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MESA
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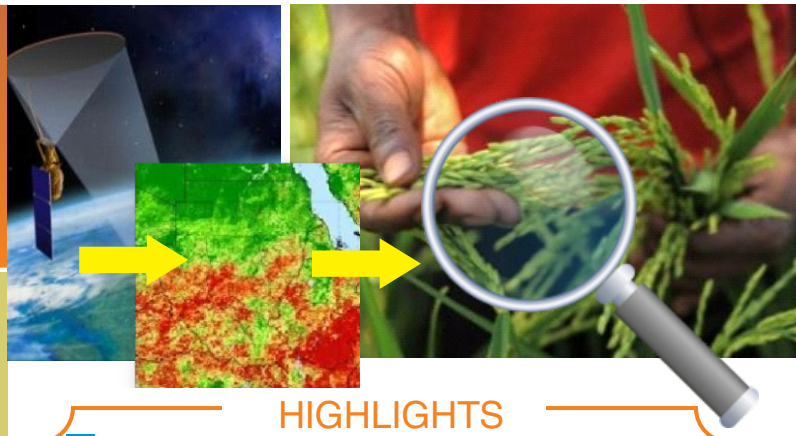

DEFINITIONS OF ACRONYMS

RFE = Rainfall Estimate
NDVI = Normalized Difference Vegetation Index
SDVI = Standardized Difference Vegetation Index
ADVI = Absolute Difference Vegetation Index
LTA = Long Term Average (Historical Mean from 2000 - 2016)
Dekad = 10-day period

HIGHLIGHTS

- Bayelsa, Akwa-Ibom and Rivers States of Nigeria recorded highest RFEs compared to other States in June, 2017. Borno, Yobe, Jigawa and Sokoto States recorded the least RFEs.
- Highest vegetation development observed in Ekiti, Osun, Cross-River and Ondo States in June, 2017. Poor vegetation observed in Jigawa, Yobe, Sokoto and Katsina States.
- Prolonged negative NDVI anomaly in parts of Lagos, Enugu, Anambra, Niger and Kaduna States may imply low productivity for croplands in the area.

Nigeria Rainfall Estimates (June, 2017)

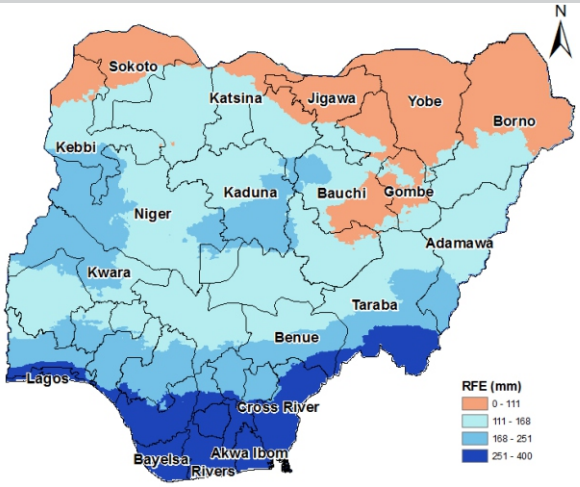

Figure 1: Nigeria Rainfall Estimate (June, 2017)

Nigeria rainfall estimate for the month of June, 2017 (Figure 1) revealed that the southern part of the country received the highest rainfall compared to other regions. States such as Bayelsa (364.54 mm), Akwa-Ibom (341.72 mm), Rivers (353.46 mm) Cross-River (293.52 mm) and Lagos (284.71 mm) were observed to record exceptionally high amount of rainfall in the month (Figures 2a-2c). According to the extracted statistics, places like Epe in Lagos State received extremely high rainfall during the second (98.77 mm) and third (100.03 mm) dekads of the month that could result in water inundation (flood events) in the area. Apart from the southern part of the country, areas including parts of Kaduna (164.10 mm), Kwara (182.53 mm), Niger (167.37 mm), Benue (183.68 mm) and Taraba (199.71 mm) States also recorded moderate levels of rainfall during the month. With this information, healthy vegetation development and good crop yield can be expected in the areas.

Areas where significantly low rainfall which may negatively impact vegetation development was observed during the month include Yobe (81.12 mm), Jigawa (96.20 mm) and Sokoto (81.13 mm) States, while large parts of Bauchi (120.35 mm), Gombe (112.29 mm) and Borno (97.55 mm) States also experienced very low rainfall compared to other states of the country. The low RFE may imply low productivity for croplands in these areas in the following dekads during the month of July.

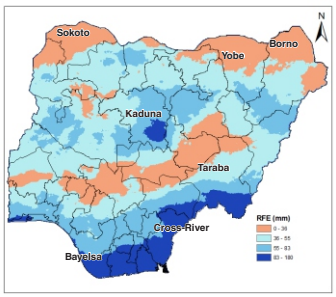

Figure 2a: Nigeria Rainfall Estimate- June, 2017 1st dekad (June 01-10)

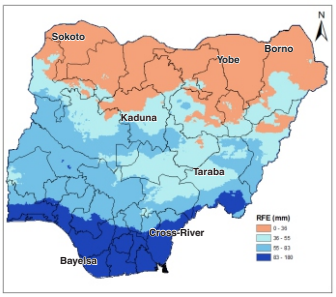

Figure 2b: Nigeria Rainfall Estimate- June, 2017 2nd dekad (June 11-20)

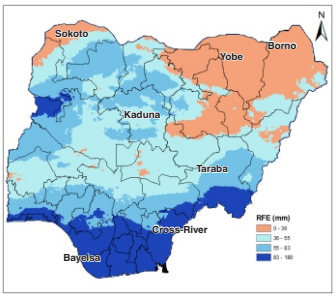

Figure 2c: Nigeria Rainfall Estimate- June, 2017 3rd dekad (June 21-30)

Nigerian RFE Anomalies (June, 2017)

Extreme negative departures from long-term average RFE were observed in parts of Sokoto, Katsina and Jigawa States during the 1st and 2nd dekads of June, 2017 (Figures 3a-3b). Moderate negative anomalies were also observed in much of central and southwestern Nigeria during the 1st dekad of the month. Furthermore, in the 3rd dekad of June (Figure 3c), negative anomalies were recorded in parts of Gombe and Bauchi States. These observed negative anomalies are capable of inducing poor vegetation development in these areas over a long period of time. However, positive RFE anomalies were observed in most of the northern states during the 1st dekad of June, while states like Kwara, Niger, Bayelsa and Rivers recorded positive RFE anomalies in the 2nd and 3rd dekads of the month.

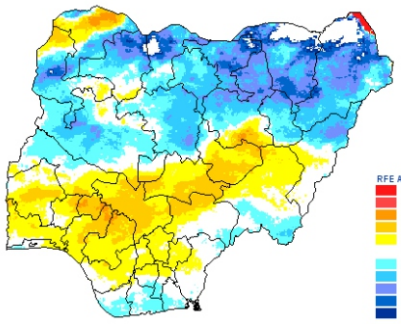

Figure 3a: Nigeria RFE Anomaly- June, 2017
1st dekad (June 01-10)

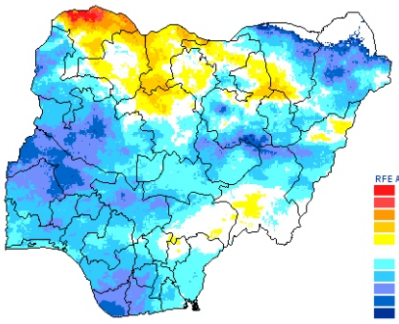

Figure 3b: Nigeria RFE Anomaly- June, 2017
2nd dekad (June 11-20)

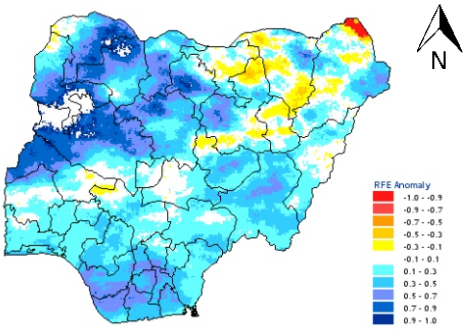

Figure 3c: Nigeria RFE Anomaly- June, 2017
3rd dekad (June 21-30)

Vegetation Development in Nigeria (June, 2017)

Analyses of satellite images (vegetation) for the month of June (Figure 4), 2017 showed that Ekiti State in southwest Nigeria recorded the highest mean NDVI value for the three dekads (Figures 5a-5c) of the month. Other notable states characterized by exceptionally high greenness during the month include Osun, Ondo, Cross-River, Kogi and Edo States. These observations will make tenable the predictions of high crop yields for farmlands in these areas during the period.

The minimum mean NDVI values for the month of June were observed in Yobe, Sokoto and Jigawa States in northern Nigeria, while Katsina and Lagos states also recorded significantly poor vegetation development compared to other states of the country. Upon overall assessment, healthy vegetation development during the month of June, 2017 was more localized towards the Southern and Central (Middle-Belt) parts of Nigeria and places like the Lake Chad area of Borno State showed above average greenness.

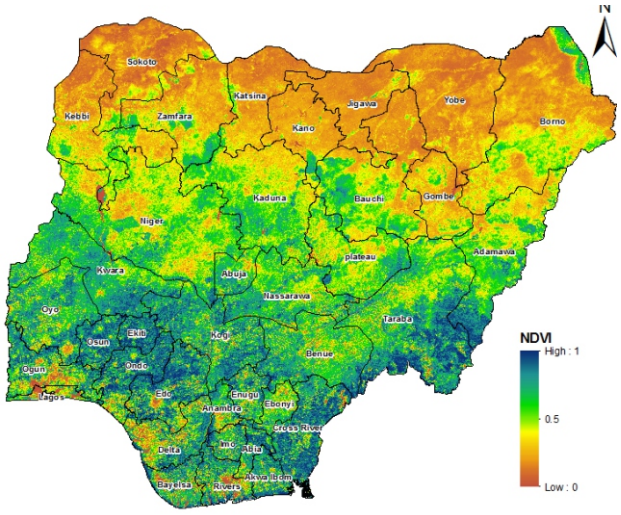

Figure 4: Nigeria NDVI (June, 2017)

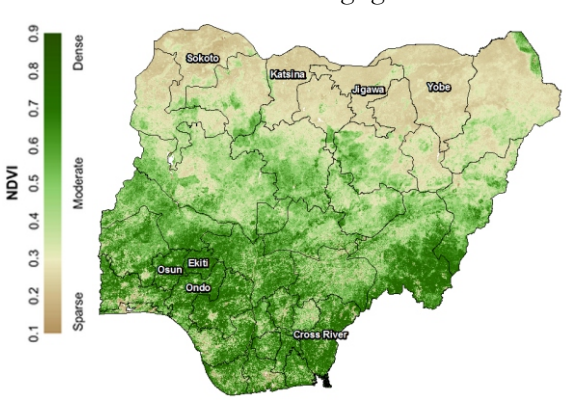

Figure 5a: NDVI of Nigeria- June, 2017
1st dekad (June 01-10)

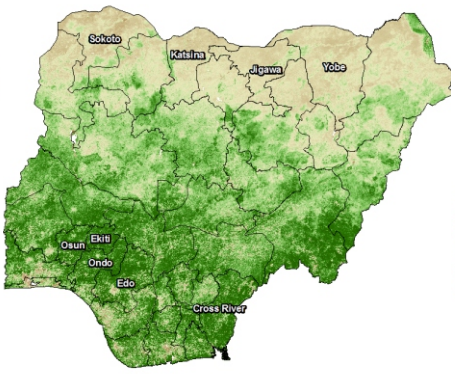

Figure 5b: NDVI of Nigeria- June, 2017
2nd dekad (June 11-20)

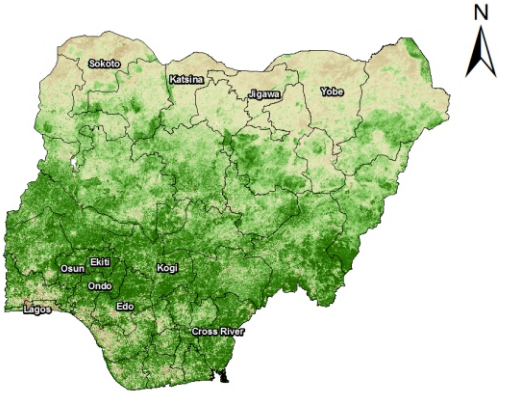

Figure 5c: NDVI of Nigeria- June, 2017
3rd dekad (June 21-30)

Anomalies in Nigeria NDVI (June, 2017)

According to statistics extracted from satellite images in time series, Ebonyi, Lagos, Niger and Kaduna States recorded extreme negative anomalies in NDVI when compared to the long-term mean NDVI (2000 -2016) for the States during June, 2017. Parts of Taraba and Benue States in North-central Nigeria also experienced significant negative departure from long-tearm average NDVI (Figures 6a-6c).

Later in the month (2nd and 3rd dekads), Anambra and Enugu States in Southeast Nigeria joined the list of States with negative anomaly from mean NDVI. The assumption is that extended periods of negative mean NDVI anomalies may result in progressive drought in sizeable parts of these areas, which will ultimately impact negatively on the expected yield of farmed crops.

The strongest positive anomalies in mean NDVI were observed in Bayelsa, Akwa-Ibom and Rivers States in South-south Nigeria. Also, areas around Lake Chad in Borno State such as Bama and Konduga Local Government Areas experienced significant positive spikes in their mean NDVI anomalies. The observation is particularly beneficial for forest vegetation and croplands of the States, as extension in period and quantity of greenness over a landscape will result in better forest and crop development.

Figure 6a: Nigeria NDVI Anomaly- June, 2017
1st dekad (June 01-10)

Figure 6b: Nigeria NDVI Anomaly- June, 2017
2nd dekad (June 11-20)

Figure 6c: Nigeria NDVI Anomaly- June, 2017
3rd dekad (June 21-30)

Selected Areas of Extreme Anomalies (June, 2017)

(1) Epe Local Government Area, Lagos State

Analyses of long-term data (Figure 7) revealed that Epe Local Government Area of Lagos State recorded very high negative departure from long-term average NDVI for the three dekads of June, 2017. This negative anomaly can be partly attributed to the negative RFE anomaly during 3rd dekad of May and the 1st dekad of June. This observation indicates a progressive decline in the vegetation development of the area, given the trend observed in NDVI curve. Other factors that may influence NDVI in the area towards a negative anomaly include rapid urbanization, increased water areas, as well as other agrometeorological phenomena like high rate of evapotranspiration.

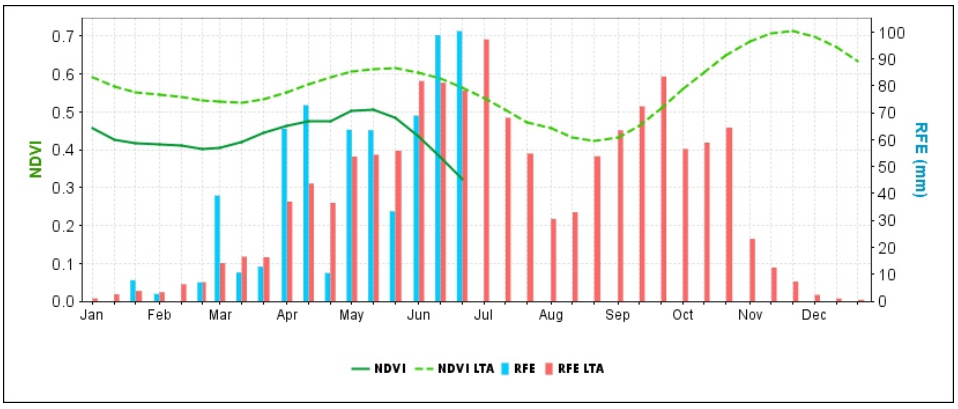

Figure 7: NDVI and RFE Anomalies of Epe LGA, Lagos, Nigeria

(2) Sagbama Local Government Area, Bayelsa State

On the other hand, Sagbama Local Government Area of Bayelsa State recorded very high positive anomaly in NDVI from 1st to 3rd dekad of June, 2017 and this was found to be as a result of highly positive RFE anomalies recorded in the area during the previous dekads, particularly the 1st and 2nd dekads of April, 2017. This observation is beneficial for long-term vegetation development of the area (Figure 8).

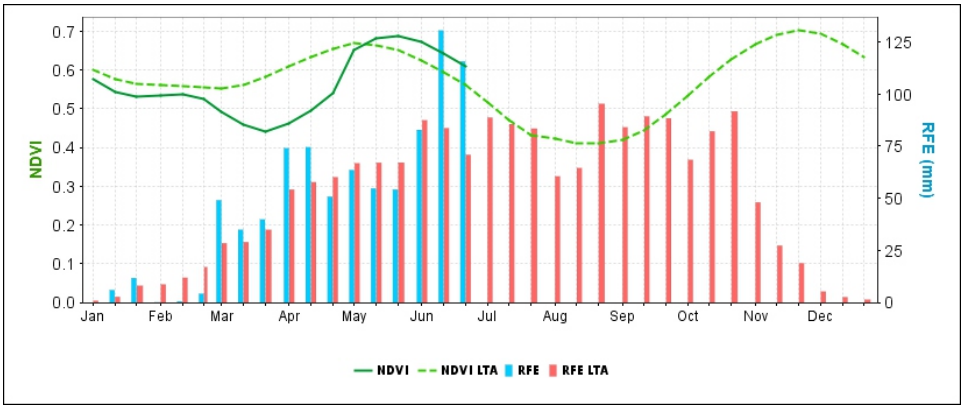

Figure 8: NDVI and RFE Anomalies of Sagbama LGA, Bayelsa, Nigeria

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