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THE ECOLOGICAL PROBLEMS OF CENTRAL ASIA AND THE WAYS TO ELIMINATE THEM

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Abstract
The article analyzes the environmental problems of Central Asia and ways to overcome them. Particular attention is paid to the historical aspects of the emergence of environmental crises in the region, their impact on socio-economic development, as well as modern approaches to solving these problems. The prospects for using international experience in developing sustainable environmental strategies aimed at restoring and preserving the region's natural resources were considered. The importance of interstate cooperation and the introduction of innovative technologies for ensuring environmental stability in Central Asia is emphasized.

Keywords: Environmental issues, Central Asia, sustainable development, natural resources, international experience, environmental strategies, innovative technologies, interstate cooperation.

ЭКОЛОГИЧЕСКИЕ ПРОБЛЕМЫ СРЕДНЕЙ АЗИИ И ПУТИ ИХ УСТРАНЕНИЯ

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Аннотация:
В статье анализируются экологические проблемы Средней Азии и пути их устранения. Особое внимание уделяется историческим аспектам возникновения экологических кризисов в регионе, их влиянию на социально-экономическое развитие, а также современным подходам к решению этих проблем. Рассмотрены перспективы использования международного опыта в разработке устойчивых экологических стратегий, направленных на восстановление и сохранение природных ресурсов региона. Подчеркивается значимость межгосударственного сотрудничества и внедрения инновационных технологий для обеспечения экологической стабильности в Средней Азии.
Ключевые слова: экологические проблемы, Средняя Азия, устойчивое развитие, природные ресурсы, международный опыт, экологические стратегии, инновационные технологии, межгосударственное сотрудничество.

Introduction

The ecological problems of Central Asia have become global in recent decades. The region's main challenges are land degradation, water shortages, atmospheric and soil pollution, and ecosystem disruption. The causes of these phenomena lie both in the region's natural and climatic conditions and in anthropogenic factors, including the irrational use of natural resources and the consequences of the Soviet period of industrialization. The relevance of this topic is due to the need to develop effective solutions that can ensure environmental safety and sustainable development of the region in the future.

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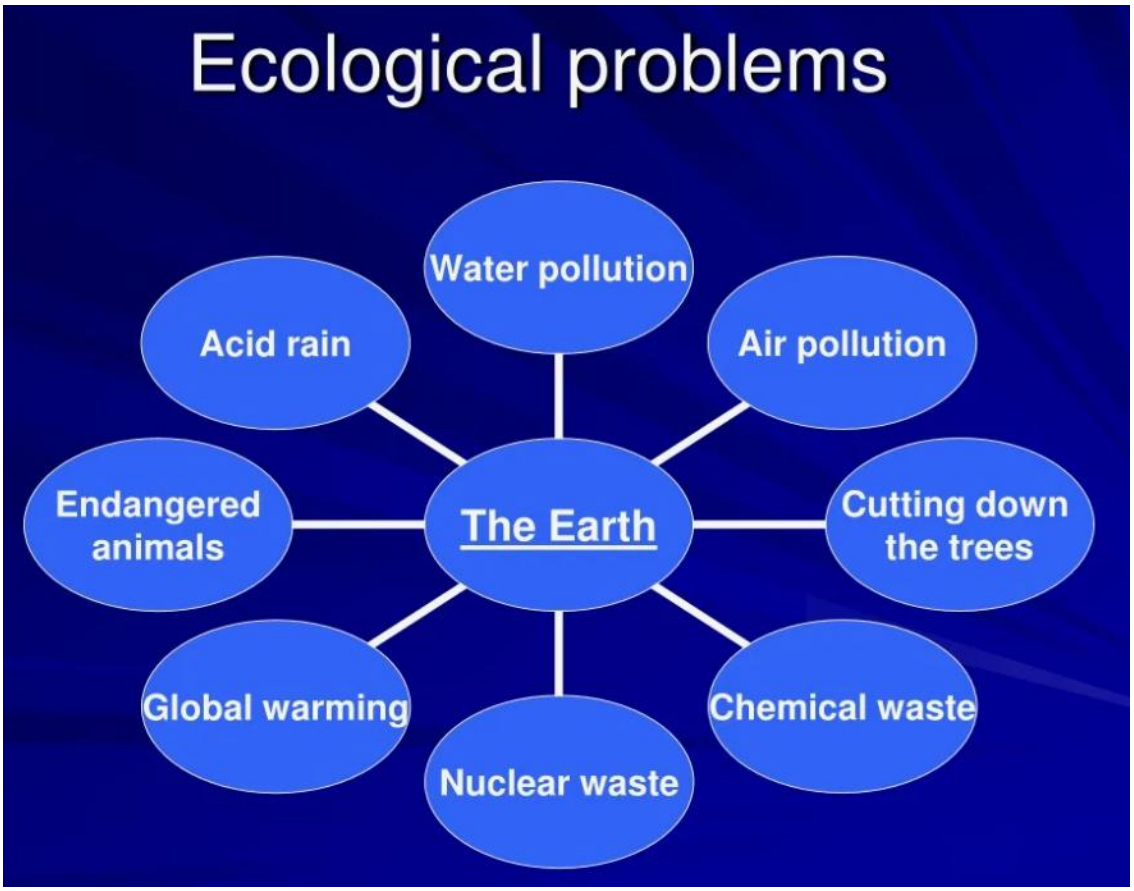
Main part

The Historical Context of Environmental Problems in Central Asia For centuries, Central Asia has been a region rich in natural resources, fertile lands, and unique ecosystems. However, the intensive exploitation of natural resources, which began in the 20th century, led to numerous environmental problems, the most famous of which was the drying up of the Aral Sea.



During the Soviet period, the environmental aspects of the region's economic development were neglected. The main focus was on increasing agricultural production, especially the cultivation of cotton, which required large-scale irrigation. The Syr Darya and Amudarya have become the main sources of water for irrigation systems. Large canals were constructed, such as the Karakum Canal, but their efficiency was negligible due to significant water losses during transportation. As a result, the Aral Sea, which was fed by these rivers, began to dry up rapidly.

The Aral Sea Problem

By the middle of the 20th century, the area of the Aral Sea was about 68 thousand square kilometers, it was the fourth largest lake in the world. However, due to the diversion of water from the Syr Darya and Amudarya for irrigation, its volume decreased by 90%. Currently, the Aralkum desert has formed on the site of a once great reservoir

The consequences of this ecological catastrophe have affected all aspects of the region's life. First, the drying up of the Aral Sea led to an increase in the concentration of salts and toxins, which were dispersed by the wind for tens of kilometers, causing respiratory diseases among the population. Secondly, the significant reduction in fish stocks deprived the local population of its primary

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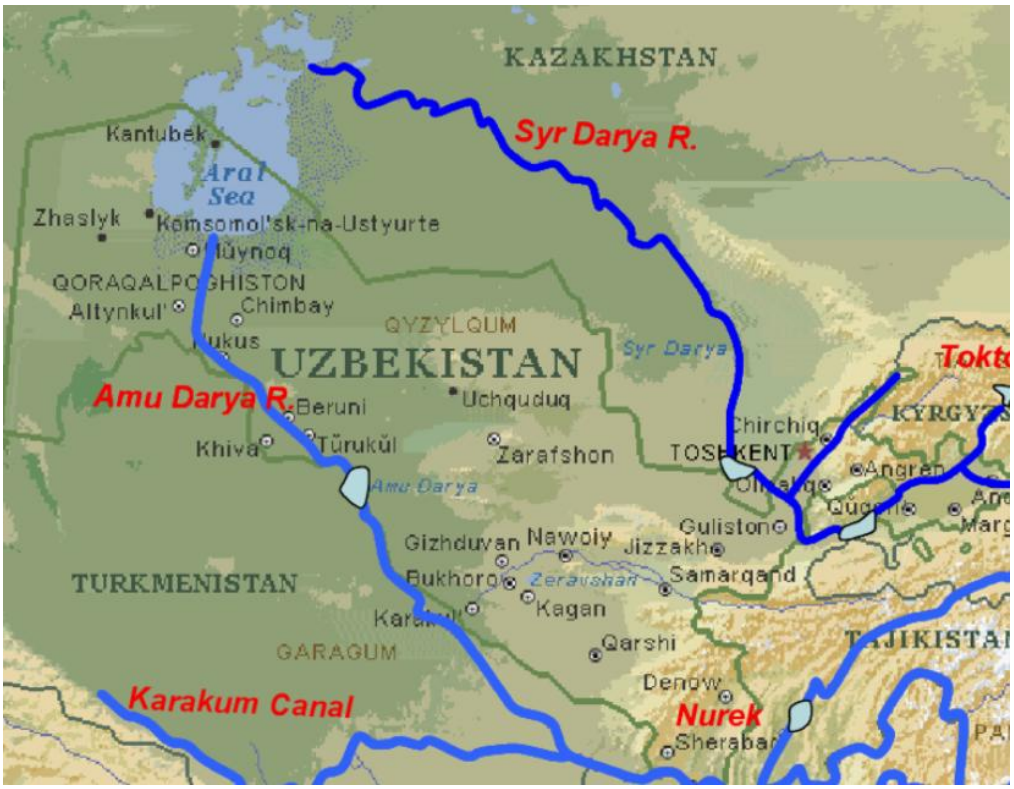
source of income. Thirdly, the climate of the region has become more extreme: summer has become hotter, and winter has become colder.

International organizations such as the World Bank, the United Nations and the European Union have initiated projects to restore the Aral Sea. An example of a successful project is the construction of the Kokaral Dam in Kazakhstan, which made it possible to partially restore the northern part of the sea. However, the full restoration of the Aral Sea is a very difficult task due to the scale of the destruction.

Irrigation and water management issues

The Amudarya and Syrdarya rivers are the main sources of fresh water in Central Asia, but their use poses many problems. The main part of water resources is spent on agriculture, where the level of water use efficiency remains low. Old irrigation systems lose up to 50% of their water due to leaks, which leads to the depletion of water resources.



In addition, the distribution of water among the countries of the region often causes conflicts. For example, the upper reaches of the Amu Darya and Syr Darya rivers are located in Tajikistan and Kyrgyzstan, which use the rivers to generate electricity, while Uzbekistan, Turkmenistan and Kazakhstan depend on these rivers for irrigation. Different priorities in water use create tension between countries.

To address these challenges, comprehensive measures are needed:

1. Improving irrigation systems. The introduction of modern technologies, such as drip irrigation, can reduce water losses.
2. Coordination of interstate strategies. The development of transboundary agreements on water resources management will reduce the risk of conflicts.

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3. Infrastructure investments. The reconstruction of canals and reservoirs will reduce water losses and increase their efficiency.

Modern environmental challenges

Climate change is one of the main factors exacerbating the environmental problems of Central Asia. The increase in average temperature leads to the melting of glaciers in the Pamir and Tien Shan mountains, which are the main sources of water for the Amudarya and Syrdarya rivers. According to scientists, glaciers may decrease by 30-50% by the middle of the 21st century, which will lead to a significant reduction in river runoff.

Furthermore, desertification remains a pressing issue. More than 60% of the region's territory is subject to soil degradation processes. This leads to a decrease in yield and an increase in land unsuitable for agriculture.

Air pollution in large cities such as Tashkent, Almaty and Bishkek is becoming a serious threat. The main sources of pollution are transportation, industrial enterprises and domestic heating. The level of fine particles in the air often exceeds permissible norms, which leads to an increase in respiratory system diseases and cardiovascular diseases.

International experience in solving environmental problems

International experience shows that solving environmental problems is only possible with a comprehensive approach. For example, China is implementing a program to combat desertification, which includes planting billions of trees to restore degraded lands. This experience can be useful for Central Asia, where forest plantations can play a key role in stabilizing soils and improving climate.

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In Europe, river cleanup programs such as the Living Rhine have shown that even heavily polluted water bodies can be restored with a clear strategy and sufficient funding. These approaches can be adapted to the restoration of the Amudarya and Syrdarya rivers.

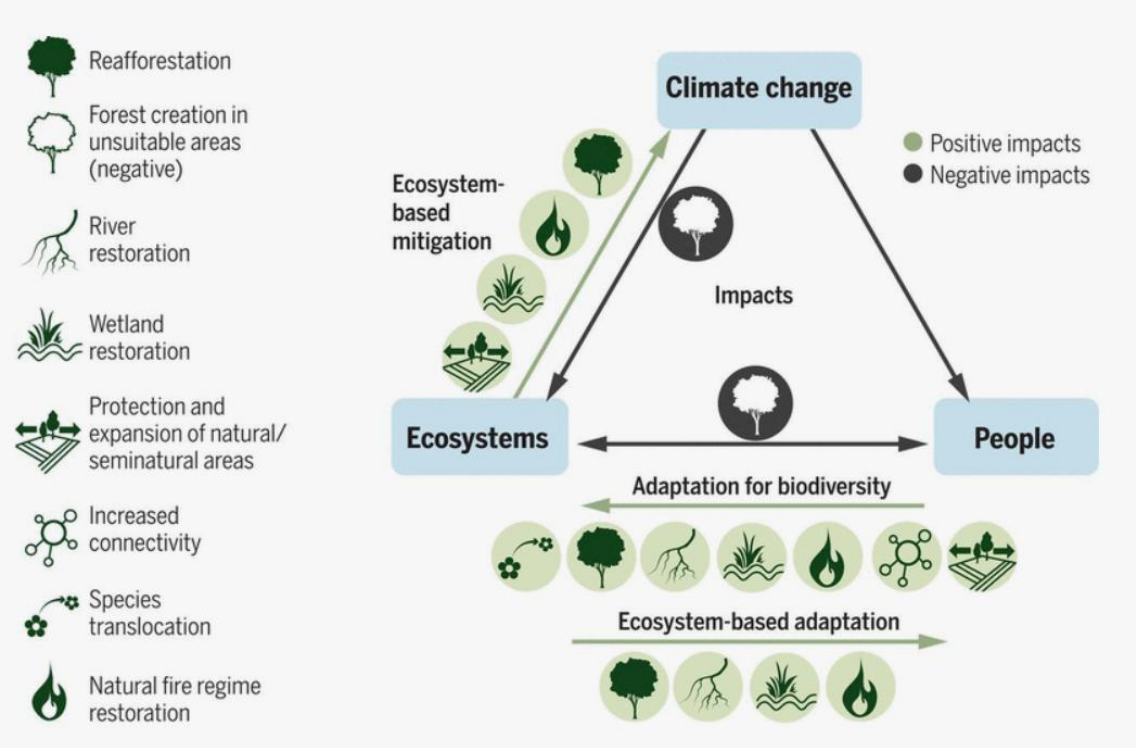
An important element is the introduction of renewable energy sources. For example, using solar and wind power plants in Kazakhstan and Uzbekistan can significantly reduce carbon dioxide emissions and reduce dependence on fossil fuels.

Ways to solve environmental problems in Central Asia

1. Development of a regional environmental strategy. It is necessary to create a joint action plan for the countries of the region, including water resources management, ecosystem restoration and pollution reduction.
2. Innovative technologies. The introduction of modern irrigation, water purification and waste disposal systems will help reduce the burden on natural resources.
3. Educational initiatives. Increasing the environmental literacy of the population through educational programs and campaigns can play a key role in solving environmental problems.
4. International cooperation. Attracting international organizations and donors to finance environmental projects such as restoring the Aral Sea and improving irrigation systems.
5. Environmental monitoring. Using satellite technologies for assessing the state of natural resources and planning activities for their protection

Conclusion

Addressing the environmental problems of Central Asia requires coordinated efforts at the national, regional, and international levels. Particular attention should be paid to the development and implementation of sustainable environmental strategies aimed at restoring natural resources, reducing the anthropogenic burden, and adapting to climate change.



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The use of international experience and innovative technologies, as well as active interstate cooperation, will become key factors in success in combating environmental challenges. The future of the region directly depends on the ability of its countries to find compromises, unite efforts and implement joint projects aimed at maintaining the ecological balance.

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