

**ANALYSING CHANGES  
OF WETLAND COMPONENTS USING GEOSPATIAL TECHNIQUES:  
A CASE OF SRI JAYEWARDENEPURA KOTTE  
WETLAND COMPLEX, SRI LANKA**

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The Sri Jayewardenepura Kotte Wetlands Complex is a distinct urban wetland in the Colombo region. Due to rapid development and population growth in the region, wetlands are losing their components and becoming a terrestrial landscape. GIS and RS technologies provide an excellent platform for investigating changes in the above features. Since there are not many studies on this subject, the study uses NDVI, NDWI, and NDMI to examine how wetland vegetation, moisture, and water content changed between 1997 and 2023. The research used primary data, including field observations and interviews with village officials, and secondary data sources, including previous studies, satellite imagery, books, and articles. The satellite imagery study used Landsat 5 images from 1997, 2005, and 2008, as well as Landsat 8 images from 2017 and 2023. To better understand the variability of the data, the indicators were reclassified using the mean and standard deviation into three groups: low (mean-standard deviation), moderate (between low and high), or high (mean + standard deviation). The image difference technique was used to detect pixel-wise changes in wetland components in reclassified images. Based on the results, the NDVI value range was -0.384 to 0.735 in the study area in 1997, which changed from -0.001 to 0.437 in 2023. Similarly, the NDWI value ranged from -0.366 to 0.740 in 1997, which varied between -0.379 and 0.049 in 2023. The NDMI value range was -0.428 to 0.5 in 1997, which reduced to -0.101 to 0.315 in 2023. The study area's low category saw the highest percentage of NDVI, NDWI, and NDMI due to land encroachment for urban expansion. According to the change detection analysis, the total change from the high to low conversion category was shown by the NDVI at 2.31 Km<sup>2</sup> (6.46%), the total change from the NDWI at 1.20 Km<sup>2</sup> (3.36%), and the total change from the NDMI at 3.05 Km<sup>2</sup> (8.52%). The study underscores the concerned parties taking additional steps to strengthen conservation of wetlands.

**Keywords:** Change detection, NDVI, NDWI, NDMI, wetland components