Analysis of the Land Surface Temperature Pattern in Kathmandu, Nepal, Using Remote Sensing and GIS.

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Land surface temperature (LST) is a striking parameter to detect urban environmental changes. In this study, we assess mean LST distribution pattern in the Kathmandu metropolitan area, Nepal, spatially and temporally based on Landsat standard terrain correction images, TM in 2001 and OLI /TIRS in 2013. Land use and land cover (LULC) were classified primarily into six categories. Then by reclassifying into two categories, we conducted a cross cover comparison. The spatial formation of LST was investigated along the eight directions from the city center. Density maps were generated using the 210m * 210m urban-rural gradient grid. The dramatic expansion of 1.23 percent of annual growth in impervious surface (IS) and, on the contrary, -0.99 percent annual decline in green space (GS) 2 was detected. A considerable correlation between impervious surface density and mean LST was observed in bivariate correlation analysis in 2001. The inverse relationship between green space density and mean LST (R = -0.589) was found in 2013. In the cross cover comparison, the IS-GS total was 0.687 ℃ mean LST, between 2001- 2013. Possible adaptation and mitigation measures should be implemented to achieve a sustainable, safe and resilient mountain city due to the evidence of accelerating the UHI effect in Kathmandu.

Keywords: Kathmandu, urban heat island, land surface temperature pattern, land use change, urban –rural gradient

