Spatial Variability of NDVI and LST in Colombo District, Sri Lanka

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Land surface temperature (LST) is a fundamental aspect of climate and biology, affecting organisms and ecosystems from local to global. National Aeronautics and Space Administration (NASA) and other international organizations have identified Land surface Temperature (LST) as one of the most essential Earth system data records for measuring thermal radiation from the Earth's surface, where incoming solar energy interacts and heats the soil or canopy surfaces in vegetated areas. With the Rapid Population growth, Urbanization, and Land Use changes, an increase can be detected in the LST in world's urban areas and Sri Lanka. This situation can be identified in Colombo District as the fastest growing area in Sri Lanka. This study mainly focused on analyzing LST spatial distribution changes with Normalized Difference Vegetation Index (NDVI) from Colombo city to suburbs in Sri Lanka. The Landsat 8 satellite data was downloaded from the USGS (United States Geological Survey) Earth Explorer website to calculate the NDVI and LST in Colombo District for the year 2015 and 2019. The Multiple Ring Buffer Tool in ArcGIS 10.1 software was used to create the 1km concentric rings from the CBD (Central Business District) and extracted the Average NDVI and LST values to the concentric rings using the Zonal Statistics tool. All analyses were carried out using ArcGIS 10.1 and MS Excel 2013 software. The results revealed that LST ranged between 34.53 ^{0}C and 23.10 ^{0}C and had an Average value of 26.39 ^{0}C in 2015. In 2019 Average LST was 27.22 ^{0}C, while LST ranged between 35.95 ^{0}C and 23.14 ^{0}C. Furthermore, it can notify the average LST values were increasing and the average NDVI values were decreasing when moving away from the CBD in 2019 more than in 2015. This kind of study enables us to measure current situations and identify past situations and patterns of LST in urban areas. It has the potential to forecast future LST changes. It enables us to take long-term action on potential problems in the future and find answers to potential problems in the future.

Keywords: *Land Surface Temperature, Normalized Difference Vegetation Index, Land Use Change, Concentric Rings*