The Role of Sub-basins Overlooking the City in the
Occurrence of Urban Floods in Izeh (Khuzestan)

Maryam Rashidi *, Mohammad Mahdi Hosseinzadeh b*

* PhD Candidate in Geomorphology, Physical Geography Department, Faculty of Earth Sciences, Shahid Beheshti University, Tehran, Iran
b* Associate Professor, Physical Geography Department, Faculty of Earth Sciences, Shahid Beheshti University, Tehran, Iran

Received: 31 January 2019
Accepted: 25 June 2019

1 Introduction
Among all natural disasters, floods are the most frequent and affect the highest number of people. Flood risk is particularly severe in urban areas. Improving urban flood risk management has become a high priority at virtually all levels of governance. The proper design and evaluation of measures to enhance urban flood resilience should be based on the analysis of a range of scenarios, in which various hydro meteorological conditions and management options are tested. Human activities in various forms have increased the flood events probability. These include: location of Iran's villages and cities in Foothills, destruction of vegetation, not respecting river privacy, excessive construction along the rivers, agriculture on the riverside and etc. Therefore, the risk of flood is very high in urban areas. Urbanization also aggravates floods by increasing the amount of impermeable surfaces and redirect water flow. To describe the watershed hydrologic behavior, models for the calculation of runoff volume from rainfall. The curve number in comparison to other factors has the most impact on peak flow during various return periods. However, the rainfall volume has a great effect on peak flow and the intensity of this effect will increase by increasing the curve number.

2 Material and Methods
The study area is located between 31° 51’ N to 31° 58’ N latitudes and 49° 46’ E to 49° 56’ E longitudes. The catchment study area is located in southwest of Izeh city that consists of three sub-basins: Sheykhan, Alakah and Tape-Shohada. Using the digital elevation model (12.5 m resolution), the boundary of watersheds and drainage system were extracted in WMS software environment. Land use map of the region was prepared, using Landsat Satellite Images. Then, field assessment in the region was done to measure cross sections, current velocity, and river slope and to determine the area affected by flooding in the rainy seasons. Furthermore, sediment sampling to identify soil texture was done aiming at characterizing soil hydrologic group. Curved number

* Corresponding author: Mohammad Mahdi Hosseinzadeh E-mail: m_hoseynzadeh@sbu.ac.ir Tel:+98911139732
layer (CN) was prepared using soil characteristics, land use, and soil moisture conditions. Moreover, peak flow values and its duration for various return periods were measured using SCS Flood Calculator software and the data consists of basin extent, average of precipitation and its duration, curve number, river length and slope. To evaluate flooding of urban channels we prepared cross section profile, channel geometry parameters and hydrological features of each sections such as current velocity and discharge. Then, we used from Ghahreman and Abkhezr method (2004) to calculate the amount of rainfall intensity-duration in various return periods.

3 Results and Discussion
Based on the data obtained from the sub-basins, the curve number values were calculated and was prepared the curve number map. Based on maps prepared, most sub-basin area especially upstream of the basin have the highest curve number and the least permeability because the Asmari Formation and rock outcropping. Then, there are built-up areas and impenetrable surfaces, such as roads with a curve number of 87. Based on Ghahreman method in varies rainfall intensities, the expected amount of precipitation is calculated and intensities consistent with basin concentration time (30 to 120 minutes) were selected. In the following at the intensity of 30, 60 and 120 minutes, maximum precipitation volume was calculated in 2, 5, 10, 20, 50 and 100 return periods.

4 Conclusion
The intensity and duration of precipitation during different return periods were used to investigate the flood potential in upstream catchments of Izeh city. The results showed that Shahda Tapeh basin had the highest water withdrawal at the entrance reaches to the city. As a result, it has the most impact on flooding the streets and creating floods in Izeh City.
In the second place, Elahak basin has the most effect on the flood in Izeh City, because the topographic slope of the area is high, also the channel was changed regardless of the hydrological parameters. Sheikhan Basin has the most negative impacts from flood damage on agricultural land because it is more distant from the city. The main causes of flooding in Izeh are: Change the natural channel of the river to artificial channels without considering the volume of inlet water, not increasing the width and depth of the channel at the city entrance (from upstream to downstream) and creating inappropriate transverse structures on the channel. Another reason for the increase in flood potential is the loss of the drainage network around the city; because the city has expanded. Also, alluvial fan cones between the city and the mountain were changed and converted into a city. Whereas in the past, alluvial fans have been used for flood spreading.

Keywords: Curve Number, Rainfall-Runoff, Urban Flood, -Izeh, Scs Flood Model
References (In Persian)


References (In English)


