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The influence of tropical cyclones to the plant productivity indices along the coast of Tanzania

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The study investigated the influence of Tropical Cyclones (TCs) to the plant productivity indices along the coast of Tanzania using both field observations and change detection methods. The study used the 16 days MODIS 250×250 m, 8 days Landsat 7 ETM 30×30 m composites and 5 Landsat 8 (LC8) images, to determine the pattern of the inter-annual variability of the Normalized Difference Vegetation Index (NDVI) and Enhanced Vegetation Index (EVI) and TCs impacts on vegetation. Moreover, we used Tropical Rainfall Measuring Mission (TRMM) data and the daily to monthly rainfall data was from Tanzanian Meteorological Agency (TMA). Inter annual variability of EVI over Chwaka, Rufiji and Pugu-Kazimzumbwi; the changes of NDVI and EVI based on pre and post storm and monthly rainfall at the coastal stations were calculated, plotted and analyzed. The results revealed that, highest EVI values were observed during March and April and minimum values in November. The results for EVI changes based on pre and post storm revealed that most stations and most TCs gave significant EVI changes ranged from -0.05 to 0.19 and -0.3 to 0.22 for MODIS and L7 ETM data, respectively. The results of the spatial changes in NDVI revealed that, TCs (Besija and Fobane) were associated with NDVI enhancement of >0.51 and >0.31 and NDVI reduction of <0.02 and <-0.19 for Chwaka and Rufiji, respectively. Besides the results revealed that, TCs episodes have induced the water covered areas to be changed into vegetation covered especially over the shorelines and inter tidal areas. These results were consistent with the analysis of rainfall patterns which indicated that low rainfall occurred in low NDVI areas and vice versa.

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