

# Environmental tragedy of Central Asia: The Aral Sea problem

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**Abstract.** The whole natural system contributes to the creation of the most favorable environment for a stable environment, biological life, and especially human life. Nature is not the wealth of mankind, the natural world that surrounds it, and man is a part of it. The formation of a system of knowledge about the state of human and environmental protection and the interaction between the hazardous impacts of the polluted environment creates the problem of creating a unified and integrated system of environmental protection. Authoritarian policies in the post-Soviet system is one of the main reasons for the emergence of a severe environmental situation in the region. The negative consequences of this policy were particularly evident in the globalization of the Aral Sea problem, which began in the 1960s. This article covers environmental and natural security issues in the Republic of Uzbekistan, and the Aral Sea is one of the strongest natural disasters in the region. Key words: Natural security, The Aral problem, environmental protection, environmental cooperation

## 1 Introduction

In the 21st century, in the globalization of the world, environmental problems have moved beyond the borders of one country or region and have an impact on the entire planet. In the name of sustainable development on Earth, the United Nations is also encouraging nations around the world to address environmental challenges and to unite their efforts and opportunities. At the 63rd Session of the UN General Assembly in 2009, it was emphasized that maintaining harmony is essential to achieve a fair balance between the economic, social and environmental needs of current and future generations.

Environmental issues are being studied by a number of universities and research centers around the world, including the threat of imbalance between man and nature in the ecosystem, the rational use of natural resources, and the implementation of economies for sustainable development. During the years of independence, Uzbekistan paid particular attention to the conservation and sustainable use of natural resources, and to provide a favorable environment for present and future generations. Tasks in this large-scale programs aimed at solving environmental problems in the country require further

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strengthening of the joint efforts of state bodies, public associations, other civil society institutions and citizens.

The President of the Republic of Uzbekistan "... we are clearly aware of the scarcity of water resources, the deterioration of the quality of drinking water, the degradation of soils, the dramatic reduction of biodiversity, and the severe climate change. ... We must unite our efforts to address the consequences of this tragedy and improve the economic situation in the Aral Sea region, addressing water and environmental problems in the region, based on our common interests [1, p. 9-18]. Therefore, environmental protection in the country, improvement of the environmental situation, and ensuring environmental sustainability are of vital importance. Issues related to economic and environmental factors of environmental protection have been covered in studies by economists and environmentalists [2, p. 14]. Further research in this area has suggested that along with the exacerbation of existing environmental problems in the country, new environmental problems will emerge [3, p. 75]. The main focus of these studies was on the Aral Sea.

## 2 Main part

The Aral Sea basin consists of 5 Central Asian republics with an area of 550,000 km<sup>2</sup> and irrigated area of 7.95 million ha. The area of renewable water resources in the region is on average 11-120 km<sup>3</sup>. Their main composition is the Amudarya, Syr Darya and ground water reserves (14.7 km<sup>3</sup>). The volume of reservoirs is 60 km<sup>3</sup> [3, p. 15]. 55.4% of total water resources in the Aral Sea are in Tajikistan, 25.3% in Kyrgyzstan, 7.6% in Uzbekistan, 3.9% in Kazakhstan, 2.4% in Turkmenistan. The remaining 5.4% in Afghanistan and partly in China and Pakistan.

The Aral Sea is the only region in the region and is of great importance in Central Asia, including the Lower Amu Darya, which directly depends on the environment, the nature, the climate, the health and the style of the people living there. The water of the sea has been constantly changing. The waters of the sea were flooded in 1785, and in 1825, forty years, they fell. Overflowed in 1835 and again in 1862. By 1881 the water level was very low, but four years later it began to grow again. Large islands in the northeast of the sea Koochool began to move here in the 1880s when the water subsided...

In 1935 the Aral Sea was 69,670 km<sup>2</sup>, the water was 1153 km<sup>3</sup>, just 16 years ago, in 1919, the area was 67,300 km<sup>2</sup>, and the water was 1087 km<sup>3</sup>. Consequently, in most period of time, the sea water increased. However, by 1976 the sea area was 64,500 km<sup>2</sup> and water was 1,000 km<sup>3</sup>. These indicators suggest that the natural decline in the Aral Sea may also be affected by the decline. However, the policy towards water and other natural resources at the end of the 20th century has eventually become one of the reasons for the environmental degradation.

One of the causes of the Aral Sea disaster since the 1960s is monopoly. 8000 thousand hectares of land were put into operation every year as a result of the attack on the reserve. In particular, since the 1970s, irrigation and cultivation of fencing has begun in order to create a cotton oasis in the Jizzak desert, a part of Mirzachul and its constituents. In connection with this, the 127 km South Mirzachul main channel and Central Mirzachul collector and the Jizzakh reservoir were built and the North Mirzachul canal was expanded. During this period the Great Andijan, Big Namangan channels and Andijan reservoir (2 billion m<sup>3</sup>) were built for deserts designing in Central Fergana, South Surkhan, Uchkizil, Degeres reservoirs in Surkhan Sherabad valley. In the Karshi steppe, the Karshi main canal and the Tolimaqinsu warehouse were built. In Uzbekistan, between 1977-85 In 1990, this figure increased 1.5 times. As a result, the annual discharge of the Amudarya and Syrdarya to the Aral Sea has declined. In particular, in the 1960s and 1980s, the water level in the Aral Sea fell from 560 km<sup>3</sup> to 2630 km<sup>3</sup>, and in the 90s it was 5 km<sup>3</sup>.

The Aral Sea was once one of the largest inland in the world, used for fishing, hunting, transport and erotic purposes. The water regime of the sea consists of the discharge of water into the Amudarya, Syrdarya, groundwater and atmospheric fuels and evaporation from the surface. In ancient times the sea level variation of 2115 was caused by natural climatic conditions, the volume of water was 1050 cubic km, and the area of the water level was 4000 sq. km. As a result of the development of irreversible water used for irrigation and drought years, the amount of water discharged into the delta of the Amudarya and Syrdarya decreased. Thus, at present the sea level has decreased by 56.8 m compared to 1961. At the same time, the sea volume will increase 3 times, the surface twice, and the salinity will increase from 90 g to 3437 g l; By 2000, it will increase by 180 to 200 g. At present, the sea level is 80 to 110 cm / year. The coastline falls 60 to 80 km, and the exposed areas are 23,000 km<sup>2</sup>. In the lower reaches of the Amudarya and Syrdarya rivers, water quality deteriorates and becomes unsuitable for drinking.

It is known that salt powder from the North American shores is several thousand kilometers away from the Aral Sea coast in the eastern hemisphere [5, p. 15]. Those who call this event a regional issue have finally realized that the threat is a global reality that spans the Central Asian region and threatens the entire world. Given the massive spread of the 75 million tonnes of salt dust from the Aral Sea shores every year, it is not difficult to predict the magnitude of the problem.

The twentieth century has shown to humanity a revolution in science and technology, an unprecedented power of development. However, the 20th century with its civilization and revolutionary development, has left its legacy with various problems. Sadly, what we are proud of is that civilization does not show people how to treat nature, how to avoid environmental risks, and how to build an environmental culture.

Over the last 50 years, the volume of water from the Amudarya River has increased three times as a result of irrigated land development. As a result, by the 1980s, the area of the Aral Sea had shrunk slightly (from 66,500 square kilometers to 36,000 square kilometers) and the water level had dropped to 14 times. By 2000, there was a significant reduction in the volume of water discharged into the sea by an area of 23,000 square meters. The water level fell by about 20 meters. At the same time, salts from the dried seas spread to the area up to 1,000 km and continue to glacier in the Pamir Mountains. The pictures from the universe clearly show that the Aral is turning into a few lakes. Amudarya water pollution plays a special role in public health. In recent years mineral salts and toxic substances in the river water have increased 3 times [89]. In the upstream regions of the Amudarya river, 250 cubic meters per second of wastewater containing residues of chemicals used for agricultural crops. It is being pumped into the river through ditches and lakes. Due to the fact that the majority of the rural population consumes river water, the incidence of jaundice (hepatitis), gastrointestinal diseases, and anemia remains high. Groundwater contamination and salinity are increasing as a result of increased salts from the Aral Sea and increased use of chemicals in agriculture. As a result, about 20% of the fruit trees die every year. In the 1980s, this was especially the case in Khazirap and Bogot districts, especially as a result of the Tuyamuyun reservoir commissioning.

Ecosystems, plants and animals are in deep crisis. The worst case is the South Island. This region includes the Northwest Red Sand, Zaungauz, Karakum, South Ustyurt and an Amudarya delutasikabi landscape complexes. The total area of the Aral Sea is 473 thousand km<sup>2</sup>, the southern part of which is 245 thousand km<sup>2</sup>. These include the territory of the Republic of Karakalpakstan, the Khorezm region of Uzbekistan and the Dashkhan region of Turkmenistan. Accelerated desertification on the islands and islands has not been experienced in the world. That is why quantitative and qualitative assessments are difficult. Desert areas are expanding due to the opening of the seabed and drainage. The

uncovered 1 million ha of surface area is covered by fine salt particles to form new sand deposits.

Thus, a new source of sand and saltosol was created in the Central Asian region. According to preliminary data, 10050 mln. tons of dust-the salts can be moved. Exports from the bottom of the sea salt pollution increases by more than 5%. The dust emissions into the atmosphere have been observed from space once in 1875. Diameter 400 km, width 40 km, radius 300 km. As a result of salinization on the surface, the yield of cotton decreased from 5 to 15% and 36% to rice. The total amount of dust and salt particles flowing to the Aral Sea is 520 kg / ha, which is one of the main causes of deterioration of soil conditions. Salt fractions of the irrigated areas of Karakalpakstan range from 250 kg / ha to 500 tons in Chimbay district. The salty sand salts occupy 15,000 hectares of pastures in the Aral Sea. Fields for cotton are infected with pathogens. The productivity of agricultural products is declining. The deterioration of land reclamation in the upper reaches of the river (Surkhandarya, Kashkadarya, Bukhara, Samarkand) leads to an increase in category II. In the water areas of Turkmenistan, where the Amu Darya is located, a complex reclamation situation is occurring. Most areas in the lower reaches of the Amudarya and Syrdarya are classified as Category 3 and 4 with poor reclamation, with 78% of saline areas. Due to soil salinization, crop production in Uzbekistan has declined 6% by 1993, in Turkmenistan by 40%, in Kazakhstan by 33%, and by Tajikistan in 1990 by 20%. Heavy salty groundwater increases the sedimentation process. As a result of the decline of the Amu Darya and Syr Darya rivers, the lower reaches of the river will reduce flows. This, in turn, results in shrinkage of riparian vegetation, and previously rich meadow soils are transformed into inferior, semi-deserted, sandy soils. The mammalian birds were diminished. Dried areas are overflowing with rodents spreading diseases for the population. The sanitary and epidemiological situation of the Aral Sea region is one of the centralized water supply to the heavy population. Half of the population uses open polluted ponds.

The problem of the Aral Sea is the preservation of it as a sea. It should be noted that during its history the Aral has changed and disappeared many times, according to scientific data. To restore the initial absolute height of the Aral Sea, more than one thousand cubic kilometers of water will be needed.

### 3 Analyses

The accumulated salts on the dry seas of the sea mix with dust when the wind blows and pose a serious threat to human health. In addition, nobody is concerned about the fact that almost half of the Aral Sea is drying up. Although foreign funds have been allocated for the restoration of the Aral Sea, no one is in control of that cost. As a result, there is a lack of funds. This can be summarized briefly as the drought in Central Asia. The international community and Central Asian countries will realize this when a knife sticks. Unfortunately, once the Aral Sea has dried up, we will look for ways to solve this problem. The main reason for the drying up of the Aral Sea is that the water supply to the Aral Sea is scarce due to its economic needs, such as the use of Amudarya and Syrdarya for cotton and wheat irrigation. As a result, the Aral Sea gradually dried up. [App. 176]

During his visit to the Aral Sea region on April 4, 2010, the UN Secretary General Ban Ki-moon became acquainted with the situation. Currently, the Aral Sea has dropped by 22 meters, with salt reaching 112 g / l and 280 g / l in the eastern part of the Aral Sea. The Aral Sea has become a "dead" sea. The area of dried bottom is 4.2 mln. hectares and has become a source of dust, salt aerosol spreading to adjacent areas. Every year, 80 to 100 million tons of dust is pumped into the atmosphere. At the same time, degradation and desertification rates are increasing in the delta of the Amudarya and Syrdarya rivers. To

date, the Aral Sea has mainly 6 lakes. p. 230] From the arid lands of the Aral Sea, salt and dust are carried to the air by the wind and spread over hundreds of kilometers. This causes drought not only in the Aral Sea region but also far beyond it.

This problem is one of the most terrible environmental catastrophes in the 20th century on Earth.

For many years, under the conditions of the administrative and command system, it has not been seriously engaged in environmental problems. The whole essence of the socialist economic system, based on wild and extensive use of natural and mineral resources, with enormous costs and wastefulness, was the idea of carefully treating the country's vast wealth. On the contrary, this use of wealth has become the backbone of the country, the basis of its export potential, in the economic competition of the two systems.

The main objective of the economic development was focused on extensive factors. Insufficient funding was provided for environmental activities. This amount would not cover even one thousandth of the damage to nature. [19]

As a result of the agrarian development of the economy and inefficient water use, the Amu Darya and Syr Darya river inflow into the Aral Sea decreased. The Aral Sea problem has become not only a regional but also a planetary disaster. The economic damage from the loss of cotton yields due to soil salinization in the region is several tens of billion soums. Socioeconomic and environmental problems have arisen for over 3 million Aral Sea residents.

The Aral Sea catastrophe began in the 1960s. As a result of a fateful decision, the ecological environment in the Aral Sea region, especially in the Lower Amudarya region, is in a critical state. The unresolved problem of environmental problems during the last decades of the Soviet era created a sharp and controversial geographic situation. It is well known that demographic processes directly combine such factors as public health, living conditions and living conditions, migration processes, economic changes in society, and urbanization. Therefore, the situation in the lower Amu Darya during the last quarter century has, to some extent, affected these processes. Under the Soviet government's policy of creating new lands and strengthening the cotton monopoly not only aggravates the environmental degradation of the region or aggravates its social life, but also drastically reduces the vast natural forests that have remained natural resources. brought him. A couple of years ago, the area 300,000 acres is now 33,000 hectares.

Unfortunately, the practical work that had to be done in the Soviet period to stabilize the Aral Sea environment remained open. One such practice was the discharge of part of the Siberian rivers' water into the Aral, although the center's interest in the project was at least 20 km<sup>3</sup> a year. But the project was suspended in 1986.

Environmental problems such as the false ideological idea of being the "master of nature", the ineffective methods of economic management, and the wild use of natural and mineral resources have become the guides of the Soviet regime. In Uzbekistan, land degradation, deterioration of soil fertility, soil contamination and degradation, air clearance, and pollution of surface and ground water have worsened the environment.

The catastrophe of the Aral Sea has been the impetus for deserts and desert development, the intensification of the cotton monoculture, and the construction of irrigation systems along the Amudarya and Syrdarya basins. The level of the Aral Sea has dropped by almost 20 meters, with its coast retreating 680 km, which is no longer a single sea, but two lakes. More than 4 million hectares of the seabed have turned into sandy, salty deserts. Heavy winds, hurricane salts, and dust storms destroy the environment and make people healthier. The incidence of gastric cancer, tuberculosis, typhoid fever, anemia, urinary tract and liver, blood pressure and other diseases are increasing. There has been an increase in child and female mortality. p. 78

Due to the intense 90-year storm, 5-75 million tons of salt are transported to the atmosphere at a distance of 3500 km. The drying up of the islands has become an environmental disaster, with almost 35 million people living in the vicinity threatened.

Ensuring environmental security in the Republic of Uzbekistan is directly related to ensuring environmental sustainability in the Central Asian region. Through the implementation of a number of important environmental and environmental objectives for the Aral Sea Basin. In this regard, the countries of the region should take measures to achieve the unanimous application of international legal mechanisms addressing the above-mentioned transboundary environmental problems [11, p. 432]

Despite the ongoing efforts to stabilize the Aral Sea, inflow to the Aral Sea is mainly based on the residual principle. The Aral Sea region is suffering from severe water shortages for the national economy. This is likely to have a devastating effect on the population living in the area.

At the meeting of Central Asian leaders in October 2002 in Dushanbe, a "Program of Actions on Improvement of Environmental and Socio-Economic Situation in the Aral Sea Basin for 2003-2010" (PBAM-2) was adopted. More than \$ 8.5 billion has been allocated for the implementation of more than 300 projects included in the Action Plan for Assistance to the Aral Sea Basin for 2010-2015 (PBAM-3).

So far, Central Asian countries have signed the Nukus Declaration of Central Asian Countries and the International Community on Sustainable Development of the Aral Sea Basin, the Almaty Declaration, the Ashgabat Declaration and the Dushanbe Declaration. A joint statement of the ministers of environmental protection of the countries of the region was also signed [11, p. 54]

The Declaration of the Council of Heads of Central Asian States (1997) states that the potential of these countries to enter the market economy should be used to address the environmental problems in the Aral Sea (The Almaty report 1997). This is important for the integration and development of environmental relations between countries in the region in the process of joint agreements and implementation of mutually beneficial agreements to use the region's natural resources on a coordinated basis.

There is an agreement on shared water sharing in the Central Asian region, in particular between Uzbekistan, Tajikistan and Kyrgyzstan. A statement of the Council of Heads of Central Asian Countries on the Aral Sea Basin (April 1999) states that "the ecosystem approach to water use is based on principles of good neighborliness and mutual interest and will not harm the interests of any state. ("Voice of Uzbekistan", April 30, 1999). Although the political wills of the leaders and governments of Central Asia have been reflected in numerous agreements (March 1993, January 1994, April 1999, April 1999 and August 2002), the years 2000-2001 have been years of water shortage in Amudarya and two years of wetlands, especially in Syrdarya. shows that the existing system is not perfect [12, p. 67].

At the meeting of the IFAS founders in Almaty on April 28, 2009, the First President of the Republic of Uzbekistan I. Karimov said: It is natural that there are different points of view, but ... we, the heads of states responsible for history, before our own people, do not exacerbate these debates today. and they should be able to find points of contact, and not political, I think. ", he emphasized, and rightly so ("Word of people's", April 30, 2009).

Addressing the 72nd session of the UN General Assembly on September 19, 2017, President of the Republic of Uzbekistan Shavkat Mirziyoyev also addressed the issue by saying: we cannot avoid this important issue. I am convinced that there is no rational way to solve the water problem except to take into account the interests of countries and peoples of the region. Uzbekistan supports the draft Conventions on the water resources in the Amudarya and Syrdarya basins, developed by the UN Regional Center for Preventive Diplomacy ("Word of people's", September 21, 2017)

At present, the countries of Central Asia are working on the purpose of organizing regular meetings of bilateral working groups on joint water resources management. In November 2016, a working group was set up to develop proposals for cooperation between Uzbekistan and Kazakhstan in water management. So far, a number of meetings of the working group have been organized. During the state visit of the President of the Republic of Kazakhstan N. Nazarbayev to Uzbekistan on September 16, 2017, Kazakhstan and Uzbekistan signed a road map for water cooperation [16, p. 89].

A special working group was established between the Republic of Uzbekistan and the Republic of Tajikistan on issues of water resources management. A similar working group is currently in the process of working with Kyrgyzstan. In accordance with the Agreement signed with Turkmenistan in 1996, the issues of sharing the water resources of the Amudarya River are being solved practically [15, p. 87]. The agreement on cooperation in water management between the Ministry of Agriculture and Water Resources of the Republic of Uzbekistan and the Ministry of Agriculture and Water Resources of Turkmenistan, signed on March 6, 2017, will raise the cooperation to a new level.

Meetings of the industry experts in the framework of bilateral working groups will facilitate the joint management of water resources, addressing many pressing issues in improving water supply and, ultimately, strengthening regional cooperation in water management.

During the state visit of the President of the Republic of Uzbekistan Sh. Mirziyoyev to the countries of Central Asia such as Kazakhstan and Kyrgyzstan, special attention was paid to this issue [16, p. 95].

In 2017, the leaders of Central Asian countries discussed the restoration of the Aral Sea Basin ecosystem, improving the socio-economic and environmental situation in the Aral Sea region, more efficient use of natural water resources and environmental protection in the region. It should be noted that this activity is carried out in cooperation with international organizations.

One of the key objectives of Uzbekistan in addressing the effects of the Aral Sea and environmental improvement of the Aral Sea basin is to provide small water resources in the arid sea area, to provide access to the delta basins to reduce dust and salt storms, biodiversity and delta ecosystems restoration.

Important issues such as enhancing regional stability, improving water resources management, ensuring gene pool health, improving living standards and quality, conservation and restoration of biodiversity have been proposed by Uzbekistan at the UN High Commissioner and distributed as the official document of the 68th session of the UN General Assembly. The Program measures on elimination of consequences of drying Aral Sea and prevention of ecosystem catastrophe destruction in the Aral Sea area.

Nearly 400,000 hectares of forest have been planted on the dried bottom of the Aral Sea. At present, the saxaul reaches to five meters in height, preventing the salting of harmful salts. The saline ecosystem is being restored, and grass is growing, and the number of birds is growing as the natural habitat recovers [16, p. 15].

On June 22, 2018, the UN General Assembly adopted a resolution "Strengthening regional and international cooperation to ensure peace, stability and sustainable development in the Central Asian region". This document, developed by Uzbekistan in cooperation with Central Asian neighbors, was unanimously supported by all UN member states.

The resolution will further strengthen security in Central Asia, ensure and integrated use of water and energy resources, mitigate the environmental and socio-economic consequences of the drying of the Aral Sea. It also underlines the importance of developing bilateral and regional cooperation to deepen ties in the arts and sports. The General Assembly's resolution approved major regional and international security and

development initiatives in Central Asia, including regional efforts to strengthen stability and economic cooperation, including the "Central Asia on History and Common Future" held on November 101, 2017 in Samarkand. , Sustainable Development and Partnership for Development " supports active cooperation to implement initiatives put forward at the international conference The experts highly appreciated it. The European Union has also issued a statement regarding the adoption of the UN General Assembly resolution. "We are pleased to assist in developing a unified approach to issues such as security, trade facilitation, border management, water and environmental protection, and sustainable interconnection," it said.

In June 2018, Tashkent hosted the Central Asia International Environmental Forum "Strengthening Cooperation in Environmental Protection and Sustainable Development". The experts noted that this international forum will help to identify specific projects for environmental protection, harmonize the interests of Central Asian countries in the implementation of the necessary measures to conserve and conserve water resources, conserve natural biodiversity and conserve the flora and fauna

26 projects were approved for implementation in cooperation with international organizations at the international conference "Joint action to mitigate the effects of the Aral Sea disaster: new approaches, innovative solutions and investments". About 6 billion soums, about 13 million euros and more than \$ 1 billion will be allocated for these purposes. Most of the projects are aimed at addressing the impact of the Aral problem on the population, expanding the protected areas, preserving biodiversity, improving land reclamation and gardening.

## 4 Conclusion

At the initiative of President of the Republic of Uzbekistan Sh.Mirziyoev at the 72nd session of the UN General Assembly, the Trust Fund was established under the UN on the basis of multilateral human security partnership for the Aral Sea region. The Fund has been tasked with attracting funds from donors from different countries to fund projects to improve the lives of people living on the islands.

The Republic of Karakalpakstan, Khorezm, Bukhara and Navoi regions in accordance with the Decree of the President of the Republic of Uzbekistan dated February 16, 2017 PP-2784 "On the Program" Adaptation to Climate Change in the Aral Sea Basin "with participation of the International Development Association is being implemented.

Following the visit of the President of Uzbekistan Shokat Mirziyoyev to Muynak district of Karakalpakstan in November 2018, a State Program for 2 years adopted, which will implement 793 projects totaling \$ 1.5 billion.

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