

(ID 179)**Land Cover Change Detection Using Geo-Spatial Technologies: A Spatio-Temporal Study on Muthurajawela Marsh-Negombo Lagoon Wetland Complex****Ashali, B.G.K.**

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Abstract

Biodiversity conservation and management encompass protecting Earth's life diversity including species and ecosystems. Conservation efforts involve protecting endangered species and maintaining healthy ecosystems. Muthurajawela Wetland is one of the listed Ramsar sites of Sri Lanka which contains a rich biodiversity and productive ecosystem. Currently, this valuable landscape undergoes a radical change of its form over decades. Therefore, this study aimed to examine land cover changes in this wetland complex over three decades using satellite imagery. For in-depth change detection analysis, both pre-classification and post-classification land cover/use methods were used to assess changes from 1997 to 2023. The study of the Muthurajawela marsh-Negombo lagoon wetland complex used per-classification methods like Normalized Difference Vegetation/Water Indices (NDVI/NDWI) to identify vegetation and water bodies. The Maximum Likelihood Supervised Classification (MLSC) technique categorized the land cover into classes, water, marshland, settlements, vegetation, and barren land. To ensure accuracy, statistical methods such as Confusion Matrix was applied for each land cover class. Furthermore, a detailed post-classification analysis was conducted through Thematic Change Detection, which compared historical changes in land classes to their current status. Thematic Change analysis helped to assess and visualize the changes in each land class over time in relation to the present conditions on the ground. Change detection analysis illustrated that, about 46% land cover of total study has been converted from one land class to another over 3 decades. In 1997, highland vegetation of agriculture, forests, and marshy areas covered 41% of total land while Built-up areas comprised 18% of the land, with agriculture being more prevalent than construction. By 2023, there have been significant changes. Built-up areas make up 38% of the land due to the development of settlements, construction activities and the Katunayake highway project. The study shows a decrease in vegetation and marshland to 6%, possibly due to deforestation. In 2023, bare lands increased due to land reclamation and garbage dumping in the wetland complex. 90% of deep-water areas converted into shallow water. 28.35 km² of deep-water bodies degraded. Prawn farming also contributed to mangrove destruction in the Negombo lagoon. The study emphasizes the need for sustainable management of valuable ecosystems and eco-friendly human approaches to mitigate wetland degradation.

Keywords: Change detection, Land cover, Muthurajawela marsh, Negombo Lagoon, Wetland