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Impact of Urbanization Development on Increase in Peak Flow Discharges and Flood Damages in the Last Half Century Using RS and GIS (Case Study: Tehran Region 22)

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Introduction

Changes in land use and urban development has led to the emergence of a growing problem in urban hydrology and in most cases, increased peak discharge and flood volume is associated. District 22, IS one of the largest urban areas, that is located in the vicinity of Kan and Vardij watersheds. The rapid rise of urbanization and the development of impermeable surfaces, have doubled the risk of flooding in the region. In this study because of flooding is importance in district 22 of Tehran Municipality, the impact of urban development and the creation of new towns on peak flow; estimated flood damage in recently decades, and finally are expressed Management practices to reduce damage caused by this phenomenon.

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Material and Methods

In this study, using geographic information system (GIS) and with the help of image (ETM), Land sat, maps and information was gathered and then the maximum discharge current three methods of statistical distribution, curve number (SCS) and the argument was estimated and the role of urban development in an increase in the maximum discharge was investigated.

Discussion and Conclusions

Assuming this study was conducted in two stages. In the first stage calculated the peak flood discharge in the region with using three methods of statistical distributions, SCS and reasoning, that SCS method has the lowest error. In the next step is estimated the damage caused by flood through questionnaires in 50 years. In order to estimate flood damage in 50 years, Statistics floods were obtaining from Forests, Range and Watershed Management Organization and preparing the questionnaire and were Price in today's rate, Then Determine damages; According to floods that happen, estimated damage About 7155000000 real. Compare the results of the peak discharge of district 22 and Kan, Vardij watershed area shows; In return period of 2 years, peak flood in urban areas was 6.2 times and in the return period of 5 years, was 1/55 times, and in return period is 10 years was 1/11 times that was more than Kan watershed. This result shows; urbanization and increased impermeable peak flow and flood volume.

Conclusions

According to urban development and the increase of impervious surfaces in District 22 of Tehran Municipality, runoff and flooding in urban areas to create a more structured and the more sensitive area against floods is small compared to the great floods. In conjunction with this problem, although the executive proposals require careful and detailed studies and research, but the results are as stressed, The

attention and respect that can lead to improved soil infiltration and reduce CN and consequently reduce runoff, Such as rivers and lack of attention to privacy in the context of unprincipled manipulation (such as the construction of the rivers, use sand, reducing the width of the bed in the implementation of urban projects, etc.) cited, The failure to observe these precautions can reduce the transmission rate, changes in roughness and slope of the ground, increasing the flow rate and the changes that will be lost. It can also develop residential users as possible be avoided with regard to the development of zone 22 as the settlements and the importance of green space, increase green space for trees proposed to the increased green space to reduce runoff and CN also be effective. The benchmarking of nature and culture of native species in urban stream and river valleys can also be effective in managing urban runoff. It also requires attention to problems of mixing water and wastewater sewage treatment occur within the transmission system, The network collects surface water drainage system is designed separately, and in the major centers in collaboration with relevant organizations identify pollution; Management in this section can be applied to reduce surface runoff pollution.