USE OF TRANSBOUNDARY WATER RESOURCES

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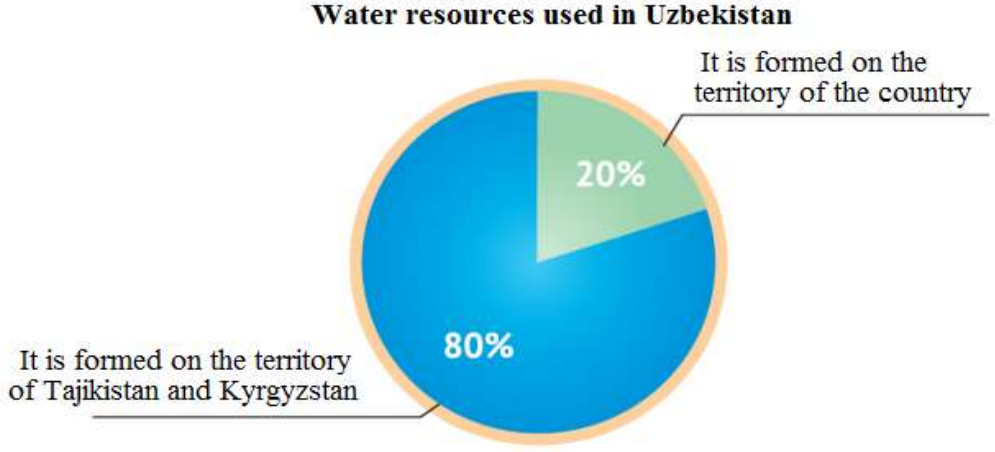
Abstract.
The article provides information on the problem of river water depletion under the influence of climate change, as well as due to transboundary water use problems and its solutions.
Keywords: annual water consumption, water management, reserves, countries, needs, region, transboundary.

INTRODUCTION

Our people have revered water since time immemorial, even comparing its every drop to gold. Proverbs such as "Water is a priceless wealth" and "Water is a gem, water is a jeweler" that have not lost their meaning over the centuries testify to how precious a blessing nature is.

Water is the main source of life on earth. It is known that mankind, flora and fauna, in general, no creature can live without water. Although two-thirds of the Earth's surface is covered by water, 97.5% of it is salt water, which is unsuitable for use. The remaining 2.5% are fresh water resources, 79% of them are permafrost, 20% are groundwater, and 1% are rivers and lakes.

According to data, 4 out of 10 of the world's population live in areas where there is a lack of clean drinking water. UN experts predict that the population of the Earth will reach 8.6 billion by 2030, and 9.8 billion in 2050. Naturally, as the human population increases, the demand for water increases.



Picture 1. Formation of water resources used in Uzbekistan.

Water is extremely important for Uzbekistan, which is located in an arid region far from the ocean and large seas. About 80 percent of the water resources used in our country (about 41.5 km3/year) are formed due to glaciers in the territory of neighboring republics. Due to global climate changes, 30% of the existing more than 8,000 glaciers in Tajikistan and 16% of the 10,000 glaciers in Kyrgyzstan have melted. Another 15-20 percent of glaciers are predicted to disappear by 2030.

At the same time, the number of years of water scarcity in our region is increasing. If until the year 2000, the water shortage was repeated every 6-8 years, then this situation is observed every 3-4 years. It can be seen that rational and effective use of every drop of water is becoming one of the most urgent tasks not only in our country, but in the whole world.

According to estimates, in 2015 the total water deficit in Uzbekistan was 3 km3, by 2030 it may reach 7 km3, and by 2050 it may reach 11-13 km3.

The socio-economic development of Uzbekistan, which has the largest population among Central Asian countries, depends to a large extent on natural resources, especially water resources, as in other regions. In addition, the development of economic sectors of our country, including the agricultural sector, cannot be imagined without water resources.

Based on this, in the future, further acceleration of reforms in the water management system, rational use of existing water resources, and the wide application of economical irrigation technologies to the production of abundant crops from agricultural crops and scientific contribution to ensuring food security are the main criteria of the activity of our scientists. .

According to the Resolution of the President of the Republic of Uzbekistan "On measures to further improve the water resources management system" of October 9, 2019 No. introduction of market principles and mechanisms in the field of management, as well as implementation of priority tasks in the field of science development.

With climate change, the water supply of the territories and the cultivation of crops in the Aral Sea zone are deteriorating. Under such conditions, the state of water consumption increases partially, requires irrigation, and also requires an increase in the rate of water consumption of agricultural crops.

Water conservation is the best option to reduce increasing water stress, but in many cases it is not viable.

It is expected that global water supplies will be subject to increased stress due to increased demand driven by population growth, rising levels of prosperity, changing diets, urbanization and rising industrial demand. Most of the world's water resources are currently used for food production, which is likely to continue until 2050. However, agricultural water consumption is expected to decline over the next 30 years as demand from industry and households continues to grow.

Under these conditions, the tasks of water saving in the face of climate change, the issues of increasing water supply, the efficient use of water resources in case of shortage are priorities, primarily for agriculture, as the main consumer of water, which takes 91% of the total water consumers in the country. Even temporary imbalances between the availability of water resources in conditions of its scarcity and water needs, the deterioration of the quality of the surface and groundwater causes rivalry between water users, leads to regional interregional conflicts, and causes serious economic and social consequences.

The water saving program aimed at increasing water availability and overcoming water shortage in the face of climate change should be implemented in two directions.

- Water saving strategy for water resources and water supply management, which should include the following.

1. Increasing available water resources by increasing the capacity of existing sources and developing new sources of irrigation.

2. Improving the systems of storage, transportation and distribution of water for irrigation in order to provide high flexibility in water supply and reduce systemic water losses;

3. Modernization of the irrigation network of facilities.

4. Improving the ameliorative state of irrigated lands to ensure the reduction of water costs for land leaching.

5. Reducing the dependence of water consumption on the availability of water in water sources by introducing systemic and on-farm water circulation.

6. Improving water management and water supply associated with compliance with irrigation schedules and optimal timing.

The second direction is agronomic, in order to reduce the need for water it is necessary.

1. Creation of a crop variety with a low level of water consumption and changes in the farming system.

2. Reducing the need of cotton for water when cultivating it under a film, where water consumption is reduced by reducing evaporation from the soil, in addition, the sowing dates are shifted by two weeks, the number of re-sowing is significantly reduced.

3. Reduction of water consumption of agricultural crops and through the development of echelon strips.

4. Carrying out leaching, taking into account the degree of soil salinity and salt tolerance, crops, the use of special methods of agricultural technology and land reclamation on saline lands.

5. Carrying out field planning using a laser system and the introduction of water-saving technologies and irrigation techniques. Planning re-collector-drainage water, the use of film mulching the soil surface.

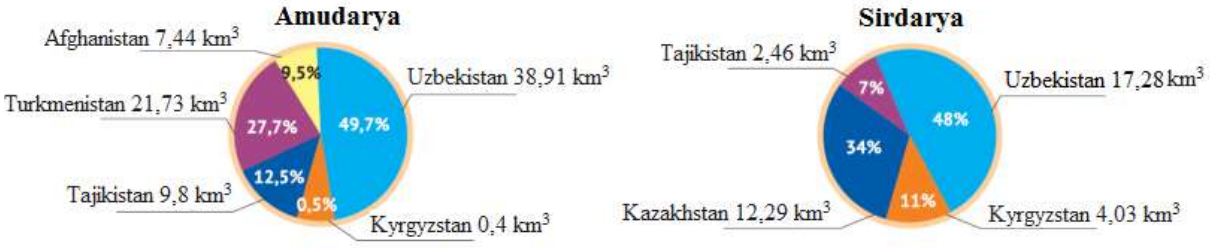
6. Planning of water use and placement of agricultural crops, taking into account the water supply of the territory. Since, the experiments conducted in Karakalpakstan showed that in order to mitigate the effects of water stress and maintain the existing level of crop production, it is advisable to place the main crops in years of low water supply on lands with high productive capacity (bonitet score). Lands with a relatively low bonitet score should be assigned to drought-salt-resistant crops and as natural plantations for the procurement of raw materials for the pharmaceutical industry.

Summarizing, the above measures for water saving in the face of climate change, the increase in air temperature by 1.5-2.0 C, the decrease in relative humidity and the decrease in precipitation by 22 mm, as well as the current market relations, require the improvement of organizational and economic methods of managing water use and especially water supply agriculture in the Aral Sea zone [5].

Amudarya is the largest river in Central Asia. Its length is 2,540 km from the main source of the Panj River, and the area of its basin is 309,000 m2. Syrdarya is the longest river in Central Asia. Its length is 3019 km from the main source of the Norin River, and the area of its basin is 219,000 m2.

The main sources of water resources used in Uzbekistan are Amudarya, Syrdarya and their tributaries. The average perennial water flow volume of all rivers in the Aral Sea basin is 116.02 km3 per year, of which 79.4 km3 is formed in the Amudarya basin (67.4%) and 36.6 km3 (32.6%) in the Syrdarya basin.

The share of water intake of Uzbekistan from the main rivers of the Aral Sea basin is 49% of the total water resources created in the region.



Picture 2. States receiving water from the Amudarya and Syrdarya rivers.

Almost all of these reserves have been used by countries for various needs. Each country in the river basin has an agreed share (limit) of water withdrawal for use.

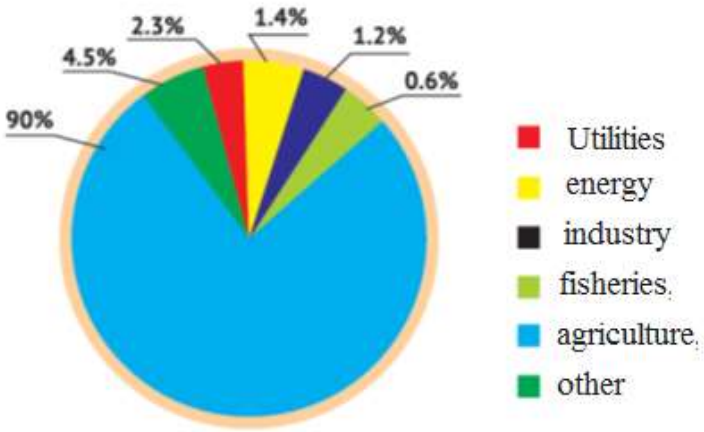
In the basin schemes of the Amudarya and Syrdarya rivers, developed in the 80s of the last century, the share of each country, the specified amount of water intake, is still recognized by all the republics of the region.

Surface water resources of the Aral Sea basin (average annual flow, km3)

Countries	Name of the basin		Total for the Aral Sea basin	
	Syrdarya	Amudarya	km³	%
Kazakhstan	2,516	-	2,516	2,2
Kyrgyzstan	27,542	1,654	29,196	25,2
Tajikistan	1,005	58,732	59,737	51,5
Turkmenistan	-	1,405	1,405	1,2
Uzbekistan	5,562	6,791	12,353	10,6
Afghanistan and Iran	-	10,814	10,814	9,3
Total for the Aral Sea basin	36,625	79,396	116,021	100

There are more than 60 reservoirs with a total water volume of 64,8 km3 in the Aral Sea basin, and the usable volume of reservoirs is 46,8 km3. 20,2 km3 of it belongs to the Amudarya basin, 26,6 km3 to the Syrdarya basin.

In recent years, the annual volume of water resources used in Uzbekistan is on average 51-53 km3. This is evidence of a serious reduction in the total amount of water received (20%). This situation is related to the depletion of river waters under the influence of climate change, as well as due to problems of transboundary water use.



Picture 3. Water use by sectors in Uzbekistan.

From 1980 to the present, the population of Uzbekistan is 15 million. from 34 mln. as a result of the increase in the number of people, the per capita water consumption decreased (from 4403 cubic meters per person in 1980, it decreased to 1600 cubic meters in 2020).

The indicator of annual water consumption per capita in other countries is as follows (m3):

Kazakhstan - 2250, Kyrgyzstan - 1910, Tajikistan - 1830, Turkmenistan - 5100, USA - 1600, Switzerland - 1000, Turkey -550, Germany - 460, Israel - 300, Singapore - 45.

Bilateral working groups are being formed and agreements are being reached on the development of cooperation in the field of water management with neighboring countries.

Also, cooperation is being implemented within the framework of the Interstate Water Management Coordinating Commission of Central Asia. The adoption of the regional program allows the development of cooperation between the countries of the region on the joint use of transboundary water resources, joint review and implementation of water and energy projects, and the adoption of new regional legal documents on the use of water resources of Amudarya and Syrdarya.

In conclusion, the following measures are planned to improve and further develop interstate cooperation in the field of transboundary water resource use of the region:

- To continue active cooperation of the Republic of Uzbekistan with the countries of the Aral Sea basin and regional interstate water management organizations in the issues of joint use of water resources and interstate water management facilities;
- Development of mutually acceptable mechanisms of joint management of transboundary water resources that ensure balance between the interests of Central Asian countries;
- promotion of norms and principles of UN conventions on transboundary waters;
- creation of a joint monitoring and open data exchange mechanism for the implementation of the existing legal agreements, including the program of improvement of water measurement on the scale of Syr Darya, Amudarya and other transboundary rivers;
- To study the possibility of participating in the joint financing of water management projects implemented by the parties, taking into account the interests of Uzbekistan and regional partners;
- permanent establishment of information exchange between the countries of the region on water use;

- to advance the development of a unified position on the construction of large hydrotechnical structures by the countries of the region, taking into account common interests;

- development of joint plans for the management of regional water resources and determination of future tasks, including taking measures to adapt to climate change and sharing experience in areas of mutual interest.

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