PROBLEMS OF THE ARAL SEA

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Abstract

This article highlights the causes of the environmental crisis related to the Aral Sea, its negative consequences, and the measures being taken to mitigate them. Once the fourth largest inland sea in the world, the Aral Sea played a vital role in the climate, agriculture, fishing industry, and livelihoods of the people in Central Asia. However, from the second half of the 20th century, water from the Amu Darya and Syr Darya rivers was diverted inefficiently for cotton irrigation through wasteful irrigation systems. This led to the drying up of the Aral Sea and the emergence of a major ecological disaster. A new desert named Aralkum has formed on the former seabed, spreading millions of tons of salty dust annually. This has increased respiratory, cardiovascular, blood, and skin diseases, particularly leukemia and developmental disorders among children. The climate has drastically changed: the air is drier, summers hotter, and winters colder. Shortages of drinking water and poor sanitation have led to the spread of infectious diseases. However, positive measures are being taken to mitigate the problem. Kazakhstan has restored the Small Aral Sea, and in Uzbekistan, saxaul trees are being planted in the Aralkum desert. Effective water resource management, environmental education, improved healthcare services, and international cooperation are proposed as key solutions to stabilize life in the Aral Sea region.

Keywords: Aral Sea, environmental crisis, water resources, salinization, climate change, health problems, Aralkum.

Introduction

The balance between nature and human activity has always been of great importance throughout history. While humanity has benefited from natural resources, this often came at a great environmental cost. One such vivid example is the tragedy of the Aral Sea. Once a source of pride in Central Asia, the Aral Sea has now become one of the world's most significant ecological problems. In the

early 20th century, it was the fourth-largest inland sea on Earth, located between Uzbekistan and Kazakhstan. It supported thousands of livelihoods through fishing, irrigation, and its moderating effect on the regional climate. However, beginning in the 1960s, water from its main sources — the Amu Darya and Syr Darya — was diverted excessively and mismanaged for cotton and other crop irrigation. This drastically reduced the water volume and transformed the sea into desert land. The Aral Sea tragedy has had a profound impact not only on the environment but also on human health, the economy, and social life. For these reasons, this topic is of both local and global significance. This article explores the main causes of the crisis, its ecological and social consequences, and the steps being taken to address it.

Main Body

1. The Aral Sea. Once the world's fourth-largest closed sea, the Aral Sea's area has decreased tenfold since the mid-20th century due to the diversion of its main water sources. Today, it has split into three separate water bodies.

2. Amu Darya and Syr Darya. These two rivers were the main sources of the Aral Sea. During the Soviet era, they were diverted for cotton fields, which stopped the flow of water into the sea, leading to its desiccation. Water-saving and international cooperation efforts are now being developed.

3. Irrigation Systems and Misguided Water Policy. Large-scale cotton farming policies led to the construction of artificial canals and collectors that disrupted the rivers' natural flow. Inefficient irrigation systems caused massive water waste. Mismanagement of agriculture and irrigation lies at the root of the problem.

4. Environmental Disaster. The drying of the Aral Sea has disrupted the entire regional ecosystem. Every year, over 75 million tons of salty dust is spread by the wind. Plant and animal life is vanishing, soils are becoming saline, and air quality is deteriorating.

5. Salinization and Land Degradation. Salts from the dried seabed have affected millions of hectares of land. Without water and with reduced rainfall, saline dust has stunted plant growth and made farming increasingly difficult.

6. Aralkum Desert. The dried portion of the Aral has become the Aralkum Desert, characterized by extreme temperatures, lack of vegetation, and salt-laden winds. It now covers more than 60,000 square kilometers and is expanding yearly.

7. Climate Change. The disappearance of the sea has drastically altered the microclimate of the region:

- Air humidity decreased
- Summers became hotter, winters colder
- Rainfall reduced

These changes threaten agriculture and human health.

8. Health of the Population. Respiratory diseases (asthma, bronchitis), cardiovascular diseases, leukemia (especially among children), allergies, and reproductive issues are widespread. Weak healthcare systems further worsen the situation.

9. Migration and Social Issues. Unemployment, drought, declining health, and loss of income have driven people to migrate. This has led to depopulation, poverty, and social instability in the Aral Sea region.

10. Environmental Restoration Projects. Kazakhstan: Built the Kokaral Dam to save the Small Aral Sea. Uzbekistan: Planted over 1 billion saxaul and desert-resistant trees in Aralkum. Belt initiatives aim to reduce dust storms and improve local climate.

11. International Cooperation and UN Involvement. The UN has officially recognized the Aral Sea region as a “zone of global environmental disaster.” International bodies like the World Bank, UNESCO, and the EU support recovery efforts. The "Saving the Aral Sea" foundation operates from Tashkent.

12. Sustainable Development and Environmental Education. Raising public awareness, promoting sustainable water management, and introducing modern irrigation technologies are vital. Environmental education is being strengthened in schools, colleges, and universities.

Common Diseases Caused by the Aral Sea Crisis

1. Respiratory Diseases. Bronchitis, asthma, pulmonary fibrosis, and chronic cough due to airborne salty dust, pesticides, heavy metals, and toxic particles.

2. Allergic Diseases. Skin rashes, allergic rhinitis, eye irritation due to allergens, dry air, and vegetation loss.

3. Cancers (Oncological Diseases). Lung, liver, and blood cancers like leukemia due to chemicals and heavy metals entering the body via air or food.

4. Blood Disorders. Anemia, leukemia, hemophilia, especially in children, caused by consumption of water or food contaminated with heavy metals (lead, cadmium).

5. Infectious Diseases. Intestinal infections, hepatitis A, typhoid, and parasitic diseases due to lack of clean drinking water and poor sanitation.

6. Skin Diseases. Dermatitis, eczema, dry skin, and chronic skin inflammation from saline water, dust, and strong solar radiation.

7. Reproductive Health Issues. Birth defects, miscarriages, infertility, and developmental delays in children due to toxins and heavy metals in mothers' bodies.

8. Neurological and Mental Health ProblemsDepression, anxiety, insomnia, and attention disorders caused by ecological stress, unemployment, poor living standards, and chronic illness.

Solutions and Preventive Measures

1. Efficient Water Management. Restore natural river flow, reduce water wastage, and implement drip irrigation and closed-pipe systems.

2. Reducing Cotton Cultivation. Switch to less water-intensive crops like wheat, lentils, or flax. Replace cotton farming with eco-friendly agriculture.

3. Greening the Aralkum Desert. Plant salt-resistant species like saxaul and tamarix to reduce dust storms and soften the climate.

4. Environmental Education and Awareness. Strengthen environmental literacy in schools, and raise public awareness through media and seminars.

5. Improving Economic Stability. Create alternative job opportunities (small business, services, crafts) and develop local infrastructure (roads, clinics, schools).

6. Expanding International Cooperation. Implement large-scale ecological projects with support from the UN, World Bank, and other global organizations. Ensure fair use of transboundary water resources.

7. Scientific Research and Monitoring. Constantly monitor soil, water, and air composition. Analyze disease statistics, dust levels, and climate trends scientifically.

8. Supporting Local Initiatives. Encourage green zone creation, water-saving efforts, and recycling by local residents, volunteers, and NGOs.

9. Expanding the Small Aral Model. Kazakhstan's Kokaral dam revived fishery and tourism in the Small Aral. Creating similar stable water bodies may revitalize the region.

Conclusion

The Aral Sea crisis is a stark reminder of how human activity can severely damage the environment. Mismanagement of water resources, ineffective irrigation, and ecologically harmful cotton policies led to the Aral Sea's disappearance and the creation of the Aralkum desert. This has caused serious environmental, health, economic, and social issues. Contaminated air, soil, and

food have contributed to widespread illnesses and worsened living conditions, leading to migration and instability. Nevertheless, there are signs of progress. The Small Aral has been preserved in Kazakhstan, and Uzbekistan has launched massive tree-planting efforts. International organizations support restoration projects. Strategic solutions such as efficient water use, modern irrigation, environmental education, economic development, and global cooperation are helping to alleviate the crisis. The Aral Sea tragedy serves as a powerful lesson in restoring balance between humans and nature and striving for sustainable development. Future decisions must always consider ecological impacts to create a healthy and livable environment for future generations.

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