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Spatio-temporal analysis of two decadal (2000 – 2020) landcover changes and spectral indices assessment for major Southeast Asian urban clusters

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The world is urbanizing at an unprecedented rate, with the United Nations projecting that 68% of the world's population will be living in urban areas by 2050. In Southeast Asia (SEA) region, it is expected that 47% of the population will live in urban areas by 2025. Urbanization patterns in this region are generally associated with rapid population growth, economic development and competing demands for land. SEA is also a hotspot of tropical deforestation due to rapid urbanization, resulting in detrimental impacts to the environment and associated ecosystem services. For example, changes in vegetation due to land use/ land cover (LULC) change impact the thermal environment. The objectives of this study are to i) calculate the land cover changes between 2000 and 2020 for 20 major SEA urban clusters; ii) characterise the change in urban form within SEA urban clusters via landscape metrics used at the neighbourhood-scale; iii) determine the relationship between landscape metrics and urban heat measured by LST; and iv) determine the relationship between landscape metrics and vegetation indices such as NDVI and EVI. Documenting the LULC transitions (2000 – 2020) and the associated impacts on urban heat and vegetation changes can help inform policy, sustainable land management and ecosystem services management using Nature based Solutions. We discuss the results per country, contrasting results for major cities and secondary cities, which show different changes in landscape.