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# ASSESSMENT OF RELIABILITY INDICATORS OF FILLING THE ANDIJAN RESERVOIR WITH WATER

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## Abstract

**General description of the basin.** The basin of the Koradarya River is located in the eastern part of the Fergana Valley. Its water flows down from the southwestern slopes of the Fergana mountain range and the northern slopes of the Alay mountain range. The Fergana range rises from the northwest to the southeast. In the northwest, its height does not exceed 4000 m, while in the southeast, in the areas connected with the Alay range, it reaches nearly 5000 m. Even the mountain passes in this part of the range exceed 4000 m in height.

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The height of the Alay range is generally above 4500 m and in many places reaches 5000 m or higher. For example, the mountain peaks in the Tor River basin (the main tributary of the Koradarya) reach 5306 m, while in the Akbura River basin, they reach nearly 5600 m. Only in the Kurshob River basin (a left tributary) does the range become slightly lower, where the highest peak is 4697 m.

All tributaries of the Koradarya flowing from the Fergana range are snow-glacier-fed rivers. However, it should be noted that the contribution of permanent snow and glaciers to the rivers flowing from the lower northwestern part of the range is very small. Therefore, in these rivers, the peak flow period occurs earlier (maximum discharges are observed in May), while during the snow-glacier melting period (July–September), the runoff accounts for only 18–20% of the annual flow. Only in the Koragulja and Tor rivers is the share of July–September runoff relatively large (37–38% of the annual flow), as these basins are located in the highest part of the Fergana range, where significant accumulations of permanent snow and glaciers exist.

The tributaries flowing down from the northern slopes of the Alay range are mainly snow-glacier-fed due to their high-altitude catchments, and their peak flow period occurs later. The Koradarya River is formed by the confluence of the Tor and Koragulja rivers. From its source to its entry into the Fergana Valley, i.e., up to the Kampirovot Gorge, the Koradarya is joined by two major tributaries: the Yassi River (from the right) and the Kurshob River (from the left). Other tributaries, such as Kugort, Koraungur, Moylisuv, Akbura, and Aravan, either do not reach the peak water period. Thus, the flow of the Koradarya is mainly formed by the waters of the Tor, Koragulja, Yassi, and Kurshob rivers.

**Hydrographic description of the Koradarya:** ( $L = 177$  km,  $F = 28,630$  km<sup>2</sup>). It is more convenient to describe the Koradarya in several sections:

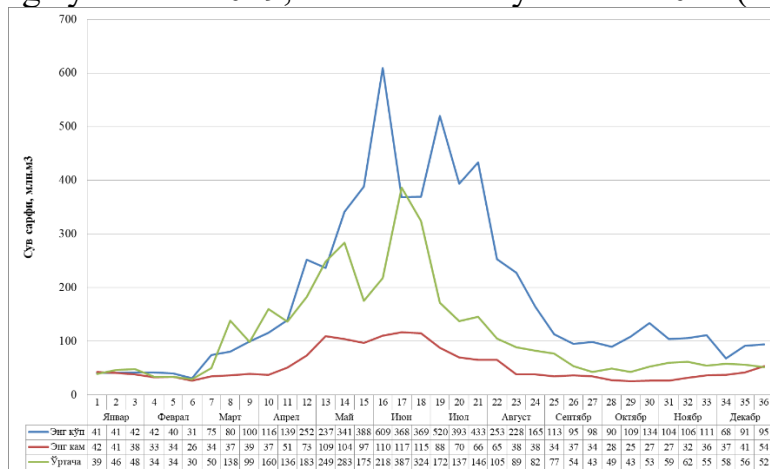
- **From the confluence of the Tor and Koragulja rivers to the Kampirovot Gorge:** In this section, the river valley width ranges from 0.5 km to 4–5 km. Near the village of Kampirovot, the valley narrows sharply and forms the Kampirovot Gorge.
- **From the Kampirovot Gorge to the Kuyganyor Dam:** As mentioned above, after passing through the gorge, the Koradarya enters the wide Fergana Valley.

Here, the river flows through a broad floodplain valley, with a width varying from 200 m to 7 km. After passing the village of Khanabad, the valley slopes blend indistinguishably with the surrounding lands.

- **From the Kuyganyor Dam to the confluence with the Naryn River:** In this section, the river also flows through a wide valley. However, the valley slopes consist of terraced steps, sometimes eroded and merging with surrounding lands. Since the riverbanks are made of soft materials, they are subject to rapid erosion and collapse in many places.

**Feeding sources and flow regime.** The annual flow of the Koradarya is formed as follows: 18% from the Koragulja River, 37% from the Tor River, 26% from the Yassi River, and the remaining 19% from the Kurshob River. The Kurshob River, flowing from the northern slopes of the Alay range, is similar in feeding conditions and seasonal distribution to the main tributaries Tor and Koragulja. The Yassi River, which flows from the southwestern slopes of the Fergana range and has a lower-altitude catchment, has an earlier peak flow period, as it is mainly fed by seasonal snow. Therefore, at the Kampirrovot Gorge, the share of permanent snow and glacier water in the Koradarya’s annual flow is lower compared to the Tor and Koragulja rivers.

Analysis of the last 25 years of inflows into the Andijan reservoir from the Koradarya shows that the maximum discharge was observed in June 2001, with 609 m<sup>3</sup>/s, while the minimum was in 2011, with 28 m<sup>3</sup>/s. The wettest year was 2001, the average year was 2019, and the driest year was 2011 (Fig. 1).



**Fig. 1. Long-term average inflows from the Koradarya River into the Andijan Reservoir.**



According to feeding conditions, the high-water period in the Koradarya begins in March, with the highest average monthly discharge in June. From July, water discharge decreases, continuing until late February. More than half of the annual runoff (51.9%) occurs during the snowmelt period (March–June). In July–September, runoff accounts for 29.8% of the annual flow (or 57% of the March–June flow), and in the low-water season (October–February), 18.2% of the annual flow passes. In some years, the seasonal distribution changes significantly. Taking into account the above-mentioned factors affecting the hydrological regime of the Koradarya, the following design flow values were determined:

- 0.01% probability – 2194.0 m<sup>3</sup>/s
- 0.1% probability – 1664.0 m<sup>3</sup>/s
- 1% probability – 1307.0 m<sup>3</sup>/s

Based on the results of research and analysis, it can be concluded that the water resources of the Koradarya River are sufficient to reliably fill the reservoir. It is possible to accumulate the required water reserves in the reservoir.

## **References**

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