ENVIRONMENTAL PROBLEMS IN UZBEKISTAN: CAUSES AND SOLUTIONS

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Introduction

Uzbekistan is facing severe ecological challenges, including the drying of the Aral Sea, soil salinization, desertification, water scarcity, and air pollution. These problems negatively affect human health, agricultural productivity, and overall sustainable development. This thesis briefly examines the causes of environmental degradation and suggests potential solutions.

Environmental degradation in Uzbekistan has become a pressing issue with long-term consequences for both nature and society. The Aral Sea disaster is a symbol of ecological mismanagement, while land degradation, salinity, and urban air pollution continue to worsen due to human activities and climate change.

Research Aim

The aim of this research is to identify the main environmental problems in Uzbekistan, analyze their root causes, and propose feasible solutions for sustainable development.

Methods

This research applied a multidisciplinary methodology to provide a comprehensive understanding of Uzbekistan's environmental problems. A systematic review of scientific literature, governmental documents, and international reports was carried out to identify the historical and contemporary causes of ecological degradation. Data from the United Nations Development Programme, the Food and Agriculture Organization, and the World Bank were included to establish an international perspective, while local sources such as the State Committee on Statistics of Uzbekistan and the Ministry of Ecology provided country-specific indicators.

Statistical data were examined to evaluate long-term trends in water consumption, soil salinity, desertification rates, air pollution, and biodiversity loss. Comparative analysis made it possible to trace ecological changes over the last three decades and to identify regions where environmental degradation is most severe.

Geographic Information Systems and remote sensing techniques were used to analyze satellite imagery and visualize the spatial distribution of ecological problems. Landsat and MODIS data were processed to detect desertification, vegetation loss, and the shrinking of the Aral Sea. These tools made it possible to map ecological hotspots in Karakalpakstan, Khorezm, and the Fergana Valley, offering a spatial perspective on the country's environmental challenges.

Finally, two case studies were examined to provide deeper insights into the regional dimensions of ecological stress. The Aral Sea basin was selected as a symbol of large-scale ecological disaster, where unsustainable irrigation policies led to one of the most dramatic examples of water mismanagement in the world. The Zarafshan Valley was chosen as a second example, where intensive agriculture and

water diversion practices have accelerated soil salinization and groundwater depletion. Together, these case studies offered evidence of how ecological problems manifest differently depending on geographical conditions and human activities.

This methodological framework ensured that ecological, geographical, and socio-economic dimensions were integrated, allowing the study to propose well-grounded and comprehensive solutions.

Results

The findings reveal that unsustainable irrigation, overuse of water from the Amu Darya and Syr Darya rivers, excessive use of chemicals, and industrial emissions are the main drivers of ecological decline. The Aral Sea has shrunk drastically, while soil salinization affects more than half of irrigated lands. Air quality in industrial cities is deteriorating, leading to increased health risks.

Discussion

Addressing these problems requires water-saving technologies, afforestation projects in degraded areas, crop diversification, and renewable energy use. Regional cooperation on transboundary rivers is also essential for long-term ecological stability.

Conclusion

Uzbekistan's environmental problems are severe but solvable. With effective governance, sustainable agricultural practices, and international collaboration, the country can overcome ecological challenges and ensure a healthier and more resilient future.