ENVIRONMENTAL DYNAMICS IN MA OYA RIVER BASIN IN MONSOON SEASONS IN SRI LANKA

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Abstract: Ma Oya, a significant stream in Sri Lanka, is a cultural and ecological entity. The study aimed to describe the environmental dynamics in Ma Oya river basin, during the North-East Monsoon (NEM) and South-West Monsoon (SWM) seasons in 2017 and 2022. The study integrates key Remote Sensing (RS) indices such as Normalized Difference Vegetation Index (NDVI), and Land Surface Temperature (LST) from Landsat 08 and 09 satellite sources. This study explored the changes and relationships between these RS indices, to quantitatively monitor variations in critical environmental parameters during selected monsoon seasons. This investigation combines data from satellite sources and ground-based observations. Gross Biomass Water Productivity (GBWP) data were taken from the FAO Water Productivity Open-access portal (WaPOR). After calculating indices, statistical analyses were applied to explore the correlations, providing insights into the ecological dynamics. The study revealed robust correlations between VCI, NDVI, and LST, during both the NEM and SWM for the years 2017 and 2022. Notable differences were observed in mean LST and NDVI values during SWM, exemplified by a mean LST of 25.41°C in September 2022 and a mean NDVI of 0.44 in the same period, indicating high variations in temperature and vegetation health. The results revealed a negative correlation between the VCI and GBWP, indicating an inverse relationship between vegetation health and water productivity in the Ma Oya river basin. The study enhances understanding of environmental dynamics in the Ma Oya river basin by examining the connections between LST, NDVI, VCI, and GBWP. The VCI severity levels highlight the dynamic nature of drought conditions in the Ma Oya river basin, exhibiting significant fluctuations across categories during both the NEM and SWM for the years 2017 and 2022. The SWM showed distinct patterns, indicating more pronounced fluctuations in VCI levels compared to the NEM. The study highlights the variations in drought severity between monsoon seasons, providing insights into the connections between meteorological factors, vegetation health, and temperature. Limitations of this study, including lack of satellite data, which may impact the generalizability of the findings.

Keywords: LST; NDVI; VCI; GBWP