Flood and Drought Monitoring using in situ data in Nigeria

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Nigerian Meteorological Agency

United Nations/Germany International
Conference International Cooperation Towards
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Introduction

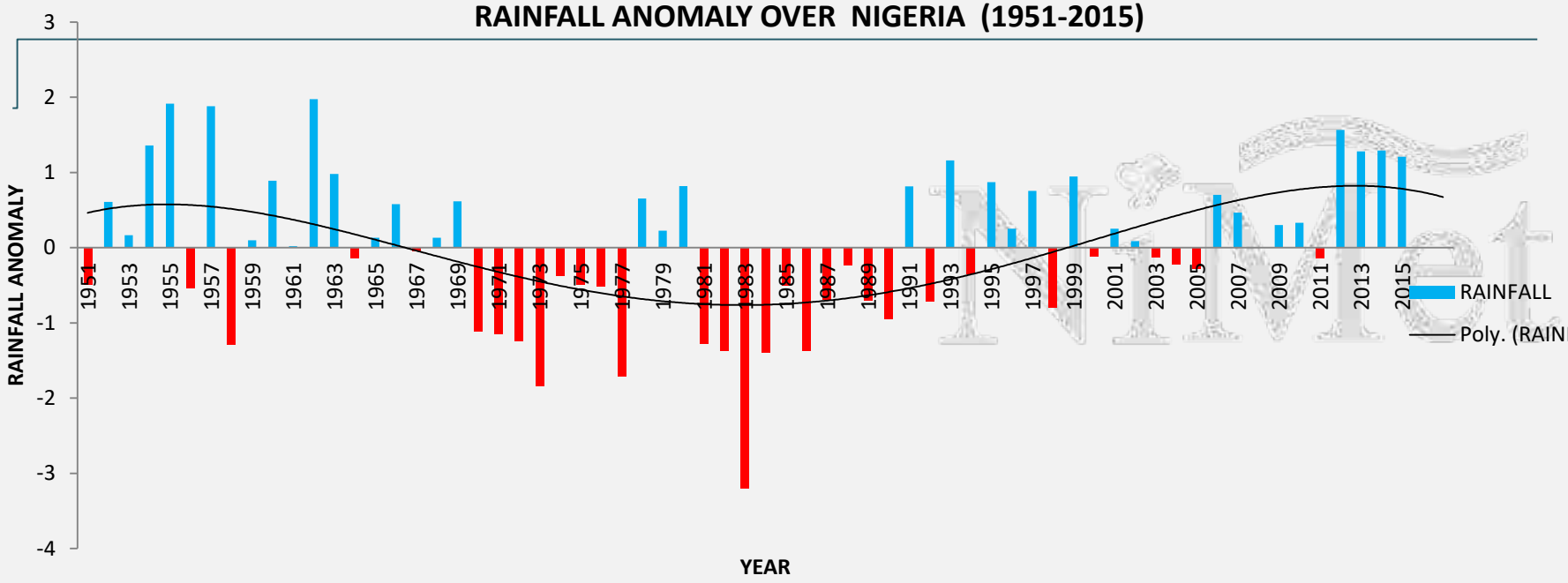
Drought and Flood early warning systems typically aim to track, assess and deliver relevant information concerning climatic, hydrologic and water supply conditions and trends. Ideally, they have both a monitoring (including impacts) and a forecasting component.

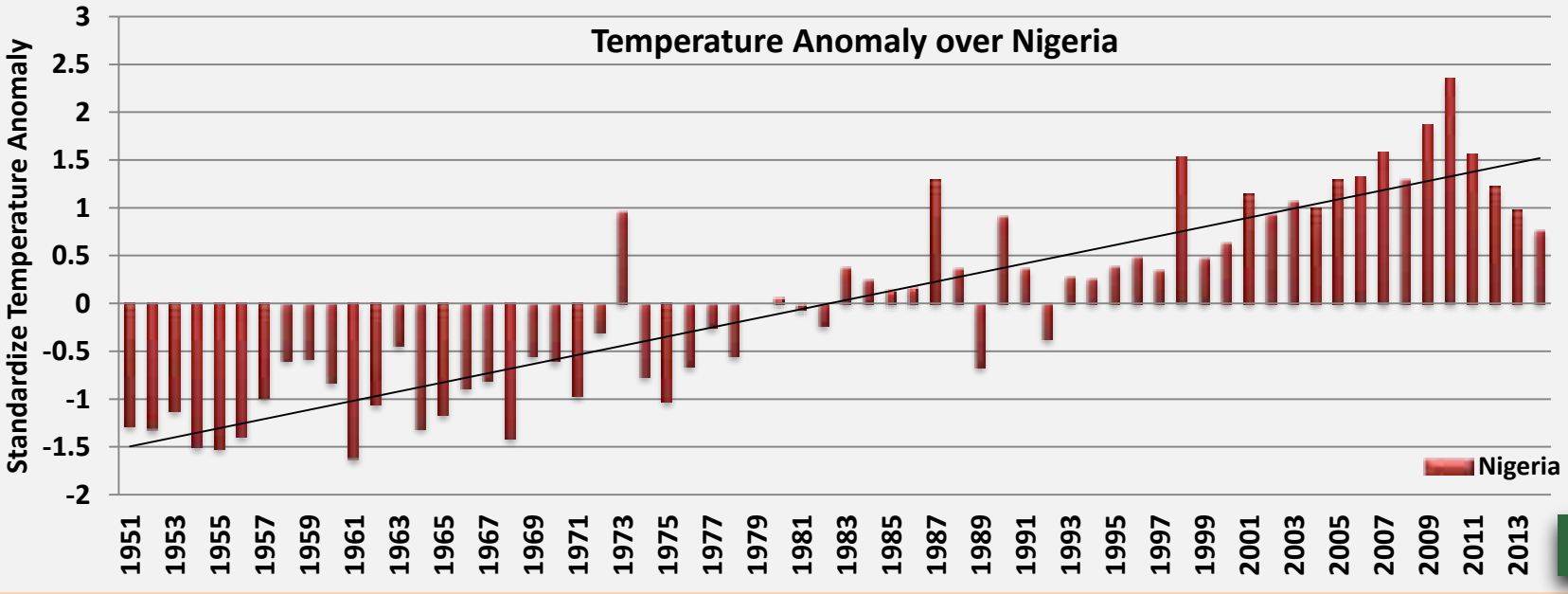
Objective

The objective is to provide timely information in advance of, or during, the early onset of drought to prompt action (via threshold triggers) within a drought risk management plan as a means of reducing potential impacts. A diligent, integrated, approach is vital for monitoring such a slow-onset hazard.

The Role of NIMET

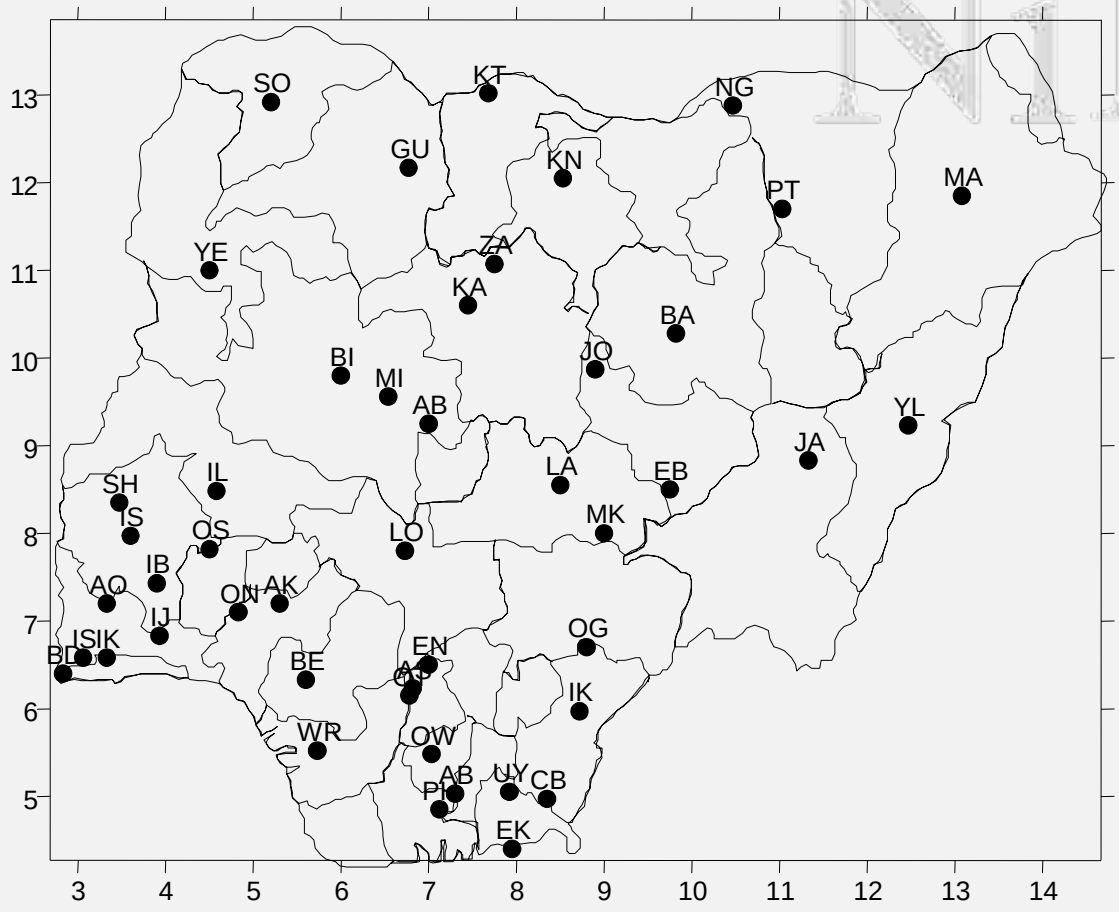
The Nigerian Meteorological Agency (NIMET) drought and flood monitoring bulletin was developed based on the drought indices using Standardized Precipitation Index (SPI), it is aims at monitoring the intensity(degree of wetness or dryness), duration and spatial extent of a location within Nigeria using observed in – situ data on 1 month, 3 months, 6 months and 12 months' timescale.





STATION NETWORK DENSITY

Nigeria is home to about 186 million people covering 923,000Sq KM



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NIGERIAN METEOROLOGICAL AGENCY

NATIONAL WEATHER FORECASTING AND CLIMATE RESEARCH CENTRE, NNAMDI AZIKIWE INTERNATIONAL AIRPORT, ABUJA, NIGERIA.

Drought and Flood Monitoring Bulletin

Providing Weather, Climate and Water Information for Safety and Sustainable Development

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PREAMBLE

The Drought and Flood Monitoring Bulletin for January, 2014 is prepared using the Standardized Precipitation Index (SPI) technique. The maps presented are respectively: the 1-month (i.e. Jan, 2014), the 3-months (Nov 2013 – Jan, 2014), the 6-months (Aug, 2013 – Jan, 2014) and the 12-months (Feb, 2013 – Jan, 2014) SPIs. These maps show rainfall variations along with degrees of wetness and dryness across the country.

Fig. 1: 1-Month Standardized Precipitation Index (for meteorological and agricultural drought)

Fig 2: 3-Months Standardized Precipitation Index (for meteorological and agricultural drought)

OBSERVED CLIMATIC FEATURES

The one-month Standardized Precipitation Index (SPI) analysis in fig 1 reveals normal rainfall feeds in most parts of the country. However, few places like Calabar and parts of Port Harcourt experienced mild dryness while some areas in the South and Central States recorded above normal rainfall with mild-to-severe wetness over Abeokuta and Ibadan.

Mild -to-severe wet conditions were also evident over the South as shown in the 3-month SPI analysis (Fig. 2). The affected areas comprises Ikom, Calabar, Port Harcourt, Owerri, Enugu, Warri, Benin, Ilebu-Ode, Ibadan, Ilesa, Abeokuta, parts of Ofinigbo extending to Makurdi. This is due to cumulative effect of previous three months of rainfall amount. Normal conditions prevailed over the remaining parts of the country.

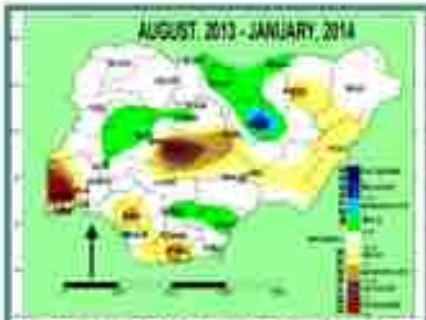

Fig. 3: 6-Months Standardized Precipitation Index (for Groundwater drought)

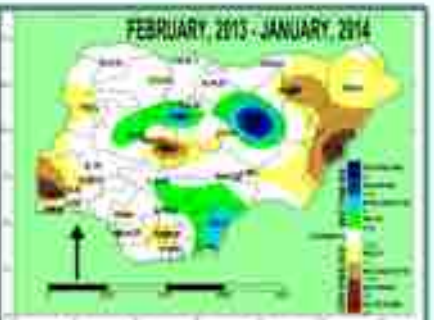

Fig 4: 12-Months Standardized Precipitation Index (for stream flow and lake storage drought)

Fig.3 which is the 6-month SPI map for groundwater monitoring revealed normal-to-dry conditions over significant portions of the country with persisting mild-to-extreme dryness over the central and south-western parts as was observed in November, 2013. As such, these areas including parts of the central states may be exposed to possible threats of ground water depletion. Such places include Potiskum, Maiduguri, Yola, Ilo, Abuja, Abeokuta, Ilesa, Benin and Port Harcourt. Hence, the need for residents around these areas to tap the resource with caution. However, few areas such as Birnin, Kaduna, Kano, Gusau and Sokoto in the North and Enugu and Ikom in the South experienced mild-to-extreme wetness.

The 12-month SPI (fig.4) show analysis for stream flow and lake storage monitoring. It reveals persisting mild-to-severe dry conditions over the northeastern and southwestern parts such as Potiskum, Maiduguri, Yola, Ilo, Gusau and Nguru in the North and Ibadan, Abeokuta, Lagos, Benin and Owerri in the South. On the other hand, mild-to-extreme wet conditions prevailed over a few areas like Birnin, Minna, Kaduna, Sokoto, Ikom, parts of Makurdi and Lokoja.

CLIMATE OUTLOOK FOR FEBRUARY, 2014

Persisting and wide spread dry conditions are likely over the country with possibility of hydrological drought. This may reduce maritime, farms and hydropower related activities due to low flow trends over rivers and streams arising from rainfall shortage. Also, water resources (rivers, dams/reservoirs and groundwater) may be threatened due to unstable hydrological regime and decreased recharge.

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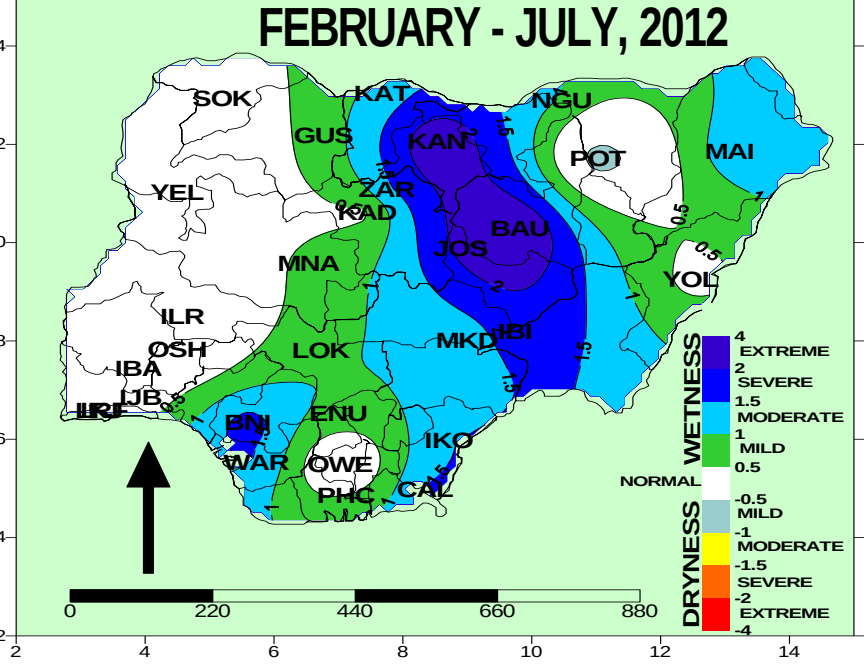
....you may also visit our website: www.nimetng.org/bulletin

http://nimet.gov.ng/publication/drought-and-flood-monitoring-bulletin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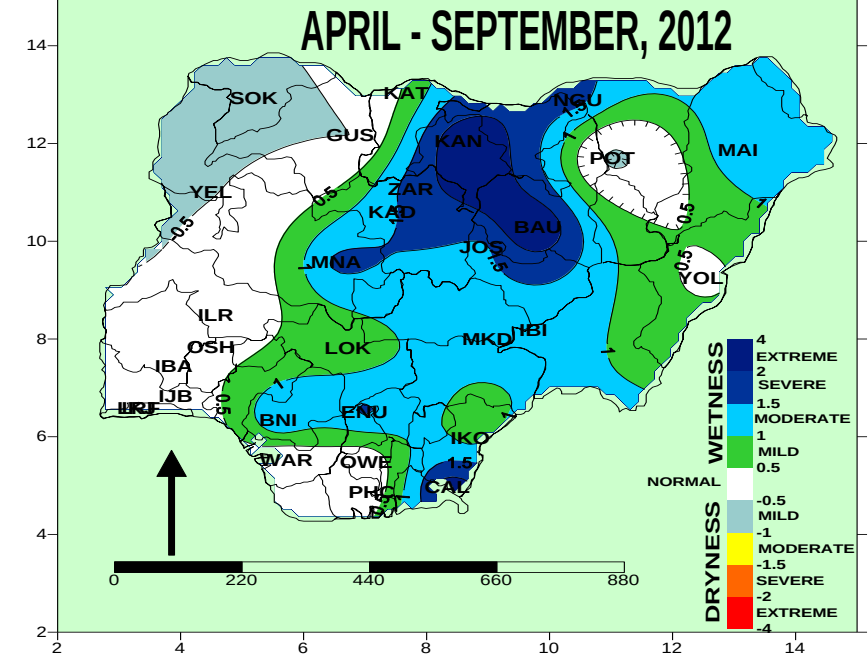
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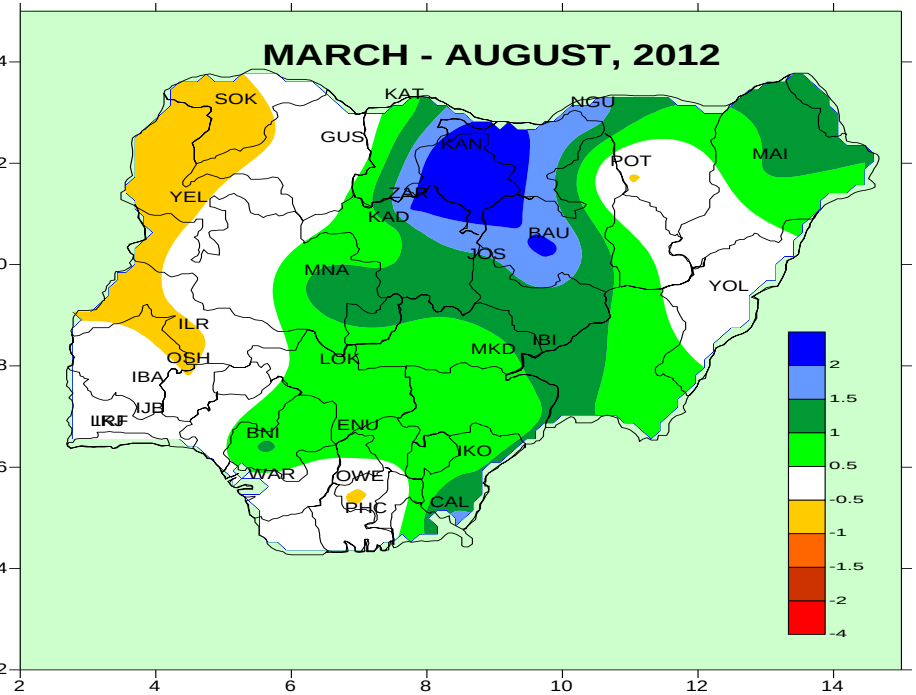
DRYNESS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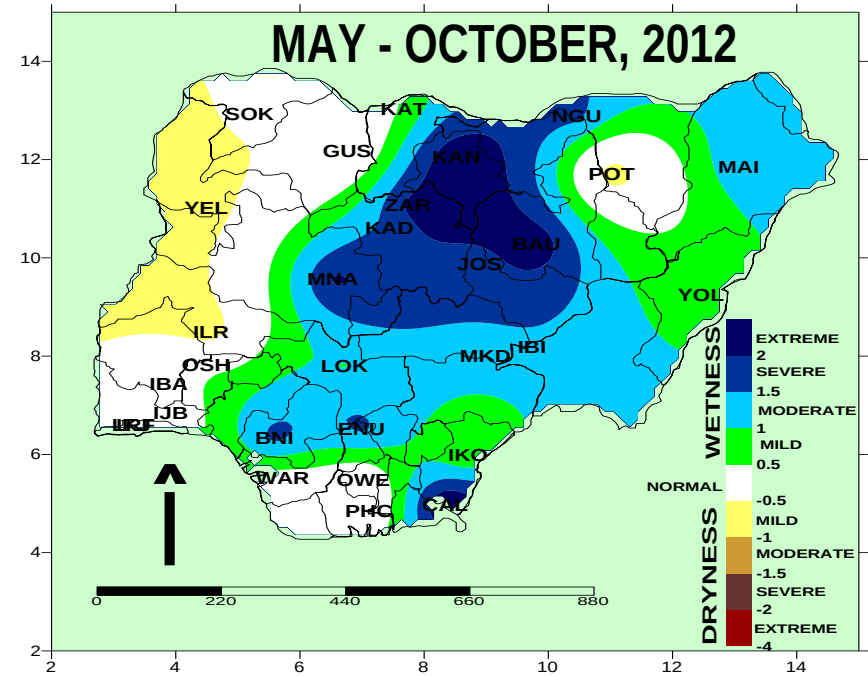
MAY - OCTOBER, 2012
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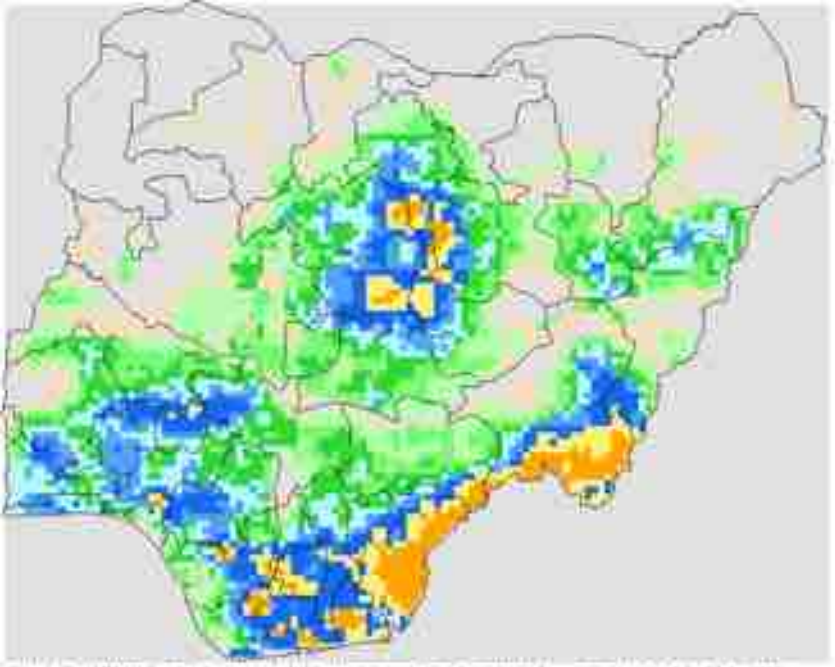

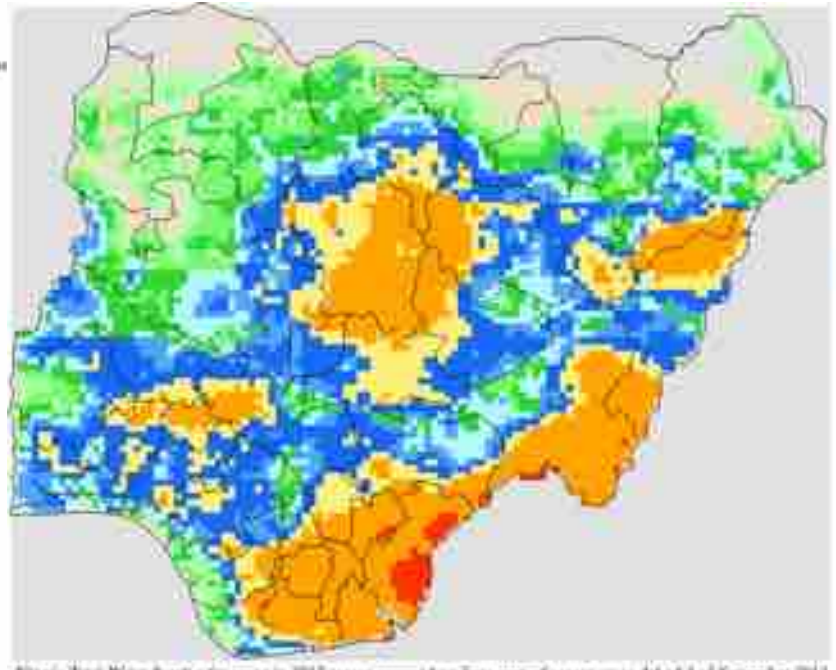

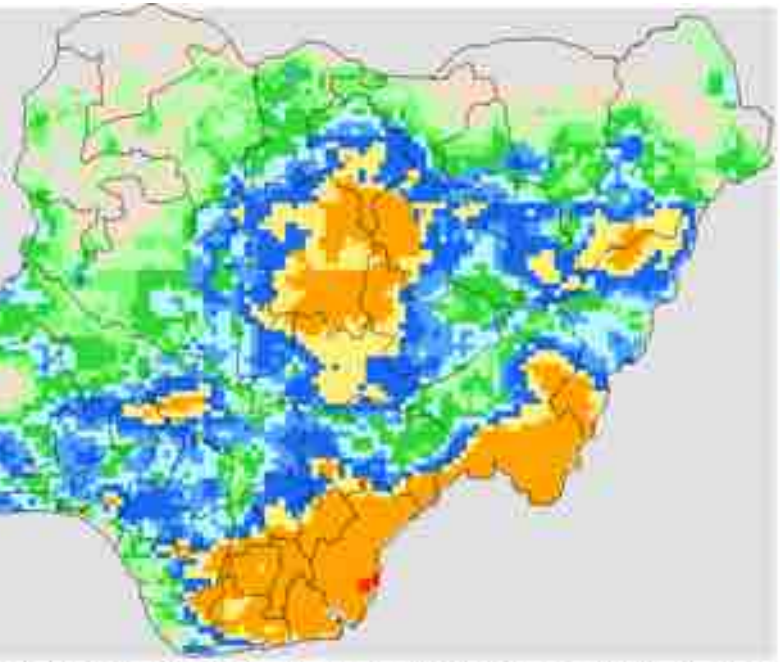

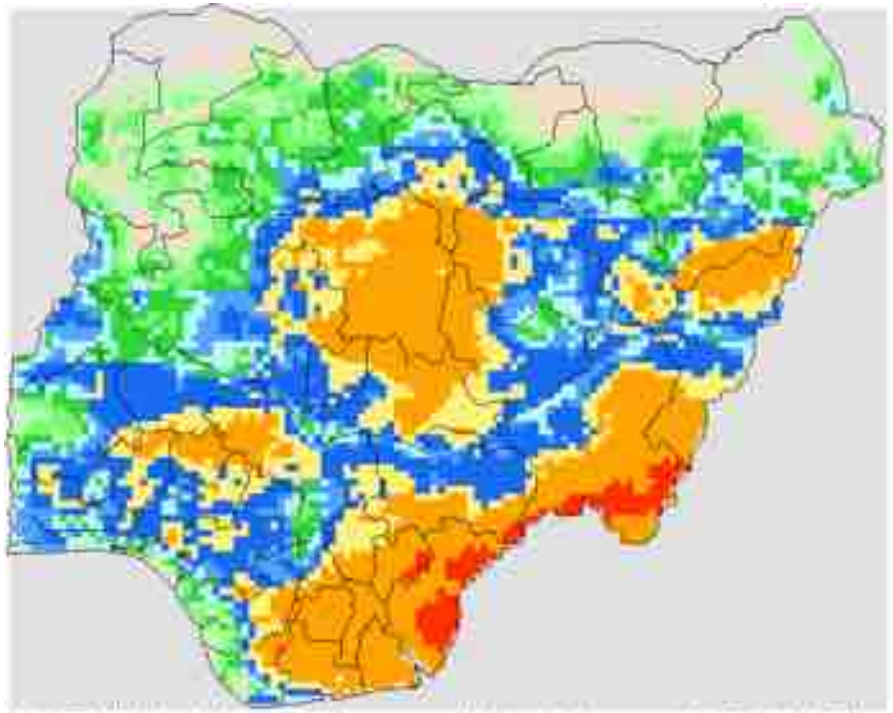

2012 Flood in Nigeria

- The unprecedented flood that ravaged parts of Nigeria between July and December 2012
- Affected over 7 million people
- Displaced 2.3 million people
- Killed 363 persons
- Destroyed or damaged about 597,476 houses in 34 States.
- Total value of damage and losses across all sectors was estimated at N2.6 trillion ($16.9 billion).
- The overall impact of the flood on real GDP growth was estimated at 1.4 percent i.e. N570 billion in nominal terms (PDNA Report, 2012).

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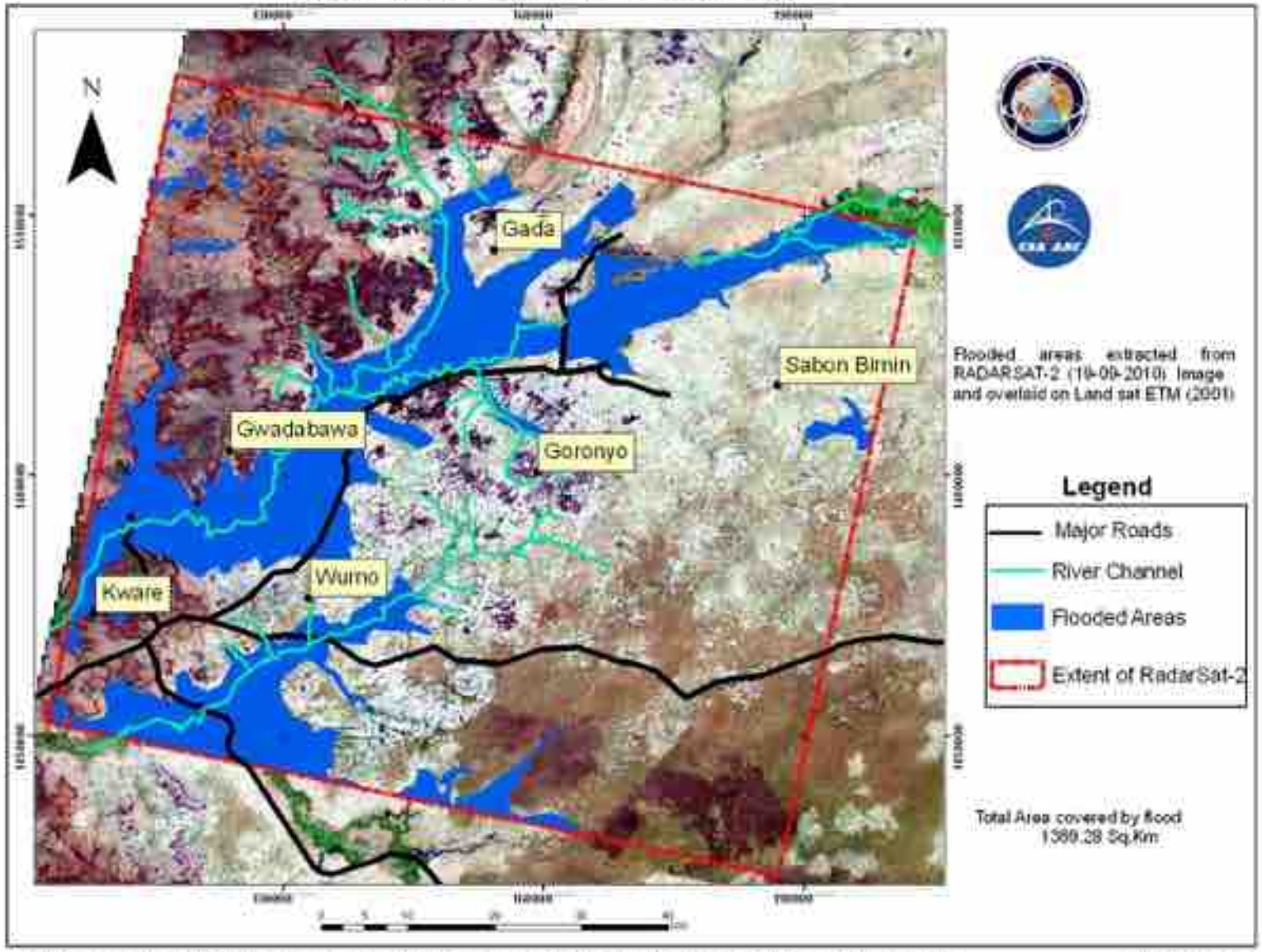
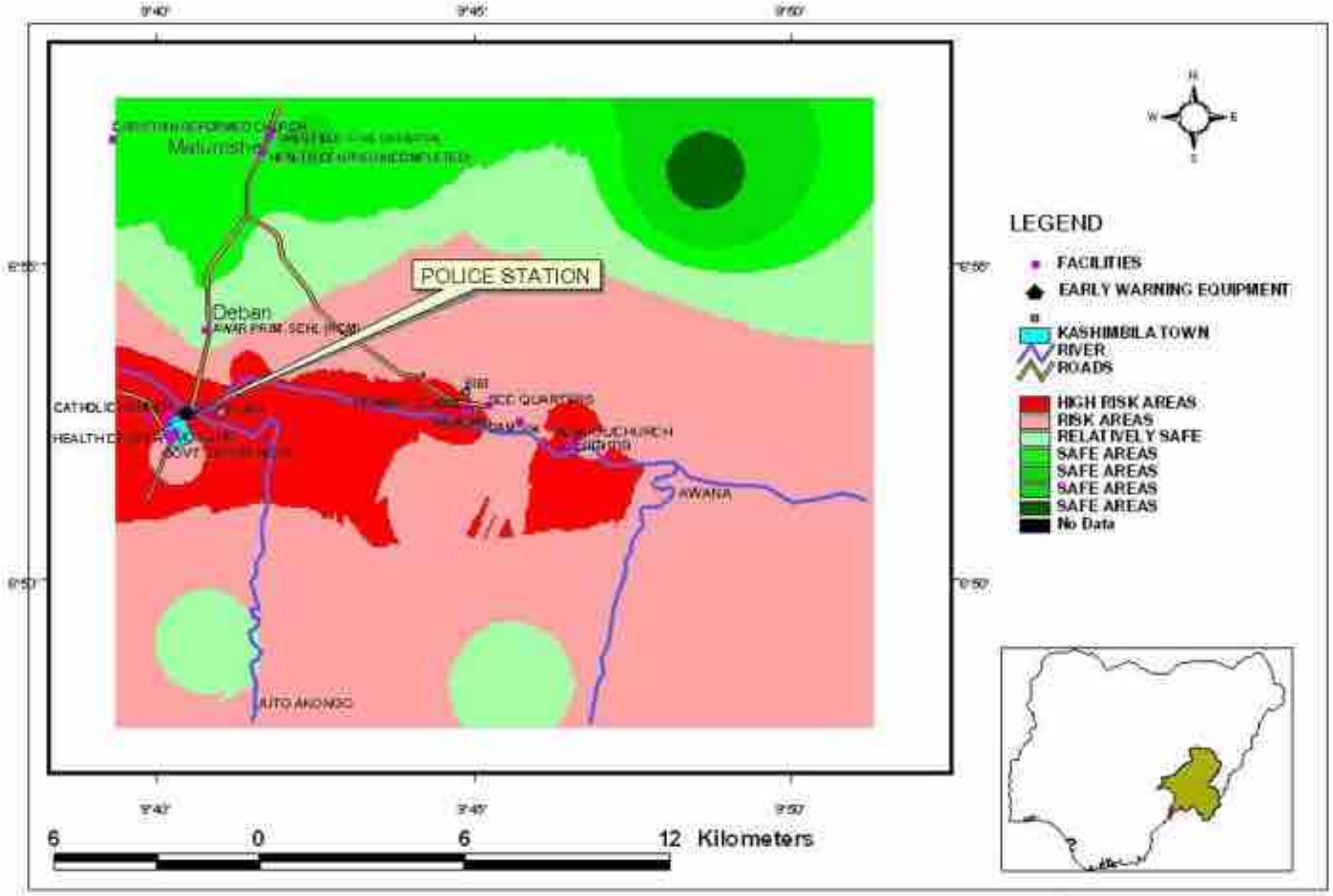
Flooded Areas in Parts of Sokoto State



Map products for charter call 324 was processed by RECTAS with assistance from International Charter for Space and Major Disasters

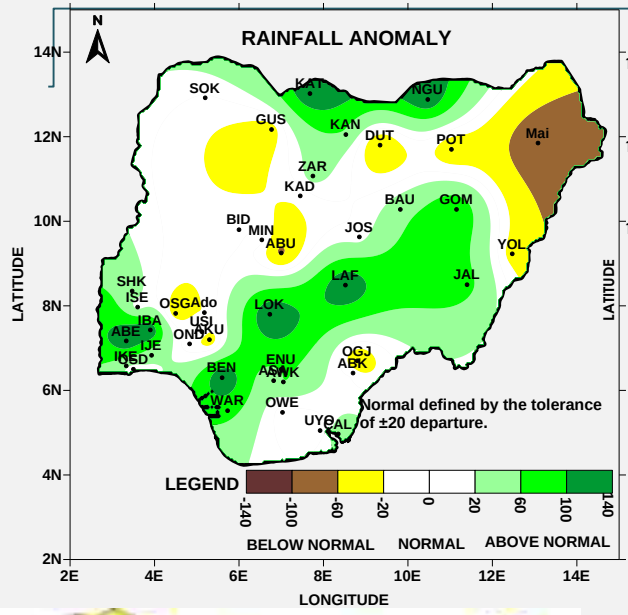
September, 2010

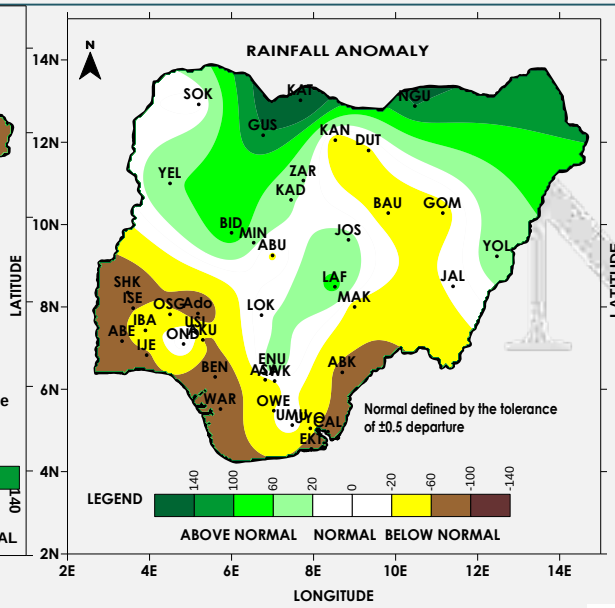
Flood Risk & Critical Infrastructure Map of Kashimbila District, Taraba State - Nigeria

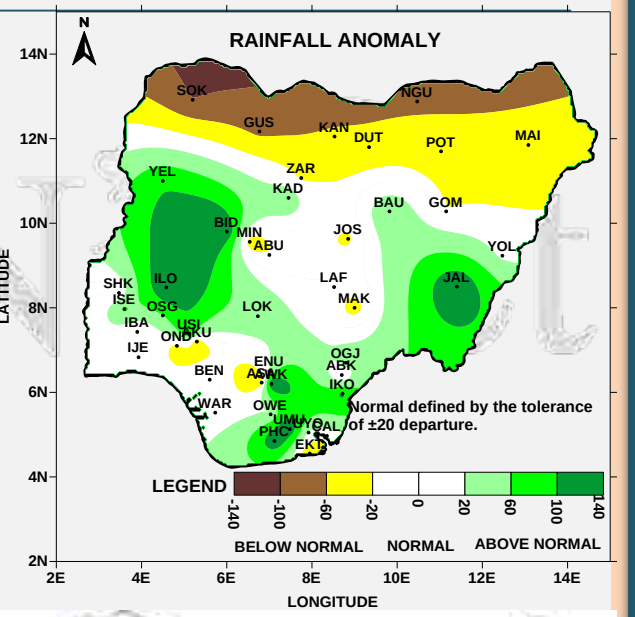


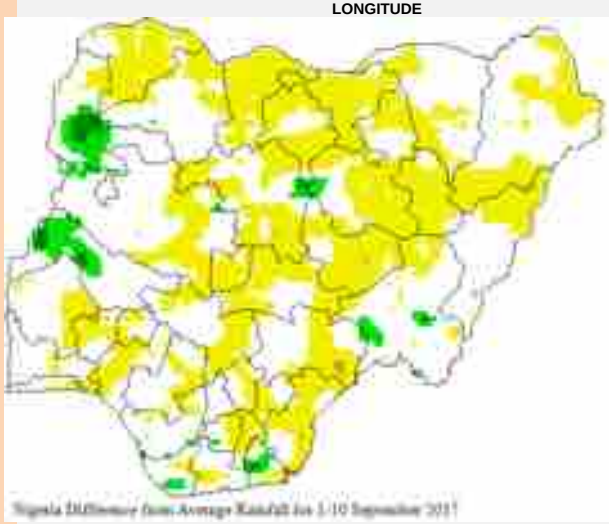
SOURCE:NEMA GIS 2010

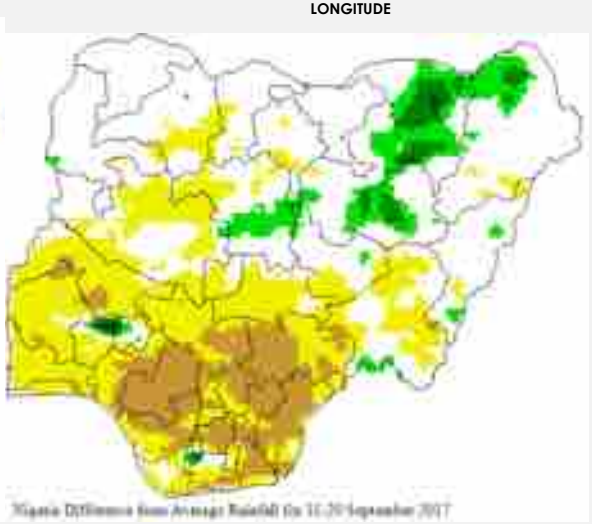
SEPTEMBER 2017

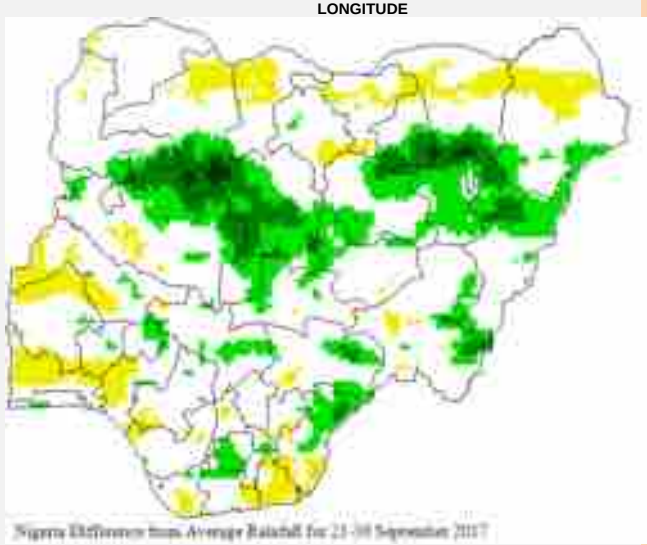












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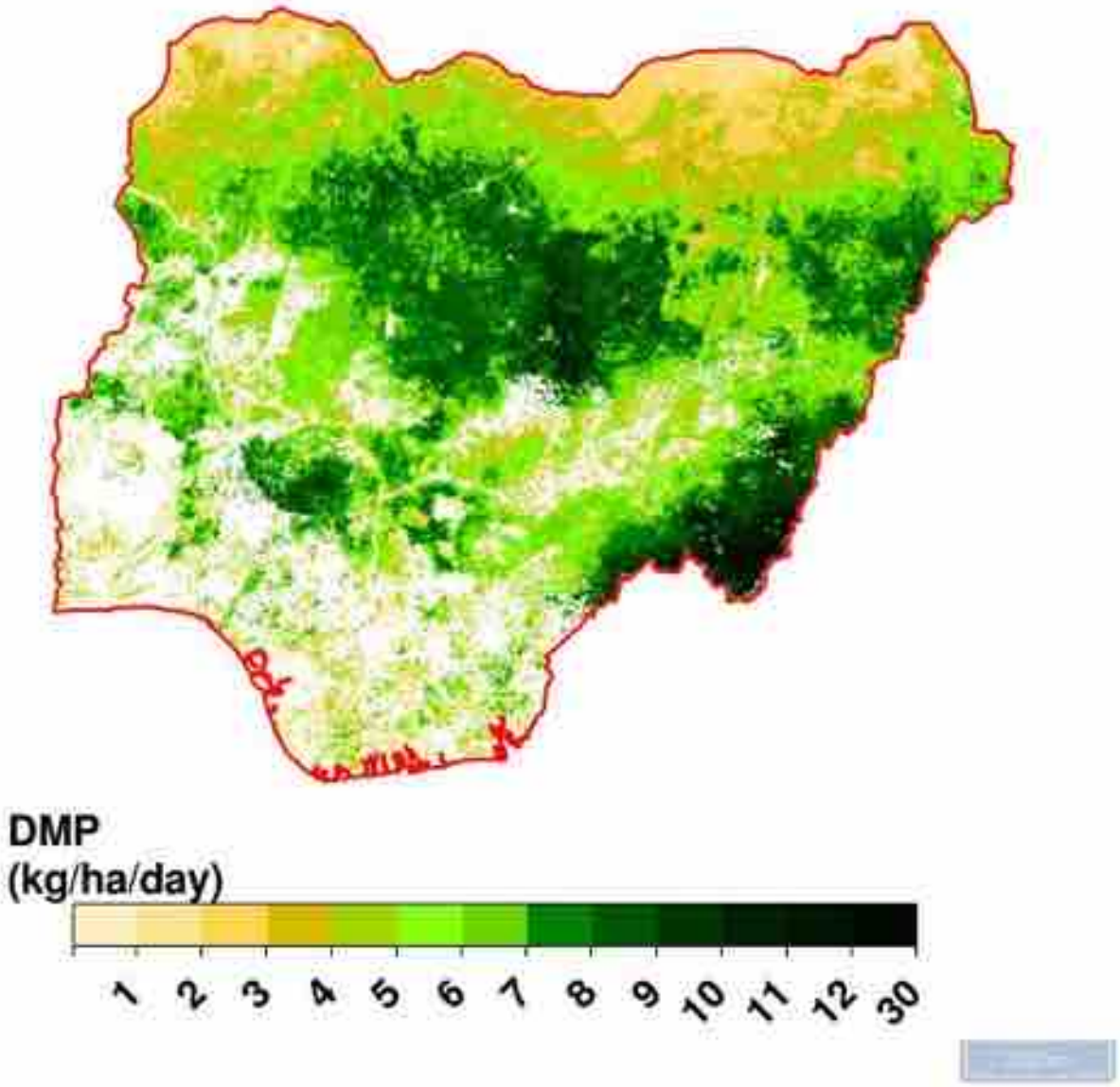
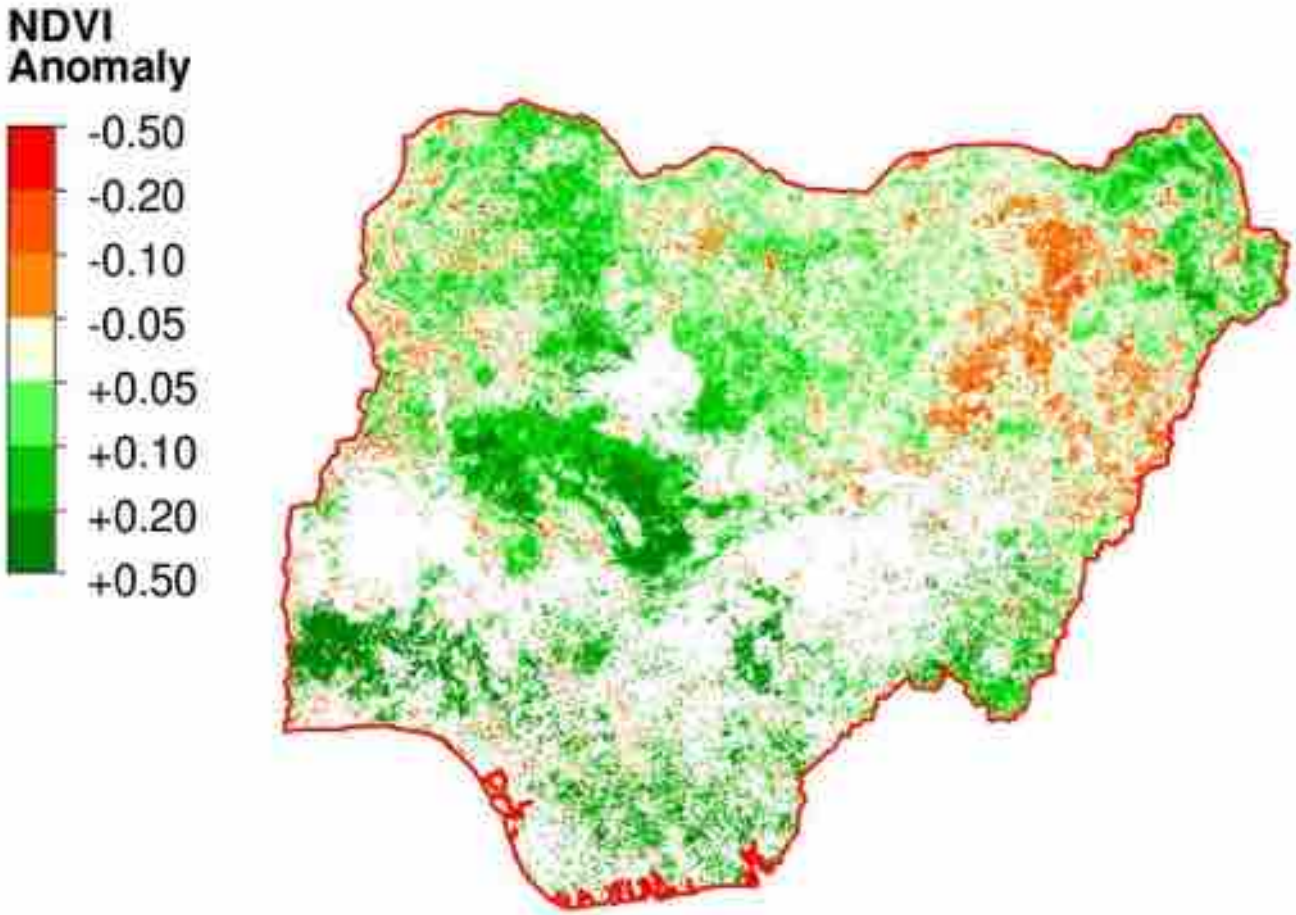
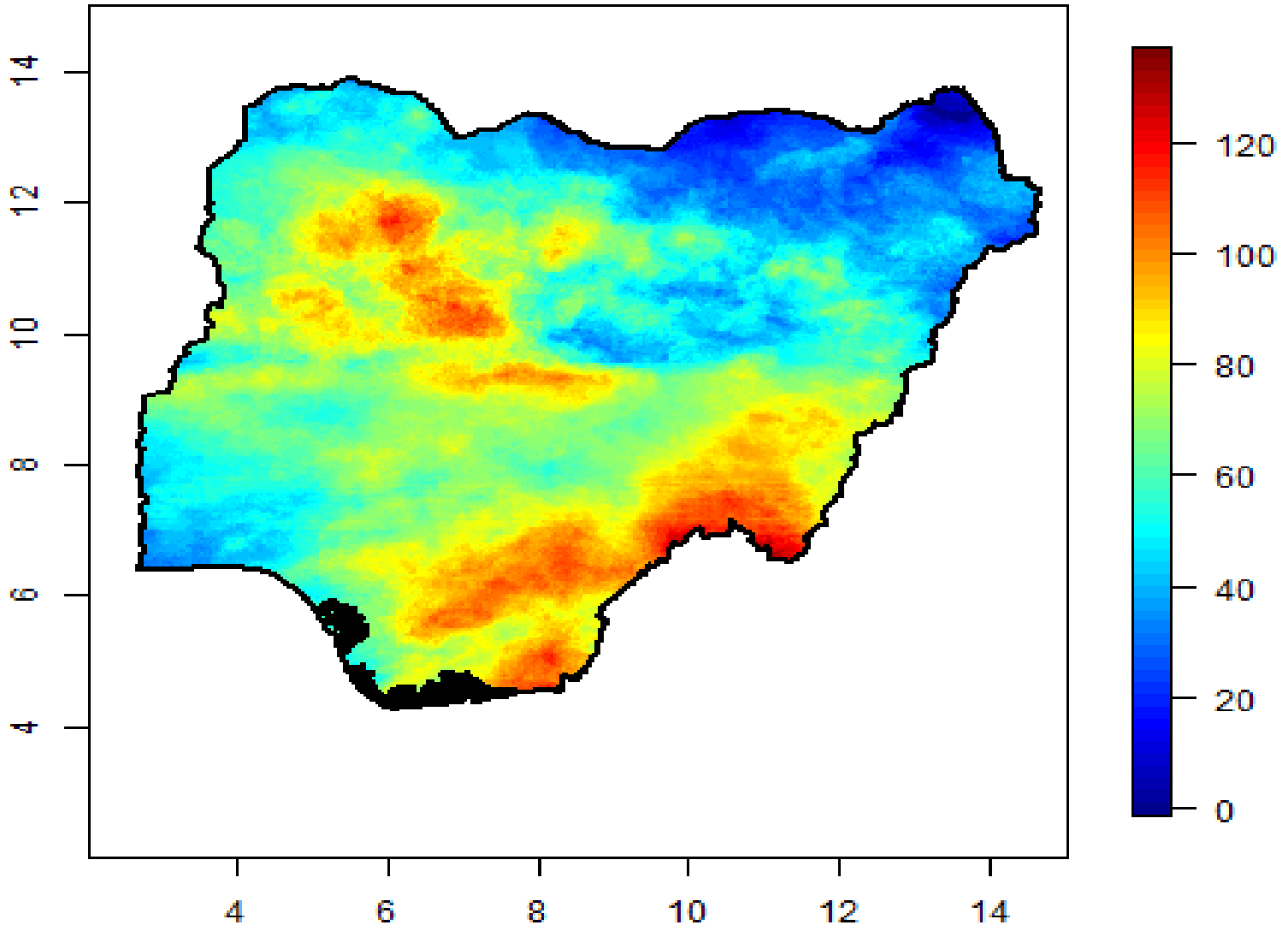
Dry Matter Availability September, 2017

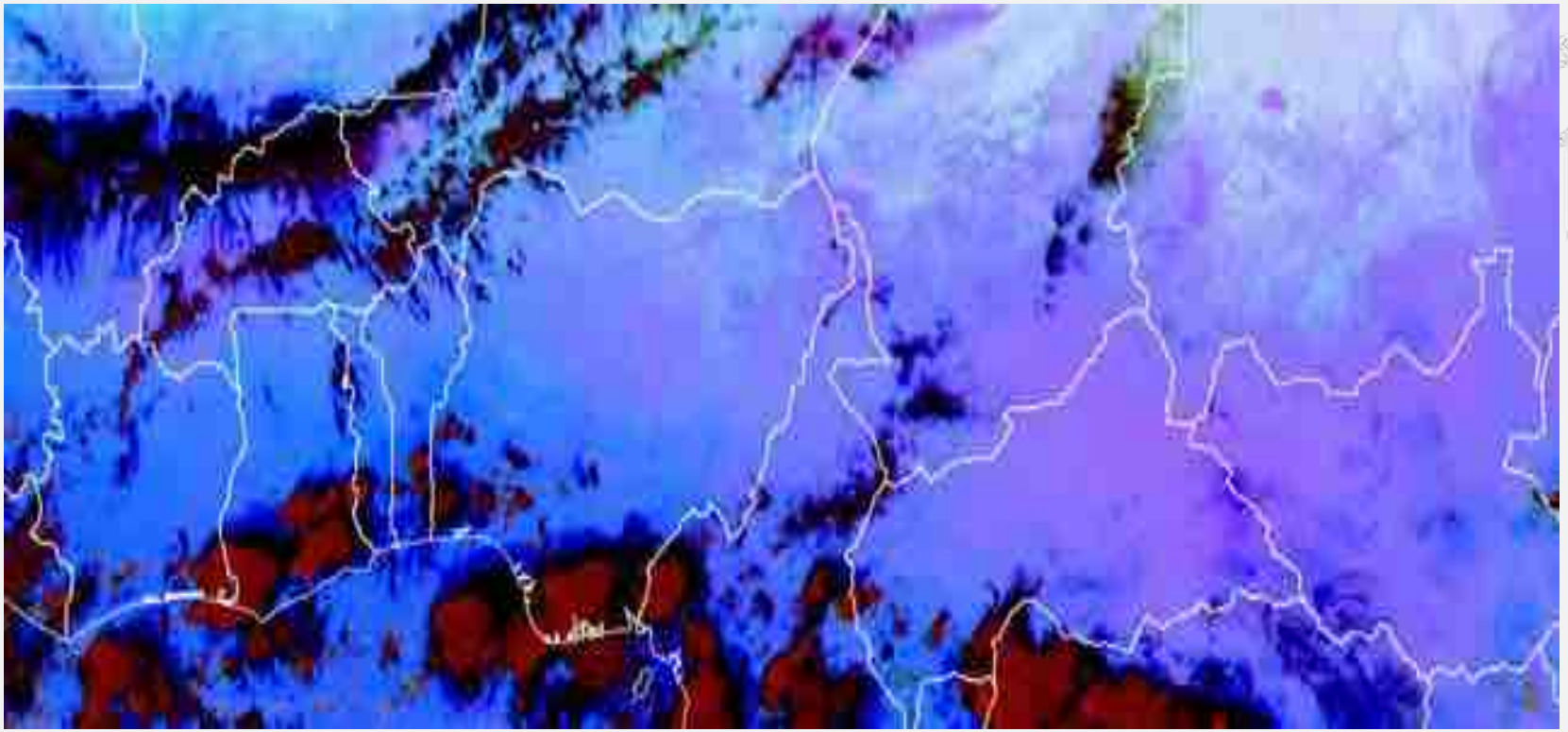


AUGUST 3rd Dekad, 2017



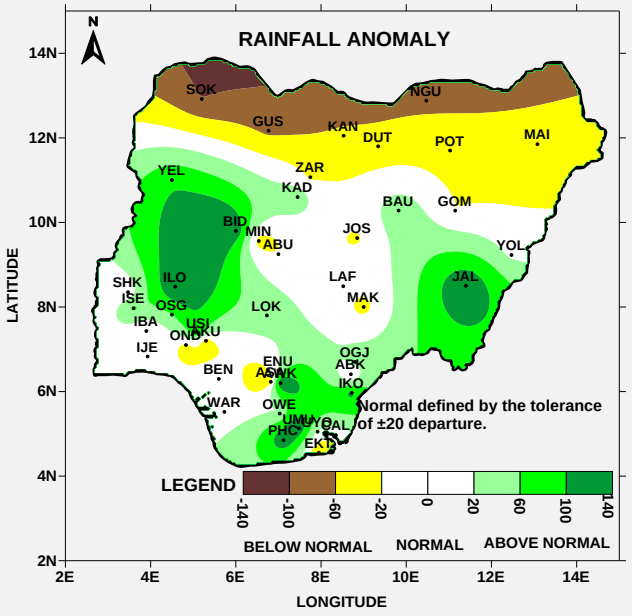
Merged data 1ST DEKAD RAINFALL AMOUNT [mm] September, 2017

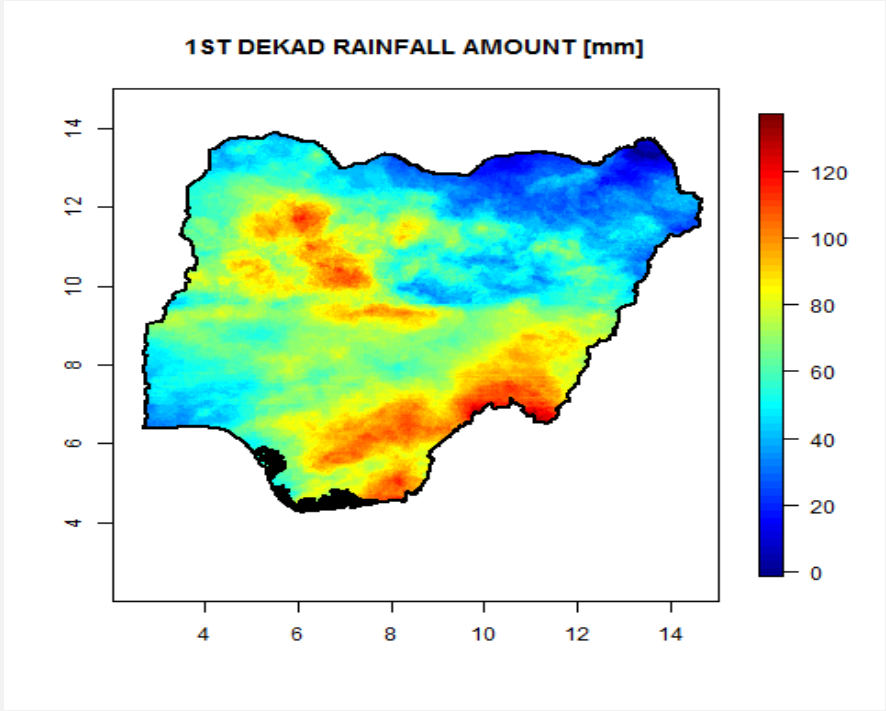




The need for satellite data to support in situ data

1. Spatial resolution to fill the gaps
2. Temporal resolution





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