

Abstract

Urban flooding is one of the disasters which turned into a grave issue for the cities of both developed and developing countries of the world. The process of haphazard and rapid urbanization has aggravated this issue. Lahore Metropolitan Area (LMA) is one of the developed cities of Pakistan, but unfortunately during Monsoon rainfall its drains become insufficient to cope with excessive runoff created by extensive events of rainfall. Increased impervious surfaces have exerted great pressure on existing drainage system of the said area. This research is dealing with evaluation and impact assessment of existing drains of LMA in relation with meteorological variables. Urban flooding is an ultimate result of the drainage network failure and excessive rainwater runoff due to increased impervious surfaces in the city. Initially land use map was digitized in this research in order to figure out trend of urban growth so that further remedial strategies would be designed. Digital map of existing drainage system was generated by using GIS technique. Thiessen polygon analysis was performed on sore points, and extent of inundation in specific spatial locations was shown with a distinctive polygon. To assess the impact of existing drains first 30M resolution re-classified Digital Elevation Model (DEM) of LMA was used to show natural slope of the area, which is towards south-west. Further DEM had been used as input data source in Arc Hydro where drainage and geometric network delineated from raster data and then attribute data has been assigned to it. All these analysis were conducted in ArcGIS 9.3. Overlay analysis of existing drainage network and delineated drainage network through DEM of the research area has identified the contrast, that existing coping system of pump stations for managing storm/rain water is not according to natural slope of the study area. To make it more efficient and cost-effective, locations have been highlighted with drainage area centroid feature class in proposed areas for future pump stations. In addition to this, more strategies i.e. Best Management Practices (BMPs) both structural and non-structural have been suggested to be adopted in order to reduce the disastrous impact of urban flooding. Government must focus on adopting other cost-effective management strategies for storm/rain water to make LMA resilient and sustainable city.