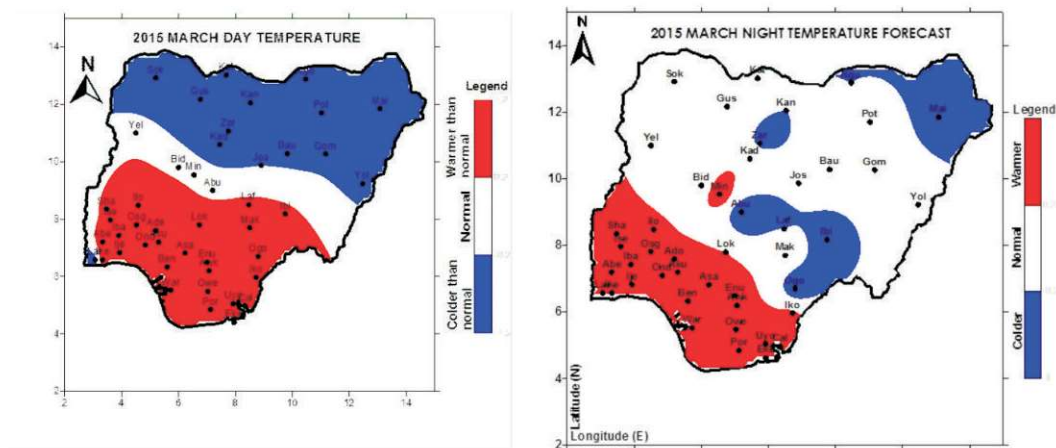


Fig. 11a & 11b: Predicted deviations of day and night temperatures from long-term means in March

The predicted temperatures during the day and night in March will be in the ranges of 31.0 - 39.0°C, and 17.0 - 27.0°C respectively (Tables 1 and 2). The North is expected to be colder during the day while the South will be warmer. The coldest effect is expected around Potiskum (-1.5°C), while the warmest effect is expected over Ondo (1.2°C). Yelwa, Bida, Minna and others in the white background will be normal during the day.

Similarly, the South will be warmer-than-normal at night, with the highest effect expected around Ijebu-Ode by 0.8°C. Nguru, Maiduguri, Zaria, Lafia, Abuja, Ibi and Ogoja are expected to be colder than normal, with the coldest effect over Abuja by -0.6°C.

2.1.1.4 April Day and Night Temperatures

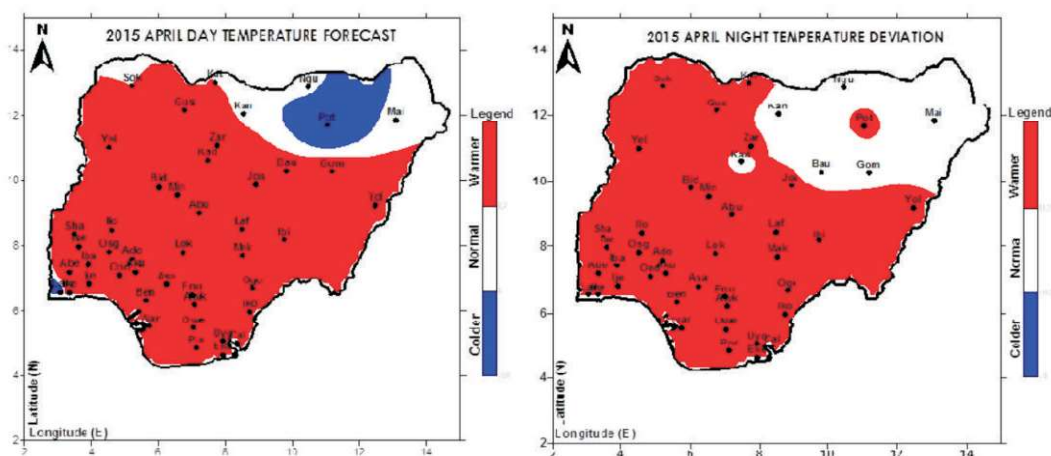


Fig. 12a & 12b: Predicted deviations of day and night temperatures from long-term means in April

Warmer-than-normal April day and night temperatures are predicted for most parts of the country in 2015. Areas in and around Gusau, Kano, Katsina, Maiduguri, Nguru and Potiskum are expected to experience day-time maximum temperatures above 39.0°C during April 2015 (Table 1). This is likely to result in considerable discomfort for the citizens during the month. The night time temperatures are predicted to be moderately warmer-than-normal in most parts of the country by a range of 0.7 - 0.9°C, particularly in the central areas.

2.2 2015 RAINFALL PREDICTION

As in the temperature forecast, the detailed dates of the arrival of established rainfall in the various zones of the country are given on table 3. Generally, the expected earliest rainfall onset date in 2015 is March 6 over Brass in Bayelsa State while the latest is June 25 over Dankoba in Sokoto State. Conversely, the rains are predicted to cease progressively from the North to the South from 27 September over Sokoto and to 28 December over Calabar. Full details of the onset and cessation dates for the 2015 growing season are given on table 4. In total, 560 locations were considered in the prediction as against 372 locations covered in the 2014 SRP.

In 2015, emphasis is placed on the deviations of predicted onset and cessation dates, length of growing seasons, as well as the percentage change of annual rainfall from long-term averages as these will show the skill of the predictions in each category.

2.2.1 ONSET & CESSATION DATES OF GROWING SEASON

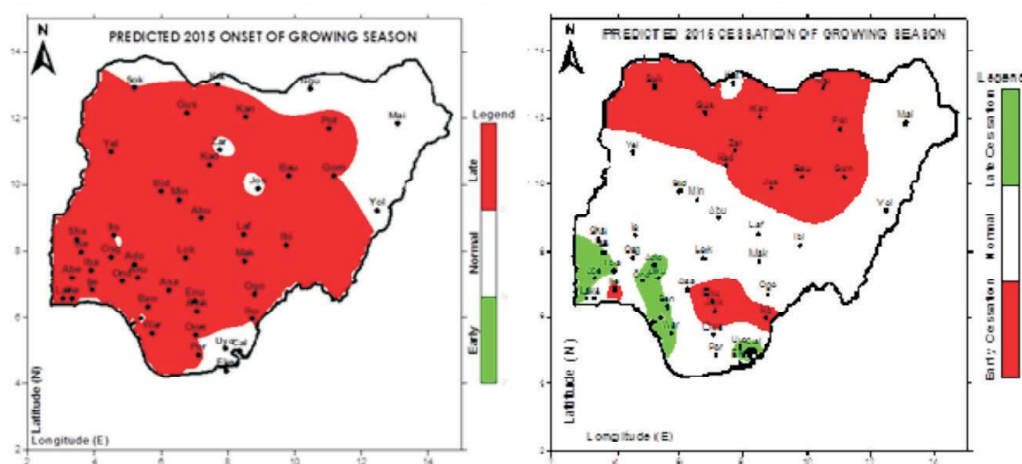


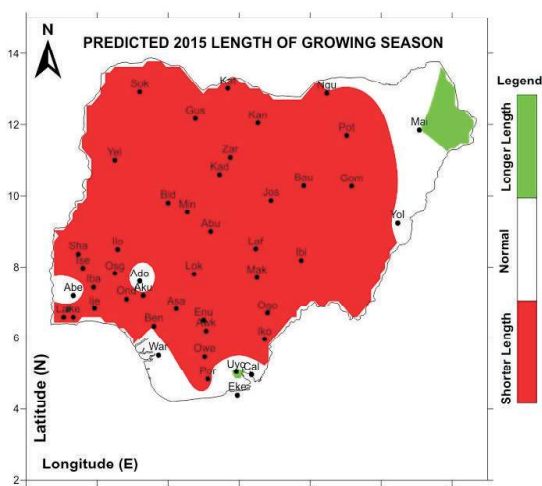
Fig. 13a & 13b: Predicted deviations of onset and cessation dates from long-term means

Figures 13a and 13b show the 2015 onset and cessation dates trend, presented in a format showing the areas where the rains are expected to be delayed, normal or early. The figures show that rainfall will be generally delayed by 2 to 13 days. **The**

delay will be most pronounced in and around Ondo, Imo, Anambra, Kogi, Yobe, northern Cross River, Rivers, Delta, Oyo, Lagos, Niger and Ogun States by 8 to 13 days. The onset of rainfall is expected to be normal in Akwa Ibom, Adamawa, parts of northern Yobe, Katsina and Sokoto States (figure 13a).

On the other hand, rainfall is predicted to cease early in the northwest, north central areas, Enugu, Awka, Ikom and Ijebu Ode (areas in red). The effect will likely be more significant in and around Ikom, Awka and Sokoto by 8 to 11 days. Conversely, a later-than-normal cessation date for the growing season is predicted for parts of Niger, Oyo, Ogun, Ondo, Edo, Delta, Cross River and Akwa Ibom States in the range of 1 to 6 days. The rest of the country is expected to be normal.

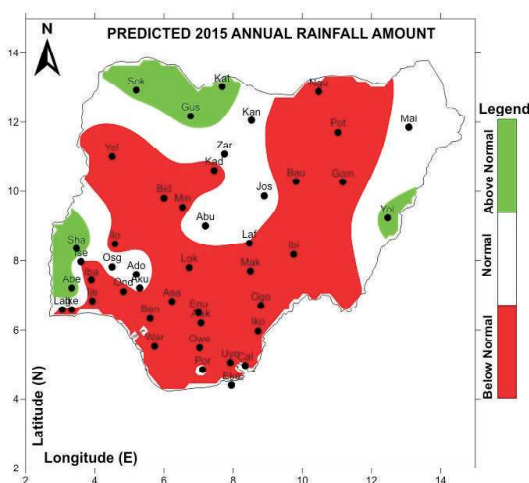
2.2.2 LENGTH OF GROWING SEASON



As shown in figure 14, the length of the growing season is predicted to range from 96 days (Danboka, Sokoto State) to 293 days (Brass, Bayelsa State). A shorter than normal length of season is predicted for most places (in red). It is predicted to be significantly reduced in Sokoto, Awka, Ibi, Bauchi, Potiskum, Kano, Zaria, Gusau, Kaduna, Gombe, Minna, Makurdi and Ikom. A longer length of season is expected over Uyo and Maiduguri. Normal conditions will prevail in Abeokuta, Warri, Calabar, and Eket.

Fig. 14: Predicted deviations of length of season from long-term means

2.2.3 ANNUAL AMOUNT OF RAINFALL



The annual rainfall amount is predicted to range from 388mm (Yobe) to about 2962mm in Brass, Bayelsa State during 2015. Below-normal rainfall is projected for the areas in red (figure 15).with expected challenge to be more pronounced in and around **Yelwa, Potiskum, Nguru, Bauchi, Ibi and Gombe** among others. Above-normal rainfall is expected in parts of the northwest, Adamawa and inland of the southwest. The rest of the country is predicted to experience a normal rainfall regime in 2015.

Fig. 15: Predicted deviations of annual rainfall amount from long-term means

2.2.4 2015 LITTLE DRY SEASON (LDS)

The map below shows areas likely to experience the Little Dry Season (short period of drought or dry spell) between July 15 and 31 August, 2015. The areas coloured in red have very high prospects of experiencing the Little Dry Season (LDS) in 2015. Areas depicted in orange have medium probability while areas in peach have the lowest probability of experiencing LDS in the country. All areas shown in white are not expected to be affected by the 2015 LDS.

Also, rainfall in August **2015** is expected to be drier than that of August **2014** in the southern States where the rainfall is bi-modal. As El Nino phase develops in the second half of the year, these regions are likely to receive less rain in August than the averages.

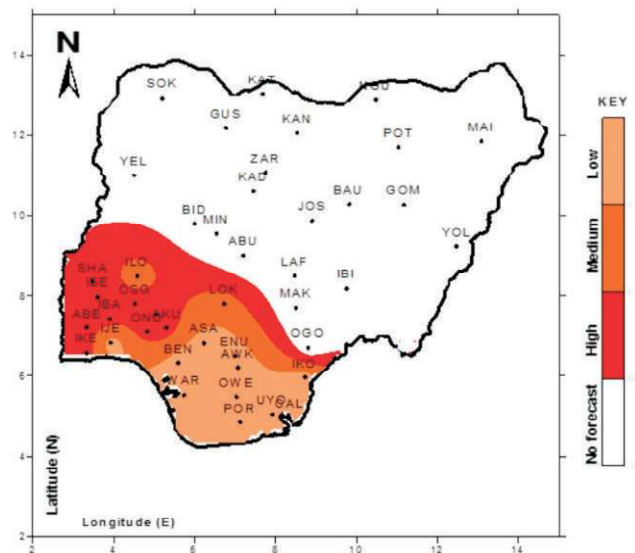


Fig.16: Chances of Little Dry Season in 2015.



2015 MALARIA FORECAST

“ This newly introduced section discusses the predictions of mosquito bites and malaria severity indices for each month of 2015. The principal vectors of malaria are mosquito bites. The more the mosquito bites, the higher the chances of people getting infected with malaria. The breeding process and bites of mosquito are largely influenced by humidity and temperature. ”

2.2.5 2015 MALARIA FORECAST

Weather and climate play significant role in the spread of diseases such as malaria. It is estimated that globally 300 million acute cases of malaria occur every year, resulting in more than one million deaths. Approximately 90 percent of these deaths occur in Africa, mostly in young children under five years of age. In Sub Saharan Africa, one in ten deaths of children under 12 months of age and one in four deaths of children between 1 and 4 years of age are caused by malaria. Nigeria is one of the countries in Africa that reports significant number of deaths due to malaria. **A major malaria carrying vector namely called *Plasmodium falciparum***, which is found in Nigeria is the most dangerous of the malaria parasites. According to the Nigerian Ministry of Health (MoH), malaria in Nigeria is responsible for 60 percent of outpatient visits to health facilities; 30 percent of childhood deaths; 25 percent of deaths in children under one year; and 11 percent of maternal deaths with an estimated financial loss of about 132 billion Naira per year.

The 2015 SRP prediction shows warmer than normal and highly humid conditions at different times across the country. These areas with high temperature and high humidity condition will enhance the breeding of disease vectors and subsequently the spread of some diseases including malaria.

This newly introduced section discusses the predictions of mosquito bites and malaria severity indices for each month of 2015.

The principal vectors of malaria are mosquito bites. The more the mosquito bites, the higher the chances of people getting infected with malaria. The breeding process and bites of mosquito are largely influenced by humidity and temperature. For example, the higher the temperature and humidity, the more rapid the life cycles and bites.

The 2015 Malaria forecast maps (figs 17-28), which give pattern of mosquito bites and associated malaria severity, suggest greatest severity from January to February and November to December from the South up to Bida. The same areas are expected to experience fewer bites during the rainy months of April to October. At latitudes above Bida, mosquito bites severity is expected to reach peak values from April till October and remain lower in other months.

Mosquito Habitat Growth Severity -Malaria severity is a function of the interaction among several factors namely; the parasite, the mosquito, the human host and the environment. The risk of malaria infection is determined by the number of mosquitoes, their survival rate, the incubation rate for both the vector and the parasite and the probability of the vector feeding off a human host. Each of these factors is directly influenced by meteorological variables such as rainfall, temperature and humidity that give rise to differences in stability of disease transmission and seasonal variations in disease incidence.

In 2015, locations including Benin City and to its south are likely to experience high to extreme mosquito population throughout the year. To the north of Benin City, risk in mosquito population is expected to be limited to rainy season months. In 2015, we expect the lowest risk to mosquito population in areas north of Zaria.

2.2.5.1 Mosquito Bites and Malaria Severity Indices for January

Figure 17 shows the mosquito bites and the malaria severity indices, the belt of "extreme" concentrations of mosquito bites index is from the coast well into the middle of the country.

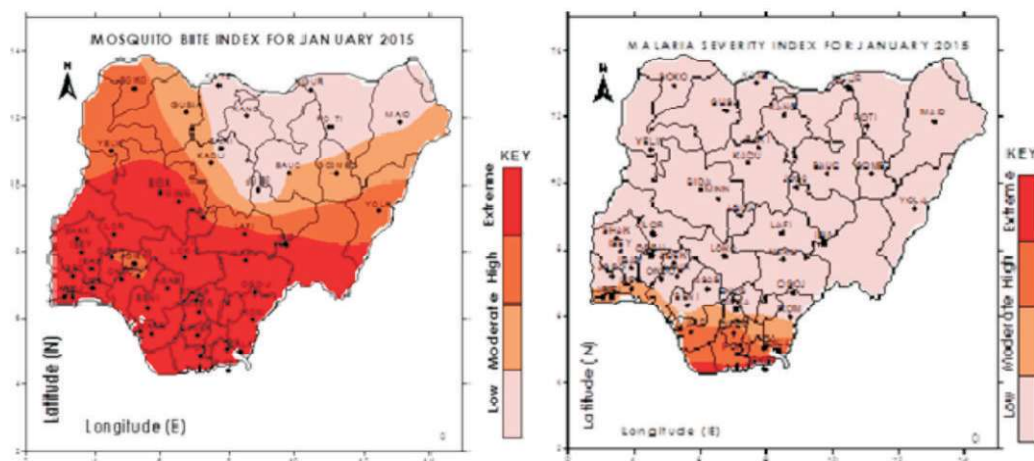


Fig 17: Mosquito Bite and Malaria Severity Indices for January

On the right-hand map, the malaria severity is located over the southernmost areas in the eastern part of the country.

2.2.5.2 Mosquito Bite and Malaria Severity Indices for February - April

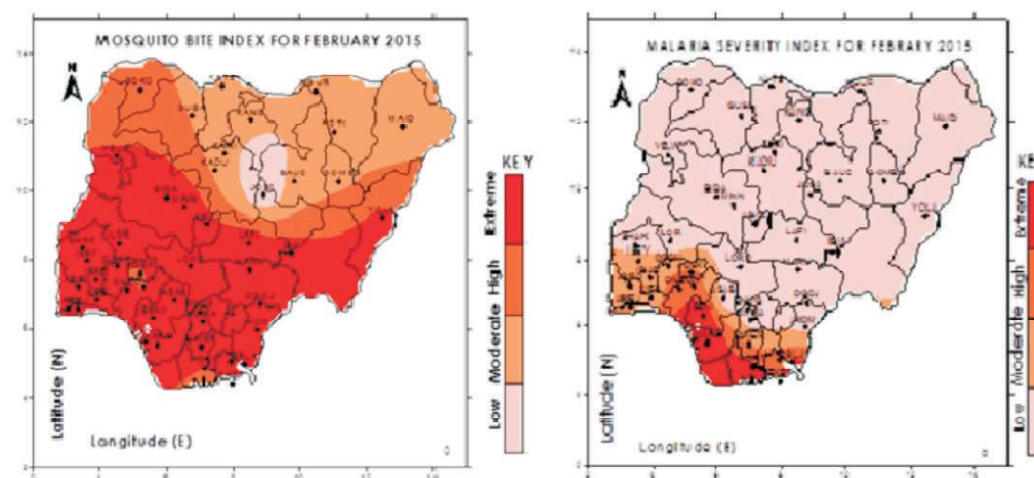


Fig 18: Mosquito Bite and Malaria Severity Indices for February

Figures 17 - 20 show the predicted mosquito bites indices on the left side and the corresponding malaria severity indices. The Bites index maps show the rapid northward progression of the belt of the extreme cases, the belt of the extreme malaria severity is predicted to remain in the South of the country. The Bites index over the Plateau is predicted to be low, due to low temperatures and high grounds observed in the area.

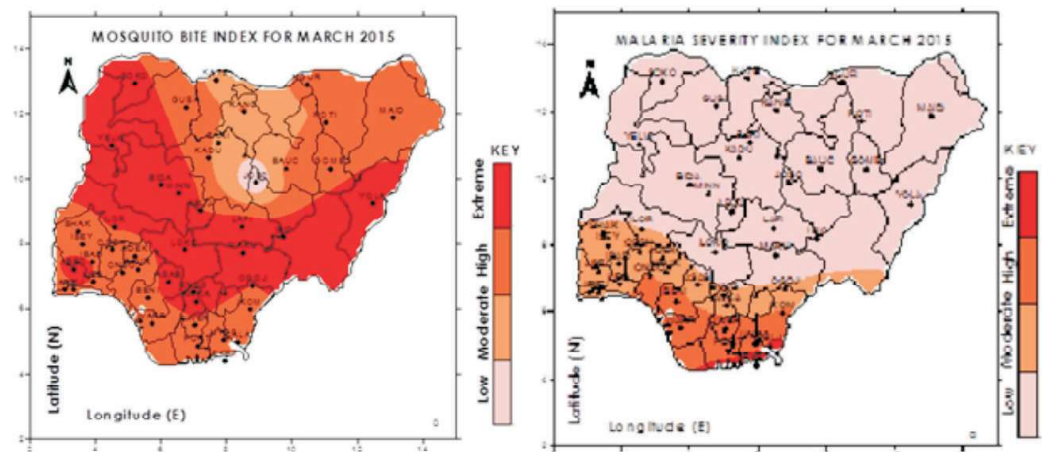


Fig 19: Mosquito Bite and Malaria Severity Indices for March

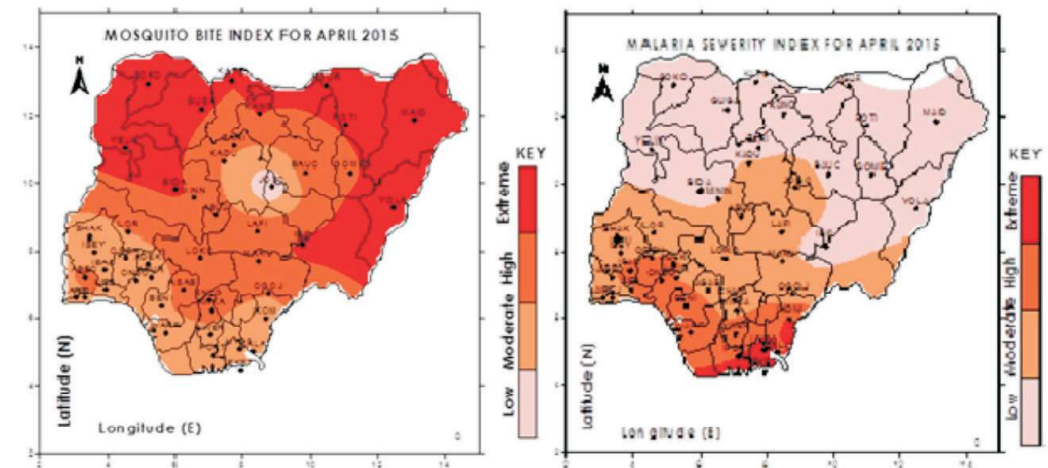


Fig 20: Mosquito Bite and Malaria Severity Indices for April

2.2.6.3 Mosquito Bite and Malaria Severity Indices for May - July

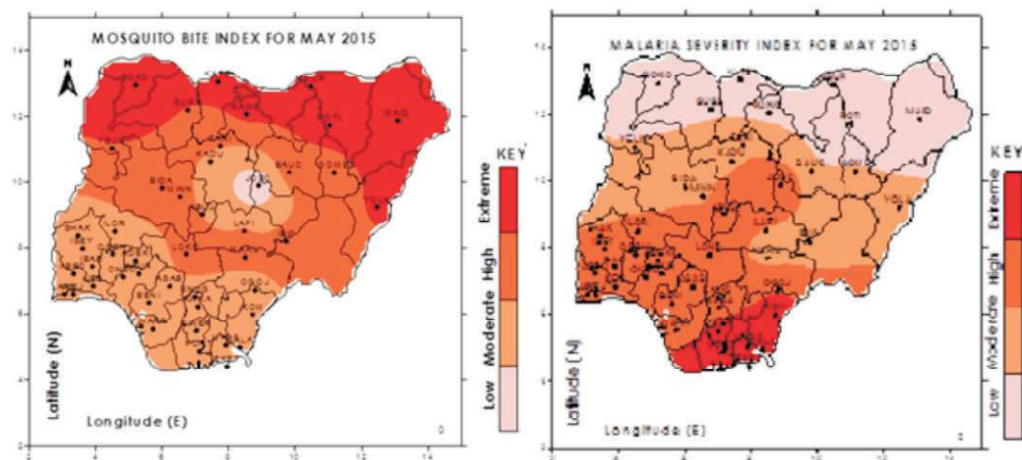


Fig 21: Mosquito Bite and Malaria Severity Indices for May

During May - July, it is predicted that the mosquito bites index will be severe in the far Northern region of the country, reducing in intensity southwards. In May, the malaria severity belt will be in the southeast, and reduce in intensity northwards. A moderate malaria severity index is predicted to reach the Jos Plateau in May, becoming severe in June. The malaria severity index will also remain extreme in the southeast and the Niger Delta region in June.

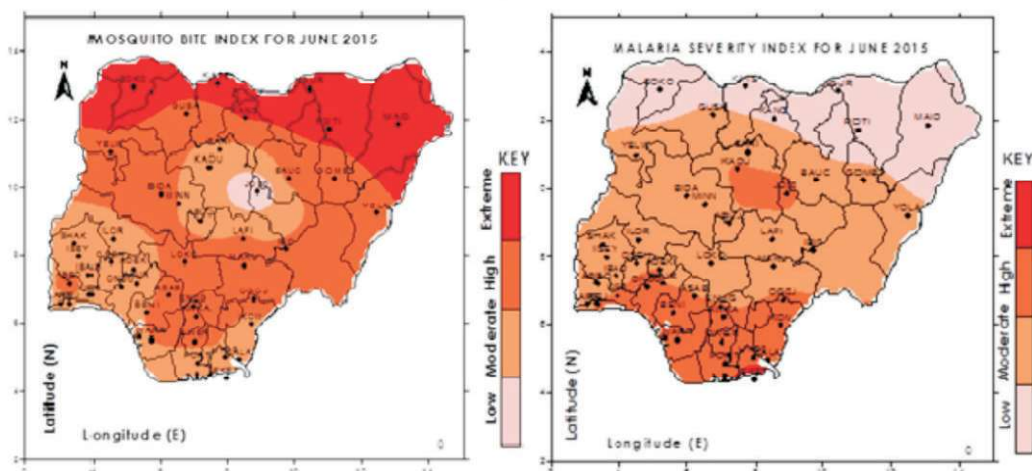


Fig 22: Mosquito Bite and Malaria Severity Indices for June

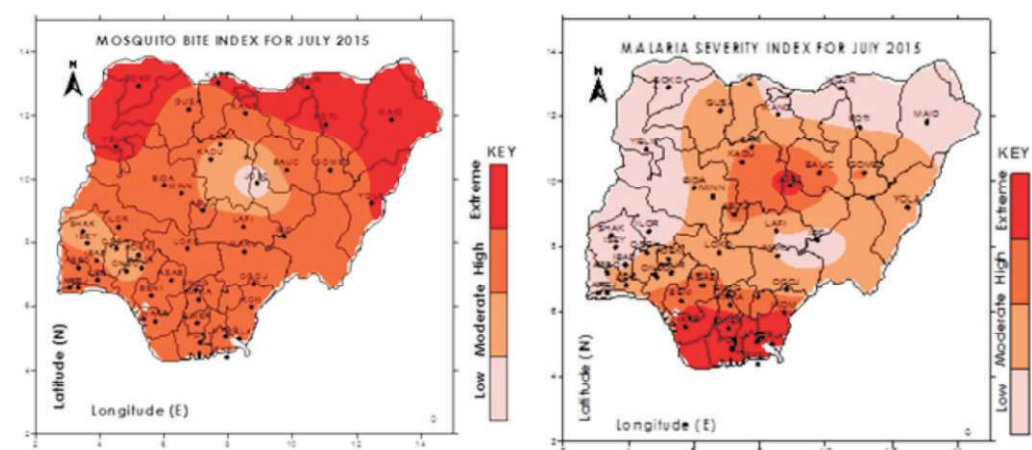


Fig 23: Mosquito Bite and Malaria Severity Indices for July

2.2.6.4 Mosquito Bite and Malaria Severity Indices for August - October

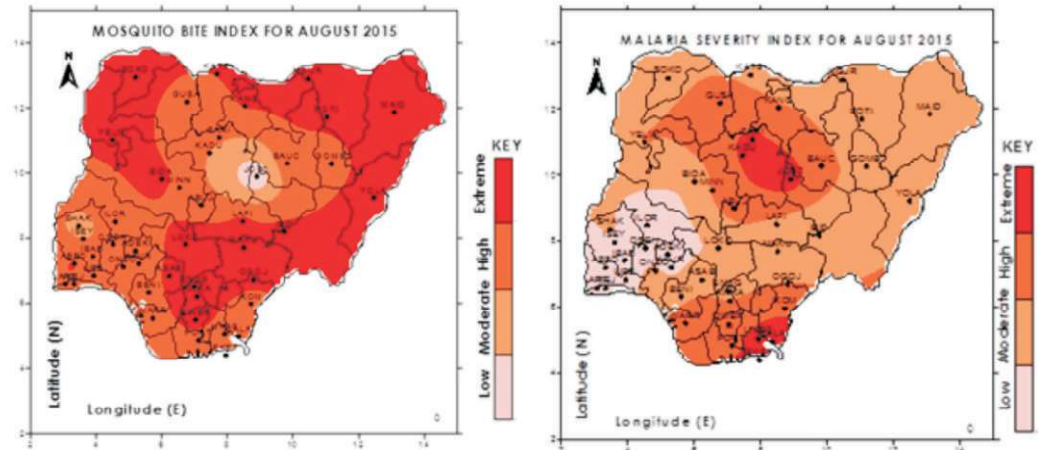


Fig 24: Mosquito Bite and Malaria Severity Indices for August

As the rains stabilize, the mosquito bite index during August - October is expected to be moderate - severe in the North and southeast, reducing in intensity over the Plateau during September and October. The malaria endemic zone is also predicted to be over Kaduna, Plateau, Cross River and Akwa Ibom states, becoming moderate in the rest of the States except over the far northern States, in September. The effect will be reduced further during October, and restricted to the coastal areas.

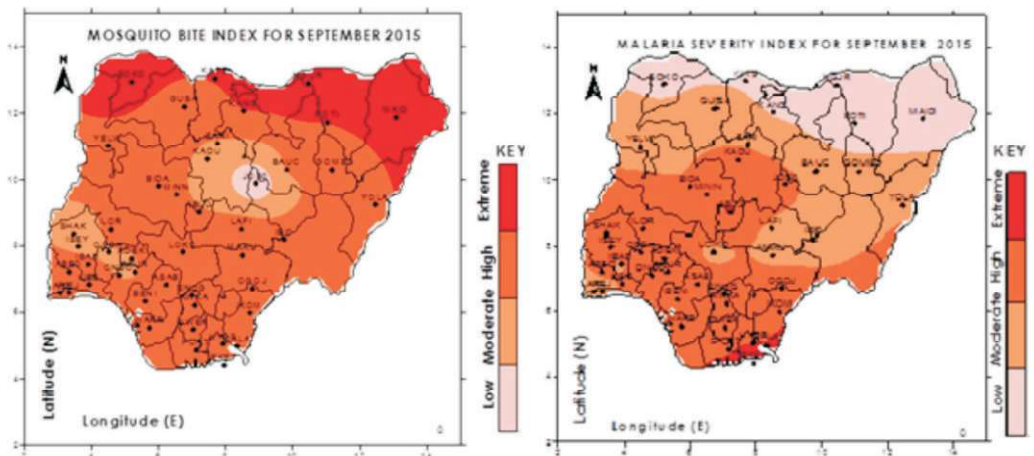


Fig 25: Mosquito Bite and Malaria Severity Indices for September

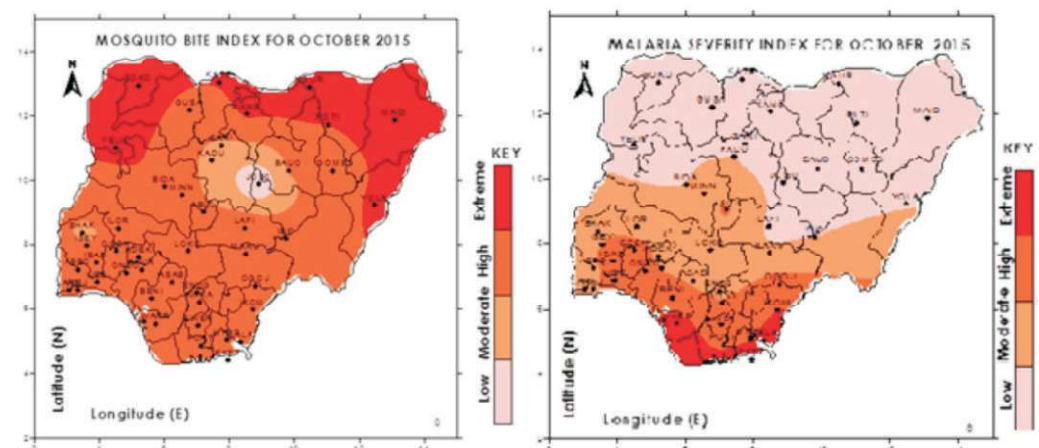


Fig 26: Mosquito Bite and Malaria Severity Indices for October

2.2.6.5 Mosquito Bite and Malaria Severity Indices for November-December

During November and December, the extreme zone of the Mosquito Bites Index will be located in the South, Central and northwestern parts of the country (figure 27). It will be gradually restricted to the South and Central States in December (Figure 28). The malaria severity index endemic zone will similarly be restricted to the South of the country during November and December.

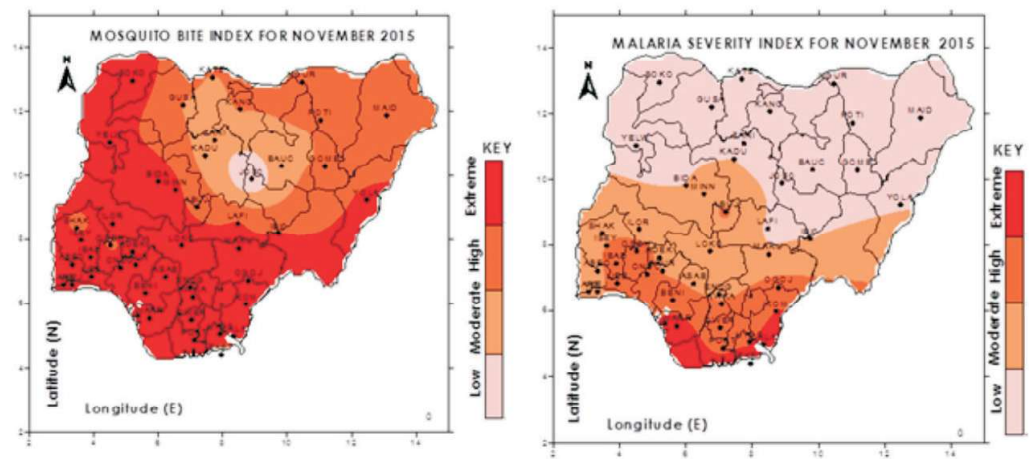


Fig 27: Mosquito Bite and Malaria Severity Indices for November

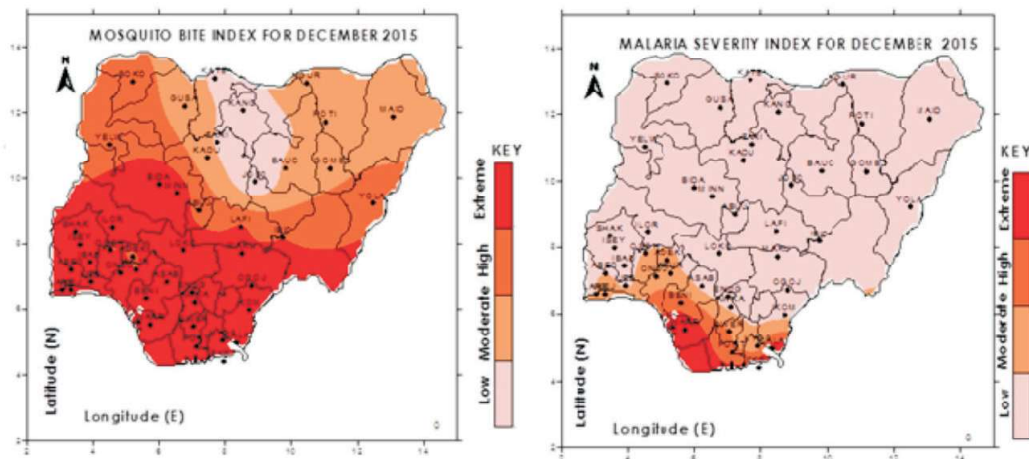


Fig 28 Mosquito Bite and Malaria Severity Indices for December.

3.0
SOCIO-
ECONOMIC
IMPLICATIONS
FOR THE
COUNTRY

3.1 AGRICULTURE: CROPS

A late onset date of the growing season, as well as shorter length of season is predicted for most areas in 2015. Early cessation of the rains is also predicted for most areas in the extreme North. This situation, coupled with the El Nino conditions prevailing during the season is expected to give rise to dry spells over the affected areas. Consequently, farmers in the extreme northern states of Sokoto, Zamfara, Katsina, Jigawa, Bauchi, Yobe and Borno are advised to:

- Note that the length of the growing season is expected to be shorter;
- Plant drought resistant crop varieties;
- Request relevant government agencies to provide them the appropriate seed varieties, cuttings and seedlings for all crops;
- Make serious effort to harvest a lot of the rain-water;
- Request government's support in subsidizing farm inputs such as fertilizers and agro-chemicals, as well as hiring of tractors and other relevant services,
- Request financial institutions to provide credit facilities with good lead-time.

To ensure adequate and sufficient good yield of both cereal root crops and other types of crop in 2015, farmers will need to be supported with sufficient irrigation and other related facilities. Increased sensitization need to be embarked upon by all stakeholders to disseminate this information early enough to ensure that adequate measures are put in place by the MDAs in the agriculture sector to reduce losses.

The month of June 2015 will be characterized by dry spell in and around Zamfara, Katsina, Sokoto, Kano, Jigawa, Yobe, Borno and Adamawa States. Farmers in these areas are advised to plant drought-tolerant crops, and seek guidance from appropriate agricultural experts to avoid economic loss.



3.2 AGRICULTURE: LIVESTOCK

Livestock production would most likely be negatively affected by the combined effect of the predicted warmer-than-normal temperatures, delayed onset and early cessation of the rains, and below normal rainfall expected in many parts of the country. A good management of rangeland for improved pastures via judicious use of the predicted rainfall is therefore recommended. This is to facilitate production of fodder to be stored against the dry season. Rain harvesting in the North and South using field ponds should be encouraged during the year to avoid early livestock water starvation.

Governments at all levels are advised to provide livestock inputs such as improved breeds, feeds and vaccines on time to increase the prospects of good livestock production. ***The predicted warmer-than-normal temperature will directly affect most livestock following increased heat stress particularly in poultry production.*** This may likely result in reduction in egg size and quality, as well as increased mortality and morbidity rates if not properly managed. Weather-related vector-borne livestock diseases are likely to be pronounced as a result of the predicted warmer than normal temperatures. The distribution of insect pest may experience a shift spatially over the country in 2015.



3.3 PERISHABLE CARGO PROJECT

As part of efforts by the Federal Government to diversify the economy in its Transformation Agenda, the Federal Ministry of Aviation is constructing Perishable cargo terminals across the country to improve the export potentials of Nigeria's agricultural sector.

The predicted warmer than normal temperatures during the months of February and April will negatively impact storage, packaging and transportation of perishable agricultural products. Therefore, the use of climate-

controlled warehouses for storage and night time transportation of perishable products is strongly advised.

NiMet's short-range forecast (daily and weekly) is available for stakeholders in the perishable cargo industry and other stakeholders to supplement the 2015 forecast.



3.4 WATER RESOURCES MANAGEMENT

In 2015 prediction, rainfall amount is expected to be above normal in parts of the northwest, Adamawa and inland areas of the southwest. But it will be in deficits in many parts of the North, Central and southern areas. There are therefore low prospects of adequate water for all domestic and industrial use, groundwater recharge, and also for agricultural activities across the country. The predicted below normal rainfall amount in Yelwa, Potiskum, Nguru, Bauchi, Lokoja and Gombe will create water stress for agriculture and other related needs in the area. There is need to provide adequate support through irrigation to improve agricultural activities in the State.



3.5 HYDROPOWER GENERATION

Above-normal rainfall amount predicted for areas in the northwest will positively impact hydropower generation activities in the area. There will be shortage in other areas as a result of the below-normal rainfall expected in many places (figure 15). Low water flows into dams are projected in 2015.



3.6 DAM MANAGEMENT

Dams located in the areas with prospects of above-normal rainfall predicted may witness high water inflow from increased run-off. Managers need to closely monitor the season and avail themselves of weather updates released by NiMet as the season evolves. Low rainfall amount is predicted for several areas and dams in these places may not get enough water for pertinent usage.



3.7 TRANSPORTATION: AVIATION

The expectation of moderate harmattan conditions in 2015 will result in increased prospects of reduced visibility caused by dust haze. Occurrence of early morning fog over the coastal areas is also expected during the harmattan period. This will likely disrupt air navigation resulting flight delays and cancellations. Increased hazardous weather conditions for aviation operations are also associated with onset and cessation. The months of February/March in the southern areas, and May/June in the North are therefore critical for safety in the air and on the road across the country. Flight operators are advised to take advantage of the daily weather forecasts and alerts issued regularly by NiMet for all airports and air-strips for safety of the flying public. Pilots are advised to take additional measures during take-off and landing to avoid weather hazards caused by wind shear, slippery runways and reduced visibility.



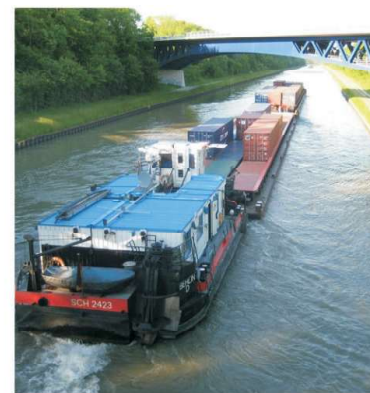
3.8 TRANSPORTATION: ROAD & RAIL

Bad weather increases the risk of delays, disruptions, damage and failure of infrastructure across different transportation systems. In 2015, warmer-than-normal temperatures are expected in areas such as Ado Ekiti, Abuja, Akure, Asaba, Awka, Ibadan, Ibi, Ijebu Ode, Makurdi, Minna, Ogoja, Ondo, Oshogbo, Enugu and Lokoja. This may likely cause tarred road surfaces to soften and expand. High temperatures expected in the months of February to April over Gusau and Kano may adversely affect rail tracks and cause them to expand and buckle.



3.9 MARITIME & INLAND WATERWAY ACTIVITIES

Inland waterways transportation may be enhanced in the southwest and northwest where above-normal rainfall is predicted for 2015. This mode of transportation may however face challenges in the majority of areas where below-normal rainfall is predicted (figure 15). Offshore fishing, as well as coastal recreational activities will be normal. However, the increased thundery activities, which herald the onset and cessation of the rains may lead to disruptions in the operations of the maritime sector including exploration activities of oil companies. Marine transport operators should regularly obtain NiMet's marine weather forecast for safety.



3.10 HEALTH

Moderate harmattan is predicted for 2015, and this will generate suspension of large plume of dust during January and February. Common ailments such as upper respiratory tract infection (pneumonia, catarrh and asthma) during this period are expected to increase in frequency, particularly in parts of the North-

Warmer-than-normal temperature conditions predicted in places such as Ado Ekiti, Abuja, Akure, Asaba, Awka, Ibadan, Ibi, Ijebu Ode, Makurdi, Minna, Ogoja, Ondo, Oshogbo, Enugu and Lokoja will likely lead to hotter days, heat stress and dehydration. This could increase the risk of heat-related illnesses and deaths and also reduce air quality. Young children, the elderly and people with related medical conditions are the most vulnerable.



3.11 DISASTER MANAGEMENT

Health-related hazards are predicted in 2015 following the predictions of warmer-than-normal temperatures and less rainfall in the majority of areas. In addition, thunderstorms accompanied by strong, winds which usually herald the start and cessation of the rains are likely to result in destruction of infrastructure. The frequency and intensity of these storms are predicted to be moderate in parts of the northwest, inland of the southwest and high-ground areas such as Plateau, Taraba, and Kaduna States, in 2015.

There is also strong possibility of domestic fire affecting the North where temperatures are expected to be high in April and May, and in areas where below normal rainfall is expected. Emergency managers are urged to devise appropriate sensitization measures against the outbreak of domestic fire and other dry-weather-related disasters to avoid loss of lives, destruction of property and infrastructure.



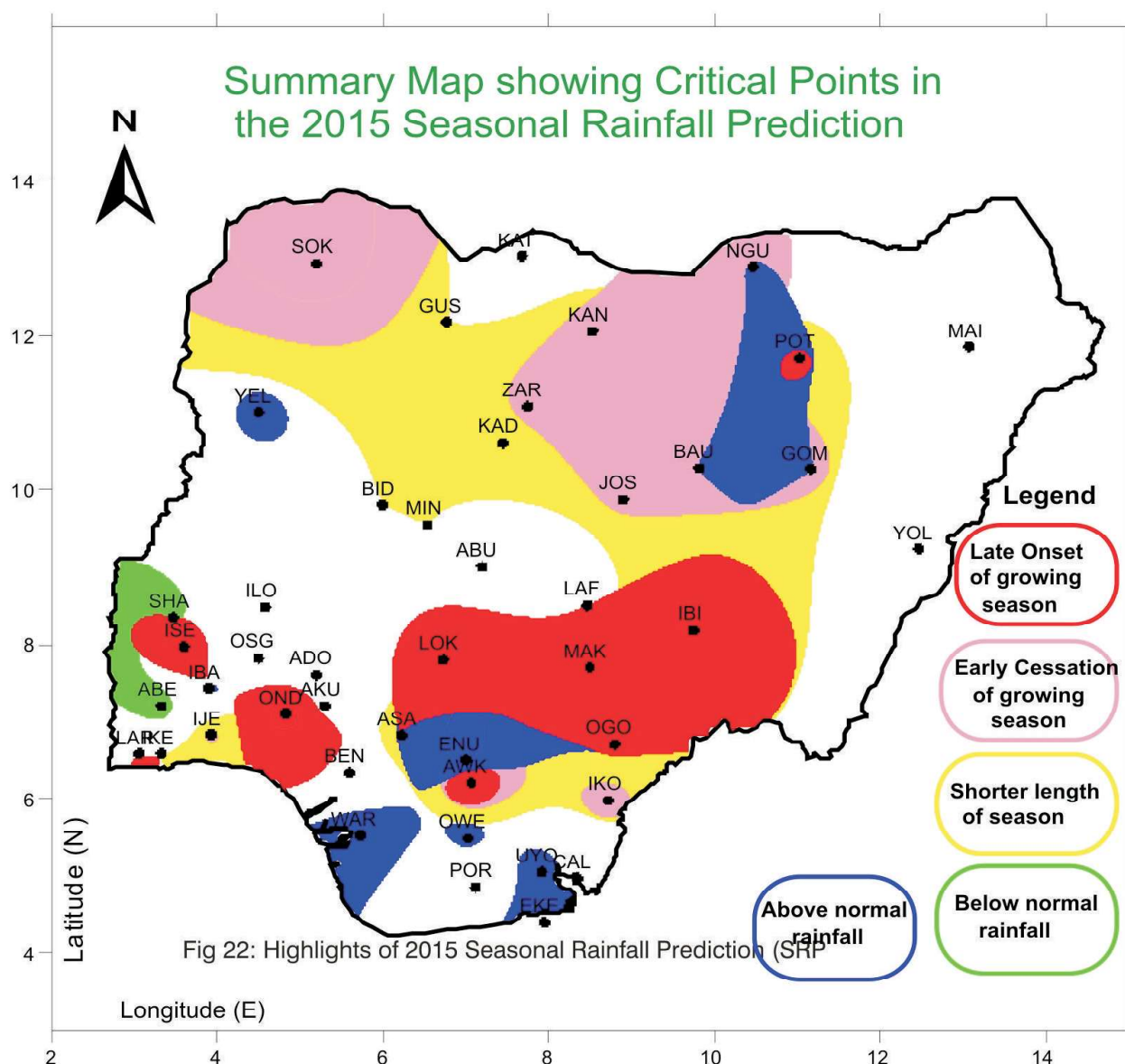
3.12 COMMUNICATION

Warmer-than-normal temperatures during the beginning of the rainy season, and the prospects of more intense rainstorms accompanied by strong winds will affect communication signal quality and infrastructure in 2015. The Nigerian Communication Commission (NCC) and other communication companies need to take all necessary precautionary measures in order to minimize the negative impact on the sector.



4.0 HIGHLIGHTS OF THE 2015 SRP AT A GLANCE

In the 2015 seasonal rainfall predictions, the combined effect of the expected late onset of rainfall, early cessation of rainfall, shorter-than-normal length of the growing season, and lower-than-normal annual amount of rainfall will differ from one location to another. By defining threshold values for the various extreme rainfall events, a map highlighting the critical points in the 2015 SRP was developed as shown in the figure below. All areas projected to have 8 - 13 days delay in the onset of the rains, i.e. **Ondo, Anambra, Kogi, Yobe, northern Cross River, Delta (Asaba), Oyo, Lagos, Benue and Taraba States are shaded in the same colour in the map while areas such as Imo and Rivers, which are outside the 8-13 days threshold are similarly coloured.** The same goes for other similar thresholds such as shorter-than-normal length of growing season, annual amount of rainfall, and others.





5.0

2015
TEMPERATURE
& RAINFALL
PREDICTION
TABLES

5.0 2015 TEMPERATURE PREDICTION TABLES

TABLE 1: A DETAILED STATION-BY-STATION PREDICTED VALUES OF DAYTIME TEMPERATURE.

Site	Long	Lat	Jan	Feb	Mar	Apr
ABEO	03.33	07.20	34.7	36.9	36.1	35.1
ADEK	05.20	07.60	33.0	35.0	34.4	33.6
ABUJ	07.20	09.00	34.6	37.0	37.1	36.4
AKUR	05.30	07.20	33.0	35.0	34.4	33.6
ASAB	06.23	06.82	34.0	36.0	35.9	34.9
AWKA	07.07	06.20	33.9	35.7	35.6	34.8
BAUC	09.82	10.28	30.8	34.2	36.4	38.2
BENI	05.60	06.33	33.0	35.2	34.7	34.3
BIDA	06.00	09.80	34.9	37.8	38.2	37.7
CALA	08.35	04.97	32.2	33.9	33.2	32.2
EKET	07.95	04.40	31.2	32.8	32.3	31.8
ENUG	07.00	06.50	33.3	35.8	35.5	34.5
GOMB	11.17	10.27	30.6	34.3	36.5	38.4
GUSA	06.77	12.17	31.3	35.1	37.0	39.4
IBAD	03.90	07.43	33.3	35.6	35.5	34.0
IBIO	09.75	08.18	34.8	37.9	38.4	37.7
IJEB	03.93	06.83	33.1	35.0	34.8	33.8
IKEJ	03.33	06.58	32.7	34.2	34.0	33.5
IKOM	08.72	05.97	32.7	35.3	35.2	33.7
ILOR	04.58	08.48	33.8	36.3	36.5	35.2
ISEY	03.60	07.97	33.8	35.7	35.1	33.6
JOSO	08.90	09.87	27.6	30.1	31.1	31.3
KADU	07.45	10.60	30.9	34.3	35.3	36.0
KANO	08.53	12.05	29.0	33.3	35.8	39.2
KATS	07.68	13.02	29.2	33.1	35.3	39.3
LAFI	08.47	08.50	35.1	38.1	38.0	36.5
LARF	03.06	06.58	30.4	31.3	31.4	30.9
LOKO	06.73	07.80	35.1	37.4	37.8	36.9
MAID	13.08	11.85	31.4	35.0	37.4	41.2
MAKU	08.50	07.70	34.9	37.9	37.9	36.4
MINN	06.54	09.54	34.8	37.6	37.9	37.5
NGUR	10.47	12.88	30.1	33.8	36.2	40.7
OGOJ	08.80	06.70	34.6	36.9	36.7	35.4
ONDO	04.83	07.10	33.0	34.8	34.5	32.9
OSGH	04.50	07.82	33.6	35.6	35.3	33.6
OWER	07.03	05.48	33.4	35.4	34.9	34.0
PORT	07.12	04.85	32.8	34.2	33.6	32.9
POTI	11.03	11.70	30.8	34.5	36.1	39.4
SHAK	03.47	08.35	33.5	35.5	35.1	33.5
SOKO	05.20	12.92	32.9	36.1	38.0	40.9
UYO0	07.92	05.05	32.9	34.9	34.3	33.1
WARR	05.73	05.52	32.8	34.3	34.0	33.6
YELW	04.50	11.00	35.0	38.0	39.2	39.2
YOLA	12.47	09.23	34.1	37.8	39.4	40.1
ZARI	07.75	11.07	29.6	33.3	35.0	36.9

The highlighted stations have Temperatures above 39°C

TABLE 2: A DETAILED STATION-BY-STATION PREDICTED VALUES OF NIGHT-TIME TEMPERATURES.

Site	Long	Lat	Jan	Feb	Mar	Apr
ABEO	03.33	07.20	21.5	24.2	25.4	25.3
ADEK	05.20	07.60	18.8	22.3	23.1	23.2
ABUJ	07.20	09.00	18.1	21.7	23.1	24.5
AKUR	05.30	07.20	18.8	22.3	23.1	23.2
ASAB	06.23	06.82	22.0	24.8	25.2	25.0
AWKA	07.07	06.20	21.9	24.7	25.1	24.9
BAUC	09.82	10.28	14.2	16.8	20.7	23.7
BENI	05.60	06.33	22.8	24.9	24.7	24.5
BIDA	06.00	09.80	21.2	24.1	25.9	26.2
CALA	08.35	04.97	23.0	24.6	24.4	24.1
EKET	07.95	04.40	22.4	24.1	24.6	24.4
ENUG	07.00	06.50	21.4	23.9	24.9	24.9
GOMB	11.17	10.27	15.2	18.0	21.6	24.3
GUSA	06.77	12.17	15.4	18.1	21.5	24.5
IBAD	03.90	07.43	22.3	24.2	24.6	24.2
IBIO	09.75	08.18	19.1	22.3	24.9	26.5
IJEB	03.93	06.83	22.0	24.4	25.1	24.8
IKEJ	03.33	06.58	23.0	25.0	25.5	25.3
IKOM	08.72	05.97	20.7	22.9	23.8	23.8
ILOR	04.58	08.48	20.0	22.7	23.9	24.0
ISEY	03.60	07.97	20.8	22.8	23.6	23.5
JOSO	08.90	09.87	12.1	14.8	16.9	18.9
KADU	07.45	10.6	15.2	18.3	21.2	22.9
KANO	08.53	12.05	13.7	16.7	20.5	24.4
KATS	07.68	13.02	13.4	16.3	19.9	24.3
LAFI	08.47	08.50	18.9	22.9	25.3	26.1
LARF	03.06	6.58	24.1	26.3	26.6	25.8
LOKO	06.73	07.80	20.1	24.1	26.0	26.4
MAID	13.08	11.85	12.8	16.0	19.7	24.5
MAKU	08.50	07.70	18.9	23.0	25.4	26.0
MINN	06.54	09.54	21.0	23.4	25.6	25.6
NGUR	10.47	12.88	13.8	16.5	20.2	24.1
OGOJ	08.80	06.70	20.5	22.4	23.3	23.9
ONDO	04.83	07.10	21.9	23.5	24.0	23.6
OSGH	04.50	07.82	18.7	22.1	23.0	23.3
OWER	07.03	05.48	22.6	24.4	24.8	24.6
PORT	07.12	04.85	21.5	23.3	23.9	23.9
POTI	11.03	11.70	12.8	16.1	20.2	24.4
SHAK	03.47	08.35	19.6	22.3	23.2	23.0
SOKO	05.20	12.92	17.5	20.0	23.2	27.1
UYOO	07.92	05.05	22.0	24.1	24.4	24.1
WARR	05.73	05.52	23.2	24.6	25.0	24.8
YELW	04.50	11.00	16.2	19.9	24.1	27.1
YOLA	12.47	09.23	17.5	20.8	24.5	27.0
ZARI	07.75	11.07	14.3	17.2	20.5	23.2

5.1 2015 RAINFALL PREDICTION TABLES

TABLE 3: A DETAILED STATION-BY-STATION LIKELY ONSET AND CESSATION DATES, EXPECTED LENGTH OF RAINY SEASON AND SEASONAL AMOUNT OF RAINFALL.

Station	Onset		End Of Season		Length of Season		Seasonal Rainfall	
	Likely	ME Days	Likely	ME Days	Likely	ME Days	Likely	ME mm
ABE	2-Apr	2	1-Dec	6	243	6	1331	99
ADE	2-Apr	4	6-Dec	4	248	4	1392	52
ABU	22-Apr	4	20-Nov	2	212	6	1474	61
AKU	1-Apr	3	4-Dec	4	247	5	1397	51
ASA	13-Apr	6	7-Dec	5	238	9	1682	71
AWK	17-Apr	7	17-Nov	3	214	8	1773	81
BAU	29-May	3	21-Oct	4	145	6	996	79
BEN	22-Mar	4	23-Dec	4	276	6	2071	152
BID	10-May	3	3-Nov	2	177	4	1058	80
CAL	12-Mar	5	28-Dec	2	291	6	2748	113
EKE	10-Mar	6	9-Dec	18	274	17	2598	280
ENU	13-Apr	3	20-Nov	5	221	6	1567	87
GOM	24-May	3	1-Nov	3	161	3	900	54
GUS	27-May	3	24-Oct	3	150	6	943	86
IBA	5-Apr	3	8-Dec	4	247	5	1208	76
IBI	11-May	5	18-Nov	2	191	6	929	43
IJE	2-Apr	4	16-Nov	5	228	6	1521	105
IKE	26-Mar	6	11-Dec	4	260	9	1402	113
IKO	30-Mar	3	22-Nov	6	237	8	2188	58
ILO	13-Apr	4	20-Nov	5	221	7	1141	69
ISE	9-Apr	4	30-Nov	4	235	5	1161	92
JOS	30-Apr	4	31-Oct	5	184	7	1276	28
KAD	22-May	3	2-Nov	5	164	5	1145	70
KAN	8-Jun	6	12-Oct	4	126	9	949	128
KAT	8-Jun	5	7-Oct	4	121	8	604	88
LAF	1-May	3	15-Nov	3	198	5	1180	94
LAR	3-Apr	8	7-Dec	5	248	12	1621	182
LOK	30-Apr	4	25-Nov	1	209	4	1070	69
MAI	14-Jun	3	24-Oct	3	132	4	565	73
MAK	1-May	2	17-Nov	2	200	4	1068	86
MIN	6-May	5	22-Nov	2	200	6	1145	59
NGU	20-Jun	4	13-Oct	5	115	7	388	36
OGO	2-May	4	13-Nov	2	195	4	1752	151
OND	27-Mar	5	14-Dec	5	262	6	1546	68
OSG	2-Apr	3	13-Nov	6	225	7	1319	72
OWE	18-Mar	4	13-Dec	4	270	6	2127	120
POR	8-Mar	4	19-Dec	3	286	4	2212	111
POT	13-Jun	5	17-Oct	4	126	6	602	58
SHA	11-Apr	3	19-Nov	5	222	6	1276	45
SOK	4-Jun	3	27-Sep	4	115	4	663	63
UYO	15-Mar	5	23-Dec	3	283	5	2199	115
WAR	10-Mar	4	27-Dec	1	292	4	2442	94
YEL	22-May	5	26-Oct	2	157	6	868	52
YOL	22-May	3	26-Oct	2	157	4	925	44
ZAR	19-May	3	23-Oct	5	157	6	1047	61
ME	Minimum	2		1		3		28
Range	Maximum	8		18		17		280

TABLE 4: A DETAILED CITY-BY-CITY PREDICTION OF THE ONSET DATES, CESSATION DATES, LENGTH OF RAINY SEASON AND SEASONAL RAINFALL AMOUNT FOR 559 CITIES.

State	City	Long	Lat	Onset date	Season end	Season Length Days	Annual Rainfall mm
Abia	Aba	07.35	05.10	16-Mar	17-Dec	277	2269
	Bende	07.63	05.55	21-Mar	13-Dec	268	2087
	Uzoakali	07.56	05.63	22-Mar	12-Dec	266	2056
	Ukwa West	07.23	04.97	14-Mar	18-Dec	280	2323
	Lekwesi	07.45	05.97	26-Mar	9-Dec	259	1928
	Igbere	07.65	05.71	23-Mar	11-Dec	264	2025
	Isiukwuato	07.46	05.76	23-Mar	11-Dec	263	2006
	Isiama	07.81	05.68	22-Mar	12-Dec	265	2037
	Nguzu-Edda	07.82	05.77	24-Mar	11-Dec	263	2002
	Ikwanano	07.81	06.03	27-Mar	8-Dec	258	1906
	Osisoma Ngwa	07.33	05.15	16-Mar	17-Dec	276	2248
	Mbosi	07.43	05.38	19-Mar	14-Dec	271	2154
	Akwete	07.35	04.88	13-Mar	19-Dec	282	2361
	Abiriba	07.73	05.70	23-Mar	11-Dec	265	2029
	Arondizuogu	07.10	05.85	24-Mar	10-Dec	261	1972
	Umuahia	07.48	05.52	21-Mar	13-Dec	268	2099
Anambra	Ihiala	06.86	05.85	24-Mar	10-Dec	261	1972
	Agulu	07.06	06.11	27-Mar	8-Dec	256	1877
	Nnewi	06.92	06.02	26-Mar	8-Dec	258	1910
	Obosi	06.83	06.11	27-Mar	8-Dec	256	1877
	Ozubulu	06.85	05.95	26-Mar	9-Dec	259	1935
	Okija	06.84	05.91	25-Mar	9-Dec	260	1950
	Omor	06.96	06.51	1-Apr	4-Dec	248	1738
	Mgbakwu	07.05	06.27	29-Mar	6-Dec	253	1820
	Umunze	07.23	05.96	26-Mar	9-Dec	259	1932
	Nzam	06.72	06.45	31-Mar	4-Dec	249	1758
	Umuchu	07.06	06.20	29-Mar	7-Dec	254	1845
	Aguleri	06.88	06.33	30-Mar	6-Dec	251	1799
	Otuocha	06.85	06.34	30-Mar	5-Dec	251	1796
	Ogidi	06.89	06.14	28-Mar	7-Dec	255	1866
	Onitsha	06.78	06.15	28-Mar	7-Dec	255	1863
	Awka	06.20	07.07	17-Apr	17-Nov	214	1773
Ebonyi	Abakaliki	08.08	06.33	30-Mar	6-Dec	251	1799
	Ezzagu	08.13	06.34	30-Mar	5-Dec	251	1796
	Odum Effium	08.03	06.74	4-Apr	2-Dec	243	1662
	Ngbo	08.00	06.45	31-Mar	4-Dec	249	1758
	Amagu	07.58	05.87	25-Mar	10-Dec	261	1965
	Echialike	08.22	06.20	29-Mar	7-Dec	254	1845
	Onueke	08.02	06.13	28-Mar	7-Dec	256	1870
	Afikpo	07.91	05.88	25-Mar	10-Dec	261	1961
Enugu	Enugu	07.00	06.50	13-Apr	20-Nov	221	1567
	Udi	07.41	06.32	30-Mar	6-Dec	252	1803

State	City	Long	Lat	Onset date	Season end	Season Length Days	Annual Rainfall mm
Imo	Igbo Eze	07.40	06.86	5-Apr	1-Dec	240	1624
	Agbani	07.55	06.32	30-Mar	6-Dec	252	1803
	Ohali	07.30	06.20	29-Mar	7-Dec	254	1845
	Ikem	07.72	06.78	4-Apr	1-Dec	242	1649
	Ukehe	07.41	06.55	2-Apr	3-Dec	247	1725
	Ezeagu	07.73	06.27	29-Mar	6-Dec	253	1820
	Ozalla	07.47	06.30	30-Mar	6-Dec	252	1810
	Amagunze	07.65	06.33	30-Mar	6-Dec	251	1799
	Ogbede	07.37	06.67	3-Apr	2-Dec	244	1685
	Uzo-Uwani	07.01	06.74	4-Apr	2-Dec	243	1662
	Eha-Amufu	07.77	06.65	3-Apr	3-Dec	245	1691
	Enugu-Ezike	07.46	06.98	7-Apr	29-Nov	238	1586
	Emene	07.58	06.47	1-Apr	4-Dec	248	1751
	Oji River	07.27	06.25	29-Mar	6-Dec	253	1827
	Nsukka	06.85	07.38	11-Apr	26-Nov	229	1466
	Awgu	07.47	06.07	27-Mar	8-Dec	257	1891
	Okigwe	07.35	05.83	24-Mar	10-Dec	262	1980
	Ehime	07.31	05.67	22-Mar	12-Dec	265	2041
	Oguta	06.81	05.71	23-Mar	11-Dec	264	2025
	Obowo	07.32	05.60	22-Mar	12-Dec	267	2068
	Ohaji- Egbema	06.59	04.81	12-Mar	20-Dec	283	2392
	Nkwerre	07.10	05.75	23-Mar	11-Dec	264	2010
	Ngor - Okpalla	07.16	05.32	18-Mar	15-Dec	273	2178
	Orsu	06.96	05.86	25-Mar	10-Dec	261	1969
	Orlu	07.04	05.80	24-Mar	10-Dec	262	1991
	Aboh Mbaise	07.23	05.46	20-Mar	14-Dec	270	2122
	Umuduru	07.25	05.68	22-Mar	12-Dec	265	2037
	Etiti	07.35	05.62	22-Mar	12-Dec	266	2060
	Uruala	07.10	05.85	24-Mar	10-Dec	261	1972
	Mberichi	06.95	05.36	19-Mar	15-Dec	272	2162
	Owerri	07.03	05.48	18-Mar	13-Dec	270	2127
Ekiti	Ado Ekiti	05.20	07.60	2-Apr	6-Dec	248	1392
	Oye	05.33	07.80	16-Apr	22-Nov	221	1351
	Efon	05.23	07.63	14-Apr	23-Nov	224	1396
	Ekiti East	05.55	07.65	14-Apr	23-Nov	224	1391
	Irepodun	04.79	07.95	18-Apr	20-Nov	217	1312
	Usi Ekiti	05.18	07.84	17-Apr	21-Nov	220	1340
	Ijero	05.07	07.81	16-Apr	22-Nov	220	1348
	Moriwo	05.10	07.38	11-Apr	26-Nov	229	1466
	Ikole	05.51	07.79	16-Apr	22-Nov	221	1353
	Emure	05.46	07.44	12-Apr	25-Nov	228	1449
	Omuo	05.41	07.88	17-Apr	21-Nov	219	1330
	Ilawe	05.11	07.60	14-Apr	24-Nov	225	1405
	Ifelodun	05.04	07.50	13-Apr	25-Nov	227	1432
	Ise/orun	05.43	07.46	12-Apr	25-Nov	228	1444
	Ikere Ekiti	05.22	07.50	13-Apr	25-Nov	227	1432

State	City	Long	Lat	Onset date	Season end	Season Length Days	Annual Rainfall mm
Lagos	Ilawe Ekiti	05.05	07.37	11-Apr	26-Nov	230	1469
	Ikeja	03.33	06.58	26-Mar	11-Dec	260	1402
	Ikorodu	03.50	06.60	2-Apr	3-Dec	246	1708
	Badagry	02.88	06.37	31-Mar	5-Dec	251	1786
	Kosofe	03.40	06.59	2-Apr	3-Dec	246	1711
	Somolu	03.38	06.54	1-Apr	4-Dec	247	1728
	Surulere	03.35	06.50	1-Apr	4-Dec	248	1741
	Ojo	03.15	06.46	1-Apr	4-Dec	249	1755
	Iyana Ipaja	03.29	06.62	2-Apr	3-Dec	245	1701
	Oshodi	03.50	06.30	30-Mar	6-Dec	252	1810
	Marine	03.25	06.26	29-Mar	6-Dec	253	1824
	Lagos Island	03.06	06.58	3-Apr	7-Dec	248	1621
	Epe	03.98	06.56	2-Apr	3-Dec	247	1721
	Ajah	03.57	06.47	1-Apr	4-Dec	248	1751
	Yaba	03.38	06.51	1-Apr	4-Dec	248	1738
	Egbeda	03.29	06.59	2-Apr	3-Dec	246	1711
	Agbara	03.09	06.51	1-Apr	4-Dec	248	1738
	Ikotun	03.30	06.51	1-Apr	4-Dec	248	1738
	Apapa	03.37	06.45	31-Mar	4-Dec	249	1758
	Agege	03.33	06.62	2-Apr	3-Dec	245	1701
Ogun	Ijebu-Ode	03.93	06.83	2-Apr	16-Nov	228	1521
	Ayetoro	03.03	07.23	10-Apr	27-Nov	233	1510
	Abigi	04.33	06.54	1-Apr	4-Dec	247	1728
	Ijebu-Igbo	04.00	06.95	6-Apr	30-Nov	238	1595
	Ewekoro	03.22	06.03	27-Mar	8-Dec	258	1906
	Ipokia	02.84	06.52	1-Apr	4-Dec	247	1735
	Odogbolu	03.76	06.83	5-Apr	1-Dec	241	1633
	Ikenne	03.71	06.86	5-Apr	1-Dec	240	1624
	Oja-Odan	02.84	06.89	6-Apr	30-Nov	240	1614
	Ilaro	03.02	06.89	6-Apr	30-Nov	240	1614
	Eruwa	03.50	07.40	12-Apr	26-Nov	229	1461
	Otta	03.30	06.68	3-Apr	2-Dec	244	1682
	Abeokuta	03.33	07.20	2-Apr	1-Dec	243	1331
	Sagamu	03.63	06.83	5-Apr	1-Dec	241	1633
	Akure	05.30	07.20	1-Apr	4-Dec	247	1397
	Ondo	04.83	07.10	27-Mar	14-Dec	262	1546
	Owo	05.58	07.18	9-Apr	28-Nov	234	1525
	Opuba	04.90	06.05	27-Mar	8-Dec	257	1899
	Okitipupa	04.70	06.50	1-Apr	4-Dec	248	1741
	Araromi	04.50	06.60	2-Apr	3-Dec	246	1708
Ondo	Ilawe	05.06	07.40	12-Apr	26-Nov	229	1461
	Ikare Akoko	05.80	07.50	13-Apr	25-Nov	227	1432
	Idanre	05.14	07.09	8-Apr	28-Nov	235	1552
	Ile-oluji	04.86	07.19	9-Apr	27-Nov	233	1522
	Okeigbo	04.72	07.17	9-Apr	28-Nov	234	1528

State	City	Long	Lat	Onset date	Season end	Season Length Days	Annual Rainfall mm
Osun	Odigbo	04.86	06.79	4-Apr	1-Dec	242	1646
	Ilaje	05.20	07.27	10-Apr	27-Nov	232	1498
	Kajola Owena	05.00	07.20	9-Apr	27-Nov	233	1519
	Owo	05.58	07.18	9-Apr	28-Nov	234	1525
	Ila	04.90	08.00	19-Apr	20-Nov	216	1299
	Oshogbo	04.50	07.82	2-Apr	13-Nov	225	1319
	Ilesa	04.73	07.62	14-Apr	23-Nov	224	1399
	Ile Ife	04.55	07.47	12-Apr	25-Nov	227	1441
	Ijebu Jesa	04.82	07.68	15-Apr	23-Nov	223	1383
	Okeigbo	04.70	07.16	9-Apr	28-Nov	234	1531
	Ikirun	04.70	07.90	17-Apr	21-Nov	218	1325
	Ede	04.43	07.73	15-Apr	22-Nov	222	1369
	Ilobu	04.48	07.84	17-Apr	21-Nov	220	1340
	Ila-Orogun	04.89	08.01	19-Apr	20-Nov	216	1297
	Gbongan	04.35	07.46	12-Apr	25-Nov	228	1444
	Iperindo	04.82	07.49	13-Apr	25-Nov	227	1435
	Iragbiji	04.70	07.89	17-Apr	21-Nov	219	1327
	Ejigbo	04.32	07.90	17-Apr	21-Nov	218	1325
	Ikirun	04.70	07.90	17-Apr	21-Nov	218	1325
Oyo	Iwo	04.18	07.63	14-Apr	23-Nov	224	1396
	Shaki	03.47	08.35	11-Apr	19-Nov	222	1276
	Iseyin	03.60	07.97	9-Apr	30-Nov	235	1161
	Ogbomoso	04.25	08.14	20-Apr	19-Nov	213	1264
	Oyo	03.93	07.84	17-Apr	21-Nov	220	1340
	Igbeti	04.13	08.75	27-Apr	13-Nov	201	1125
	Iwere Ile	03.05	07.98	18-Apr	20-Nov	217	1304
	Okeho/Oke Iho	03.35	08.03	19-Apr	20-Nov	216	1291
	Igbo Ora	03.28	07.43	12-Apr	25-Nov	228	1452
	Ido	03.71	07.50	13-Apr	25-Nov	227	1432
	Awe	03.94	07.82	16-Apr	22-Nov	220	1345
	Iresa	04.43	08.09	20-Apr	19-Nov	214	1277
	Ago Are	03.42	08.50	24-Apr	15-Nov	206	1180
	Kishi	03.85	09.08	1-May	10-Nov	194	1059
	Oke- Ile	03.02	07.93	18-Apr	21-Nov	218	1317
	Igboho	03.75	08.83	28-Apr	12-Nov	199	1109
	Ibadan	03.90	07.43	5-Apr	8-Dec	247	1208
Akwa Ibom	Eket	07.92	04.63	10-Mar	9-Dec	274	2598
	Abak	07.47	04.59	10-Mar	22-Dec	288	2488
	Etinan	07.86	04.85	13-Mar	19-Dec	282	2374
	Ikot-Abasi	07.34	04.34	7-Mar	24-Dec	293	2601
	Ibeno	07.58	04.33	7-Mar	24-Dec	293	2606
	Essien-Udim	07.45	05.05	15-Mar	17-Dec	278	2289
	Nsit-Ubium	07.40	05.08	15-Mar	17-Dec	278	2277
	Onna	07.43	05.11	16-Mar	17-Dec	277	2264
	Mkpat-Enin	07.46	04.42	8-Mar	23-Dec	291	2564

State	City	Long	Lat	Onset date	Season end	Season Length Days	Annual Rainfall mm
Bayelsa	Oron	08.14	04.50	9-Mar	23-Dec	290	2528
	Ikot Ekpene	07.43	05.11	16-Mar	17-Dec	277	2264
	Uyo	07.92	05.05	15-Mar	23-Dec	283	2199
	Yenogoa	06.25	04.92	14-Mar	19-Dec	281	2344
	Amassama	06.11	04.97	14-Mar	18-Dec	280	2323
	Ogbia	06.50	04.40	8-Mar	24-Dec	292	2574
	Otuoke	06.31	04.79	12-Mar	20-Dec	284	2400
	Oporoma	06.85	04.80	12-Mar	20-Dec	283	2396
	Oloibiri	06.30	04.66	11-Mar	21-Dec	286	2457
	Sagbama	06.21	05.17	17-Mar	16-Dec	276	2240
	OGBOINBIRI	05.97	04.82	12-Mar	20-Dec	283	2387
	Nembe	06.37	04.48	8-Mar	23-Dec	290	2537
Cross River	Brass	06.25	04.30	6-Mar	24-Dec	294	2619
	Calabar	08.35	04.97	12-Mar	28-Dec	291	2748
	Ikom	08.72	05.97	30-Mar	22-Nov	237	2188
	Akampka	08.35	05.32	18-Mar	15-Dec	273	2178
	Obubra	08.33	06.10	27-Mar	8-Dec	256	1881
	Obudu	09.17	06.65	3-Apr	3-Dec	245	1691
	Otu	08.11	05.29	18-Mar	15-Dec	273	2190
	Okpoma	08.66	06.49	1-Apr	4-Dec	248	1745
	Odukpani	08.35	05.08	15-Mar	17-Dec	278	2277
	Akpet Central	08.10	05.55	21-Mar	13-Dec	268	2087
	Sankwala	09.24	06.60	2-Apr	3-Dec	246	1708
	Akpabuyo	08.41	04.92	14-Mar	19-Dec	281	2344
Delta	Ugep	08.07	05.82	24-Mar	10-Dec	262	1984
	Ogoja	08.80	06.70	2-May	13-Nov	195	1752
	Asaba	06.82	06.23	13-Apr	7-Dec	238	1682
	Abraka	06.10	05.79	24-Mar	11-Dec	263	1995
	Burutu	05.50	05.35	19-Mar	15-Dec	272	2166
	Kwale	06.44	05.72	23-Mar	11-Dec	264	2021
	Ozoro	06.22	05.53	21-Mar	13-Dec	268	2095
	Oduobori	06.06	05.15	16-Mar	17-Dec	276	2248
	Ughelli	05.99	05.50	20-Mar	13-Dec	269	2107
	Sapele	05.67	05.89	25-Mar	10-Dec	261	1957
	Warri	05.73	05.52	10-Mar	27-Dec	292	2442
	Benin	05.60	06.33	22-Mar	23-Dec	276	2071
Edo	Abudu	06.03	06.30	30-Mar	6-Dec	252	1810
	Agenebode	06.69	07.11	8-Apr	28-Nov	235	1546
	Ozalla	06.02	06.80	5-Apr	1-Dec	242	1643
	Oredo	05.65	06.29	30-Mar	6-Dec	252	1813
	Igueben	06.22	06.52	1-Apr	4-Dec	247	1735
	Ubiaja	06.38	06.66	3-Apr	2-Dec	244	1688
	Ekpoma	06.07	06.75	4-Apr	2-Dec	243	1659
	Afuze	05.98	06.94	6-Apr	30-Nov	239	1598

State	City	Long	Lat	Onset date	Season end	Season Length Days	Annual Rainfall mm
Rivers	Siluko	05.16	06.53	1-Apr	4-Dec	247	1731
	Uromi	06.33	06.71	3-Apr	2-Dec	243	1672
	Auchi	06.27	7.07	8-Apr	29-Nov	236	1558
	Phc	07.12	04.85	8-Mar	19-Dec	286	2212
	Ahoade	06.65	05.09	16-Mar	17-Dec	277	2273
	Bori	07.37	04.68	11-Mar	21-Dec	286	2448
	Buguma	06.86	04.74	11-Mar	20-Dec	285	2422
	Elele	06.82	05.10	16-Mar	17-Dec	277	2269
	Degema	06.77	04.77	12-Mar	20-Dec	284	2409
	Omoko	06.65	05.34	18-Mar	15-Dec	272	2170
	Rumuodogo	06.79	04.92	14-Mar	19-Dec	281	2344
	Ogoni	07.15	04.78	12-Mar	20-Dec	284	2405
	Emohua	06.86	04.88	13-Mar	19-Dec	282	2361
	Eleme	07.11	04.79	12-Mar	20-Dec	284	2400
	Abonnema	06.77	04.72	11-Mar	21-Dec	285	2431
	Oyigbo	07.14	04.87	13-Mar	19-Dec	282	2366
	Opobo	07.55	04.62	10-Mar	21-Dec	287	2475
	Bonny	07.15	04.42	8-Mar	23-Dec	291	2564
	Okrika	07.08	04.74	11-Mar	20-Dec	285	2422
Adamawa	Mayo Belwa	12.03	09.03	1-May	10-Nov	195	1069
	Hong	12.55	10.14	13-May	31-Oct	172	888
	Girei	12.33	09.22	3-May	9-Nov	191	1033
	Yola	12.47	09.23	22-May	26-Oct	157	925
	Lamurde	11.47	09.60	7-May	5-Nov	183	967
	Mubi	13.25	10.27	15-May	30-Oct	169	871
	Jada	12.10	08.72	27-Apr	13-Nov	201	1132
	Gombi	12.43	10.09	13-May	31-Oct	173	894
	Furfore	12.34	09.13	2-May	9-Nov	193	1050
	Song	12.62	09.82	10-May	3-Nov	178	933
	Shelleng	12.00	09.89	11-May	2-Nov	177	922
	Toungo	12.05	08.12	20-Apr	19-Nov	214	1269
	Maiha	13.21	09.98	12-May	1-Nov	175	910
	Guyuk	11.93	09.91	11-May	2-Nov	176	920
	Michika	13.23	10.37	16-May	29-Oct	167	859
	Madagali	13.63	10.88	22-May	24-Oct	156	806
Bauchi	Darazo	10.24	10.59	19-May	27-Oct	162	834
	Alkaleri	10.25	10.32	16-May	29-Oct	168	865
	Toro	09.04	10.03	12-May	1-Nov	174	903
	Bauchi	09.82	10.28	29-May	21-Oct	145	996
	Jama'are	09.56	11.39	28-May	19-Oct	145	767
	Tafawa Balewa	09.55	09.74	9-May	4-Nov	180	945
	Ganjuwa	10.17	10.86	22-May	24-Oct	156	807

State	City	Long	Lat	Onset date	Season end	Season Length Days	Annual Rainfall mm
Borno	Bulkachuwa	10.52	11.65	31-May	17-Oct	140	753
	Dambam	10.71	11.68	31-May	17-Oct	139	751
	Yakoba	09.84	10.31	15-May	29-Oct	168	866
	Duguri	09.76	09.90	11-May	2-Nov	177	921
	Misau	10.28	11.18	26-May	21-Oct	150	781
	Azare	10.17	11.67	31-May	17-Oct	139	752
	Katagum	10.21	12.17	6-Jun	12-Oct	129	736
	Ningi	09.34	11.04	24-May	23-Oct	153	792
	Warji	09.45	11.11	25-May	22-Oct	151	786
	Bama	13.68	11.51	29-May	18-Oct	143	760
	Askira/ Uba	12.91	10.65	19-May	26-Oct	161	828
	Gwoza	13.14	11.05	24-May	22-Oct	152	791
	Maiduguri	13.08	11.85	14-Jun	15-Oct	123	565
	Kwaya Kusar	11.50	10.30	15-May	29-Oct	168	867
	Biu	12.18	10.61	19-May	27-Oct	162	832
	Kukawa	13.57	12.92	15-Jun	5-Oct	113	739
	Konduga	13.41	11.64	31-May	17-Oct	140	753
	Chibok	13.11	10.85	22-May	24-Oct	157	808
	Magumeri	12.83	12.11	5-Jun	13-Oct	130	737
	Gumsuri	12.82	11.05	24-May	22-Oct	152	791
	Jare	12.16	10.71	20-May	26-Oct	160	822
	Dambo	12.75	11.15	25-May	22-Oct	150	783
	Monguno	13.36	12.40	9-Jun	10-Oct	124	734
	Dikwa	13.91	12.04	5-Jun	13-Oct	132	739
	Billiri	11.09	09.50	6-May	6-Nov	185	984
	Gombe	11.17	10.28	23-May	30-Oct	160	900
	Akko	10.57	10.17	14-May	31-Oct	171	884
	Dukku	10.46	10.49	18-May	28-Oct	164	845
Gombe	Nafada	11.10	11.32	27-May	20-Oct	147	771
	Funakaye	11.10	10.17	14-May	31-Oct	171	884
	Kaltungo	11.31	09.82	10-May	3-Nov	178	933
	Balanga	11.68	09.96	11-May	2-Nov	175	912
	Yamaltu	11.30	10.14	13-May	31-Oct	172	888
	Shomgom	11.13	09.39	5-May	7-Nov	187	1002
	Kwami	11.15	10.30	15-May	29-Oct	168	867
	Bali	10.96	07.85	17-Apr	21-Nov	220	1338
	Gashaka	11.49	07.37	11-Apr	26-Nov	230	1469
	Zing	11.75	09.00	30-Apr	11-Nov	196	1076
	Karim Lamido	11.19	09.30	4-May	8-Nov	189	1018
	Ibi	09.75	08.18	11-May	18-Nov	191	929
	Donga	10.05	07.72	15-Apr	23-Nov	222	1372
	Wukari	09.78	07.88	17-Apr	21-Nov	219	1330
Taraba	Gembu	11.25	06.72	4-Apr	2-Dec	243	1668
	Lau	11.27	09.21	3-May	9-Nov	191	1035

State	City	Long	Lat	Onset date	Season end	Season Length Days	Annual Rainfall mm
Yobe	Chediya	10.20	08.18	21-Apr	18-Nov	213	1255
	Tsokundi	10.01	07.88	17-Apr	21-Nov	219	1330
	Abako	09.89	07.63	14-Apr	23-Nov	224	1396
	Dooshima	09.69	08.23	21-Apr	18-Nov	212	1242
	Dampar	10.13	08.53	25-Apr	15-Nov	205	1173
	Moti	09.82	08.18	21-Apr	18-Nov	213	1255
	Abbare	11.61	09.25	3-May	8-Nov	190	1027
	Garin Bakari	10.98	08.56	25-Apr	15-Nov	205	1166
	Gassol	10.36	08.59	25-Apr	14-Nov	204	1160
	Gujba	11.56	11.30	27-May	20-Oct	147	773
	Yusufari	11.21	13.08	17-Jun	4-Oct	110	744
	Jakusko	10.14	12.38	9-Jun	10-Oct	125	734
	Nguru	10.46	12.88	20-Jun	13-Oct	115	388
	Potiskun	11.03	11.70	13-Jun	17-Oct	126	602
	Fika	11.18	11.28	27-May	20-Oct	148	774
	Damaturu	11.96	11.74	1-Jun	16-Oct	138	749
	Geidam	11.55	12.89	15-Jun	5-Oct	114	738
	Machina	09.59	13.06	17-Jun	4-Oct	110	743
	Yunusari	11.44	13.07	17-Jun	4-Oct	110	743
Kwara	Ilorin	04.54	08.89	13-Apr	20-Nov	221	1141
	Lafiagi	05.41	08.85	28-Apr	12-Nov	199	1105
	Offa	04.72	08.15	20-Apr	19-Nov	213	1262
	Ijara Isin	05.02	08.25	21-Apr	18-Nov	211	1238
	Omu Aran	05.09	08.14	20-Apr	19-Nov	213	1264
	Osi	05.23	08.08	19-Apr	19-Nov	215	1279
	Share	04.98	08.82	28-Apr	12-Nov	199	1111
	Pategi	05.76	08.72	27-Apr	13-Nov	201	1132
	Kaiama	03.95	09.61	7-May	5-Nov	183	966
	Afon	04.53	08.31	22-Apr	17-Nov	210	1223
	kosubosu	03.25	09.57	7-May	5-Nov	183	972
	Araromi Opin	05.82	08.14	20-Apr	19-Nov	213	1264
	Jebba	04.82	09.11	1-May	10-Nov	193	1053
	Esie	04.89	08.21	21-Apr	18-Nov	212	1247
	Bwen	02.89	08.84	28-Apr	12-Nov	199	1107
	Ilofa	05.14	08.09	20-Apr	19-Nov	214	1277
	Owu Isin	05.02	08.28	22-Apr	17-Nov	211	1231
	Oke Oyi	04.72	08.58	25-Apr	15-Nov	204	1162
Kogi	Lokoja	06.74	07.80	30-Apr	25-Nov	209	1070
	Okene	06.23	07.55	13-Apr	24-Nov	226	1418
	Idah	06.73	07.11	8-Apr	28-Nov	235	1546
	Ajaokuta	06.65	07.56	13-Apr	24-Nov	226	1416
	Ero	06.69	07.58	14-Apr	24-Nov	225	1410
	Imbaka	06.67	06.55	2-Apr	3-Dec	247	1725

State	City	Long	Lat	Onset date	Season end	Season Length Days	Annual Rainfall mm
Plateau	Amabo	06.72	06.63	3-Apr	3-Dec	245	1698
	Ogwo	06.65	06.75	4-Apr	2-Dec	243	1659
	Onyedega	06.67	06.88	5-Apr	30-Nov	240	1617
	Iyara	05.97	07.84	17-Apr	21-Nov	220	1340
	Mopa	05.89	08.09	20-Apr	19-Nov	214	1277
	Ife	05.76	07.90	18-Apr	21-Nov	218	1319
	Isanlu	05.67	08.15	20-Apr	19-Nov	213	1262
	Ejiba	05.63	08.30	22-Apr	17-Nov	210	1226
	Kabba	06.07	07.84	17-Apr	21-Nov	220	1340
	Ayangba	07.17	07.49	13-Apr	25-Nov	227	1435
	Ankpa	07.63	07.43	12-Apr	25-Nov	228	1452
	Itobe	07.56	07.72	15-Apr	23-Nov	222	1372
	Obajana	06.43	07.91	17-Apr	21-Nov	218	1322
	Jos	08.88	09.93	30-Apr	31-Oct	184	1276
	Bokkos	08.99	09.30	4-May	8-Nov	189	1018
	Pankshin	09.43	09.33	4-May	8-Nov	189	1013
	Langtang	09.80	09.15	2-May	9-Nov	192	1046
	Bukuru	08.86	09.77	9-May	3-Nov	179	940
	Mangu	09.14	09.49	6-May	6-Nov	185	985
	Mabudi	09.86	08.58	25-Apr	15-Nov	204	1162
	Damshin	09.45	08.63	26-Apr	14-Nov	203	1151
	Riyom	08.71	09.58	7-May	5-Nov	183	970
	Quan'pan	09.28	08.97	30-Apr	11-Nov	196	1081
	Wase	09.96	09.10	1-May	10-Nov	193	1055
	Dengi	09.95	09.37	4-May	7-Nov	188	1006
	Ganjuwa	10.31	09.44	5-May	7-Nov	186	994
	Kwabzak	09.50	09.13	2-May	9-Nov	193	1050
Nasarawa	Yelwa-Shendam	09.66	08.81	28-Apr	12-Nov	199	1113
	Lafia	08.51	08.49	1-May	15-Nov	198	1180
	Akwanga	08.41	08.91	29-Apr	11-Nov	197	1093
	Keffi	07.88	08.85	28-Apr	12-Nov	199	1105
	Wamba	08.60	08.94	29-Apr	11-Nov	197	1087
	Doma	08.36	08.40	23-Apr	16-Nov	208	1203
	Amaku	08.13	08.24	21-Apr	18-Nov	211	1240
	Gidan Rai	08.36	08.06	19-Apr	19-Nov	215	1284
	Bakara	07.49	08.36	23-Apr	17-Nov	209	1212
	Kainyehu	07.14	08.09	20-Apr	19-Nov	214	1277
	Toto	07.08	08.39	23-Apr	16-Nov	208	1205
	Giza	08.63	08.20	21-Apr	18-Nov	212	1250
	Uke	07.69	08.91	29-Apr	11-Nov	197	1093
	Gwadi	08.34	08.92	29-Apr	11-Nov	197	1091
	Ninga	08.31	09.09	1-May	10-Nov	194	1057
Benue	Awe	09.14	08.11	20-Apr	19-Nov	214	1272
	Obi	08.76	08.36	23-Apr	17-Nov	209	1212
	Keana	08.80	08.15	20-Apr	19-Nov	213	1262
	Gboko	09.00	07.32	11-Apr	26-Nov	231	1484

State	City	Long	Lat	Onset date	Season end	Season Length Days	Annual Rainfall mm
Niger	Makurdi	08.54	07.73	1-May	17-Nov	200	1068
	Otukpo	08.14	07.20	9-Apr	27-Nov	233	1519
	Aliade	08.48	07.30	10-Apr	26-Nov	231	1490
	Oju	07.91	07.38	11-Apr	26-Nov	229	1466
	Ugbopko	07.88	07.66	15-Apr	23-Nov	223	1388
	Wanunne	08.89	07.57	13-Apr	24-Nov	225	1413
	Anyiin	08.58	07.71	15-Apr	23-Nov	222	1375
	Okpoga	07.80	07.04	7-Apr	29-Nov	236	1567
	Orokam	07.55	06.97	7-Apr	30-Nov	238	1589
	Egumale	07.96	06.80	5-Apr	1-Dec	242	1643
	Idekpa	07.92	07.23	10-Apr	27-Nov	233	1510
	Obagaji	07.91	07.88	17-Apr	21-Nov	219	1330
	Kyado	09.72	07.65	14-Apr	23-Nov	224	1391
	Zaki Biam	09.61	07.51	13-Apr	25-Nov	227	1430
	Katsina Ala	09.28	07.16	9-Apr	28-Nov	234	1531
	Okpoga	07.80	07.04	7-Apr	29-Nov	236	1567
	Orokam	07.55	06.97	7-Apr	30-Nov	238	1589
	Egumale	07.96	06.80	5-Apr	1-Dec	242	1643
	Idekpa	07.92	07.23	10-Apr	27-Nov	233	1510
	Obagaji	07.91	07.88	17-Apr	21-Nov	219	1330
	Kontagora	05.47	10.40	16-May	29-Oct	166	855
	Minna	06.55	09.61	6-May	22-Nov	200	1145
	Bida	06.01	09.07	10-May	3-Nov	177	1058
	Warari	05.32	10.92	23-May	24-Oct	155	802
	Rijau	05.25	11.10	25-May	22-Oct	151	787
	Wushishi	06.11	09.72	9-May	4-Nov	180	948
	Duku	04.88	11.20	26-May	21-Oct	149	780
	Kwamba	07.17	09.20	3-May	9-Nov	191	1037
	Shiroro	06.80	09.98	12-May	1-Nov	175	910
	Mokwa	05.05	09.29	4-May	8-Nov	189	1020
	Gbako	05.97	09.00	30-Apr	11-Nov	195	1075
	Paiko	06.63	09.43	5-May	7-Nov	186	996
	Agwara	04.31	10.89	22-May	24-Oct	156	805
Abuja	Lapai	06.57	09.05	1-May	10-Nov	194	1065
	Kutiwenji	05.68	09.52	6-May	6-Nov	185	980
	Baro	06.42	08.64	26-Apr	14-Nov	203	1149
	Abuja	07.48	09.07	22-Apr	20-Nov	212	1474
	Kwali	07.06	08.85	28-Apr	12-Nov	199	1105
	Karshi	07.55	08.82	28-Apr	12-Nov	199	1111
	Gwagwalada	07.09	08.94	29-Apr	11-Nov	197	1087
	Kuje	07.22	08.92	29-Apr	11-Nov	197	1091
	Gwaska	07.28	09.02	30-Apr	10-Nov	195	1071
	Madalla	07.22	09.11	1-May	10-Nov	193	1053
	Bwari	07.39	09.28	3-May	8-Nov	190	1022
	Asokoro	07.51	09.04	1-May	10-Nov	195	1067

State	City	Long	Lat	Onset date	Season end	Season Length Days	Annual Rainfall mm
Kebbi	Pegi	07.48	09.06	1-May	10-Nov	194	1063
	Bassa	06.79	08.63	26-Apr	14-Nov	203	1151
	Kubwa	07.31	09.14	2-May	9-Nov	192	1048
	Zuba	07.39	09.06	1-May	10-Nov	194	1063
	Gosa	07.29	08.94	29-Apr	11-Nov	197	1087
	Chukuku	07.15	08.84	28-Apr	12-Nov	199	1107
	Abaji	06.94	08.47	24-Apr	16-Nov	207	1187
	Tando	06.85	09.20	3-May	9-Nov	191	1037
	SAKABA	05.60	11.07	24-May	22-Oct	152	789
	CHINCHINNA	05.72	11.47	29-May	19-Oct	144	762
	MAHUTA	04.97	11.55	30-May	18-Oct	142	758
	Yelwa	04.50	11.00	16-May	26-Oct	163	868
	Maraba	04.73	10.32	16-May	29-Oct	168	865
	Birnin Kebbi	04.20	12.43	9-Jun	10-Oct	124	734
	Argungu	04.52	12.72	13-Jun	7-Oct	117	735
	Aliero	04.46	12.29	8-Jun	11-Oct	126	734
	Augie	04.59	12.89	15-Jun	5-Oct	114	738
	Zuru	05.23	11.43	29-May	19-Oct	145	764
	Ngaski	04.71	10.40	16-May	29-Oct	166	855
	Bagudo	04.22	11.40	28-May	19-Oct	145	766
	Jega	04.43	12.20	6-Jun	12-Oct	128	736
	GWANDU	04.64	12.50	10-Jun	9-Oct	122	733
	BAGIZZA	04.42	12.97	15-Jun	5-Oct	112	740
	ILLO	03.70	11.55	30-May	18-Oct	142	758
	SAKWABE	04.22	13.16	18-Jun	3-Oct	108	747
	GARIN ISA	04.58	11.63	31-May	17-Oct	140	754
	Sokoto	05.20	12.92	4-Jun	27-Sep	115	663
	TUNGAN MOGAJI	04.95	12.07	5-Jun	13-Oct	131	738
Sokoto	DOMAWA	04.70	12.35	8-Jun	10-Oct	125	734
	Tambuwal	04.71	12.26	7-Jun	11-Oct	127	735
	Shagari	04.99	12.62	11-Jun	8-Oct	120	734
	Goronyo	05.67	13.43	21-Jun	30-Sep	103	759
	Wamako	05.09	13.03	16-Jun	4-Oct	111	742
	Bodinga	05.22	13.04	16-Jun	4-Oct	111	742
	KURAWA	06.36	13.52	22-Jun	29-Sep	101	764
	GWAZANGE	04.26	13.42	21-Jun	30-Sep	103	758
	DANBOKA	05.37	13.73	24-Jun	28-Sep	96	778
	ALIKERU	05.99	12.93	15-Jun	5-Oct	113	739
	IRABA	06.28	10.97	23-May	23-Oct	154	798
	DOKA AYI	06.10	11.09	25-May	22-Oct	152	788
	Gusau	06.77	12.17	30-May	1-Oct	124	881
	DONKO	05.20	11.75	1-Jun	16-Oct	138	748
	GALADI	06.43	13.06	17-Jun	4-Oct	110	743
	ZURMI	06.78	12.79	13-Jun	6-Oct	116	736
	Gummi	05.10	12.13	6-Jun	12-Oct	130	737
Zamfara							

State	City	Long	Lat	Onset date	Season end	Season Length Days	Annual Rainfall mm
Katsina	Talata Mafara	06.07	12.55	11-Jun	9-Oct	121	734
	Bakura	05.87	12.60	11-Jun	8-Oct	120	734
	Shinkafi	06.50	13.07	17-Jun	4-Oct	110	743
	Birnin Magaji	06.86	12.34	8-Jun	10-Oct	125	734
	Maru	06.33	11.68	31-May	17-Oct	139	751
	Bukkuyum	05.46	12.13	6-Jun	12-Oct	130	737
	ANKA	05.93	12.11	5-Jun	13-Oct	130	737
	KURUA	05.64	12.47	10-Jun	9-Oct	123	733
	FASKARI	07.02	11.72	1-Jun	16-Oct	138	750
	BAURE	08.75	12.83	14-Jun	6-Oct	115	737
	Katsina	07.68	13.02	8-Jun	7-Oct	121	604
	KUSADA	07.98	12.47	10-Jun	9-Oct	123	733
	KUKA	07.99	13.32	20-Jun	1-Oct	105	753
	Funtua	07.30	11.52	30-May	18-Oct	143	759
	Daura	08.30	13.00	16-Jun	4-Oct	112	741
	Matazu	07.67	12.23	7-Jun	11-Oct	128	735
	Musawa	07.67	12.13	6-Jun	12-Oct	130	737
	Mani	07.87	12.86	14-Jun	6-Oct	115	738
	Safana	07.41	12.41	9-Jun	10-Oct	124	734
	Kaita	07.75	13.08	17-Jun	4-Oct	110	744
Kano	Bakori	07.42	11.56	30-May	18-Oct	142	757
	RUMA	07.23	12.87	14-Jun	6-Oct	114	738
	KURFI	07.48	12.66	12-Jun	7-Oct	119	734
	RUNKA	07.31	12.45	9-Jun	9-Oct	123	733
	ROGO	07.83	11.57	30-May	18-Oct	142	757
	DADIN KOWA	08.63	10.70	20-May	26-Oct	160	823
	KACHAKU	09.26	11.54	30-May	18-Oct	142	758
	Kano	08.53	12.05	8-Jun	12-Oct	126	949
	KUNCHI	08.27	12.50	10-Jun	9-Oct	122	733
	Madobi	08.29	11.78	2-Jun	16-Oct	137	747
	Kura	08.43	11.77	1-Jun	16-Oct	137	748
	Bichi	08.24	12.23	7-Jun	11-Oct	128	735
	Kwankwaso	08.40	11.58	30-May	18-Oct	141	756
	Gezawa	08.72	12.03	5-Jun	13-Oct	132	739
	Gaya	09.00	11.83	2-Jun	15-Oct	136	745
	BAGWAI	08.14	12.15	6-Jun	12-Oct	129	737
	Rano	08.57	11.53	30-May	18-Oct	142	759
	GABASAWA	08.92	12.18	6-Jun	12-Oct	129	736
	DAMBARTA	08.52	12.43	9-Jun	10-Oct	124	734
Jigawa	GWIWA	08.33	12.78	13-Jun	6-Oct	116	736
	BASIRKA	10.24	11.15	25-May	22-Oct	150	783
	KILA	09.77	11.33	27-May	20-Oct	147	771
	Ringim	08.54	12.65	12-Jun	8-Oct	119	734

State	City	Long	Lat	Onset date	Season end	Season Length Days	Annual Rainfall mm
Kaduna	Birnin Kudu	09.50	11.45	29-May	19-Oct	144	763
	Gwaram	09.89	11.28	27-May	20-Oct	148	774
	Kafin Hausa	09.91	12.24	7-Jun	11-Oct	128	735
	Maigatari	09.45	12.81	14-Jun	6-Oct	116	737
	Dutse	09.33	11.80	2-Jun	16-Oct	137	746
	AMARYAWA	08.35	12.56	11-Jun	8-Oct	121	734
	MALAGANTA	08.28	12.77	13-Jun	6-Oct	116	736
	Kazaure	08.40	12.67	12-Jun	7-Oct	119	734
	Hadejia	10.03	12.40	9-Jun	10-Oct	124	734
	FILLA	08.57	12.67	12-Jun	7-Oct	119	734
	Gumel	09.37	12.62	11-Jun	8-Oct	120	734
	BABURA	09.02	12.77	13-Jun	6-Oct	116	736
	AUJARA	09.43	12.05	5-Jun	13-Oct	132	739
	Makarfi	07.88	11.37	28-May	20-Oct	146	768
	Kudan	07.73	11.30	27-May	20-Oct	147	773
	Kaduna	07.45	10.60	22-May	2-Nov	164	1145
	Zaria	07.75	11.07	19-May	23-Oct	157	1047
	Jaba	08.00	09.44	5-May	7-Nov	186	994
	Zonkwa	08.28	09.78	9-May	3-Nov	179	939
	Ikara	08.23	11.18	26-May	21-Oct	150	781
	Kubau	08.38	10.97	23-May	23-Oct	154	798
	Kachia	07.95	09.87	10-May	3-Nov	177	925
	Birnin Gwari	06.53	10.67	20-May	26-Oct	160	826
	Kafanchan	08.28	09.57	7-May	5-Nov	183	972
	Saminaka	08.68	10.42	17-May	28-Oct	166	853
	Jere	07.44	09.57	7-May	5-Nov	183	972
	Gwantu	08.46	09.23	3-May	8-Nov	191	1031
	Kaura	08.15	10.57	18-May	27-Oct	163	836
	Giwa	07.41	11.28	27-May	20-Oct	148	774

6.0 NATIONWIDE CONTACTS FOR NIMET INFORMATION

S/N	NAMES	STATES	PHONE NUMBERS
1.	Mr. G.I. Anyagwa	Abia	08036817446
2.	Mr. C. Igbo	Abuja	08038775707
3.	Mr. I. O. Ajao	Adamawa	07011769213
4.	Mr. C. E. Ngoka	Akwa Ibom	08038771060
5.	Mr. O. A. Audu	Anambra	08038654850
6.	Mr. J. Ayawari	Bauchi	08065522719, 08073765340
7.	Mr. W. N. Uriah	Bayelsa	08028693332, 08038822237
8.	Mr. T. O. Oyafidein	Benue	08027414275
9.	Mr. B. Sule	Borno	08057275915
10.	Mr. A. B. Ikara	Cross River	07035397567
11.	Mr. K. Osawaru	Delta	08023311111
12.	Mr. T. A. Nwaogu	Ebonyi	08130469187
13.	Mr. E. Mmumu	Edo	08077884077
14.	Mr. J. K. Eboh	Enugu	08034959593
15.	Mrs. F. A. Jimoh	Ekiti	08053456849
16.	Mr. P. I. Uba	Gombe	08089713529
17.	Mrs. C. C. Nwaogu	Imo	08037759398
18.	Mr. J. O. Noah	Jigawa	08036820716
19.	Mr. I. Shittu	Kaduna	07031651142, 08028720840
20.	Mr. Z. Bello	Kano	08033648831
21.	Mr. F. R. Idiong	Katsina	08062560501
22.	Mr. K. A. Mohammed	Kebbi	08067990231, 08023921369
23.	Mr. O. A. Osunlalu	Kogi	08036820685, 08024564382
24.	Mrs. I. Adewole	Kwara	08120001105
25.	Mrs. T. Eze	Lagos	08038982468,
26.	Mr. E. O. Udezor	Niger	08077185673
27.	Mr. J. I. Azi	Nasarawa	07034634544
28.	Mr. J. A. Alabi	Ogun	08060154682
29.	Mr. E. G. Okoghenu	Ondo	08077543106
30.	Mr. J. I. Onyeoziri	Osun	08038936185, 08068955296
31.	Mr. M. A. Olayiwola	Oyo	08034825509
32.	Ms. R. O. Umar	Plateau	08057334354
33.	Mr. I. S. Frank	Rivers	08037650208
34.	Mr. A. M. Buba	Sokoto	08058368711
35.	Mr. P. A. Edoh	Taraba	08066269581, 08054053599
36.	Mr. I. M. Abbas	Yobe	08057573007
37.	Mr. T. A. Amuda	Zamfara	08058547765, 08065172898

7.0
GLOSSARY

Agro-meteorological information - Weather and climate information that if applied to guide agricultural activities improves yields and enhance coping strategies against adverse impact of climate-related hazards in the sector.

Annual rainfall amount – is the total amount of rainfall observed and recorded in the year under reference.

Cessation-date of rainy season - Cessation date is determined when the available water content at the root zone has dropped to 50%.

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.

Climate variability – refers to variations in the mean state and other statistics such as standard deviations, the occurrence of extremes etc. of the climate on all spatial and temporal scales beyond that of the single event. Variability may be due to natural processes within the climate system or anthropogenic forcing.

Coastal inundation – Flooding which occurs when water is driven onto land from an adjacent body of water such as the sea or ocean.

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

Desertification - A type of land degradation, slowly moving southwards in the northern hemisphere, in which a relatively dry region becomes increasingly arid, typically losing its bodies of water as well as vegetation and wildlife.

Dry season farming project - Farming practices sustained by irrigation during period of little or no rainfall

ENSO - El Nino – Southern Oscillation- A global coupled ocean-atmosphere phenomenon, which occurs mainly over the Pacific in three different phases namely; the warm (El-Nino), the cold (La-Nina) and the neutral phase.

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.

La Nina – An extensive cooling of the waters in the upper section of the tropical eastern Pacific Ocean

ENSO – Neutral –normal temperature conditions in the ocean water of the equator off the coast of Peru in South America.

Extreme weather – is an event that rarely occurs at a particular place and time of the year. Extreme weather event would normally be as rare as or rarer than the 10th or 90th percentile of the observed probability density function.

Global warming – An overall increase in the world temperatures, which is caused by additional heat being trapped by greenhouse gases mostly as a result of human activities.

Green House Effect – The warming generated by the trapping of long-wave radiation (heat) by Green House Gases (GHG) in the atmosphere.

IPCC – Inter-Governmental Panel on Climate Change.

Length of rainy season - is the number of days between the onset and cessation dates of the rainy season.

MDGs -Millennium Development Goals.

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%.

Phenological information - Is information on periodic plant and animal life cycle of growth such as flowering, breeding, and migration; and how these are influenced by seasonal and inter-annual variations in climate, as well as habitat factor.

Perishable goods – Agricultural goods that rapidly go bad if weather-controlled preservation techniques are not employed. This subsequently results in considerable economic losses, especially when there is delay in their conveyance from the produce point to the desired place of sale.

Seasonal Rainfall Prediction (SRP) – Forecast of weather or climate condition for a period or season ranging from about three months to one year.

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.

Tele-connection – describes statistical correlations between weather events that occur at different parts of the world.

Transformation Agenda - is a summary of how the Federal Government hopes to deliver projects, programmes, and key priority policies, towards advancing development of the nation from 2011 to 2015.

Vision 20:20:20: Nigeria's Vision to become one of the twenty (20) nations with largest economies by the year 2020.