

Analyzing the Changing Pattern of Nigerian Vegetation Zones and Its Ecological and Socio-Economic Implications Using Spot-Vegetation Sensor

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Abstract : This study assesses the major ecological zones in Nigeria with the view to understanding the spatial pattern of vegetation zones and the implications on conservation within the period of sixteen (16) years. Satellite images used for this study were acquired from the SPOT-VEGETATION between 1998 and 2013. The annual NDVI images selected for this study were derived from SPOT-4 sensor and were acquired within the same season (November) in order to reduce differences in spectral reflectance due to seasonal variations. The images were sliced into five classes based on literatures and knowledge of the area (i.e. 0.16 Non-Vegetated areas; $0.16-0.22$ Sahel Savannah; $0.22-0.40$ Sudan Savannah, $0.40-0.47$ Guinea Savannah and 0.47 Forest Zone). Classification of the 1998 and 2013 images into forested and non forested areas showed that forested area decrease from $511,691 \text{ km}^2$ in 1998 to $478,360 \text{ km}^2$ in 2013. Differencing change detection method was performed on 1998 and 2013 NDVI images to identify areas of ecological concern. The result shows that areas undergoing vegetation degradation covers an area of $73,062 \text{ km}^2$ while areas witnessing some form restoration cover an area of $86,315 \text{ km}^2$. The result also shows that there is a weak correlation between rainfall and the vegetation zones. The non-vegetated areas have a correlation coefficient (r) of 0.0088, Sahel Savannah belt 0.1988, Sudan Savannah belt -0.3343, Guinea Savannah belt 0.0328 and Forest belt 0.2635. The low correlation can be associated with the encroachment of the Sudan Savannah belt into the forest belt of South-eastern part of the country as revealed by the image analysis. The degradation of the forest vegetation is therefore responsible for the serious erosion problems witnessed in the South-east. The study recommends constant monitoring of vegetation and strict enforcement of environmental laws in the country.

Keywords : vegetation, NDVI, SPOT-vegetation, ecology, degradation

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