

The study of Heat Island and its relation with Urbanization in Gurugram, Delhi NCR for the period of 1989 to 2018

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Abstract: Rapid growth in population and land cover makes urban areas more vulnerable to Urban Heat Island. Due to which, cities experience higher mean temperature than its proximate surrounding rural or non-urban area. The relationship between UHI and urbanization is proven in previous studies. Delhi the capital city of India is well known for its extreme heat condition in summer and air pollution. In this study, an attempt has been made to understand UHI behavior in a satellite town of Delhi. Satellite town or cities are the small independent towns built in the vicinity of a large city or metropolitan city. In this study, out of 4 major satellite towns of Delhi, i.e. Gurugram (name changed from Gurgaon in April 2016), Noida, Faridabad and Ghaziabad. Gurugram was chosen based on parameters like rate of urban expansion, population density, GDP growth and increasing temperature in past two decades. Gurugram has undergone a major growth journey from being a small town to ‘The Millennium city’ of the country in a short span. The Landsat images of past three decades ranging from different time period i.e. 1989, 1996, 2002, 2009, 2014 and 2018 were investigated by applying integrated approach of GIS and Remote sensing. The images represent the condition of UHI and urbanisation in different period. The temporal change in LULC was used to study the rate of urban growth in last three decades. The results showed the increase in built-up area out of the total area of Gurugram from 7.28% (i.e. 34 sq. km) in 1989 to 17.25 % (80.5 sq. km) in 2002 which further increased to 45.1% (210.4 sq. km) in 2018. Thermal Infrared band of Landsat series were used to retrieve land surface temperature (LST) intensity of the study period. The results show a positive correlation between impervious surfaces and LST. The UHI hotspots in the city were identified using hotspot analysis. The results of the study could be helpful in identifying the causative factors and level of impacts in different zones and also enable us to develop a mitigation strategy based on spatial decision support system.

Keywords: Satellite town, Urban Heat Island (UHI), Urbanization, Hotspot analysis, Delhi