

## **Evaluation of Rainfall Effects on Flood Hydrograph Using HEC-HMS and WEAP Models: in Mashin Watershed-Khuzestan**

### **Abstract**

Rainfall-runoff simulation process has spatial importance on water resources management, river engineering, control structures and etc. in the basin catchment area. Reaction to the phenomenon of basin rainfall is very complex because of various hydrological factors. Runoff depends to geomorphologic basin properties such as geometry, vegetation, soil type and climatic basin characteristics such as rainfall, temperature, etc. Each of these factors influence on the runoff production is completely non-uniform. Many models have been proposed for simulation process as yet. On the other hand, many of these models have a complex structure. So a large part of the hydrological researches is dedicated to calibrate these models.

In this study, three models of Soil Conservation Service (SCS), Soil moisture accounting (HEC-HMS) and Soil moisture accounting (WEAP) compared in rainfall-runoff process simulation. For this study the Rud Zard basin data in the east Khuzestan province have been used. The basin has 860.75 square kilometers area and 3 percent average slope and located in southwestern Iran in the Zagros Mountains between 49 degrees and 25 minutes to 50 degrees and 5 minutes easting, and 31 degrees 23 minutes to 31 degrees 42 minutes Northing. For comparison three models, simulated and actual hydrographs on value of runoff volume and peak discharge were compared and fourth statistics analysis including Mean Relative Error, Coefficient of Reminded Mass, Relative Root Mean Square Error and adaptation index (d) on the results of models has done.

This study showed hydrographs resume from Soil Moisture Accounting model (HEC-HMS) was more accurate, especially in long-term rainfall. The results also showed Soil Conservation Serves model has acceptable accuracy in the short-term rainfall, but by increasing rainfall duration, method accuracy decrease. The result of these studies also has shown the inefficacy of the Soil Moisture Accounting model (WEAP) in the flood basin simulating than the other two models.

**Keywords:** Rainfall-Runoff Model, SCS Model, Soil Moisture Accounting Model, HEC-HMS, WEAP, Zard River Basin



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