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## GENERAL ENVIRONMENTAL WATER ISSUES IN THE SOUTH ISLAND

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### **Abstract**

*This article discusses the current state and factors influencing the problems of water resources in the Karakalpakstan region, as well as the general environmental problems of the southern Aral Sea, the problem of lack of water for the population and the physicochemical and biological characteristics of water.*

### **Key words**

*drinking water , environmental protection , water mineralization, water pollution level , wastewater.*

Water is one of the inexhaustible natural resources on the planet. Without water, the existence of living organisms is impossible, since water forms the climate. The layer of water covering the surface of the earth is called the hydrosphere.

Water is an integral part of almost all technological processes in agriculture and industry. In these areas, water is used in large quantities. If groundwater is overused, it can eventually disappear. This happens because modern technology is not able to completely purify water one hundred percent. To fully purify water, it is also necessary to use surface water, which in turn is even more wasteful. This leads to serious consequences for natural water basins.

In our republic, work is currently underway to reduce polluted wastewater and reduce the use of groundwater resources. The use of water in rural areas is monitored. Water meters are installed in houses.

Although water is the most abundant substance on the earth's surface, about 98% of it is salt water from the seas and oceans. As little as 0.1% of available fresh water can be used. However, water availability is also affected by inefficient utilization technologies. For example, to produce 1 ton of synthetic fiber, 500 cubic meters of fresh water are required. The total volume of water used to produce 1 ton

of product ranges from 15,000 to 20,000 cubic meters. Currently, water recycling schemes have been developed and partially implemented in certain industries. This is a local method of water purification. However, such measures significantly reduce water use standards and in some cases may eliminate the possibility of extracting groundwater resources (Lvovich, 1981).

Water is the most abundant inorganic substance on our planet. Without water there is no life on earth. Water plays a key role in photosynthesis, being the main source of oxygen. It is important for the formation of the atmosphere and climate.

Most of the water on earth is concentrated in the seas and oceans. Only 2% of all water on earth is fresh water. 85% of fresh water comes from glaciers and other glaciers. Recycling of fresh water occurs in nature thanks to the water cycle. Rivers are mainly sources of fresh water. Fresh water is used from rivers for domestic purposes, agriculture and industry. Unfortunately, human activities lead to pollution of natural water resources, which negatively affects their biosphere function. Water pollution is a pressing problem nowadays. Water is polluted mainly by oil and oil products, industrial and agricultural waste, radioactive elements, hazardous chemicals and other substances (Tursunov Kh.T., 1997, Khasanov and Gulomov, 2002).

Humanity is heavily dependent on fresh water resources. However, there are currently problems with the availability of fresh water in various parts of the planet. Currently, the need for fresh water for the urban population is no more than 20% of the total number of residents, and for the rural population - no more than 75%.

According to your message, pollution of water resources leads to a decrease in their reserves and a deterioration in water quality. Particularly dangerous are contaminated surface waters that return to water bodies in the form of wastewater. Most polluted water resources are caused by industry, industrial use of water, and various chemical and organic pollutants.

To prevent wastage and waste of water, it is necessary to develop technologies for purification and reuse of water in industry, and to combine the production of drinking water with the production and use of water in other areas to minimize losses and excess use.

A significant part of the rivers is also polluted. This is due to industrial and municipal enterprises, treatment areas, sanitation, as well as the use of various mineral and organic fertilizers and hazardous chemicals that enter the rivers from agricultural, industrial and mining areas.

To create sustainable agroecological systems, first of all, it is necessary to deeply study their condition and determine the impact of economic activities on the environment. Studying the environmental problems of water management and industry in the Republic of Karakalpakstan can provide an opportunity to identify the causes of these problems and develop measures to solve them. Karakalpakstan is a historical area of agriculture, and its history of development is closely connected with problems of water ecology (Abdirov, 1991, Agadzhanyan, 1994, Kamalov, 1996, Konstantinova, 1998).

Water is the most important thing for the survival of living organisms on earth, since without water life is impossible. Water forms the basis of cells and tissues of living organisms. Currently, every person in the city needs 300-500 liters of water per day for their vital needs. The total amount of fresh water used by all people living on our planet is approximately the same as what falls on the earth's surface in a year. The process of formation of organic substances by plants is carried out by absorbing large volumes of water. For example, to form 1 kg of plant mass, 150 to 200 cubic meters of water are required, depending on conditions. All plants on the territory of the Republic of Moldova consume an average of 3,500 cubic meters of water per year, which is one third of total consumption. The process of harvesting plants also requires large volumes of water. For example, growing 1 ton of cotton on 1 hectare of the growing season requires from 1,500 to 10,000 tons of water. On Earth, the cultivated area under agricultural crops is 220 million hectares. Growing 1 hectare of agricultural crops annually requires an average of 12 to 14 thousand cubic meters of water. Therefore, the issue of reducing the volume of water used in agriculture becomes relevant (Avtsin, 1972, Ilinsky, 1988). In addition, the source of water should be rivers and lakes located above the area where there is no salinity. Water should be taken from a river depth of at least 2.5 meters to avoid contamination. Any source of water, especially open reservoirs, must be connected with the external environment and ensure water quality, since it can be influenced by natural phenomena, industry, municipal construction and everyday activities of the population, therefore, when constructing a water supply system, it is necessary to create a sanitary protection zone. In some areas, such as large cities or industrial complexes, where there is heavy use of hazardous chemicals in agriculture, it may be necessary to expand these areas to meet the requirements of health authorities.

Also, in modern conditions, the issues of water use and its legal protection in agriculture, enterprises and organizations of our republic are considered in a number of scientific, legal and environmental sources. However, modern market

economics and lifestyle require the use of new legal, scientific, technical and environmental approaches.

Firstly, legal environmental protection of water resources plays an important role in providing the population with clean drinking water, is of significant importance from a hygienic point of view, and even in preventing the spread of diseases. Legal environmental protection of water resources also helps to preserve nature as a whole, associated with flora and fauna that depend on water.

Ultimately, legal environmental use of water, having the right to use water, economical use, using water wisely and responsibly, environmental protection of water resources based on laws related to the use and conservation of water resources used, conservation and use of water in accordance with sanitary - epidemiological norms and regulations, as well as elements that can deprive the right to use water, are of great importance. In general, further improvement of environmental protection of water means improved life, longevity, so to speak, we are not making mistakes.

Thus, for the continuation of human life, it is necessary to ensure access to water, water resources on earth, especially fresh water. The importance of water for the human body has been well studied by many Eastern scientists. For example, the first volume of the book "Canons of Medicine" by Abu Ali ibn Sino (Avicenna) contains a lot of information about the "Essence of Water", where he explains that water is one of the necessary elements for human life and describes several ways to improve the properties of water (Bashiev and al., 1996).

The objectives of water conservation in the independent Republic of Moldova include "preventing threats to public health from pollution of all water, as well as reducing the content of pesticides in water, deterioration of water supply conditions and the physicochemical and biological properties of water, deterioration of natural water purification, disruption of the hydrological and hydrogeological regime as a result of other adverse events," etc.

The new water law pays attention to the importance of preserving and improving the condition and regime of water, implementing measures to ensure the protection of water resources, as well as interaction with enterprises, organizations and local governments to protect nature using technology, irrigation, land reclamation, agriculture, hydraulic engineering, sanitary measures and other useful activities.

Water pollution is defined as a change in the physical, chemical and microbiological properties of water relative to its original state.

Currently, water pollution is mainly associated with industrial emissions, which leads to negative consequences in the form of surface water pollution. The conservation and protection of water resources from pollution is mainly based on the creation of a water supply system that ensures sufficient water in the catchment areas, a clean environment and the preservation of subsoil.

When choosing a place for collecting water from open water pools, it is necessary to take into account the absence of water pollution, a sufficient amount of water in the pool, the cleanliness of the environment, and the non-violation of the hydrological regime. Choosing a place to collect water is always a difficult sanitary problem. It is important to take into account the proximity of the water collection site to the wastewater outlet and the population's residence.

Also, unplowed areas require a large amount of water compared to plowed areas. For example, if 1 hectare of unplowed land requires 1200 m<sup>3</sup> of water, then a large area of arable land will require 12-14 thousand m<sup>3</sup> of water.

In addition, people use large amounts of water for industry, agriculture and domestic needs. In industry, water is used to carry out various technological processes or cool equipment. For example, to produce 1 ton of steel, 5000 tons of water are required, to produce 1 ton of nylon - 1500 tons, to produce 1 ton of nylon - 5600 tons, to produce 1 ton of paper - 1000 tons, to process 1 ton of cotton - 200 tons of water, for extraction of 1 ton of coal - 6 tons of water. (Bashiev, 1996).

It is vitally important to provide sufficient water to the population in all places. This figure is approximately 150-200 cubic meters in moderately developed areas and 500-600 cubic meters in highly developed industrial areas.

Many places use water that does not meet water quality requirements. There are no plumbing systems. Such conditions exist on our territory. Especially in spring and summer, water quality decreases. This leads to the emergence of some infectious diseases, such as hepatitis, jaundice, cholera and others (Atabaev, 1980, Atanazarov, 1999, Ataniazova, 2001, Beder, 1982, Zhulomov, 1994, Zhollibekov B. et al., 1987, 1997).

To solve these problems, large-diameter water supply lines Tuyamoin-Nukus-Takhtakupyr, Takhiatosh-Kungirov-Kulsari were built in Karakalpakstan. They are still functioning. In the near future, water supply lines Tuyamoin-Turtkul, Kegeyli-Bozatov, Tuyamoin-Ellikkala and Urgench-Mangit will be launched. The Kungirov-Moinok water line is being built. Water supply systems are being built in regional centers. In addition, in rural areas of the republic there are about 80 EKOS-50 water treatment units that serve the rural population.

In the past, our republic had enough water. However, in recent years, due to the redistribution of water in the upper and middle reaches of the Amu Darya, the construction of reservoirs and the expansion of arable land, water restoration has become insufficient. In addition, the decrease in water level in the Amu Darya due to its use by the Karakum, Amu-Bukhara and Amu-Afghan canals has led to a significant decrease in water. Therefore, for the development of industry and the subsequent development of agriculture in our republic, it is necessary to strictly control water sources. Because there is nothing more valuable than water, which cannot be replaced by anything else.

Currently, one of the most important problems in the use of the environment and natural resources is providing the population with a sufficient amount of clean drinking and domestic water.

By order of the President of the Republic of Uzbekistan dated May 24, 2022 No. PQ-257, additional measures were taken to improve the level of provision of the population with clean and high-quality drinking water, as well as to improve water supply and sanitation in order to create comfortable living conditions and preserve the health of citizens.

It is clear that improving water supply is a priority for the government of Karakalpakstan. In order to gradually solve environmental problems for the sustainable development of our country, serious work has been carried out on long-term programs. As a result, the national program "Environmental Protection in the Republic of Uzbekistan for 1999-2005" was developed with the support of the Swiss Confederation and the World Bank. This program set goals for creating a healthy environment for the population, sustainable use of natural resources, preventing water, air and soil pollution, as well as solving other problems.

To date, during the years of independence of Uzbekistan, significant funds have been allocated from the state budget to improve water supply and build 850 km of water supply networks. The measures taken have already yielded positive results: over the next five years, the provision of clean drinking water to the population of Karakalpakstan increased by 11%, and in the Khorezm region this figure was 32%. In other regions of the country, positive dynamics are also observed, and strict monitoring is carried out to ensure the purity of water. State environmental authorities and enterprises monitor the condition of water resources, including lakes and rivers located near industrial facilities.

In general, about 20% of industrial enterprises have contaminated water sources; production waste contains hazardous substances and heavy metals. In industrial areas, permissible concentrations of heavy metals in industrial

wastewater exceed the norm by approximately 50 times, and oil - in larger quantities. According to information from specialists from the State Inspectorate for Analytical Control, out of 626 industrial enterprises, a significant number do not comply with wastewater treatment requirements. The efficiency of the wastewater treatment equipment used varies from 5% to 90% strength. However, due to the wear and tear of the treatment plants, modern requirements are not met, and their efficiency is no more than 40-50%. This leads to a sharp deterioration in water quality. Some enterprises have outdated water treatment equipment and their efficiency is very low. For example, a dairy plant in the Bukhara region, a Kogon textile plant, a jerboa and silk factories in Romitan and the Karakul region have the efficiency of water purification equipment of less than 8-10%. Similar problems with pollution of lakes and canals can be found in the Salar and Korasuv canals flowing from Tashkent, where the chromium content was found to be 55 times higher than that of petroleum products. In addition, one of the sources of drinking water pollution are collectors and canals into which contaminated wastewater containing pesticides and other mineral salts is discharged in significant quantities. According to information from the State Inspectorate for Analytical Control, the situation worsened during 2001 by 3 times throughout the republic. In 2002, as a result of a study in the Arnazoy lake system, it was revealed that they were contaminated with salt and dead sea in the range of 3.5-15.2 mg/l. Water mineralization ranged from 5.6 to 10.4 mg/l. In subsequent years, the mineralization of water in Lake Tuzkon continued to increase. For example, in January 2001, mineralization was 3.9 g/l, and according to the results of the latest study at the end of March, this figure was twice as high. Research has also shown that the mineralization of water in Lake Aydarkol is much higher and currently amounts to 2 g/l. These data indicate an increase: Already approximately 20% of industrial enterprises have contaminated water sources, which contain up to 20% of harmful substances and heavy metals. Industrial enterprises in their wastewater exceed the permissible concentrations of heavy metals by 50 times, and also exceed the norms of oil. Specialists from the state inspectorate responsible for analytical control reported that out of 626 industrial enterprises, a significant proportion do not comply with wastewater treatment requirements, and as a result of such improper treatment, a significant amount of untreated wastewater enters the environment. Existing treatment plants have treatment efficiencies ranging from 5% to 90%. However, wear and tear of equipment and aging mean that these treatment facilities do not meet modern requirements and their efficiency is only 40-50%. This has a significant impact on water quality and it becomes increasingly

polluted. Some enterprises use outdated water treatment equipment, and the efficiency of their treatment systems is extremely low. For example, a textile mill in the Bukhara region, factories in Romitan and Karakul region have the efficiency of water purification systems of less than 8-10%. Similar problems with water pollution are observed in the Salar and Korasuv canals, which flow from the city of Tashkent. In these channels, the chromium content significantly exceeds the norm by 55 times. In addition, the surrounding agricultural areas experience contamination of drinking water with untreated wastewater containing pesticides and other mineral salts. According to state inspection data, during 2001 the situation with water pollution in the country worsened by 3 times. In 2002, studies showed that high levels of salt and mineral pollution were found in the Arnasoy lake system, reaching 3.5-15.2 mg/l. The water mineralization in these lakes ranged from 5.6 to 10.4 mg/l. In subsequent years, the concentration of minerals in the water of Lake Tuzkon continued to increase. For example, in January 2001 the concentration was 3.9 g/l, and according to the latest data it has doubled. A similar situation is observed in Lake Aydarkol, where the concentration of minerals also significantly exceeds the norm and continues to grow. These data indicate an increase in water pollution in Uzbekistan.

Water pollution has serious consequences for the environment and public health. Drinking water contaminated with toxic substances and heavy metals can lead to various diseases, including poisoning, kidney disease, liver disease and nervous system disease. It is especially dangerous for children, pregnant women and people with weak immune systems.

The government of Uzbekistan is taking measures to combat water pollution and improve the quality of water resources. As part of national programs, plans have been developed for the modernization and construction of new treatment facilities, as well as the introduction of modern wastewater treatment technologies at industrial enterprises. There are also educational programs and campaigns to raise public awareness about the need to conserve and protect water resources.

However, the problem of water pollution remains relevant, and its solution requires an integrated approach, including cooperation between the state, enterprises, the population and environmental organizations. It is necessary to strengthen monitoring of compliance with environmental standards and wastewater treatment requirements, as well as encourage the use of environmentally friendly technologies in industry.

The conservation and protection of water resources are important tasks for ensuring the sustainable development of the country and the well-being of its



population. This requires joint efforts and long-term strategies aimed at improving the condition of water systems and reducing water pollution in Uzbekistan.

Recently, an analysis of the composition of surface waters of the Zarafshan rivers in Samarkand, Navoi and Bukhara regions was carried out. At 20 points of the river, water samples were taken three times and analyzed for the presence of heavy metals and petroleum products. Water in the nearby areas of the Tallikulan and Navoi Azot chemical plants, as well as in the Siba canals, contained a significant amount of ammonia - from 5.2 to 36.5 mg/l, manganese - from 3.5 to 170.7 mg/l, selenium - from 3.0 to 91.0 mg/l and fluorine - above 2.2 mg/l (Vodokhoz. p. et al. Environment in Central Asia, 1980).

In addition, an increased content of ammonium ions - from 1.9 to 1.8 mg/l, nitrates - from 2.5 to 19.2 mg/l and phosphates - from 2.5 to 18.9 mg/l.

These data indicate the insufficient efficiency of water treatment plants and the fact that we ourselves pollute the water we use. According to the results of the analysis, water treatment facilities in the republic do not work properly; most of them are outdated and do not fulfill their functions. The time has come to introduce economic mechanisms to improve water quality. The use of any production methods that harm water quality must be stopped. Otherwise, the benefits of water will be much less than its harm. Human health is of supreme importance and cannot be measured by material indicators.

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