



## Ecological Problems of Central Asia

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**Received:** April 27, 2021

**Published:** May 14, 2021

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### Introduction

Sustainable development of any country is based on three components - they are economic growth, social protection and ecological safety. At the same time, in the system for achieving country's national safety the main role-plays the ecological sustainability. In the context of global climate change, the past decades have been marked by worsening of environmental problems, the emergence of new threats and challenges of environmental sustainability. They concern the increase in water scarcity, salinization of significant part of irrigating lands and degradation of pastures, increase of industrial and municipal wastes, decrease of bio diversity, production emission of industrial enterprises that pollute atmosphere, soil and water. The emerging threats have a global nature and are able to cause technogenic disasters of colossal scale, the effects of which just like Fukushima (Japan) disaster would once again prove the vulnerability of people to disasters of this magnitude. Unique by its geographic location and natural potential, today the Central Asian region has become a centre of a whole range of ecological threats and challenges. Desiccation of the Aral Sea, irrational use of water resources of transboundary rivers, transboundary pollution of territories have all become one of the sensitive problems that need immediate solutions. In September 2010, during the UN Summit for Millennium Development Goals, the President of the Republic of Uzbekistan Islam Karimov had once again appealed to the world society in the need to collaborate the efforts in solving the problem of Aral Sea, which has a global nature in terms of

its scale. In his speech he has pointed out: "...The tragedy of Aral, which practically during a lifetime of one generation has turned from once one of the unique and most beautiful seas into a drying and vanishing water reservoir stands as a vivid example and evidence of our irresponsible attitude towards the environmental problems". The key position of Uzbekistan ecologists in this regard is based on the claim to apply international law and international conventions, conduct unprejudiced and independent international ecological inspection in a course of projects for construction of huge hydro in the upper reaches of Syrdarya and Amudarya, as well as in regard of the impact of the polluting substances emitted by large enterprises on the environment and health of population in the region. The material presented in this publication focuses on the existing problems and threats of environmental sustainability, technogenic risks, measures taken to minimize and eliminate them, as well as the participation of the international community on these matters. Data listed in the publication, illustrations and figures are designed to characterize the extent and depth of environmental problems in Central Asia.

### The ecological crisis of the Aral sea and its area Retrospective analysis of the Aral Sea

Not so long ago the Aral Sea was the world's 4 lake by its size with 68,9 thousand sq. kilometers in square and 1083 cub. kilometers in water volume, it was famous for its rich natural supplies, while the Aral Sea area was known as flourishing and biologically diverse natural environment. In historically viewed past

the population of the region has successfully led their farm lands secured their vital needs, the unique flora and fauna have been preserved. The ichthyofauna of the Aral Sea has included 20 species of fish, such as spike, asp, carp, bream, catfish. The lakes of Aral Sea area have been inhabited by 38 fish species. Among world's deltaic plains, the delta of Amudarya river was the 2nd after the delta of Volga river by its size, productivity and biodiversity. The widespread territories of the Aral Sea area have been inhabited by hoofed animals, such as Bukhara deer, goitered gazelle (dжейран), Ustyurt argali, registered in the Red Book of Uzbekistan, as well as by boars and saigas. The fauna of the Amudarya delta consisted of 498 vertebrate species. Today, the Aral Sea area has lost more than a half of its flora and fauna gene pool. The floristic composition has lost dozens of plant species. The representatives of endemic More than 638 species of higher plants used to grow in the Aral Sea area. In 50's of XX century, during the soviet era, there have began large-scale works on irrigation of large territories of all Middle Asian republics in order to gain a cotton independence of USSR and Eastern Europe countries, which had caused a rapid increase of water intake from Syrdarya, Amudarya rivers and their tributaries. That has led to significant decrease in the flow of water into the Aral Sea. While in 1960 the water inflow into the Aral Sea and Aral Sea area was 64,1. cub. kilometers (including by Amudarya - 43,0 cub. Kilometers and Syrdarya - 21,1 cub. kilometers), later on it has been quickly reducing: in 1960's the annual average was 37,8 cub. kilometers, in 1970's - 17,4 cub. kilometers, in 1980's 4,2 cub. kilometers, in 1990's - 10,4 cub. kilometers and in 2000's - 6,7 cub. kilometers accordingly. Along with decrease in water inflow to Aral Sea area, the quality of water has also reduced. Increase of rivers' water mineralization, as well as chemical and biological pollution have caused destabilization of ecological situation and have negative impact on socioeconomic conditions of the region, health of population and biodiversity. The widest biodiversity has been observed in river flows deltas, forming a huge amount of riparian woodlands - peculiar forests, consisting of shrubs, herbaceous and woody vegetation, typical for floodplains. The lakes of the Aral Sea area were ideal place for wintering birds, the lower Amudarya for centuries laid on the way of migrating birds. Tens of thousands of birds used to rest on the lakes of the delta during their flights. The reduction of the lakes' areas has violated the traditional migratory routes of birds. Till 60 of the past century, the Aral Sea had played an important climate-regulating role and been a catalyst for the formation of clouds from evaporating water. This moisture had re-

newed the ice and snow reserves of the mountain systems in the region. Due to intensive drying, the pond has lost this function.

### Ecological and socioeconomically situation in the Aral Sea area

In the course of 45 - 50 years, we witness the disappearance of one of the largest closed water reservoirs in the world. There was no such a case, when within a single generation the death of a whole sea has been witnessed. Today the water level has decreased by 29 meters; the volume has reduced from 1083 in 1960 to 72 cub. Kilometers. In 2011 the salinity level has reached the point of 120 grams/liter in the western parts and 280 grams/liter in eastern parts accordingly. A massive territories of white salty fields covered by sand have appeared on dried parts of the sea, turning into a new desert called 'Aralkum', with estimated territory of around 5,5 million hectares. Sandy and salty storms rage in this area, spreading millions tons of salt, dust and sand to hundred kilometers away. The impact of the ecological disaster has affected the life of million people, living in the basin of the Aral Sea. At the present time, most of small lakes have shrunk and dried in the Southern area of the Aral Sea. This has led to disappearance of almost 90% of riparian (tugay) forests in the area of 800<sup>th</sup>. ha. Together with their inhabitants. The desertification of the Aral Sea area comes along with a loss in earth resources, worsening quality of essential pastures and hayfields. Mineralization of the earth has become more active covering new territories. The biological reproduction has reduced 10 times because of the anthropogenic desertification.

### The impact of ecological factors on the Aral Sea basin population's health

The Aral crisis has a negative impact on life conditions and quality of the whole population of the region, yet the deepest impact has been done to the population of Karakalpakstan, Kyzyl-Orda province of Kazakhstan, Khorezm, Bukhara and Navoiy provinces of Uzbekistan and Tashauz province of Turkmenistan. The total impact of an unfavorable environment has led to serious aggravations of population health status. Pollution of water and a large amount of dust and salt lifted up from the bottom of dried Aral play crucial role in growth of human morbidity, general and infant mortality. Thus, decade's average indicators of infant and maternal mortality in the Republic of Karakalpakstan exceeded the same indicator of the Republic of Uzbekistan on 13% and 17% accordingly. It is associated with the growth of respiratory, blood, cardiovascular, kidney,

gallstones, cancer, and acute intestinal diseases. Mortality a used by tuberculosis in the Republic of Karakalpakstan remains highest in the country (last decade's average reaches 28 per 100,000 population) and 3 times as much as the average for Uzbekistan (10 - last decade's average). The incidence of acute intestinal infections in Karakalpakstan in the last decade was 21 per 100,000 population and 1.7 times higher than the average for the Republic of Uzbekistan. The structure of respiratory morbidity in chronic bronchitis 2.5 - 3 times higher than the national average. The closer the region is to the Aral Sea, the higher morbidity and mortality.

### Actions aimed to soft the Aral Sea crisis

After the independence, Uzbekistan had made colossal efforts to soft the Aral Sea disaster. In April 2009, during the meeting of IFAS countries' heads, the President of the Republic of Uzbekistan Islam Karimov had offered a concept of the Program for further actions to be taken by IFAS members for the period of 2011 - 2015 and wide involvement of the world society in solving the problems of the Aral Sea basin. During the last few years, in order to stabilize the ecologic situation of Aral Sea area, Uzbekistan has implemented projects all worth 1,5 billion US dollars. There are joint international and interstate projects, such as UNDP project, which aims at: - preservation of riparian forests and strengthening the system of protected areas in delta of Amudarya River, Republic of Karakalpakstan. The project includes the creation of a new protected area - biosphere reservoir and Bukhara deer monitoring, registered in the international and national Red Books; - fulfilling the "Clean energy" Project, which demonstrates a practical implementation of photovoltaic stations (PVS) in remote areas of Karakalpakstan, which are for domestic use and work on solar energy. 50 stations installed in total. There are also a number of other large-scale projects being fulfilled within UN cooperation. There is a complex project on creation of small local lakes along the dried coastline of the Aral Sea and Amudarya delta, which contribute to improvement of the ecological situation, recovering of biodiversity, and softening of the climate. The total lakes area after the completion of all stages will be about 230 thousand hectares, which will lead to significant recovering of biodiversity in the region, increase labor capacity by increasing the involvement in fish and cattle farming. To ensure an effective strike against the dusty salty storms and localization of its negative impacts on environment, there is a project - "The development of the dried part of the Aral Sea based on the local salt and dust firming plants (saxaul, cherkez, etc.)". The planned measures will improve the ecological environment, restore biodiversity, re-

duce wind erosion, fix the moving sands, which would minimize the deflation process, the spreading of salt and dust from the area. The government has adopted a Scheme for development of water supply of the Republic of Karakalpakstan for the period up to 2020, which would result on providing water supply by up to 100% in the cities and 80% in superb. The projects "Clean Water, Sanitation and Health" for the sum of 37.7 million US Dollars and "Improvement of the Water Supply Systems in the Republic of Karakalpakstan and Khorezm Province" for thesum of 2.9 million US Dollars have been carrying out in participation of international donors. There are works being successfully realized upon the "Installation of water treatment equipment to supply drinking water to population of Muynak" project - 5 water desalination units all worth 1.2 million US Dollars have been installed at the expense of the French Government and "Improvement of chlorination of water intake facilities for liquid chlorine" project - 10 water intakes all worth 650 thousand US Dollars have been equipped by chlorination system at the expense of IFSA. For further improvement of ecologic situation and development of this region, the following is suggested:

- Creation of artificial watering of the dried bottom of the Aral Sea in order to develop the system of local lakes - wetlands;
- Under taking for Est preserving measures on the dried bottom of the Aral Sea;
- Recovering the population of flora and fauna, including saigas, increasing the areas of protected territories in the region;
- Development of complex program for implementation of ecologically clean renewable energy sources and technologies in settlements of the ecological disaster zone.

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