## **Estimation and Management of Annual Runoff of River Vedi**

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The river Vedi is the left tributary of Araks (fig. 1).

Vedi river basin is located on 800-2800 m height of Armenian volcanic plateu: the average sea

level height is 2090 m. The length of river is 58 km, up to Urtsadzor -29 km, the square accordingly is 633 and 329 km<sup>2</sup>.

In middle and lower flows the waters of river are used for irrigation completely. Therefore, main significance has the studying of features of intra-year distribution of river runoff, estimation and management of river runoff.

Taking into account the above-mentioned have been solved following tasks:

- to study and analyze the main physicgeographic factors determinant the runoff;
- to collect, work out, analyze and estimate the results of actual hydrometeorological observations of river basin;
- to discover and analyze the features of intra-year distribution of river runoff of basin:
- to study dynamic changes of river runoff;
- to make up the methods of methods of long-term forecasting of monthly and annual runoff;
- to make a map of spatial distribution of river runoff.

Toward this end were collected, worked out and analyzed the data of observations of hydrological and meteorological stations and

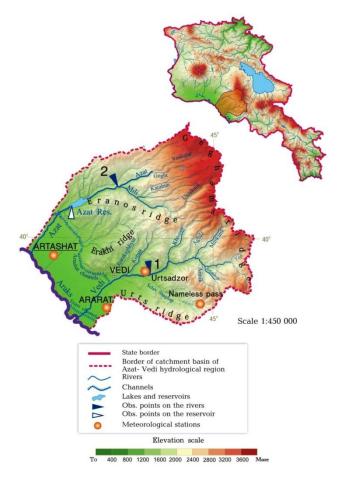


Fig. 1. Position of Vedi catchment basin in Azat-Vedi hydrological region
1 - r. Vedi – p. Urtsadzor; 2 - r. Azat – p. Garni

hydrological and meteorological stations and points of basin, which have been kept in Armstatehydromet and have been used according literary sources and mathematic-statistic, geographic, mapping, analyze and correlation methods.

From the point of river of irrigation for estimate of river runoff important characteristic is intrayear distribution of runoff by months and seasons of year (table 1). It means, from the point of view of water resources using the intra-year distribution of runoff and water regime of rivers are important characteristics, which depend on sources of ding and conditions of runoff generation and formation. For intra-year distribution of runoff and water regime important role has source of feeding of any river. Like other rivers of republic, river Vedi also feeds by melted, rainy and underground water that means, river Vedi has mixed feeding. In case of these conditions river Vedi has unstable water regime (big fluctuations of level). To river of Armenia, to Vedi river also, is characterized spring-summer flood, summer-autumn and winter low water level stages.

**Table 1** Intra- year and seasonal distribution of long-term average values of runoff consumption against annual (%)

River – point	Months												Seasonal		
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	IV-VI	IV- IX	III - X
R. Vedi – p. Urtsadzor	4	4	6	20	36	13	4	2	2	3	4	3	69	77	23
R. Selav Shahap – p. Shahap	2	6	9	24	24	16	3	5	1	3	3	2	64	74	26

In the basin the annual runoff characters with one spring maximum (April-June). Second, small increasing of expense observes during autumn rains (fig. 2). But is important to note, that average monthly values of expense during the spring flood can be 5-10 times more than average annual values.

In low water level period the smallest average monthly values of expense are 10-30 % of average annual values. Even sometime observes drying of river and it needs irrigation.

In intra-year distribution of runoff there are some difference between cold and warm seasons of year also. In warm period (IV-X) by river Vedi passes 80 % of whole annual runoff, and in cold period (XI-III) -20%.

As we see, to river basin is characterized intra-year unequal distribution

Fig. 2. Annual course of long-term average outlets of water of Vedi river in Urtsadzor part

of river runoff. So, for economic productive using of water of river is necessary to organize rightly regulation and management of river runoff. The role of it is increases more in conditions of climate change, depending on dynamic change of river runoff.

For more productive organization of regulation and management of runoff is necessary scientific knowledge, that means, it need to forecast. So, after studying, analyzing and estimation of the physic-geographic conditions of river basin, literary sources have been made methods of long-term forecasting of monthly and annual runoff. The monthly forecast is being published in 23-24 of previous month.

So, in the period of spring floods by river passes 65-70 % of annual runoff. And in this time often observes maximum expense of river water. Usually is forms in the April- in the beginning of May but especially in the first part of May.

River has a stage with low water level, with summer-autumn and winter periods, minimum expenses of water observe in summer mainly.

So, observes the tendency of deceasing of river runoff, especially since 70th of XX century. It observes both of annual and maximum runoff.

The methods of forecasting, which made in the result of studying, can be used for operative forecasting, and with predicted values beforehand, the river runoff can be managed. We suggest to accumulate the water during high water season for using it in region with low water level.