# The Estimated height runoff in watershed Ivar using America Soil Conservation Service (SCS)

Ali Asghari[1*], Saeed Shojaei[2], Fahime Arabi Aliabad[3], Narjes Moqbelihanzaei[4]

[1]Department of Agriculture, Payame Noor University, Iran
[2] Young Researchers and Elite Club, Zahedan Branch, Islamic Azad University, Zahedan, Iran
[3]Master of Science desert management, Yazd University, Yazd, Iran
[4]M. Sc Student mbating Desertification, University of Tehran, Iran

**Abstract**: Floods in Iran due to specific climate and topography, especially with spatial and temporal distribution of precipitation inappropriate, The most important factor threatening human capital and human resources that many physical and financial losses in recent years has led So that makes the destruction of bridges and roads, residential areas, Cut power lines and communications, damage to agricultural land, industrial facilities and also has human migration. In the present study compared statistics in hydrometric stations and using SCS Ivar was to estimate the amount of runoff in the area. According to the results, in all return periods of maximum and minimum runoff is related to the field of I08 and I8.
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**Keywords:** runoff, hydrology, SCS, curve numbers, Ivar.

## 1. Introduction

Flood refers to a situation in which unexpectedly increased river flow as it leads to the loss of life and property. Many in the design of hydraulic structures, calculating the maximum flood discharge is sufficient. Insufficient hydrometric stations using empirical methods to estimate Water flows is essential. Floods in Iran due to specific climate and topography, especially with spatial and temporal distribution of precipitation inappropriate, The most important factor threatening human capital and human resources that many physical and financial losses in recent years has led So that makes the destruction of bridges and roads, homes, cut power lines and telecommunications, damage to agricultural land, industrial facilities and also has human migration (Avandi et all., 2006).

The estimated maximum amount of flood basin, river training is an important part of the hydrologic studies. In this connection it is necessary and hydrograph flood peak discharge for return period to be determined. Doing so requires a long-term statistics and Lymyngraf device is in the desired location.

Taskr et al (1982) based on properties such as surface area, mean annual rainfall, elevation, area and soil index, Maximum discharges with return periods of 2, 10 and 25 years were estimated for the region Arizona.

Campbell and Side (1984), to estimate the maximum discharge models in the Oregon District, various physical factors and climate inspected. Factors area, average height and average annual rainfall as independent factors were included in the models.

Arab khedri (1989) models for estimating maximum flood-free areas hit by floods in the watersheds of northern Alborz regional reviews presented.

Salajaghe (1994) examined 38 small watershed floods in different parts of Iran, which had been an area of less than 10,000 hectares Payment and empirical coefficients and range covering many relationships in return periods of 5, 10, 25, 50, 100 and 1000 years to determine.

Nazari (1989) Fuller experimental method for calibrating watershed in Fars province was interested. The end result of this research, combining the two parts of the study and achieve a classification of watersheds Watershed in terms of the potential for flooding and the provision of related maps have been created.

## 2. Materials and methods

Ivar watershed with an area of about 5,500 hectares, located in North Khorasan province, Jajarm city and with longitude 56 degrees 8 minutes and 58 seconds to 56 degrees, 15 minutes, 53 seconds width and longitude 36 degrees 58 minutes and 3 seconds up to 37 degrees and 4 minutes and 26 seconds. The climate classification will be assessed Domarten of 1031 and 1603 meters, the annual average rainfall of 168 mm. The average annual temperature 14.1, the average annual minimum temperature 7.8, 22.1 average annual maximum temperature, absolute annual minimum -8.1 and the absolute maximum annual 40.1 ° C. Prevailing wind are east winds and the amount of 17.3 of the total.

US Soil Conservation Service in 1972, has earned an equation for estimating runoff. The method for instruction by Richard (1982) were presented. The amount of runoff (Q) to precipitation (P) and volume of water retention in the soil depends. In all floods always runoff (Q) less than or equal rainfall (P). Similarly, after the runoff, the actual amount of water retention (Fa) or less maximum storage capacity (S). Ia is the amount of rainfall runoff before the runoff potential of the soil. Therefore, the P-Ia.

SCS method it is assumed that the actual amount of runoff water retention is equal to the potential runoff means:

$$\frac{F_a}{S} = \frac{Q}{P - I_a}$$

Using the continuity equation, we have:

$$P = Q + I_a + F_a$$

Q: runoff P: Rainfall S: parameter that indicates water retention basin level is obtained from the following equation.

$$S = \frac{25400}{CN} - 254$$

CN: Curve Number

Ia: initial abstraction

The amount of initial maintenance and maximum retention capacity depends on various factors such as soil type, vegetation type, Infiltration, soil moisture content is stored in the pit. Research conducted in the US showed that the amount Ia of the S 0.02 to S 2.2 changes (Richard, 1982).

$$Q = \frac{(P - 0.2S)^2}{(P + 0.8S)}$$

As can be seen, CN is the most important parameter that must be estimated.

CN is a combination of two groups of hydrological and land use is estimated to be anywhere in the area and CN whole area is the weighting average estimate. SCS method to estimate flood in need of some parameters is described below.

**2.1 Designed to determine the Rain**

In order to determine the layout of rain, 24-hour rainfall areas in different return periods and temporal distribution of precipitation 24-SCS is used.

**2.2 CN to determine the field**

CN combining two groups of hydrological and land use is estimated to be anywhere in the the field and CN whole field of weighting average is calculated. Map curve number (CN), a combination of map and map vegetation hydrological groups, by calculating the histogram for each hydrological unit and a weighted average was estimated using an Arcview capabilities. After determining the curve number at a specific user, using interpolation amount of weight can be achieved in sub.

Figure (4) to calculate the curve number by combining land use maps and hydrologic soil group shows.

**3. Results**

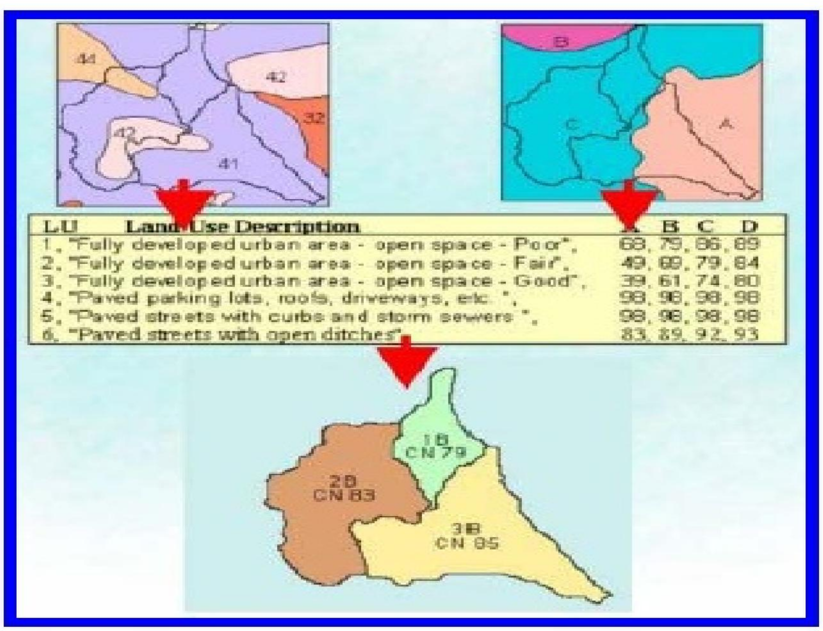


Figure 1. Estimated Number curve by combining land use maps and hydrologic soil group

Figure (1) estimate the number curve by combining land use maps and soil hydrological groups displayed. In Fig. 2 hydrological model the field Jajarm Ivar and in Figure 3 curve number map of the field, in Figure 4 and Figure maps S (5) map shows the field the initial abstraction. In Table 1 the peak flood discharge is provided.

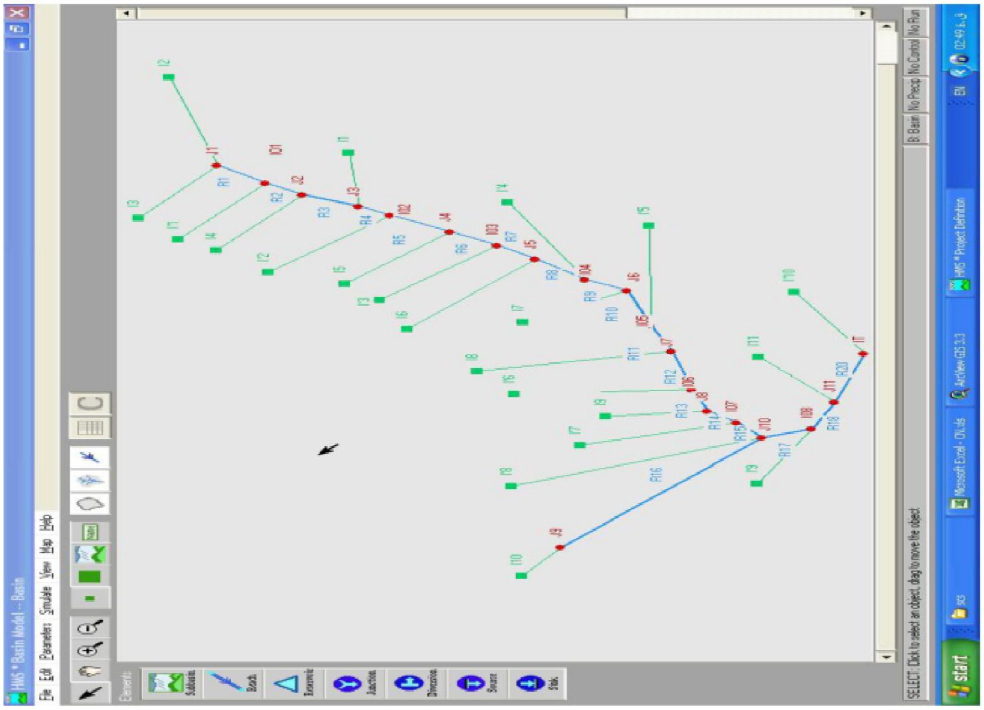

Figure 2. the field hydrologic model Ivar Jajarm

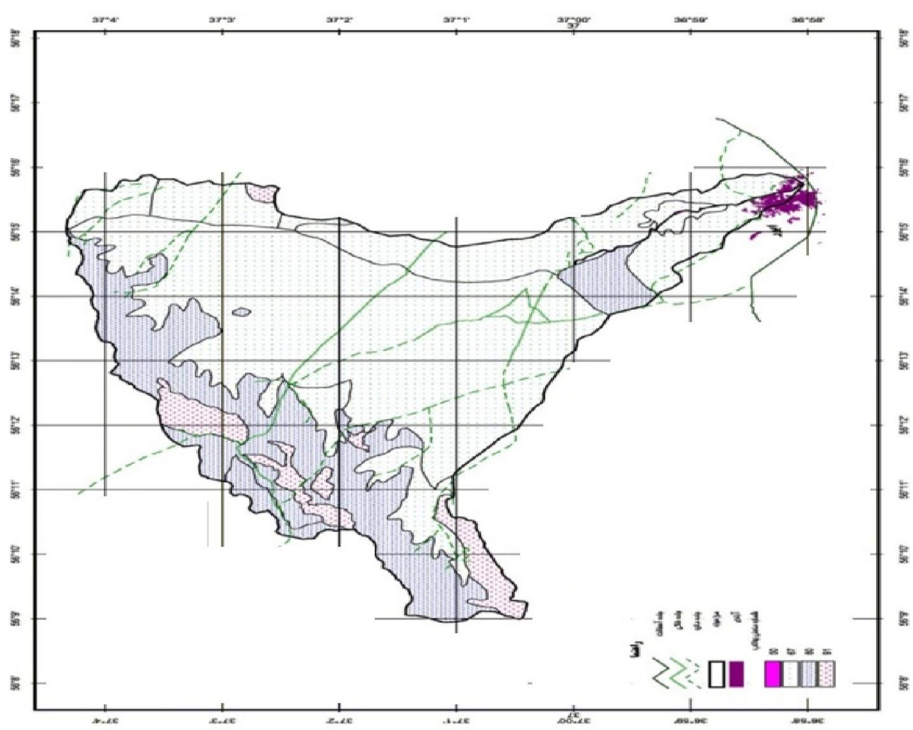

Figure 3. Map of Ivar CN the field Jajarm

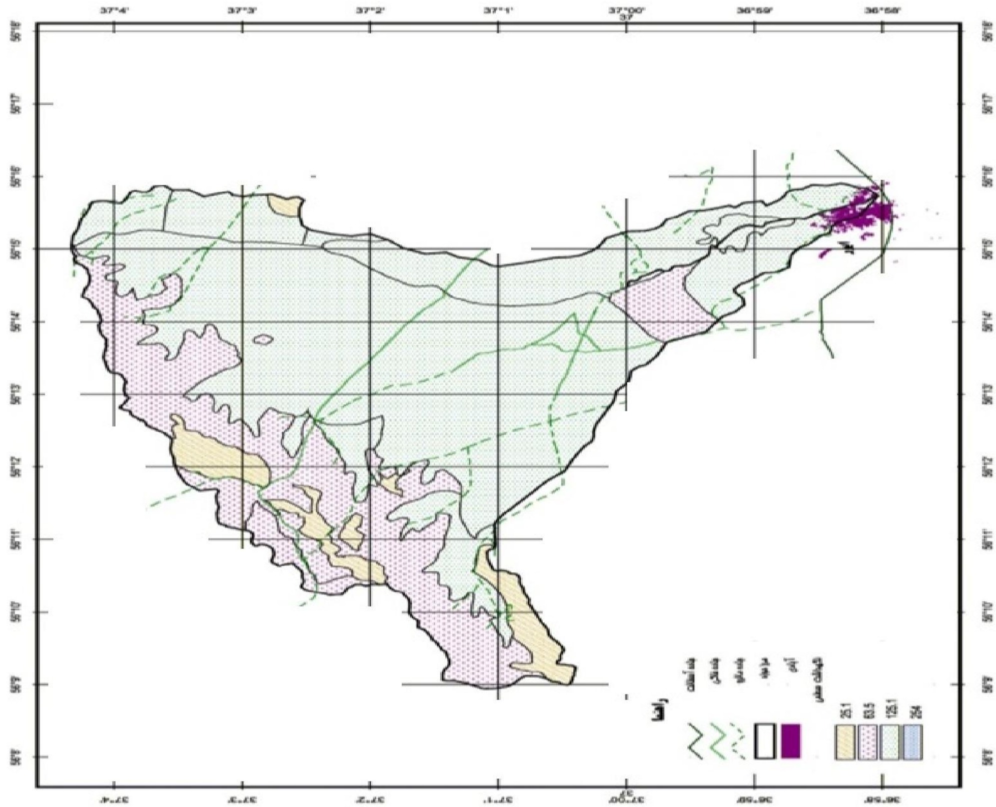

Figure 4. Map S the field Ivar Jajarm

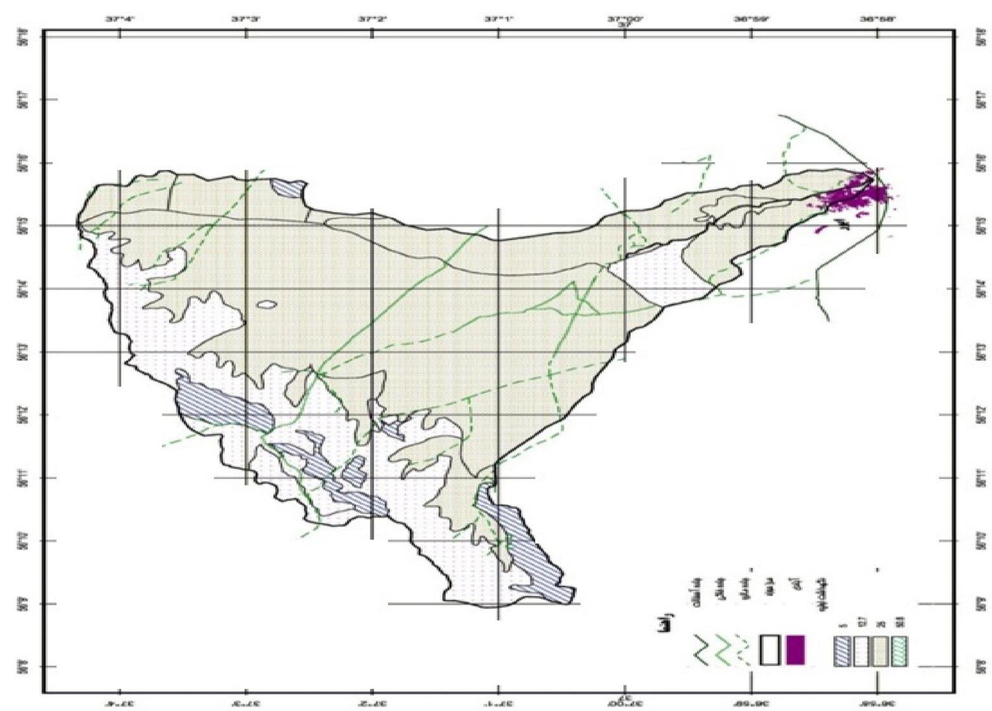

Figure 5. Map of initial abstraction (Ia) Ivar the field Jajarm

Table 1. Dubai peak (cms) calculated using SCS in the field of Ivar Jajarm

| Sub-field | Area | time تمـركز | Delay time | CN | S | Ia | Returned period | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Time | | | Milimeter | | 2 | 5 | 10 | 25 | 50 | 100 |
| I1 | 2/068 | 1/15 | 0/69 | 68/8 | 114/9 | 23/0 | 0/0036 | 0/0419 | 0/0929 | 0/1900 | 0/2998 | 0/4266 |
| I2 | 7/799 | 0/74 | 0/44 | 69/9 | 109/1 | 21/8 | 0/0250 | 0/2222 | 0/4632 | 1/052 | 1/675 | 2/382 |
| I3 | 2/946 | 0/75 | 0/45 | 71/6 | 101/0 | 20/2 | 0/0194 | 0/1289 | 0/2696 | 0/6103 | 0/8909 | 1/190 |
| I4 | 5/139 | 0/63 | 0/38 | 71/3 | 102/3 | 20/5 | 0/0293 | 0/2099 | 0/4428 | 0/9930 | 1/449 | 1/933 |
| I5 | 5/357 | 1/11 | 0/67 | 81/6 | 57/3 | 11/5 | 0/8295 | 2/195 | 3/198 | 4/533 | 5/486 | 6/453 |
| I6 | 1/904 | 0/77 | 0/46 | 67/0 | 125/1 | 25/0 | 0/0000 | 0/0202 | 0/0561 | 0/1213 | 0/1917 | 0/3048 |
| I7 | 5/358 | 0/82 | 0/49 | 72/1 | 98/1 | 19/6 | 0/0441 | 0/2640 | 0/5639 | 1/229 | 1/762 | 2/329 |
| I8 | 1/751 | 0/75 | 0/45 | 67/0 | 125/1 | 25/0 | 0/0000 | 0/0186 | 0/0516 | 0/1118 | 0/1767 | 0/2825 |
| I9 | 2/990 | 0/87 | 0/52 | 71/9 | 99/0 | 19/8 | 0/0225 | 0/1396 | 0/2881 | 0/6476 | 0/9410 | 1/255 |
| I10 | 4/584 | 0/53 | 0/31 | 80/2 | 62/8 | 12/6 | 0/5739 | 1/951 | 2/991 | 4/397 | 5/419 | 6/462 |
| I11 | 1/854 | 0/85 | 0/51 | 67/0 | 125/1 | 25/0 | 0/0000 | 0/0196 | 0/0545 | 0/1170 | 0/1848 | 0/2877 |
| I01 | 10/843 | 0/79 | 0/47 | 70/4 | 107/0 | 21/4 | 0/0422 | 0/3479 | 0/7144 | 1/619 | 2/524 | 3/534 |
| I02 | 19/765 | 0/94 | 0/56 | 70/2 | 108/1 | 21/6 | 0/0728 | 0/6021 | 1/246 | 2/643 | 4/136 | 5/889 |
| I03 | 26/229 | 1/08 | 0/65 | 72/4 | 97/0 | 19/4 | 0/791 | 2/108 | 3/767 | 6/650 | 9/179 | 11/94 |
| I04 | 29/187 | 1/22 | 0/73 | 71/8 | 99/7 | 19/9 | 0/733 | 2/073 | 3/785 | 6/551 | 9/062 | 11/98 |
| I05 | 34/573 | 1/25 | 0/75 | 71/9 | 99/5 | 19/9 | 0/721 | 2/286 | 4/296 | 7/540 | 10/62 | 14/09 |
| I06 | 36/692 | 1/32 | 0/79 | 71/6 | 100/8 | 20/2 | 0/709 | 2/217 | 4/244 | 7/659 | 10/35 | 13/93 |
| I07 | 40/736 | 1/57 | 0/94 | 71/6 | 100/9 | 20/2 | 0/693 | 2/372 | 4/428 | 8/225 | 11/27 | 14/49 |
| I08 | 51/534 | 1/82 | 1/09 | 72/1 | 98/5 | 19/7 | 1/202 | 3/954 | 6/914 | 11/51 | 15/76 | 20/61 |
| Area | 55/000 | 2/01 | 1/20 | 66/9 | 126/0 | 25/2 | 1/139 | 3/803 | 6/813 | 11/38 | 15/16 | 20/74 |

**Conclusion**

Flood events have long existed and is usually accompanied by great human and financial. If we can correctly manage floods adjust, we may even huge volume of flood flows for optimal use of our resources. In many cases the construction of hydrometric stations on the river flood discharge directly measured there is no need to examine the factors affecting the formation of floods. But the study area were without gauging stations And inevitably estimation of maximum flood is possible only with experimental methods The methods are based on the effective factors on flood That each of them depending on how much of their relationship in terms of natural factors have on the flood on the importance of the find. According to the results, in all return periods of maximum and minimum runoff is related to the the field I08 and I8.

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