



THE ARAL SEA CRISIS: CAUSES, EFFECTS, AND SOLUTIONS

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Annotatsiya. *Maqolada Orol dengizi inqirozi, uning sabab va oqibatlarini — ekologik, iqtisodiy hamda sog'liqni saqlash sohasidagi ta'sirlari va mumkin bo'lgan yechimlari tahlil qilingan. Ilmiy adabiyotlar va xalqaro hisobotlar asosida inqirozning asosiy sababi barqaror bo'lmagan sug'orish amaliyotlariga borib taqalishi ko'rsatilgan. Tadqiqot natijalari suv resurslaridan samarali foydalanish, ekologik tiklanish va mintaqaviy hamkorlikning Markaziy Osiyoda barqaror rivojlanish uchun muhimligini ta'kidlaydi.*

Kalit so'zlar: *Orol dengizi, ekologik falokat, suv resurslarini boshqarish, Markaziy Osiyo, barqaror rivojlanish*

Аннотация. *В статье рассматривается кризис Аральского моря, его причины, экологические, экономические и медицинские последствия, а также возможные пути решения. На основе анализа научной литературы и международных отчетов показано, что основная причина катастрофы связана с неустойчивыми методами орошения. Результаты подчеркивают необходимость эффективного управления водными ресурсами, экологической реставрации и регионального сотрудничества для устойчивого развития Центральной Азии.*


Ключевые слова: *Аральское море, экологическая катастрофа, управление водными ресурсами, Центральная Азия, устойчивое развитие*

Annotation. *The article examines the Aral Sea crisis, focusing on its causes, environmental, economic, and health effects, as well as possible solutions. Based on academic literature and international reports, the study highlights unsustainable irrigation practices as the main cause of the disaster. The findings emphasize the importance of efficient water management, ecological restoration, and regional cooperation for sustainable development in Central Asia.*

Keywords: *Aral Sea, environmental disaster, water management, Central Asia, sustainability*

Introduction

The Aral Sea, once the world's fourth-largest inland water body, has experienced one of the most catastrophic environmental disasters of the 20th century. This paper explores the causes of the Aral Sea crisis, its environmental, economic, and health effects, and evaluates potential solutions. Through a review of scholarly works, international reports, and case studies, this study highlights the importance of sustainable water management, ecological restoration, and regional cooperation. The findings suggest that while some restoration



projects have shown positive results, large-scale rehabilitation requires integrated strategies at national and international levels.

The Aral Sea, located between Uzbekistan and Kazakhstan, once covered an area of 68,000 km², making it the fourth-largest inland sea in the world (Micklin, 2007). It played a vital role in sustaining ecosystems, regulating local climate, and supporting the livelihoods of millions. However, large-scale irrigation projects initiated during the Soviet era drastically reduced water inflow from the Amu Darya and Syr Darya rivers, leading to severe ecological degradation (Glantz, 1999).

The Aral Sea crisis is now regarded as one of the most striking examples of human-induced environmental disaster. It has caused ecosystem collapse, economic decline, and major public health problems in Central Asia (Saiko & Zonn, 2000). The purpose of this article is to examine the primary causes, assess the socio-economic and health impacts, and analyze proposed solutions to mitigate further damage.

Methods

This study employs a qualitative research approach through a **literature review** of academic articles, international reports, and environmental studies. Data were collected from peer-reviewed journals, the World Bank, UNESCO, and the United Nations Environment Programme. The analysis focused on identifying the underlying causes of the Aral Sea disaster, its effects on the environment, economy, and public health, and the feasibility of proposed restoration strategies.

Results

Causes of the Aral Sea Crisis

The main cause of the Aral Sea's desiccation was the diversion of the Amu Darya and Syr Darya rivers for cotton and rice irrigation projects in the 1960s (Micklin, 2007). Poor water management, outdated canal systems, and high evaporation rates further reduced water inflow (Glantz, 1999). Recurring droughts and climatic variability exacerbated the situation (Saiko & Zonn, 2000).

Environmental Impacts


By the 2000s, the Aral Sea had lost nearly 90% of its volume, splitting into smaller lakes (World Bank, 2010). The exposed seabed turned into the **Aralkum Desert**, generating toxic dust storms that spread pesticides and chemicals across the region (UNEP, 2018). Biodiversity collapsed, with the extinction of many fish species and loss of wetlands.

Economic Impacts

The once-thriving fishing industry collapsed, leading to unemployment and economic decline in local communities (Micklin, 2014). Agricultural productivity was reduced due to soil salinization caused by inefficient irrigation practices.

Health Impacts

Dust storms increased respiratory illnesses such as bronchitis, asthma, and lung cancer (Crighton et al., 2011). Waterborne diseases spread due to contamination of drinking water



sources. Infant and maternal mortality rates rose in affected areas, particularly in Karakalpakstan, Uzbekistan (Ataniyazova, 2003).

Discussion

The Aral Sea disaster illustrates the long-term consequences of unsustainable water management policies. While the situation remains critical, some restoration efforts have shown success. For instance, the **Kok-Aral Dam** project in Kazakhstan has partially restored the North Aral Sea, improving local fisheries and stabilizing water levels (World Bank, 2010).

However, large-scale restoration of the entire sea would require massive investments and international cooperation, including potential diversion of water from Siberian rivers (Glantz, 1999). More feasible solutions include improving irrigation efficiency, promoting less water-intensive crops, and adopting integrated water resource management (UNEP, 2018).

Conclusion

The Aral Sea crisis represents a global lesson in environmental mismanagement. Sustainable development in Central Asia depends on balancing agricultural needs with ecological preservation. Continued regional and international cooperation is necessary to rehabilitate affected areas, improve public health, and prevent similar ecological disasters in the future.

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