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SPATIAL AND TEMPORAL ANALYSIS OF LAND USE CHANGE AND ITS SOCIO–ENVIRONMENTAL IMPACTS IN THE WELIMADA DIVISIONAL SECRETARIAT DIVISION, SRI LANKA (2005-2025)

H.M.A. Priyadarshanie* and D.L.N.P. Liyanage

Department of Geography and Environmental Management,
Sabaragamuwa University of Sri Lanka, Belihuloya, Sri Lanka
**anomaherath481@gmail.com*

Land-use change is evident in the urbanization of areas in Sri Lanka, and it has different impacts on local communities. The study focuses on the spatial and temporal land-use changes and impacts within the Welimada Divisional Secretariat Division (DSD) in Sri Lanka from 2005 to 2025. The study used both primary and secondary data sources: an interview survey with 30 respondents selected across three Grama Niladhari (GN) divisions; governmental reports; previous research reports; and Landsat 5 and 8 satellite imagery (2005-2025). Using interview data, the analysis employed thematic analysis to identify the socio–environmental impacts and the major challenges of land-use changes. Normalized Difference Vegetation Index (NDVI) analysis was used to identify spatial and temporal land-use changes, and Spearman's correlation analysis was also used to assess the relationship between land use and socio–environmental impacts. The findings revealed that the forest cover decreased continuously from 50.43% in 2005 to 37.59% in 2025. Further, the share of developed land increased substantially from 2.45% to 15.46%, reflecting rapid urbanization and infrastructure expansion within the study area. There were noticeable positive socio–environmental impacts, such as improvements in livelihoods, infrastructure development, urban growth, and settlement expansion. Negative impacts include loss of traditional livelihoods, population pressure, resource competition, loss of forests and biodiversity, climate variability, and declines in vegetation health. The correlation analysis confirmed a strong positive relationship ($\rho = 0.866$) between land-use changes and their impacts. Sustainable land management strategies, environmental conservation programs, and proper policy implementation are essential to minimize environmental degradation and ensure balanced regional development within the study area.

Keywords: Land use changes, NDVI, Socio-environmental impacts, Welimada