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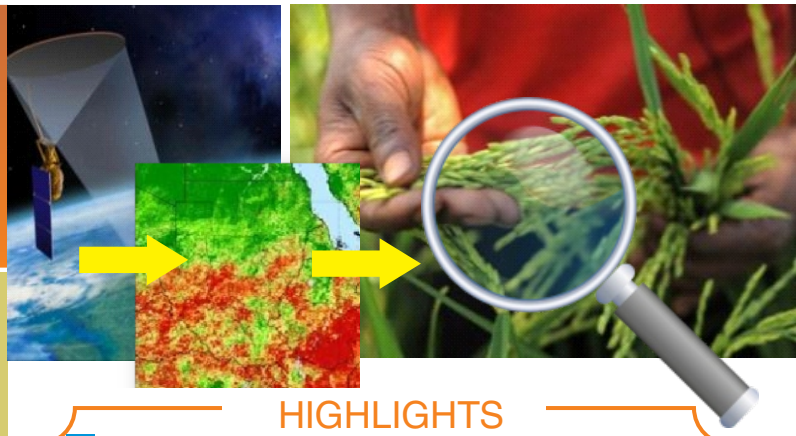

DEFINITIONS OF ACRONYMS

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

- Lagos, Delta, Bayelsa and Taraba States of Nigeria recorded highest RFEs compared to other States in July, 2017. Borno, Yobe, Sokoto and Oyo States recorded low RFEs.
- Highest vegetation development observed in Ekiti, Osun, Kogi, Kwara and Kaduna States in July, 2017. Poor vegetation observed in Jigawa, Yobe, Sokoto and Katsina States.
- Prolonged negative NDVI anomaly in parts of Lagos, Enugu, Edo, Anambra and Ebonyi States may imply serious implications for croplands in the area.

Nigeria Rainfall Estimates (July, 2017)

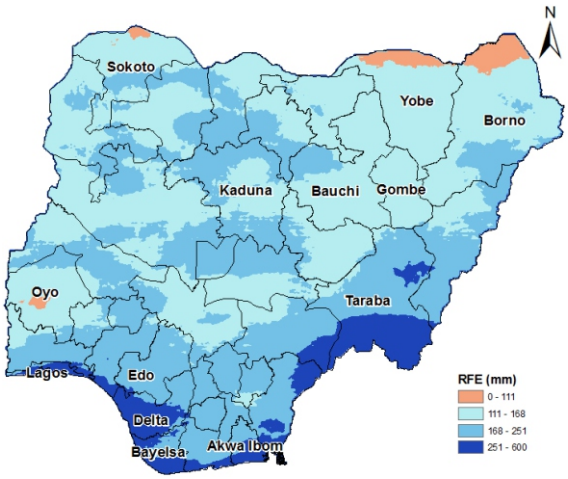

Figure 1: Nigeria Rainfall Estimate (July, 2017)

In the month of July, 2017, The Rainfall Estimate of Nigeria (Figure 1) showed Lagos (276.11 mm), Bayelsa (265.29 mm), Delta (262.78 mm), Akwa-Ibom (254.99 mm) and Taraba (244.52 mm) States as being among the Nigerian States that received highest rainfall in the country. During the 1st dekad of the month (Figure 2a), abundant rainfall was more concentrated at the southwestern States of Lagos, Ogun and Ondo, as well as in parts of Bayelsa and Taraba States. The 2nd dekad of the month (Figure 2b) however saw southern States such as Rivers, Akwa-Ibom and Imo having the highest RFEs in the country, while Cross-River and Taraba States experienced highest rainfall in the 3rd dekad (Figure 2c). Other areas with above average RFEs during the period include parts of Kaduna (171.02 mm) and Edo (209.98 mm) States. Development of vegetation in these areas is expected to be well above average in the month of August, and may well result in healthier crop status.

During this period, Gombe (138.40 mm), Yobe (138.47 mm) and Sokoto (146.41 mm) States, as well as parts of Oyo (147.31 mm), Borno (149.62 mm) and Bauchi (150.28 mm) States experienced exceptionally low rainfall which may spell bad for cropland productivity in the areas..

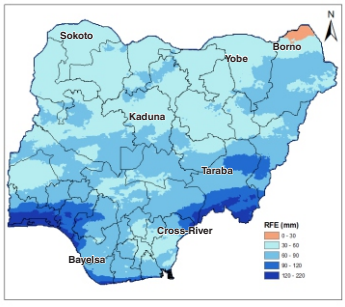

Figure 2a: Nigeria Rainfall Estimate- July, 2017 1st dekad (July 01-10)

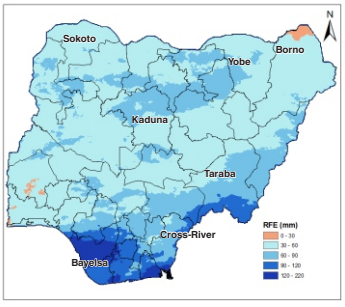

Figure 2b: Nigeria Rainfall Estimate- July, 2017 2nd dekad (July 11-20)

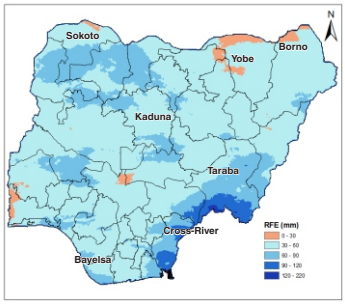

Figure 2c: Nigeria Rainfall Estimate- July, 2017 3rd dekad (July 21-31)

Nigeria RFE Anomalies (July, 2017)

Negative RFE anomalies were observed in parts of Ebonyi, Cross-River, Abia, Rivers and Imo States during the 1st dekad of July, 2017 (Figure 2a). In the 2nd dekad of the month (Figure 2b), negative deviations from long-term average RFE were observed in parts of Borno, Cross-River and most North-central States (Middle-Belt) of the country. Also, during the 3rd dekad (Figure 2c), most Nigerian States recorded negative RFE anomalies, including Rivers, Cross-River, Kogi, Jigawa, Bauchi and Borno States.

Generally, positive RFE anomalies were observed in Sokoto, Katsina, Niger and Kebbi States during the three dekads of July, 2017. The positive anomalies in these areas may improve vegetation development over an extensive period of time.

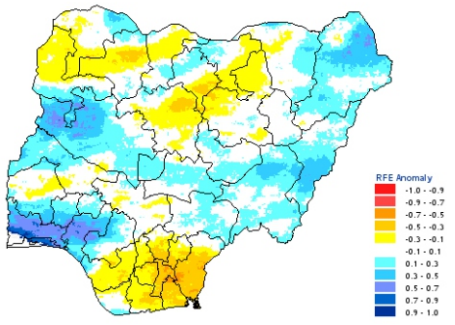

Figure 3a: Nigeria RFE Anomaly- July, 2017
1st dekad (July 01-10)

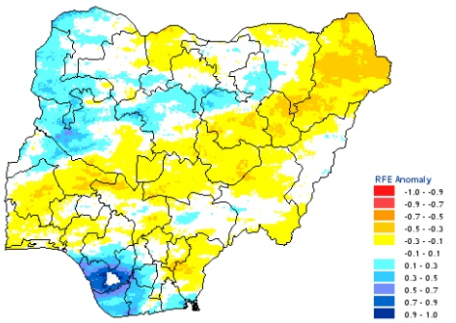

Figure 3b: Nigeria RFE Anomaly- July, 2017
2nd dekad (July 11-20)

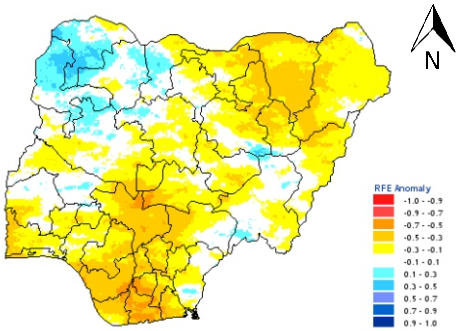

Figure 3c: Nigeria RFE Anomaly- July, 2017
3rd dekad (July 21-31)

Vegetation Development in Nigeria (July, 2017)

Analyses of satellite images (vegetation) for the month of July (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 Kwara, Kogi, Delta, and parts of Kaduna and Taraba States. These observations may also indicate good crop yield for the 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 Lagos, Bayelsa and Akwa-Ibom States also recorded significantly poor vegetation development compared to other states of the country. Upon overall assessment, healthy vegetation development during the month of July, 2017 was healthier around the Central (Middle-Belt) parts of Nigeria and places while above average greenness was also observed around the Lake Chad area and southern parts of Borno State.

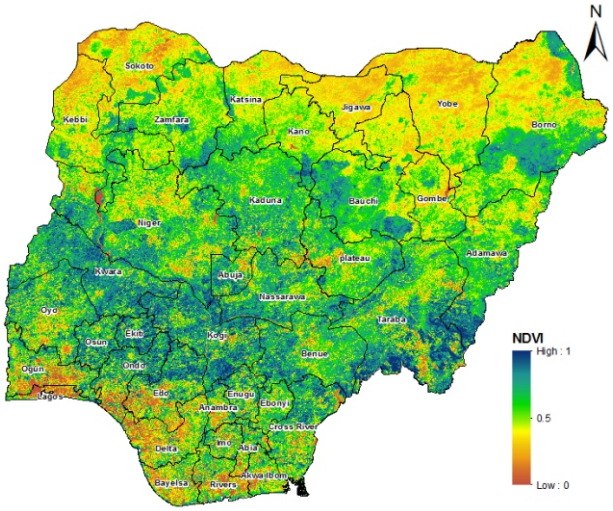

Figure 4: Nigeria NDVI (July, 2017)

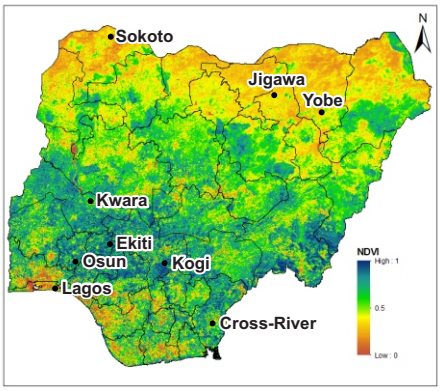

Figure 5a: NDVI of Nigeria- July, 2017
1st dekad (July 01-10)

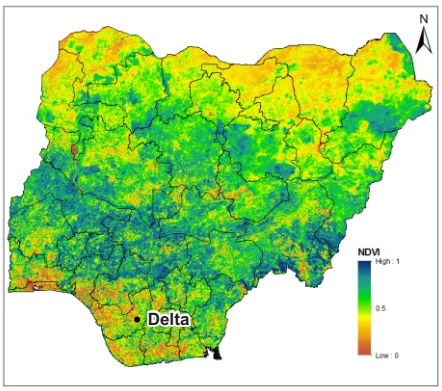

Figure 5b: NDVI of Nigeria- July, 2017
2nd dekad (July 11-20)

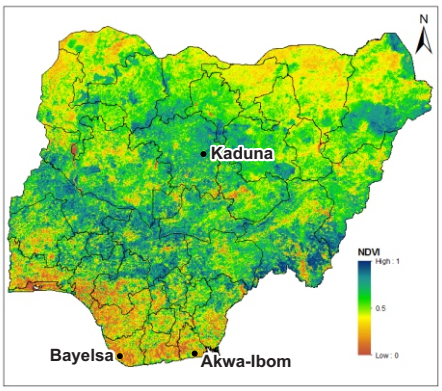

Figure 5c: NDVI of Nigeria- July, 2017
3rd dekad (July 21-31)

Anomalies in Nigeria NDVI (July, 2017)

According to statistics extracted from satellite images in time series, Lagos, Anambra, Edo and Ebonyi States recorded extreme negative anomalies in NDVI when compared to the long-term mean NDVI (2000 -2016) for the States during July, 2017. Parts of Taraba, Adamawa and Bauchi States in Northern Nigeria also experienced significant negative deviations from long-term average NDVI (Figures 6a-6c). Based on these observations, it is assumed that extended periods of negative mean NDVI anomalies may result in progressive drought in large parts of these areas, which will ultimately impact negatively on the expected yield of crops in cultivated lands over time.

The strongest positive NDVI anomalies during the month of July were observed in Bayelsa, Akwa-Ibom and Rivers States in South-south Nigeria. Also, areas around Lake Chad in Borno State in Northeastern Nigeria recorded significant increase in their mean NDVI anomalies. However, in the 3rd dekad of July, Osun, Katsina, Ekiti and Zamfara States also recorded highly positive anomalies in NDVI. 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- July, 2017
1st dekad (July 01-10)

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

Figure 6c: Nigeria NDVI Anomaly- July, 2017
3rd dekad (July 21-31)

Selected Areas of Extreme Anomalies (July, 2017)

(1) Anaocha Local Government Area, Anambra State

Analyses of long-term data (Figure 7) revealed that Anaocha Local Government Area of Anambra State recorded signigicant negative deviation from long-term average NDVI for the three dekads of July, 2017. This event could be attributed to the negative anomaly in RFE earlier observed for the area between April and May, 2017. This observation indicates a negative impact on the vegetation development of the area, according to the trend observed in generated NDVI curve. Also, rapid urbanization is another major factor that may negatively influence NDVI in the Local Government area, resulting in negative NDVI anomaly.

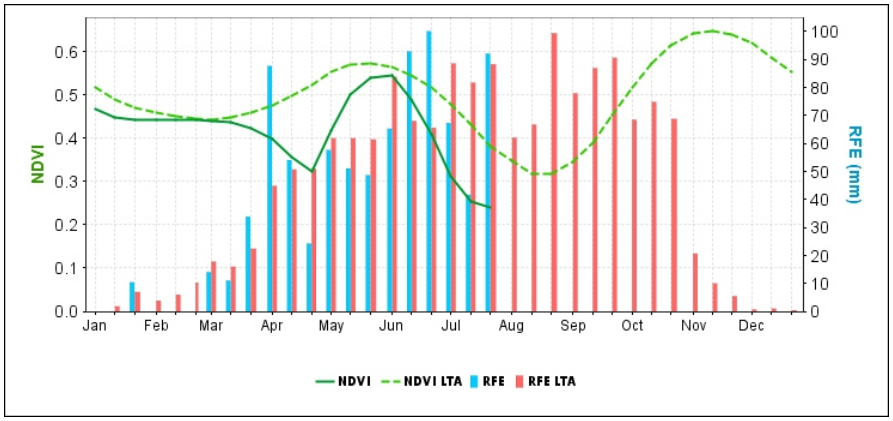

Figure 7: NDVI and RFE Anomalies of Anaocha LGA, Anambra, Nigeria

(2) Bama Local Government Area, Borno State

On the other hand, Bama Local Government Area of Borno 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 months of May and June, 2017. This observation is beneficial for long-term vegetation development of the Local Government Area which comprises of a vast forest expanse (Some parts of Sambisa Forest).

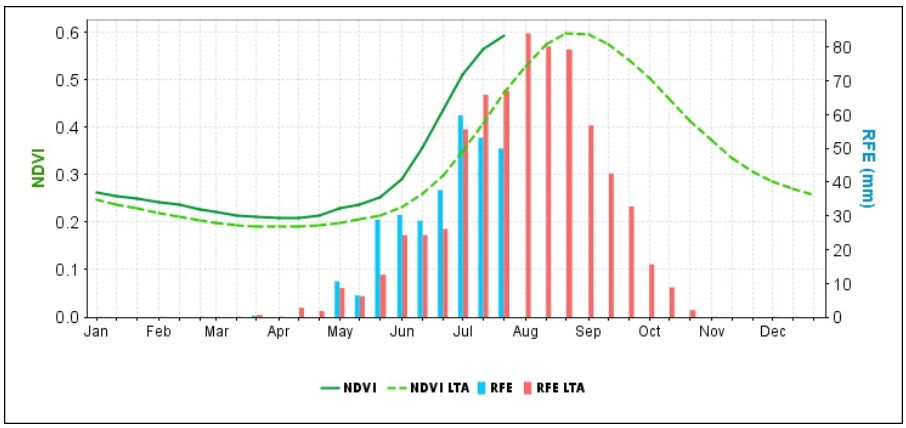

Figure 8: NDVI and RFE Anomalies of Bama LGA, Borno, Nigeria

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