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Article

A Rational Solution to the Aral Sea Tragedy

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Abstract: The XXI century began with global environmental problems in the public life of the peoples of Central Asia. Between the two deserts of Central Asia – the Kyzylkum and the Karakum – there was a rare gift of nature - the Aral Sea. The sea is located on the territory of Uzbekistan and Kazakhstan, two Central Asian countries, and geographically close to the Caspian Sea. For thousands of years, this sea has had a positive impact on the natural conditions, climate and fauna of the region. However, the unjustified anthropogenic impact has had a catastrophic impact on this sea. As a result of improper development of the national economy, inability to see the future ecological situation, creation of excessive artificial lakes, disorderly use of water and monopolization of cotton, the volume of waters of the Syr Darya and Amu Darya rivers flowing into the Aral Sea decreased, "The island's water area decreased from 64 thousand to 39 thousand km, became smaller and dropped to 6th place after the largest lakes the world. The water level in it decreased by 20.5-24 meters compared to 1960, the amount of mineral salts in the water exceeded 70-72 grams per 1 litre of water".

Keywords: Unilateral, irrational activities, stabilization, USSR.

Introduction

As a result of the unilateral, irrational activities of the authoritarian system of the former USSR, the Aral Sea begins to dry up. This system has turned Central Asia into its raw material base. In the 80s of the last century, Uzbekistan was obliged to grow 6 million tons of cotton. Similarly, the Republics of Turkmenistan, Kazakhstan and Tajikistan have received an obligation to grow large amounts of cotton. To grow such a large amount of cotton, hundreds of thousands of hectares of protected land had to be developed. As a result, many huge channels were dug from the Amu Darya and Syr Darya rivers flowing into the Aral Sea [1]. The waters of the Aral Sea were used unplanned and wastefully for the development of desert and steppe zones covering large areas. As a result, not enough water got into the Aral Sea, which led to its drying up. As a result, thousands of hectares of salt deserts appeared.

Currently, the Aral Sea is divided into three parts: the first is a small and shallow northern part; the second is the eastern part, which has a relatively large area and is shallow; the third is the deepest western part.

"In subsequent years, the construction of the Kukaral dam and the restoration of the Syr Darya Delta led to stabilization of the level of the Small Aral Sea. The area of the Eastern Aral Sea, which has a large area, continues to become shallow and shrink [2], [3].

Methodology

The fate of the Western Basin, considered the deepest, depends on the flow of groundwater. The researchers note that there may be many freshwater springs on the west

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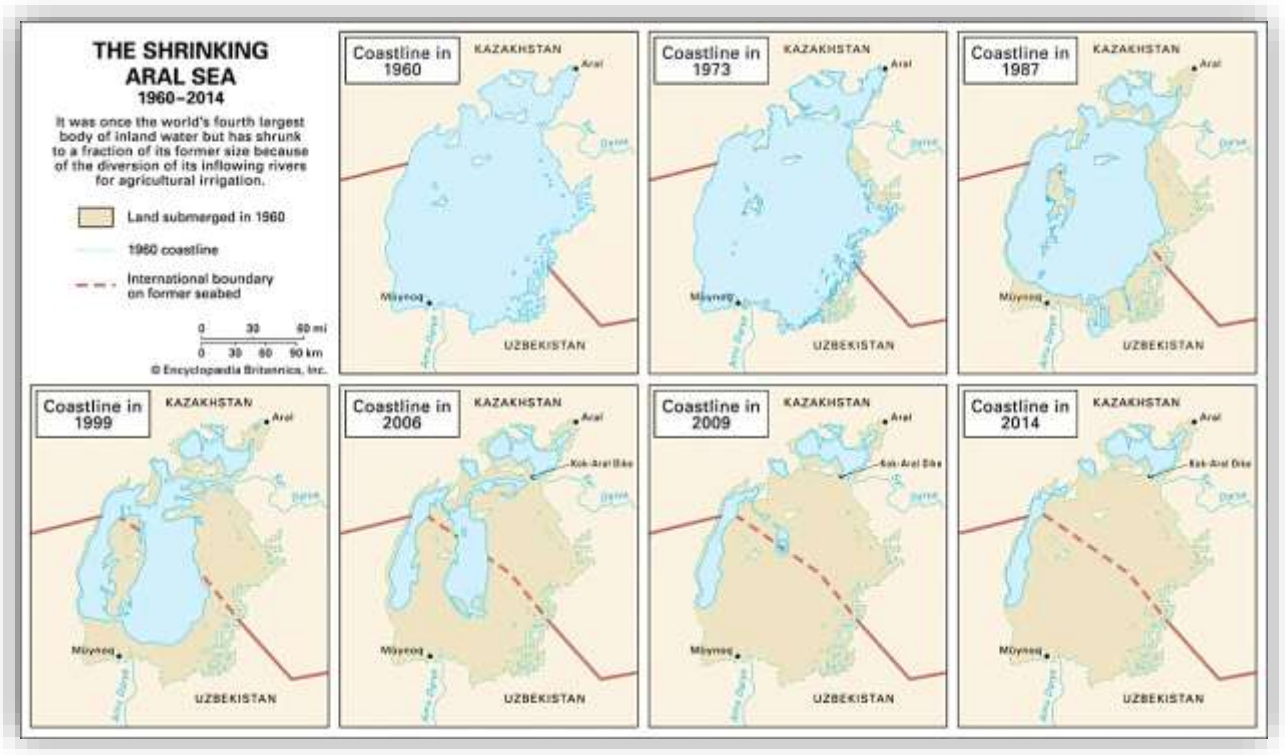
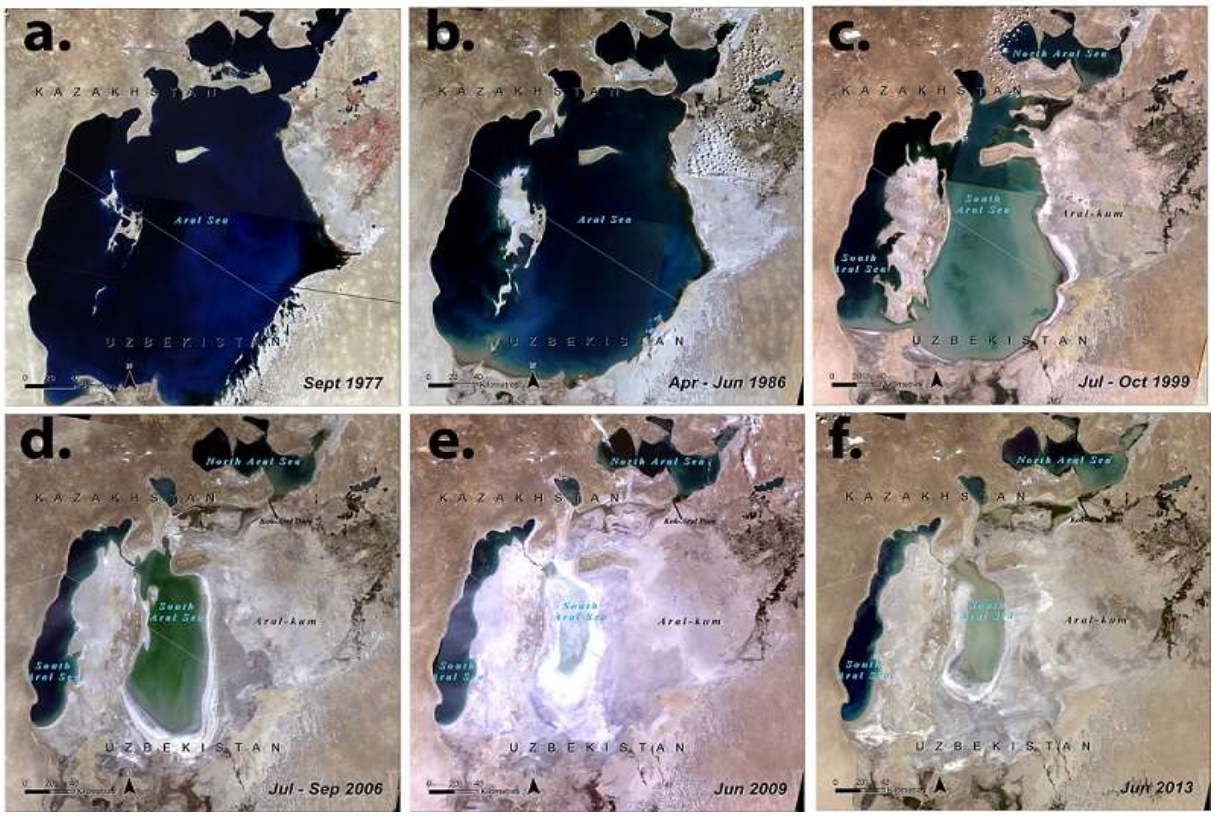
coast. According to some authors, the area of the western basin remains up to 2,100 km, remains to a certain extent auriferous and in places reaches a depth of 37 m. The salinity of its water significantly exceeds 100 g/l".

Result and Discussion



Picture 1. Changes in the Area and Water Level of the Aral Sea (1960–Present).



Picture 2. Current Division of the Aral Sea into Northern, Eastern, and Western Basins.

Since the 90s of the 20th century, several projects have been proposed to prevent a catastrophic situation in the Aral Sea. One of them was the diversion of the southern tributaries of the Volga, Ob and Irtysh into the Aral Sea. But according to research by Russian scientists, this project will have a serious negative impact on the environmental situation in Western Siberia. If these scientists had made such a rational warning back in the 60-70s of the last century and said in advance that the unreasonable use of the waters of the Amu Darya and Syr Darya would entail the drying up of the Aral Sea and an unfavourable environmental situation in the region, perhaps the Aral tragedy could have been prevented [4], [5]. However, the government needed cotton raw materials more than the environmental situation in the region.

“Currently, 700-750 kg of salts of sodium sulphate, chlorine and magnesium account for every hectare of land around the island. Salinization of cultivated fields increases every year. The island's environment has become a salt distribution area. The drying up of the island also affects the climate. For example, the winter temperature in the foothills of the Amu Darya and Syr Darya rivers is 1.5-2 °C lower than the previous one, and 2-4 °C warmer in summer” [6].

As a result of the drying up of the Aral Sea, 5 million hectares of sandy-salt desert appeared. For the negative reason of this tragic accident, the island is called the "Arolkum desert" because there is no need to call the island the sea.

Due to a sharp increase in the mineralization of the water of the Aral Sea, all creatures in it disappeared, especially 24 species of fish. One of the most diverse ecosystems in the world in the Amu Darya and Syr Darya deltas has been destroyed. The number of animal and plant species on the territory has significantly decreased.

In subsequent years, negative changes in diseases such as thyroid gland and diabetes mellitus were observed among the population as a result of changes in ecology and climate due to the "Tragedy of the Aral Sea". The drying up of the Aral Sea has led to an increase in diseases among the population of the region [7] . Today, as a result of environmental changes caused by the "Aral tragedy", the incidence of urolithiasis in the region in 2000 amounted to 0.8%, and in 2014 — 1.6% and increased 2.0 times. In particular, oncological diseases are common, including various forms of cancer, breast cancer, genital cancer and similar serious diseases. In 2000, oncological diseases accounted for 0.24% of the population, in 2014 — 0.26%.

It is clear that the tragedy of the Aral Sea causes serious problems related to the health of the region's population [8]. Therefore, UNESCO has included historical documents related to the Aral Sea in the "Memory of the World" register as a source for studying environmental tragedy.

Over the years, Moynaq on the Aral Sea used to be a port city with large production facilities and a large fish cannery, but now the dead shores of the sea have turned into a graveyard of ships [9].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Picture 3. The cemetery of ships in the Aral Sea.

Today, the "Tragedy of the Aral Sea" is becoming a global environmental problem. More than 100 million tons of sand, dust and salt fly from the dry bottom of the island over distances of hundreds and thousands of kilometers per year [10], [11].

Such migrated particles of salt and sand have been found in countries such as Norway, Japan, the Pamirs, Altai, the Tien Shan mountain ranges and the Arctic.

The island problem is considered one of the largest catastrophes of the 21st century in terms of environmental, socio-economic consequences. Given the fact that this problem is universal, Uzbekistan has taken the initiative to create a special United Nations commission on the island and hold an international conference on this issue under the leadership of the United Nations.

In 1993, the First President of the Republic of Uzbekistan, I. Karimov, spoke at the 48th session of the United Nations General Assembly and drew the attention of the world community to the tragedy of the Aral Sea [12]. He stressed that the problem of the Aral Sea is a global problem not only of Uzbekistan or Central Asia, but also of the whole world. In addition, on October 24, 1995, on the occasion of the fiftieth anniversary of the creation of the United Nations, at a special meeting of the General Assembly, it was emphasized that the environmental tragedy associated with the drying up of the Aral Sea, the biosphere covering the entire Earth, is a problem that has a devastating impact on the living conditions, health and offspring of tens of millions of people, he stressed that it cannot be solved without organizational activities of international organizations, including the United Nations [13].

Former UN Secretary General Ban Ki-moon called the drying up of the Aral Sea "one of the worst environmental disasters on the planet" after his visit to Moynaq in 2011.

On November 27, 2018, the United Nations Multilateral Partnership for Human Security Trust Fund for the Aral Sea Region was established. This initiative was supported by the Secretary General of the international organization Antonio Guterres. On June 5, 2018, the President of the World Water Council, Benedito Braga (France), who took part in the Tashkent International Conference on Island Problems, said: "We all understand that the island problem belongs not only to Uzbekistan or the Central Asian region" [14]. This is a recognition that the tragedy of the Aral Sea is a global problem affecting the regions of the near and far abroad.

The Republic of Uzbekistan is taking practical measures to eliminate the environmental situation in the Aral Sea and reduce its tragic consequences. In particular, theoretical studies and practical work are being carried out in the Republic of Uzbekistan on problems related to the drying up of the Aral Sea, the negative consequences of the tragedy, as well as issues of improving the ecological condition of the Aral Sea. Now it is planned to plant seeds and seedlings on the dry bottom of the Aral Sea and thereby prevent salt storms [15].

Currently, saxovullization works are continuing in the dry part of the Aral Sea. Today, 500 thousand hectares of saxaul have been planted along the Aral Sea. According to experts, saxaul is such a plant that if you plant it in seven rows, it will be large enough to hold 90 percent of the sand in 5-7 years and is self-reproducing. In addition, the ecosystem in the area where the saxaul grows becomes an oasis. This will create an opportunity to increase biodiversity in the regions. Experimental polygons have been created in the region, a gene pool of desert and ornamental plants resistant to salinity and drought has been formed, 13 types of flora objects are being tested.

Picture 4. Saxaul Afforestation Activities on the Dried Bottom of the Aral Sea to Mitigate Environmental Degradation.

The tragedy of the Aral Sea has shown us what irresponsible use of water and unreasonable treatment of nature, especially water resources, can lead to. Therefore, strengthening environmental education in the education system and the formation of a rational attitude of the younger generation to nature is a requirement of the time.

Conclusion

Summing up the results:

Firstly, it is technologically impossible to return the Aral Sea to its previous state;

Secondly, in order to eliminate the negative consequences of the Aral Sea tragedy, it will be necessary to improve the quality of irrigation channels in the region, prevent water loss, use alternative types of cotton that require less water, and if possible, grow crops other than cotton.

Thirdly, it is necessary to conduct extensive research on projects such as pumping water from the nearby Caspian Sea to the Aral Sea through a pipeline and diluting it with fresh water from local reservoirs;

Fourthly, it should be borne in mind that the construction of large hydroelectric power plants by the countries of the lower reaches of the transboundary rivers of Central Asia poses a major threat to the ecology of the Aral Sea and the region.

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