



THE VANISHING OASIS: WARNING FOR THE FUTURE

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Abstract: *Central Asia is known for its great heritage and the big contribution for the world history. Its nature is also known for picturesque views namely forests, mountain resources, and river sides, However, in the beginning of 19th century, political issues had a sweeping effect on its ecology. Drying of the main water source, the Aral Sea (68,000 square kilometers before, 26,300 square kilometers now), created a number of environmental and economical based barriers for Central Asian countries. This article will explore the causes and effects of this habitual catastrophe led by human mismanagement and natural disaster as well as the providing with the measures that are taken.*

Keywords: *The Aral Sea, human mismanagement, natural disasters, economy and ecology, water source, drying.*

Introduction

Drainage of The Aral Sea is nowadays' major regional issue mainly encompassing Uzbekistan and parts of Kazakhstan, was considered to be the 3rd largest endorheic sea until the 1960s. Nevertheless, due to the USSR's insufficient irrigation¹, shrinking period started as its water used in World War II to cover the agricultural shortages. Today the Sea is adapting to become a desert, and locally appearing issues are affecting the quality of livestock. Additionally, regional people are struggling with dust storms that occur every season, and this environmental degradation of toxic dust and water scarcity affects the increasing number of populations born with natural

¹ UNESCO. Water security. <https://www.unesco.org/en/water>



illnesses. Authorities along with international organizations, have taken several measures to address the health-related crisis and conducted in-depth analysis of the root-causes of different human insecurities, also restore the water to the Aral Sea². Turn by turn this article will explore the current situation of the Aral Sea and the government attempts to prevent the complete drainage to save the oasis.

Research data and methods:

All statistic information in this article is based on UN, Uzbekistan Ministry of Health, World Islamic Association, IFAC, and ASPB. Moreover, research findings are made through observation and secondary data.

Literature review:

Many scholars made researches about the case in the Aral Sea. The scientists explored about The Aral Sea's history which reflects a complex interplay of natural and human-induced factors driving its regression and transgression cycles. Other studies have extensively documented these changes through geological, archeological, and historical records, highlighting significant lake level fluctuations over the past two millennia. While early research provided foundational insights into Aral Sea dynamics, advances in sediment analysis, radiocarbon dating, and remote sensing have improved the accuracy of reconstructions.

Irrigative unsustainability of Central Asia which had caused to shrink of Aral was analyzed by Philip Micklin³. He studied historical fluctuations of Aral: the main natural influencer of the vast lake and how the government made a fatal mistake leading to depletion, which had showed severe agricultural and economic crises.

Monocultural diversity of irrigation, air and soil salinization, health caring barriers and increasing degree of mortality were researched by Philip Whish-Wilson and Michael H. Glantz.⁴ According to their analyses, the natural drawback produces high mortality among infants, malnutrition, and diseases like tuberculosis and hepatitis.

² UN Uzbekistan. Summary Project Report on a Socio-economic Survey of the Needs of the Population in the Aral Sea region. <https://uzbekistan.un.org/en/49740-summary-project-report-socio-economic-survey-needs-population-aral-sea-region>

³ Micklin. P. (2010). The past, present, and future of Aral Sea

⁴ Whish-Wilson. P, Glantz. H. (2002). The Aral Sea environmental health crisis



Ecological problems and restorations of the Aral Sea zone was Bao Anming⁵, he believed that there should be artificial floods to restore the surface of the Aral Sea.

Manzoor Qadir, Andrew D Noble, Asad S Qureshi, Raj K Gupta, Tulkun Yuldashev, Akmal Karimov⁶ they have studied the ecological crisis and its impact on Health, he emphasizes that the shrinking of the Aral Sea and the rising salinity levels in the surrounding areas have had a significant negative impact on public health. According to the study, the contamination of water sources, increased salt and chemical pollutants in the air, has led to respiratory diseases and other health problems. This issue has disproportionately affected children and the elderly.

Olimjon Saidmamatov, Umidjon Matyakubov, Inna Rudenko, Viachaslau Filimonau, Jonathan Day⁷ they explore the social-economic impacts of the Aral crisis. The reduction of water resources has severely affected agriculture, particularly farming. The research mentions that in some regions, this has led to population migration, a decrease in employment levels, and a decline in economic activity.

Sergey Krivinogov⁸ focuses on the loss of biodiversity due to the drying of the Aral Sea. The disappearance of plant and animal species in the region has destabilized the ecosystem. This, in turn, has had a severe impact on the local population's way of life and their daily activities.

Alexander A. Svitoch⁹ analyzes the Aral Sea crisis from the perspective of international law. The drying up of the Aral Sea and the degradation of the environment have led to violations of human and ecological rights. The study particularly highlights issues related to the population's right to clean water and maintaining public health.

Tatyana A. Shvidenko's¹⁰ study discusses the potential for the future ecological restoration of the Aral Sea region. The research considers the possibilities of water

⁵ Anming. B. (2007). Aral Sea Basin: A Sea Dies, A Sea Also Rises

⁶ Qadir. M, Noble. A. D, Qureshi. A.S, Gupta. R. K, Yuldashev. T, Karimov. A. (2009). Salt-induced land and water degradation in the Aral Sea basin: A challenge to sustainable agriculture in Central Asia. Natural resources forum

⁷ Saidmamatov. O, Matyakubov. U, Rudenko. I, Filimonau. V, Day. Jonathan. (2020). Employing ecotourism opportunities for sustainability in the Aral Sea Region: Prospects and challenges

⁸ Kriginogov. S. (2014). Changes of the Aral Sea levels

⁹ Svitoch. A. A. (2009). Palaeogeographical history of the Aral Sea

¹⁰ Shvidenko. T.A. (2017). Environmental Issues Resulting from the Drying of the Aral Sea



conservation, ecological rehabilitation, and the introduction of green technologies as means to restore both the population and the environment in the region.

Causes and effects

The climate change issue is happening nowadays in the region of Karakalpakstan (in Uzbekistan); the disappearing Aral Sea, till 1960s served as the main source of water, and as a result of Soviet Union's project about the construction of dams and water control structures lead to the overuse of water in agriculture and the Aral Sea was isolated from its only sources of water Amu Darya and Syr Darya. The project's main goal was to undertake the two major water rivers, turn deserts into farms for cotton and other crops, fed by snowmelt and mountain precipitation, leading to clinical degradation. In spite of the process made desert farms flourished, the consequences spoilt the demographic life, local household and the habitat. By 2009, it had fragmented into four water bodies, losing 92% of its volume and seeing an increase in salinity.¹¹

Back in several decades, fluctuations in the Aral Sea's size were influenced by natural diversions of the Amu Darya and Syr Darya river. However, post-1960 depletion resulted mainly from extensive water withdrawals for agriculture, leading to severe ecological and economic crises. Complete restoration is unlikely, but partial recovery is possible. A 2005 project successfully revived the Small Aral Sea, raising water levels and reducing salinity. However, restoring the Large Aral Sea remains costly and complex. Efforts should focus on preserving deltas and maintaining biological refugia. Moreover, health issues include high infant mortality, malnutrition, and diseases like tuberculosis and hepatitis increased during the shrinking period. Toxic pollutants in the environment contribute to cancer and reproductive disorders, while water shortages worsen conditions.

Worldwide, the index of such water sources is increasing. For instance, Lake Chad in Africa¹², shrunk by 90% since 1960s, as a result of combination of climate

¹¹ Brilliant Maps. The Incredible Shrinking Aral Sea 1960-2014. brilliantmaps.com

¹² The Lake Chad basin. <https://www.fao.org>



change (reduced rainfall) and also human activities, including water usage for irrigation and dam construction, obviously the reasons are as similar as the Aral Sea's case. Lake Winnipeg¹³ situated in North America,

is linked to prehistoric dry conditions and a period of reduced lake area, due to changes of landscape and climate.

As well as the ecological impacts, it has a political, economic, social, and technological factors affecting the Aral Sea.

Pest analysis of the Aral Sea that shows the impacts on the policy, economy, social, and technological factors to the government

Political factors: The Aral Sea is boarded by Uzbekistan Turkmenistan and Kazakhstan so the political cooperation among these countries has been challenging, including the water usage interests, agriculture and economic priorities.

Political factors: <ol style="list-style-type: none">1. Geopolitical issues2. Water management and policy3. Environmental legislation4. International aid and cooperation	Economic factors: <ol style="list-style-type: none">1. Agricultural dependency2. Fishing industry collapse3. Environmental damage cost4. Tourism potential
Social factors: <ol style="list-style-type: none">1. Health issues2. Migration3. Cultural impact4. Social inequality	Technological factors: <ol style="list-style-type: none">1. Irrigation techniques2. Desalination technologies3. Restoration Technologies4. Renewable energy

The diversion of rivers has been a vital political decision in the Soviet era; thus, this prompted the lack of strong and coordinated Water management policy. Also, the environmental policies in the region have historically been weak, with insufficient enforcement of regulations. This complicated the efforts taking by the government. International aids including those from the UN, have been limited in terms of creating

¹³ Environment and Climate Change. Lake Winnipeg. <https://www.gov.mb.ca/sd/water/lakes-beaches-rivers/lake-winnipeg.html>



sustainable solutions for the restoration process. Economic factors: The economies of the countries surrounding the Aral Sea, particularly Uzbekistan and Kazakhstan, are heavily dependent on agriculture. The fishing industry is almost completely devastated, influencing the locals whose major income included fishing, as the decline in fish stock have occurred as a result of high salt rate (10 grams per liter) and drainage basin. Furthermore, population faced with some health problems: respiratory issues due to strong dust storms from the exposed seabed which leads to higher healthcare costs. With the environmental collapse, tourism in the area has also been severely affected, restricting the economic recovery from tourism sector. Social factors: This desiccation created several widespread health-based problems; harmful salts and chemicals inflaming the asthma, additionally, increasing morality rate among new born babies are being a huge problem for the regional healthcare policies. The collapse in economy also caused the social inequality, affecting the poorer communities in the area. Worsening living quality pushed for migration leading to the depopulation and stricter pressure on other regions such as Khorezm and Kyzylorda. Disappearing culture and history has a significant importance, and this was resulted in the loss of traditional livelihoods. Technological factors: Inefficient irrigation systems, such as using flood aggravated the situation, In the early 2000s the sea had shrunk to less than 10,000 square kilometers (1,087 sq kilometers per year), representing a nearly 90% loss of its surface area, the massive lake split into main bodies: the North Aral Sea, the South Aral Sea larger and much smaller ones respectively.

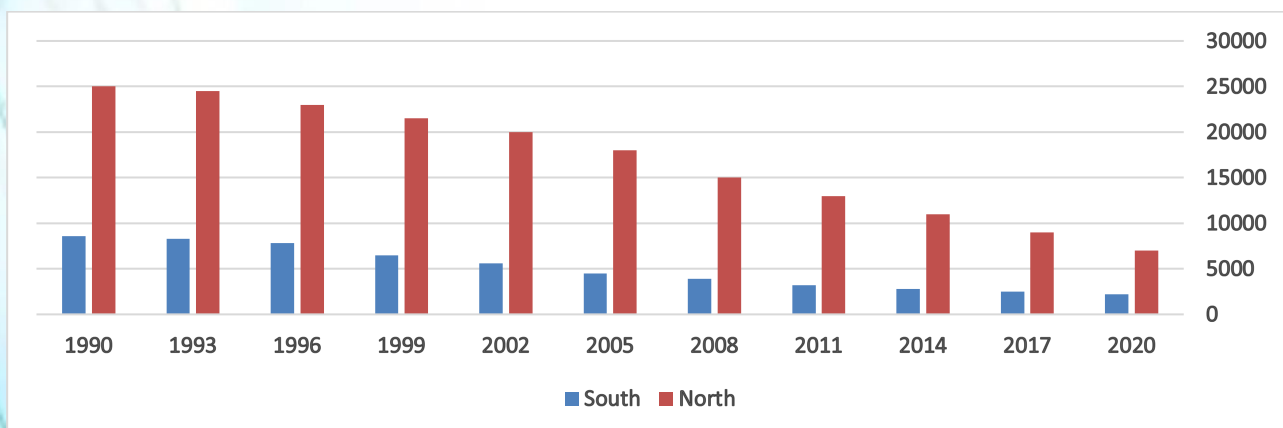


Table 1: drainage rate of the North and South parts of the Aral Sea from 1990 and 2020¹⁴

The drainage basin in the North Aral Sea (mostly located in Kazakhstan) started from 1960s due to inefficient strategy of USSR, the 2 rivers have changed the direction, along with that the following years were the desiccation period, the drastic desiccation commenced from 1980s, the influence of climate change (in summertime period the temperature rose by 12°C) and the misuse of left water accelerated the process. By the early 2000s, the North Sea had lost about 60% of its surface area. To address the issues the authorities of Kazakhstan constructed the Kok-Aral Dam in 2005, this helped to restore the water, the sea level rose from 30 meters to 38 meters by 2006, it also reduced the salinity levels which facilitated the return of freshwater fish species, and revived the local fishing industry. Till 2020, this stabilized the procedure, but it remains much smaller compared to the 1990. Between October 2024 and January 2025, surpassing the initial expectations one billion cubic meters of water were added.

The South Aral Sea (Uzbekistan) is much smaller one and this side of sea has been severely affected part of the Aral Sea basin, by experiencing the significant shrinkage over the past decades. In 1990, the sea already shrunk to about half its original size approximately 10,000 square kilometers. The next years, sea went through the sharp shrinking, and in 2000 the South Aral Sea had shrunk by 90% of its original size. Nowadays, only a small remnant of sea remains, and the eastern portion entirely disappeared. Local authorities planted saxaul and to mitigate the damage as its core, this plant's structural adaptations include the water reserves and keeping from dehydration.

International programs and financial allocations

International Programs provided support to the nature and helped the affected population, so several initiatives are taken. For instance, Aral Sea Basin Program (ASBP) was initiated in 1994 as a regional cooperation, aimed to backbone the environmental and socio-economic consequences of the Aral Sea disaster. The

¹⁴ Aral Sea transboundary river basin. Food and Agriculture Organization of the UN. openknowledge.fao.org



ASBP-2¹⁵ included project financed by international organizations and governments, funding over \$2 billion. In 1993 five Central Asian countries established the International Environmental Fund for the Aral Sea (IFAS), this program works with UN and World Bank and other international donors to fund Aral-related projects. IFAS focuses on the management of water, and reducing the polluting also including public health initiatives. Uzbekistan with IFAS's support has set up forest plantation strategy on the Akpetke Archipelago, inner island appeared by desiccation of the sea, aiming to plant up to 200,00 hectares. Recently World Islamic Relief Agency (WIEA) along with international organizations, has played a crucial role in providing with needed humanitarian aid. WIEA allocated financial support based on the severity of the crisis, such as food aid, healthcare, and clean water access. Their funding involves donations, government grants and partnerships with other international agencies. The survey conducted in 2018 by UN covered 1,600 households across 116 communities, focused on improving the public health, highlighting the high rates of respiratory diseases and malnutrition, also to develop sustainable livelihoods for people who rely on fishing and agriculture.¹⁶ December 31, 2022, The UN¹⁷ contributes approximately \$16,42 million from various donors, and \$8,61 million was reported as expenditure, to support projects aiming the region's condition.

Food & Water and Health sector is mainly considered fields internationally, organizations such as UNESCO, UNICEF, UNDP, and UNFPA implemented projects regarding the before mentioned sectors.

Project name	Agency	Status	Approved budget	Expenditure	Percentage
Food & Water					
Aral Sea MPHF-Human Insecu	UNDP	Operationally closed	1,312,414	1,311,007	99.89

¹⁵ Agency of IFAS. Aral.uz

¹⁶ International Fund for Saving the Aral Sea as a Platform for Sustainable Development of Central Asia
<https://www.icwc-aral.uz>

¹⁷ Human Security Trust Fund. <https://www.un.org>



Aral Sea MPTF-Human Insecu	UNESCO	Operationally closed	151,487	147,785	99.90
Health					
Aral Sea MPFT- Perinatal care	UNFPA	Operationally closed	639,322	639,290	99.99
Aral Sea MPFT- Perinatal care	UNICEF	Operationally closed	980,344	980,344	100.00
JP-Investing Karakalpakstan	UNFPA	On Going	200,250	194,410	99.58
JP-Investing Karakalpakstan	<u>UNICEF</u>	On Going	3,098,027	2,858,837	92.28

Table 2: displays the net funded amounts and financial delivery rates by joint program and participating organizations on the Aral Sea disaster. The Fund governance allocations are referred to as “direct costs”¹⁸

In 2022, the total funding for food & water accounted for: \$1,463,900 (99.90%), and Health totally amount to \$4,910,911.

Conclusion:

In conclusion, it can be said that, The Aral Sea crisis stands as one of the most severe environmental disasters of modern times, with unrenowable consequences for the economy, ecology, public health of Central Asia. The restoration water and greenery projects that are carrying on today's have a positive impact on the enhancement of the region, and the regional governments continue to invest in rehabilitation strategies, but this long-term process requires big efforts, and a combination of effective water management policies, technological innovations, and a

¹⁸ CONSOLIDATED ANNUAL FINANCIAL REPORT of the Administrative Agent. Aral Sea UN Human Security Trust Fund for the Aral Sea in Uzbekistan for the period 1 January to 31 December 2022. <https://mptf.undp.org>



stronger joint of nations as well as being a huge financial stopper for state budget. If the above-mentioned human mismanagements are not stopped in approaching decades, this phenomenon will get more fatal for all over the globe causing depletion of other vital water resources. However, the mankind actions bound to be a culprit in the global warming, but the already happened efforts cannot be overcome.

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