

ASSESSING THE IMPACT OF LAND COVER CHANGES ON LAND SURFACE TEMPERATURE IN *MALWATHU OYA* RIVER BASIN

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The *Malwathu Oya* river basin, a vital ecological and socio-economic unit in Sri Lanka, faces significant challenges stemming from rapid land cover changes and their impacts on land surface temperature (LST). This study assessed the implications of these changes on ecosystem health and human well-being, for 1994, 2007, and 2021. Analysis revealed fluctuations in LST over time, with mean temperatures increasing from 23.27°C in 1994 to 24.96°C in 2021. Change detection analysis highlighted forest loss rates of 9% between 1997–2007 and 15% between 2007–2021, suggesting the urgency of forest conservation efforts. Linear regression analysis revealed significant ($p < 0.001$) relationships between LST and land cover dynamics in the area across all years. Contrastingly, analysing LST by forest and non-forest classes separately revealed distinct estimates, with forested areas consistently exhibiting lower coefficients compared to non-forested regions, highlighting the impact of land cover on temperature dynamics within this river basin. The NDVI, NDWI, and NDBI values offer valuable insights into vegetation health, water content, and built-up areas impacting LST dynamics. The negative correlation observed between NDVI and LST in 2021 suggests a potential cooling effect from healthier vegetation. The significant positive correlation between NDWI and NDBI with LST emphasized the substantial influence of water content in urbanization and built-up areas on temperature dynamics within the region. Recommendations include integrating remote sensing and ground-based observations for comprehensive monitoring, adopting sustainable land management practices, and continuous monitoring to inform land use planning and climate change adaptation efforts. Further, this study showcases the importance of LST and land cover dynamics for sustainable development and ecosystem resilience. In conclusion, the findings emphasize the urgent need for targeted conservation measures and sustainable land management practices to mitigate the adverse effects of land cover changes on ecosystem health and human well-being.

Keywords: Change detection, Correlation, Land cover dynamics