

## Ecological Results of Creation of Average Kura Cascade and other Reservoirs

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### Abstract

From the conducted research it can be concluded that the construction of reservoirs created on the Kura River was very important for our country. The construction of both hydroelectric power stations and thermal power stations has greatly benefited our republic. The creation of the Kura River Cascade also prevented water floods. However, along with this, there were some negative effects on the downstream of the Kura River. For example, the water of the Kura (reservoirs, due to the regulation of water) decreased downstream, it should be noted that water does not reach the Caspian Sea in some seasons, and the surface of the sea water rises along the Kura on the contrary. This also leads to the fact that the biodiversity in the Kura is reduced and even destroyed. Due to global climate change, there are difficulties in meeting the country's water needs as a result of the lowering of the water level in the Kura and Araz rivers, the largest rivers in Azerbaijan. Clean water is reduced by 20% due to pollution of the Kura and Araz rivers from the territories of neighboring countries ( Georgia and Armenia). The Kura River is most exposed to anthropogenic impacts within the city of Tbilisi (40 km). The left tributaries of the Araz River are subject to serious pollution by some regions of Armenia that after the confluence of the Araz and Kura River in the territory of Sabirabad (sugovushan ) it flows into the Caspian Sea in the lower reaches of the Kura.

**Keywords:** Kura River, Cascade, reservoir, pollution, biodiversity.

### Introduction

The Kura River, an important life artery of the South Caucasus, was exposed to serious pollution in the territory of neighboring Georgia before it entered the territory of the Republic of Azerbaijan. Its waters include Akhalsikhe, Borjomi, Khashuri, Kareli, Gori, Kaspii and.s. industrial and household-communal waste of cities mixes. However , the most complex

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environmental conditions occur in the territory of Tbilisi, as the river flows through the city area at a distance of 40 km. All the waste of the city of Rustavi is discharged into the river.

Azerbaijan is one of the oldest agricultural countries in the world. Although irrigation agriculture, which has a history of up to three thousand years, covers a large part of the land suitable for Agriculture, its water supply has always been negligible. Thus, the state of irrigation in general depends on the flow of rivers in the summer lowland period. The water they discharge during this period is only up to 15% of the annual flow.

The main part of Water Resources in Azerbaijan is made up of river waters. S. H. Rustamov and R. M. According to Gashga (1987), their total volume is 30.9 km<sup>3</sup>. But only 1/3 of the flow (10.3 km<sup>3</sup>) is formed on the territory of the Republic, and the rest comes from neighboring territories. The flow generated on the territory of Azerbaijan accounts for only 14.5% of the water resources of the South Caucasus (71 km<sup>3</sup>) and 0.2% of the water resources of the former USSR. Despite the fact that the area of the Rioni River Basin, which flows into the Black Sea, is up to 15% of the territory of the Republic of Azerbaijan, its flow exceeds the territory of our republic (13.6 km<sup>3</sup>).

Uneven distribution of river flow in the Republic throughout the year and on the territory location of the territory in the arid climate zone and evaporation up to 3 times greater than the flow causes great difficulties in studying the water demand of various sectors of the economy and requires extremely efficient and economical use of Water Resources.

The future development of the economy in the Republic can only be ensured by regulating the flow of all rivers. The Republic has more than 140 reservoirs. 57 of them are engineering structures built on the basis of a special project. The rest were built by local economic authorities and their volume was 1 million. They are ponds smaller than m<sup>3</sup>. The total area of all water reservoirs of Azerbaijan exceeds 1000 km<sup>2</sup>, which is 1.3% of the territory of the Republic.

The total volume of reservoirs of the Republic exceeds 21 km<sup>3</sup>. This figure is 10.3 times greater than the river flow (3 km<sup>2</sup>) formed in the area. Their construction allows regulating the flow of rivers and efficient use of Water Resources yaratmışdır. Su most of its warehouses were built for irrigation purposes. Only 6 of them (Mingachevir, Shamkir, Sugovushan, Sarsang, Yenikend and Varvara) have complex or energy-irrigation significance. Although they make up only 5% of the number of reservoirs in the Republic, their volume was 20.6 km<sup>3</sup>, the water reaches 97% of the total volume of reservoirs.

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The total area of Mingachevir, Shamkir, Yeniken and Varvara water and reservoirs included in the Orta Kura cascade is 841.5 km<sup>2</sup>, and the total volume is about 20 km<sup>3</sup>. This means that 76% of the total area of the reservoirs of Azerbaijan and more than 89% of their volume fall to the share of these 4 reservoirs built on the Kura River.

Among the reservoirs, one should especially note The Mingachevir reservoir, which occupies a brinci place in size. Its water mirror and water mass account for 62% of the area and 76% of the volume of the Republic's reservoirs. The Mingachevir reservoir, whose construction was completed in 1953 in the middle reaches of the Kura River, is a huge reservoir of complex importance. This water junction consisting of hydroelectric power station and two water channels allows to use its water resources effectively in the downstream of Kura River yaratmışdır. Su the volume of the reservoir regulates the flow of the Kura River and ensures the water demand of Agriculture in the Kura-Araz lowland, as well as the Prevention of floods and malaria and other diseases caused by them in the lower reaches, improving the environmental conditions in general and ensuring the functioning of agriculture throughout the year. s. for it is of great importance.

After the commissioning of Shamkir reservoir in 1982, the Kura River has completely lost its natural regime in the downstream. These 2 large reservoirs together with Varvara and Yenikend reservoirs have created conditions for long-term regulation of the flow and transformation of the middle flow of the Kura River into a cascade of reservoirs and hydroelectric power plants.

Water reservoirs have important energy importance. They are necessary not only for the operation of hydroelectric power plants, but also for the operation of a very large thermal power plant, such as the “Yeni Azerbaijan” hydroelectric power station in Mingachevir.

At the same time, the construction and operation of water reservoirs led to some undesirable consequences, and the shortcomings in their design and placement gave a serious impetus to the violation of the ecological balance.

Studies show that the influence of reservoirs on the volume of inflow in large rivers is observed at great distances along the lower reaches. When the river does not accept large tributaries, it cannot restore its silt to the mouth. However, despite the collapse of the mines in the Mingachevir reservoir and the outflow of stagnant water to the lower side, it can have a strong impact on the change in the flow of Kura mines in Sabirabad and Salyan settlements bilmir. Su in the Zardab settlement, located 150 km from the reservoir, the river is able to restore 25% of its silt, and after the confluence of the Araz River near Sabirabad, it almost regained its former silt.

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Regulation of river flows in the Caspian Sea basin through dams and reservoirs after the Second World War was formed during the long geological period when valuable fish, especially sturgeons, lived and multiplied, seriously aggravated the ecological conditions. Goat and semi-goat fish, as a rule, live in the sea, but for reproduction ( spawning ) they can be found on the Volga, Kura, Araz, etc. They move up the upper reaches of rivers. Since the construction of dams blocked their migration routes, it caused a sharp reduction in these very valuable fish species and caused enormous damage to the fish farm. As a result, fish stocks and fishing in the Caspian Sea basin have decreased so much that it should be regarded as a geological disaster.

Up to 90% of the world's Sturgeon reserves are concentrated in the Caspian Sea. However, as a result of anthropogenic impact, including regulation of the flow of rivers, great damage was caused to the ancient fauna of the Caspian Sea. Sturgeon and herring species were greatly reduced, and ship and rockfish species were completely destroyed, and some fish species were listed in the "Red Book".

Along with the construction of dams, pollution of the Caspian sea, rivers and lakes with industrial and domestic wastewater, oil products and climate have a very negative impact on the sharp reduction of fishing in the Republic. Anomalous heat causes a decrease in biodiversity in the Caspian region. Collector-drainage waters contaminated with herbicides and pesticides, which are discharged into the sea to the fish farm, also cause a lot of damage. Toxic chemicals that enter rivers, lakes, reservoirs and the Caspian Sea are toxic and dangerous not only for aquatic organisms, especially fish and invertebrate plankton and benthos, which make up their main food sources, but also for the population.

Over the past 5 years, the volume of water in the Kura River has decreased by 45-50% depending on the season. Of course, in places with a small volume of water, fish can spawn and reproduce. Recently, the water of the Kura almost does not reach the Caspian Sea, and the water of the sea enters the Kura. In this case, during the spawning period of fish, especially transient and semi-migratory fish cannot reproduce. It should be said that the decline in some fish stocks is typical not only for our country, but also for the entire Caspian Sea.

Statistics show that in 1932, that is, until the implementation of large-scale water management measures in the Kura River Basin, 305 thousand Sentiner is a valuable transitory and semi-transitory fish. After the construction of many large water facilities, their catch in 1982 decreased to 20 thousand sentiners and thus fell by 50 times over 15 years.

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Researchers believe that the reason for these serious consequences is also the fact that less fresh water enters the sea water area at the mouth of the Kura River due to the use of irrigation, the deformation of the natural regime of the distribution of river flow during the year through Mingachevir Shamkir, “Araz water Junction” and other water reservoirs.

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