

Ecological situation of Kura river

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Abstract. The article includes the ecological situation of Kura which is a transboundary river. Firstly, there is general information about Kura river. The flora and fauna of the river are described briefly. Also, the article gives information on current situation in Kura river basin. The reason of the decreasing of the water of Kura river and impact of the climate change on basin mentioned in the paper. At the end, there is a conclusion on the social, economic and environmental effect of decreasing water in the river Kura.

Key words. Kura river, Pollution, Climate, Water decreasing.

1.INTRODUCTION

The Kura is the biggest transboundary river that links the three South Caucasus nations. This river rises between 2,200 and 2,700 meters above sea level in the east of Turkey, flows through the eastern portion of Georgia, crosses the border into Azerbaijan, enters the Mingachevir reservoir, and finally empties into the Caspian Sea.

The river is 1515 kilometers (941 miles) long overall. Azerbaijan owns 906 km of the river, 435 km in Georgia, and roughly 174 km in Turkey. Georgia and Azerbaijan share 94,760 km² of watershed. Seasonally, melting snow (36%), groundwater (30%), precipitation (20%), and melting ice and snow in glaciers (14%), combine to form the Kura River's water.



Figure 1. Kura river

The Kura River originates in eastern Turkey on the slopes of Kısırındağı and intersects numerous valleys north of the Lesser Caucasus Range. The Kura originates in the Kars Mountains of the Lesser

Caucasus, in a small valley in northeastern Turkey. It flows west, then north, east, and into Georgia after Ardahan. It rises in the mountains near Khashuri, flows northwest, then into a canyon near Akhaltsikhe,

and many flows 15 kilometers (47 miles) northeast into a gorge.

The river flows southeast and eastward along the Kartli Plain shortly after entering Georgia. A dam was constructed along the Mtskheta river above the Georgian capital, Tbilissi, and the river valley spanned a large plain. After Gori, close to Mtskheta, it bends east and starts to flow approximately 120 km (75 miles) from east to southeast.

It then passes through a small canyon to the south and west of Tbilisi, the largest city in the area. The river passes through pastures on the Georgian-Azerbaijani border before flowing southeast through Rustavi and turning east at the Khrami River's confluence. It then enters the Shamkir Reservoir and subsequently the Yenikend Reservoir.

Lower Kura flows into Lake Mingachevir, a reservoir with a sizable dam, where the Mingachevir hydroelectric power station was constructed, after winding through small areas close to the Azerbaijani city of Mingachevir. Many towns and villages can be found along the Kura's lower reaches. Flooding is widespread along the Kura's lower course. At last, the river empties into the Caspian Sea through a delta in the Azerbaijani district of Neftchala.

The biodiversity of Kura river

Fauna. Fish in the Kura River are abundant. These include the following in order of importance: weight (Cyprinus carpio), nakha (Silurus glanis), pike (Esox lucius), mursa (Luciobarbus mursa), barbus lacerta, alburnoides bipunctatus, and alburnus. There are voles (Apodermus sylvatica), gray rabbits (Lepus europaeus), wild boar (Sus scrofa), etc. in the area. The following animals are examples of predators: wolves (Canis lupus), badgers (Meles meles), common foxes (Vulpes vulpes), bears (Ursus arctos), forest cats (Felis silvestris), and jackals (Canis aureus).

Flora. There are various zones within the tugai forests that line the river. Shrubs such as sea buckthorn (Hippophae rhamnoides), blackberry (Rubus sp.), willow (Salix sp.), and common barberry (Berberis vulgaris) can be found along the banks of the Kura River. Populus hybrida forests, trembling poplar (P. tremula), black poplar (P. nigra), white mulberry (Morus alba), and different willow (Salix sp.) Tugai

Clematis vitalba encircle the trees. Immense undergrowth is produced by common pomegranate (Punica granatum), willow (Tamarix sp.), blackberry (Rubus sp.), and common unicorn (Ligustrum vulgare).

The condition in the Kura basin

Official data shows that there has been a notable decline in rainfall in recent years as a result of climate change, and that the country's rivers have less water in

them as a result of the drought lasting longer during the warm months of the year. Due to below-average precipitation and unusually high temperatures in early June of 2020, the water level in the Kura River and the rivers that feed into it dropped in May and June. As a result, the water level in the upper Kura River (Giragkesemen settlement, on the border between Georgia and Azerbaijan) dropped by 108 cm (1.08 meters) between May 15 and May 31. Concurrently, below the Kura River's Mingachevir reservoir, the water level dropped by 147 cm in Yevlakh, 127 cm in Zardab, 165 cm in Surra, 190 cm in Shirvan, 154 cm in Salyan (with a maximum decrease of 1.54 meters), and 122 cm in the Araz River's Novruzlu settlement. Long-term observations generally show that the area downstream of the Kura River was hot and dry during the summer, with some years seeing a decline in the amount of water demand. While the decrease this year is marginally greater than in prior years, a comparable circumstance was noted in 2001. The current situation is impacted by the increased water withdrawal from the Kura River caused by the extensive use of water resources to meet demand in neighboring Georgia, Turkey, and Azerbaijan.

Due to the impact of climate change and the summer season, the volume of water has decreased due to increased demand for water in agriculture. According to Georgian media, the water level in the Kura River (Georgians call it Mktivari) has decreased since 2014, and there is a significant decrease in water levels in many cities, including Tbilisi.

The reason why Kura river water decreasing

It is also identified by intricate issues like water scarcity. As a result, when the Kura's water level drops, its flow rate also decreases, allowing seawater to seep into the riverbed, particularly during periods of increased northeast wind.

Human activity has also resulted in a major decline in water quality. Large volumes of pollutants are released into rivers and other bodies of water worldwide on a daily basis, either directly or indirectly. The quantity and quality of water resources on Earth are also impacted by pressure factors such as natural disasters related to water and global warming. These factors are causing the world's water supply to steadily decline. to

influenced primarily by two factors: water demand and climate change.

The rising water use in Georgia and Turkey are additional factors contributing to the Kura River's declining water level. Thus, the province of Ardahan, through which the Kura passes, overuses water in irrigation systems. The Kura River is home to multiple hydropower plants, which is one of the primary causes.

Impact of climate change on Kura river basin

Water demand and availability are impacted by climate change. Furthermore, crops grown in basins will need more water for transpiration as temperatures rise.

The evaporation of water from reservoirs, rivers, lakes, and soil will also increase with warmer weather. The Kura River basin has a finite supply of potable water. Water use in the Kura Basin may be severely restricted if water flow continues to decrease as a result of climate change. This will have an impact on the Kura basin's population's quality of life and cause social and economic issues. If the basin's water resources are used more wisely and water losses are drastically decreased, then this risk can be avoided or reduced.

Dry rivers have become the norm in many areas of the Kura River basin in recent years. Reduced flow in rivers can be naturally caused by weather conditions that accelerate evaporation, but if excessive water use is added to this process, rivers may dry out over an extended period of time. Reduced river runoff damages surrounding ecosystems as well as those in the aquatic environment because the area's climate gets drier. Water use efficiency measures whether water is wasted (overused) or used efficiently in the production of goods and services.



Figure 2. Kura river basin

To forecast how climate change will worsen in the future, scientists utilize computer programs called

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particular circumstances. Climate models, for instance, assist us in understanding how the climate will change as greenhouse gas concentrations rise or how glaciers and river flows will be impacted by temperature variations of just one or two degrees. Climate scientists from Azerbaijan estimate that between 2015 and 2050, the temperature could rise by 0.7–1.58 °C based on their analysis using a variety of climate models. While there won't be any changes in temperature in Georgia's east, there will probably be a major decrease in the water flow in the Kura River and its tributaries in both countries. Agriculture

is going to be the most vulnerable sector to climate change.

There are social, economic, and environmental consequences to the Kura River's decreasing water level. Social effects. The population's likelihood of unemployment and poverty will rise as income levels decline, and the state will be forced to offer financial support to those individuals. Economic effects. Azerbaijan is a country with a lot of arable land along the Kura River. Its people mostly work in agriculture and raising livestock. The population will move into cities as a result of the development of this sector ceasing entirely due to the reduction of water, irrigation systems, and fresh water resources for livestock.

The population will be deprived of actual incomes as a result, and our vast areas will be abandoned and underutilized. As a result, this industry will contribute less to state revenue and more jobs will be created. This will continue economic development while raising unemployment and having a large financial impact on the state. Environmental effects. The Kura River's decreasing water supply will entirely or partially destroy the river's native flora, particularly the tugai forests that have grown there over thousands of years. The area's desert areas will become more widespread as a result of the destruction of this forest.

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