## Abstract

The stability or variability of runoff regime can be indicative of different processes such as climate fluctuations, land use changes and or due to water resources management methods. Thus, watershed characteristics, because of its effects on hydrological cycle are of important role and can cause intensive impacts on hydrological response of watershed. In this research, effects of land use changes on peak flood discharge and flood volume have been studied by using HEC-HMS model and GIS. For this purpose, hydrological response of Shaeikh Besharat dam basin to different scenarios of land use was predicted by using HEC-HMS model on the basis of the land use maps for the years of 1980 and 2000. In this study, the SCS CN Method in HEC-HMS model was employed for simulating direct surface runoff from 2 storm events for the model calibration and one storm event for validation. The results showed the existence of increasing trends in peak flood flow and flood volume owing to land use changes and rangeland degradation of Sheikh Besharat dam basin. Moreover, it was characterized that by increasing flood return period, vegetation effects reduce and role of vegetation on reduction of floods with high return periods is minimized. The results obtained from flood hydrograph prediction under optimistic land use scenarios (vegetation degradation trend) and pessimistic land use scenarios (vegetation restoration), indicate that assuming a continuing degradation trend of rangelands and development of dry-farming lands of the basin, peak flood flow will increase. The conducted sensitivity analysis of peak flood flow to spatial varaiations of curve number (CN) in the subwatersheds of the study area shows that the subwatershed No.4 has high potential for occuring flood with having high priority in order to perform flood control meaures. This research highlights that combining GIS and hydrological models can be used to simualte land use change effects and vegetation on flood regime of watersheds for efficient flood management.

**Keywords**: Rainfall-Runoff, land use change, HEC-HMS model, Sheik Besharat dam basin

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# Study of Land Use Change Effects on Flood Hydrograph of Shaikh Besharat Dam Basin Using HEC-HMS Model

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