

Evaluating the Impact of Expansion on Urban Thermal Surroundings: A Case Study of Lahore Metropolitan City, Pakistan

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Abstract : Urbanization directly affects the existing infrastructure, landscape modification, environmental contamination, and traffic pollution, especially if there is a lack of urban planning. Recently, the rapid urban sprawl has resulted in less developed green areas and has devastating environmental consequences. This study was aimed to study the past urban expansion rates and measure LST from satellite data. The land use land cover (LULC) maps of years 1996, 2010, 2013, and 2017 were generated using landsat satellite images. Four main classes, i.e., water, urban, bare land, and vegetation, were identified using unsupervised classification with iterative self-organizing data analysis (isodata) technique. The LST from satellite thermal data can be derived from different procedures: atmospheric, radiometric calibrations and surface emissivity corrections, classification of spatial changeability in land-cover. Different methods and formulas were used in the algorithm that successfully retrieves the land surface temperature to help us study the thermal environment of the ground surface. To verify the algorithm, the land surface temperature and the near-air temperature were compared. The results showed that, From 1996-2017, urban areas increased to about a considerable increase of about 48%. Few areas of the city also shown in a reduction in LST from the year 1996-2017 that actually began their transitional phase from rural to urban LULC. The mean temperature of the city increased averagely about 1°C each year in the month of October. The green and vegetative areas witnessed a decrease in the area while a higher number of pixels increased in urban class.

Keywords : LST, LULC, isodata, urbanization

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