

Change Detection of Water Bodies in Dhaka City: An Analysis Using Geographic Information System and Remote Sensing

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Abstract : Since the late 1900s, unplanned and rapid urbanization processes have drastically altered the land, reduced water bodies, and decreased vegetation cover in the capital city of Bangladesh, Dhaka. The capitalist modes of urbanization results in the encroachment of the surface water bodies in this city. The main goal of this study is to investigate the change detection of water bodies in Dhaka city, analyzing spatial distribution of water bodies and calculating the changing rate of it. This effort aims to influence public policy for environmental justice initiatives around protecting water bodies for ensuring proper function of the urban ecosystem. This study accomplishes research goal by compiling satellite imageries into GIS software to understand the changes of water bodies in Dhaka city. The work focuses on the late 20th century to early 21st century to analyze this city before and after major infrastructural changes occurred in unplanned manner. The land use of the study area has been classified into four categories, and the areas of the different land use have been calculated using MS Excel and SPSS. The results reveal that the urbanization expanded from central to northern part and major encroachment occurred at the western and eastern part of the city. It has also been found that, in 1988, the total area of water bodies was 8935.38 hectares, and it gradually decreased, and in 1998, 2008, 2017, the total areas of water bodies reached 6065.73, 4853.32, 2077.56 hectares, respectively. Rapid population growth, unplanned urbanization, and industrialization have generated pressure to change the land use pattern in Dhaka city. These expansion processes are engulfing wetland, water bodies, and vegetation cover without considering environmental impact. In order to regain the wetland and surface water bodies, the concern authorities must implement laws and act as a legal instrument in this regard and take action against the violators of it. This research is the synthesis of time series data that provides a complete picture of the water body's status of Dhaka city that might help to make plans and policies for water body conservation.

Keywords : ecosystem, GIS, industrialization, land use, remote sensing, urbanization

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