

Temporal Transformation of Built-up Area and its Impact on Urban Flooding in Hyderabad, India

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Abstract : In recent years, the frequency and intensity of urban floods have increased due to climate change all over the world provoking a significant loss in terms of human lives and property. This study investigates the effect of Land Use and Land Cover (LULC) changes and population growth on the urban environmental conditions in the Indian metropolitan city namely Hyderabad. The centennial built-up area data have been downloaded from the Global Human Settlement Layer (GHSL) web portal for various periods (1975 to 2014). The ArcGIS version 10.8 software is employed to convert the GHSL data into shape files and also to calculate the amount of built-up area in the study locations. The decadal population data are obtained from the Census from 1971 to 2011 and forecasted for the required years (1975 and 2014) utilizing the Geometric Increase Method. Next, the analysis has been carried out with respect to the increase in population and the corresponding rise in the built-up area. Further the effects of extreme rainfall events, which exacerbate urban flooding have also been reviewed. Results demonstrate that the population growth was the primary cause of the increase in impervious surfaces in the urban regions. It in turn leads to the intensification of surface runoff and thereby leads to Urban flooding. The built-up area has been doubled from 1975 to 2014 and the population growth has been observed between 109.24% to 400% for the past four decades (1971 to 2014) in the study area (Hyderabad). Overall, this study provides the hindsight on the current urban flooding scenarios, and the findings of this study can be used in the future planning of cities.

Keywords : urban LULC change, urban flooding, GHSL built-up data, climate change, ArcGIS

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