

# WATER MANAGEMENT IN SOUTH CAUCASUS

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Caucasus Region is the place of trans-boundary river basins. About two-fifths of the territory of this sub-region is located in trans-boundary river basins.

Caucasus rivers belong to the basins of the Black, Azov and Caspian seas. The annual average flow of the Caucasus rivers fluctuates between 1,000-2,000 mm to 50 mm and low. Important trans-boundary rivers include Kura, Araks, Sulak, Terek, Choroki. The major rivers and datas of the Caucasus are given below in the table N 1.

*General data of the Caucasus Rivers, Table N1*

<b>RIVER</b>	<b>LENGTH KM</b>	<b>BASIN DRANAGE AREA, m2</b>	<b>AVERAGE DISCHARGE m3/sec</b>	<b>BASIN HEIGHT m</b>
<i>Araks</i>	<i>1072</i>	<i>102000</i>	<i>210</i>	<i>3400</i>
<i>Kura</i>	<i>1364</i>	<i>188000</i>	<i>575</i>	<i>2100</i>
<i>Sulak</i>	<i>332</i>	<i>13400</i>		<i>3580</i>
<i>Terek</i>	<i>600</i>	<i>43700</i>	<i>302</i>	<i>3199</i>
<i>Choroki</i>	<i>438</i>	<i>22130</i>	<i>307</i>	<i>1800</i>
<i>Enguri</i>	<i>213</i>	<i>4060</i>	<i>170</i>	<i>3050</i>
<i>Kuban</i>	<i>906</i>	<i>57800</i>	<i>425</i>	<i>3080</i>
<i>Rioni</i>	<i>327</i>	<i>13400</i>	<i>405</i>	<i>2800</i>

*Source: Caucasus Water Balance, 1991. Water Resources of the Trans-Caucasus, 1998*

## Water resource issue

The lowland trans-boundary river, Kura-Araks, is characterized with a small amount of flow. For example, flow of low mountains fluctuates between 200-600mm, but in middle mountains the flow is 600-900 mm. The outflow is related to evaporation. In the places, where the climate is humid, the evaporation reaches up to 100 mm. During the recent years, a marked decline in precipitation has been observed in the Caucasus countries. In Georgia, the 1998 and 2000 summers were dry causing significant economic losses in terms of reduced agricultural production in both rain fed and irrigated areas, which gave rise to food shortage. the water balance in the three Caucasus countries are given in the table N 3.

*Water balance in the South Caucasus Table N3.*

<b>Country</b>	<b>precipitation km<sup>3</sup></b>	<b>total flow km<sup>3</sup></b>	<b>surface km<sup>3</sup></b>	<b>evaporation km<sup>3</sup></b>	<b>underground flow km<sup>3</sup></b>	<b>infiltration km<sup>3</sup></b>
<b>Armenia</b>	<i>17.4</i>	<i>6.24</i>	<i>2.34</i>	<i>3.9</i>	<i>11.2</i>	<i>9.77</i>
<b>Azerbaijan</b>	<i>35.1</i>	<i>7.81</i>	<i>4.81</i>	<i>3.0</i>	<i>27.3</i>	<i>14.2</i>
<b>Georgia</b>	<i>93.3</i>	<i>52.8</i>	<i>31.1</i>	<i>21.7</i>	<i>40.5</i>	<i>45.6</i>

*Source: Caucasus Water Balance 1991, Water Resources of the Trans-Caucasus, 1988*

In 2000, a severe drought affected the northern region of Armenia causing devastation to subsistence farmers in the mountainous areas who depend on rain fed irrigation. Droughts are also common in Azerbaijan, Particularly in the Kura-Araks lowland, which receives very little precipitation. In these years, the extremely dry summers caused significant economic losses to agriculture and fishery. Drainage for agriculture has destroyed many wetlands in Armenia, Georgia and Azerbaijan, particularly those in Kolkheti lowland, the Caspian Sea shore, and lowland areas of the Kura River basin, the Ararat Valley and around Lake Sevan. Some of the wetlands are returning back to their natural state because of the non-drainage systems<sup>1</sup>.

In the South Caucasus Region water resources aren't distributed equally. While Georgia is the richest country in water resources, Azerbaijan suffers from shortage of water supply. In the table N 2 are the data of water resources in South Caucasus.

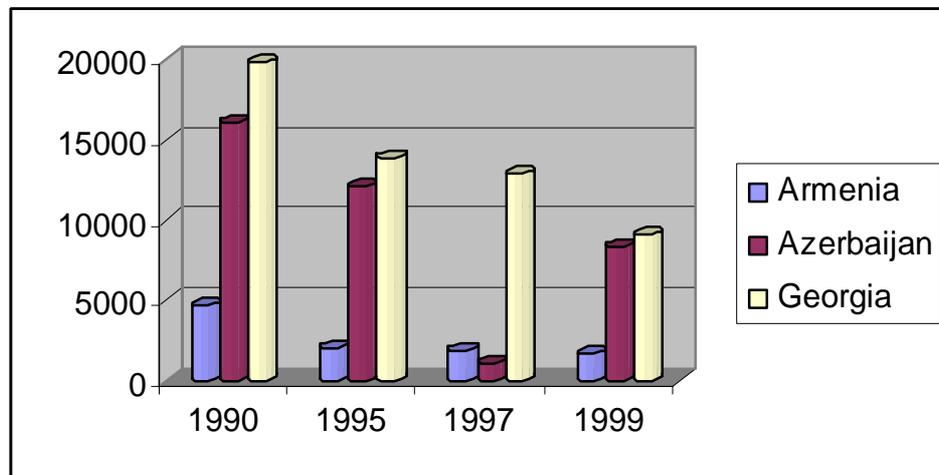
*Water Resources of the South Caucasus, Table N 2*

Country	Area of water collection 1000km <sup>2</sup>	Country area 1000km <sup>2</sup>	Local flow km <sup>3</sup>	Inflow km <sup>3</sup>	Total resources km <sup>3</sup>	Outflow km <sup>3</sup>
Armenia	59.2	29.8	5.63	2.08	8.32	7.71
Azerbaijan	217.9	86.6	7.72	19.4	28.1	19.7
Georgia	99.3	69.7	51.9	8.67	61.45	60.61

*Source: Caucasus Water Balance, 1991, Water Resources of the Trans-Caucasus, 1998*

In Caucasus the main user of water is the agriculture, followed by households and industry uses. It is significant, that usage of water resources and supply were changed after the break-up of the Soviet Union. In the period of Soviet Union, the losses of water in irrigation and water supply system were high. Only a small percent of water was reused. In irrigation system losses of water were 29-33%. In Armenia, in Azerbaijan and in Georgia the enterprises were exceeded their limits by 15, 16 and 17 million cubic meters. It is significant, that now the use of water was declined in all above-mentioned countries (especially in Georgia and in Armenia due to decline the industrial activities). However, in Azerbaijan the usage of water isn't changed so much. While overall per capita renewable water resources are abundant in Georgia, with 12.000m<sup>3</sup> per year, in other countries, like Armenia and Azerbaijan, this amount is less than one-third: Armenia 2,800m<sup>3</sup> and Azerbaijan 3,800m<sup>3</sup>. The usage of water resources are given below on the graphic.

<sup>1</sup> Water Resources in the South Europe and Central Asia Region 2003



This graphic shows how collaborates the usage of water resources from 1990 to 1999 years.

### **Quality of Surface and Ground Waters**

It is very important to take into account the quality of Surface and Ground waters. The water quality is one of the main environmental problems. Organic and chemical substances, heavy metals, hazardous chemicals, and oil products are the main polluters of the basins of Southern Caucasus Rivers. The same can be said about Black and Caspian seas' basins. In Armenia and Azerbaijan different industries also discharged high loads of pollutants into the Kura and Araks rivers and their tributories. One of the main pollutants of river basins is municipal sewage collectors and land fields, which are arranged near the river. Kura-Araks has a high degree of international importance in terms of both quality and quantity. It covers the below mentioned countries: Georgia, Armenia, Azerbaijan, Turkey and Iran. The rivers in the Kura basin provide water for millions of people in these countries for agriculture, domestic, industrial, power generation, and recreational purpose. Azerbaijan relies heavily on the Kura River for all types of water use.

### **Kura-Araks Water basin**

Kura –Araks water basin, includes two main rivers, the Kura, Araks and their tributories, which covers three countries: Armenia, Azerbaidjan, Georgia and part of Turkey and Iran. The Total area of the basin is more than 200,000 km<sup>2</sup>, where the 188,000 km<sup>2</sup> of catchamane is Kura river basin and for about 102,000 km<sup>2</sup> is Araks river basin. The Kura takes the source from Northern Turkey and pass through Georgia and flows in Caspian Sea in Azerbaijan. The total lenght of

Kura river is about 1,515 km and its main tributary, Araks river is for about 1,072km. The basin is rich with biodiversity and wetlands.

The rivers are mainly used for agriculture, domestic, households, industrial, and hydropower generation and recreation purposes. Whereas Armenia and Georgia have abundant underground water reserves, which are used as a major source of drinking water, Azerbaijan is almost entirely reliant on the Kura river for all types of water uses. The problems existing in the basin are related to both quantity and quality of water. Water shortage is acute for Georgia and Azerbaijan, since rainfall disappears from West to east of the basin. The average annual precipitation in Central Georgia, where the Kura enters Georgia from Turkey, is 500 mm but is 200 mm in Azerbaijan, where the river flows into Caspian Sea. Similarly, evaporation rates soar from west to east. Drought periods in the Kura basin are very common. This has seriously affected the economies of Georgia and Azerbaijan. Overall, despite the efforts to manage river flow the region faces both floods and shortages. Water quality is deteriorated by raw municipal and industrial wastewaters and return flow from agriculture, imposing health, ecological and aesthetic threats. Additionally, improperly designed solid waste landfills and illegal dumpsites, drainage waters from open pit mines and urban run-off degrade the water quality. Municipal sewage contributes the highest share in pollution. The Kura river downstream of such large city like Tbilisi is heavily polluted with organical matters and other pollutants. Thus, when the river crosses the border of Azerbaijan it is already heavily polluted. For example, in 1992-94, average annual concentrations of phenols and oil products exceeded existing water quality standards about 13-14 and 2.5-3 times respectively in the vicinity of village, Azerbaijan near the border with Georgia.

At present, most wastewater is left untreated. Existing treatment facilities are out of date and work with low efficiency.

Drought and floods are common in the basin.

Problems are also growing in the Choriki river shared by Turkey and Georgia as a result of the construction of a dam south of the Turkish-Georgian border. The erosion problem in Georgia coastline is directly related to the transport of sediment in the Choroki river, which is expected to increase unless sediment management measures in the operation of the new Turkish dam are properly implemented.

### **Need for Good Management Practices**

Trans-boundary water management is very important for South Caucasus. Two out of three countries in the region have 70% of their territory lying within trans-boundary river basins, and one out of three countries have more than 50% of their water resources originating outside their boundaries. Pressing concerns such as flood mitigation, improvement of water quality, operation of hydraulic infrastructure, and wetlands conservation, all have trans-boundary dimension.

Some countries are making progress for the management of trans-boundary water resources such as the adoption of broadly recognized principles, including responsibility for cooperation and joint management and incorporation of trans-boundary water issues in revised legal and institutional frameworks. Efforts however are limited to a few trans-boundary river basins, lakes and deltas<sup>2</sup>.

### **Recommendations**

To achieve the trans-boundary water management in Caucasus, the countries of this region should:

- ❖ work out the projects aimed at improvement of management in trans-boundary river basins;
- ❖ rehabilitate the water infrastructure and irrigational systems;
- ❖ reduce water losses;
- ❖ integrate water resources planning and management;
- ❖ provide assistance to strengthen water quality monitoring systems;
- ❖ improve water quality and etc.

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<sup>2</sup> Water Resources in the South Europe and Central Asia Region 2003