Assessment of watershed management implemented on springal peak flood discharge and flood volume, using HEC-HMS model (case study: Kushk Abad sub-basin in Iran)

ABSTRACT

Assessment of watershed management operation is one of the main subjects for future planning of practical projects and natural resources management. Flood Damage is one of the most important problems in countries same Iran, which is mostly, affected most parts of the country and caused hazards. Therefore, identification of the area with high potential risk of flood occurrence is the main purpose in order to the flood control and reducing its damages. Due to the lack of any tool for assessment of watershed processes in many cases, distributed hydrological models can be useful. The indicator watershed of Kushk-Abad Basin as the study area in Khorasan province of Iran divided to 6 sub-basins which was processed geometrically using GIS and HEC-HMS extension. With using HEC-HMS model and emission of individual repetition of the sub-basins, the homogenous flood hydrographs have gained in relation to the recorded precipitation calculated for different sub-basins. For this purpose, first by considering observed events, HEC-HMS model was optimized and calibrated. Then, for evaluating the effects of check dams on time of concentration, it was optimized and calibrated. Then, for evaluating the effects of check dams on time of concentration, it was calculated before and after of check damøs construction by use of field observations and vegetation cover improvement was also estimated after the project. These parameters were imported to HEC-HMS to find out the effects of watershed practices and then flooding condition was simulated. For assessment purposes, peak discharche and flood volume were calculated for before and after construction conditions. Results showed that check dams as mechanical measures had low effect on time of concentration while biological practices lead to decease in curve number with an average value of 4.5. This result in decrease of peak flow and flood volume meanly 19% and 14%, respectively.

Keyword: HEC-HMS model- SCS method; GIS; Rainfall-runoff; Kushk-Abad Basin, Iran