Spatial Analysis of Urban Heat Islands and Land Use Strategies in Kathmandu Valley: A Green Development Approach

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SUMMARY

With the rise of urbanization, impervious pavements and buildings have increased, which has brought about changes to weather conditions and contributed to the Urban Heat Island (UHI) effects. The aim of this study was to create a decadal heat map for Kathmandu Valley for October 2000, 2010, and 2023, integrating Land Surface Temperature (LST), vegetation health (NDVI), land use and land cover (LULC), topography (DEM), population density, and Anthropogenic Heat Flux (AHF). This paper provides a detailed procedure of prioritizing these six factors using the Analytical Hierarchy Process (AHP) to identify UHI hotspots and offer possible mitigation strategies for different places in urban areas. Decadal growth pattern shows an increment in the heat island effect as built-up areas increase and the loss of agricultural land. The result also shows the agglomeration of heat island effect centers around major traditional settlements, reflecting dense urbanization. These hotspots need intervention on an individual and policy level with mitigating strategies like rain gardens, rooftop gardens and cool reflective roofs, and riverbank afforestation, floodplain restoration and permeable pavements respectively.