ENVIRONMENTAL POLLUTION AND MEASURES IN UZBEKISTAN

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Abstract

Environmental pollution remains one of the most urgent issues of modern Uzbekistan. The rapid development of industry, agriculture, and transport has led to air, water, and soil contamination, as well as the degradation of natural ecosystems. This article provides an analytical overview of the current environmental situation in Uzbekistan, discusses the main sources of pollution, and highlights governmental measures to improve ecological safety and promote sustainable development.

Keywords: environmental pollution, Uzbekistan, air quality, Aral Sea, soil degradation, ecological policy, sustainability.

1. Introduction

Uzbekistan, located in Central Asia, is a landlocked country with limited water resources and an arid climate. Over the last several decades, economic expansion, urbanization, and industrialization have significantly increased anthropogenic pressure on the environment.

Air pollution, soil salinization, and the catastrophic drying of the Aral Sea are among the most pressing problems. Environmental degradation not only threatens ecosystems but also directly affects human health, agriculture, and national economic stability.

The government of Uzbekistan has recognized environmental protection as one of its key national priorities, integrating it into long-term development strategies such as the “Green Development Strategy 2030.”

2. Literature Review

Numerous studies have addressed the issue of environmental degradation in Uzbekistan.

According to Turdiev & Karimova (2021), air pollution in urban centers like Tashkent and Navoi has reached critical levels due to outdated industrial technologies and the rapid increase in vehicle numbers.

World Bank (2023) reports emphasize that 90% of Uzbekistan's water resources are transboundary, making efficient regional cooperation essential.

The UNDP Uzbekistan Environmental Report (2022) highlights the Aral Sea crisis as one of the world's largest ecological disasters, which has drastically altered the regional climate and caused severe health problems.

FAO (2022) research focuses on land degradation, showing that over half of the irrigated lands suffer from moderate to severe salinization.

Meanwhile, Bektemirov (2020) notes that the success of environmental reforms in Uzbekistan largely depends on public awareness and institutional capacity.

These studies collectively confirm that environmental sustainability in Uzbekistan requires an integrated approach, combining technological modernization, ecological education, and legislative support.

3. Air Pollution in Uzbekistan

Air pollution is a major environmental concern in Uzbekistan. The largest sources include vehicle exhaust (about 55%), industrial emissions (30%), and the energy sector (10%).

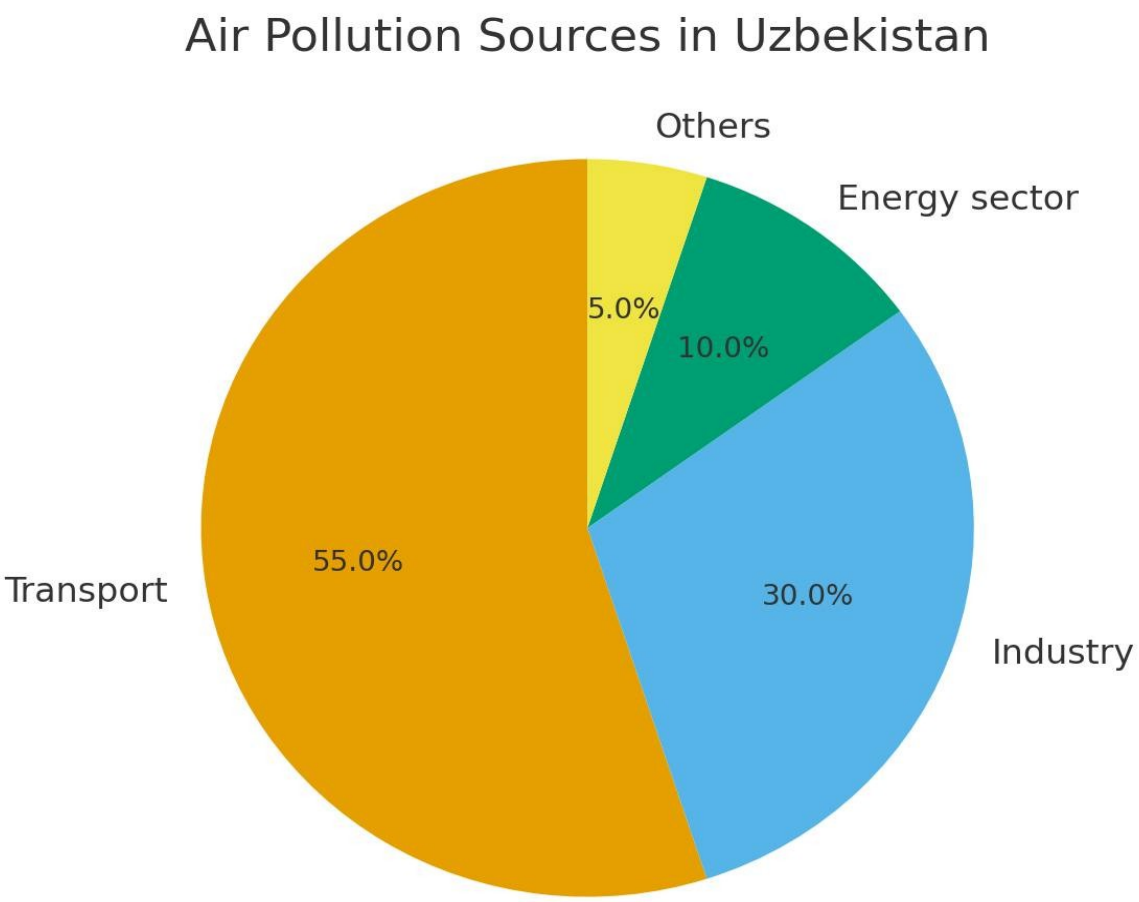

Figure 1: Air pollution sources in Uzbekistan (pie chart)

Transport – 55%
Industry – 30%
Energy sector – 10%
Others – 5%

According to the State Committee for Ecology, more than 700,000 tons of harmful gases are released into the atmosphere annually.

The main pollutants include carbon monoxide (CO), nitrogen oxides (NOx), sulfur dioxide (SO_2), and particulate matter (PM2.5).

High concentrations are observed in cities such as Tashkent, Angren, and Navoi.

Air contamination contributes to respiratory diseases, cardiovascular problems, and premature deaths. Studies by the World Health Organization (WHO, 2023) estimate that air pollution reduces average life expectancy in Central Asian cities by up to two years.

4. Water Pollution and the Aral Sea Crisis

Water resources in Uzbekistan are under extreme stress.

Over 85% of available water is used for irrigation, which often leads to waste due to outdated canal systems.

Chemical fertilizers, pesticides, and industrial wastewater have further worsened the situation.

The Aral Sea disaster remains the most striking ecological tragedy. Excessive diversion of the Amu Darya and Syr Darya rivers for cotton irrigation caused the sea to lose over 90% of its volume since 1960.

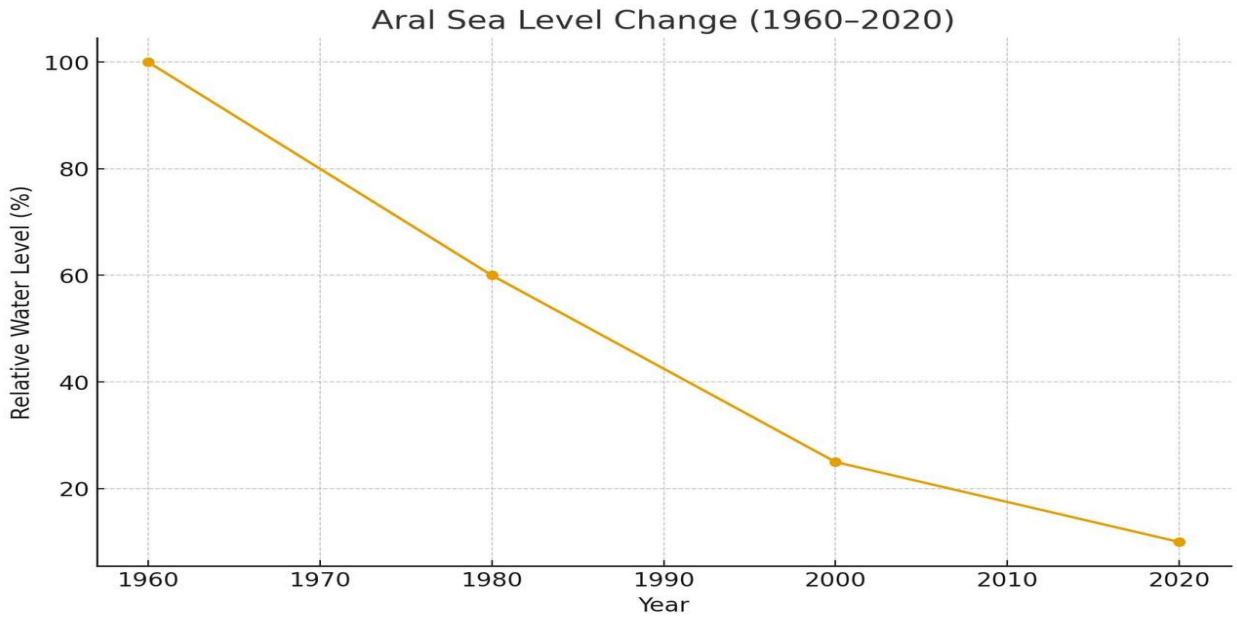

Figure 2: Aral Sea level change (line chart)

1960 – 100%
1980 – 60%
2000 – 25%
2020 – 10%

This catastrophe has turned once-flourishing fishing regions into barren deserts, created toxic dust storms, and negatively affected public health in the Karakalpakstan region.

However, recent projects such as the “Aral Sea Region Restoration Program” and international cooperation have begun to restore small water bodies and stabilize the ecosystem.

5. Soil Degradation and Land Salinization

Soil degradation is another major issue, particularly in irrigated areas of Bukhara, Khorezm, and Syrdarya.

More than 50% of agricultural land is affected by salinity. The primary causes include inefficient irrigation systems, lack of drainage, and overuse of agrochemicals.

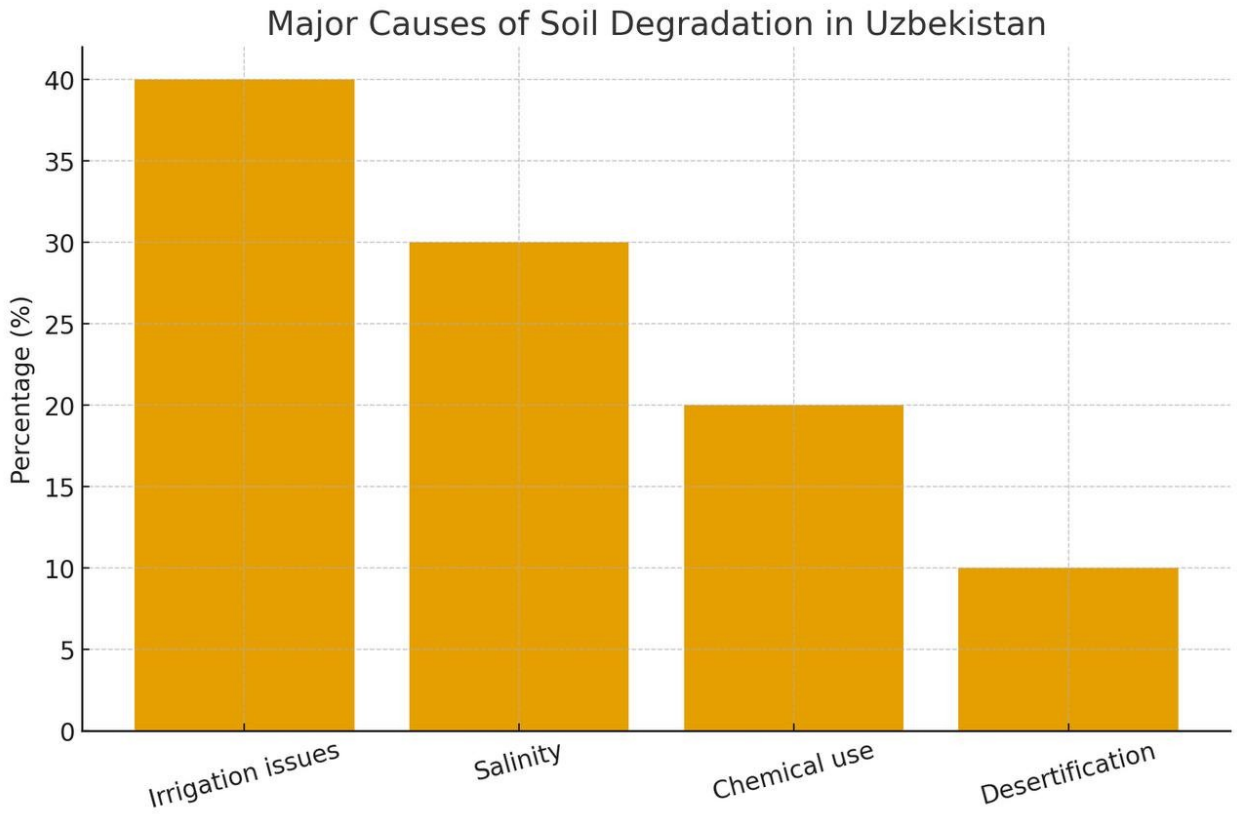

Figure 3: Major causes of soil degradation (bar chart)

Irrigation issues – 40%
Salinity – 30%
Chemical use – 20%
Desertification – 10%

Soil erosion reduces productivity, threatens food security, and accelerates desertification.

The FAO report (2022) warns that if current trends continue, Uzbekistan could lose up to 20% of its arable land by 2040.

6. Governmental Measures and National Programs

Recognizing the importance of environmental sustainability, the Uzbek government has launched several nationwide initiatives:

- “Yashil Makon” (Green Space) — a reforestation program aimed at planting more than one billion trees and shrubs by 2030.
- “Clean Air” Project — focuses on reducing vehicle emissions and promoting electric transport.
- “Aral Sea Restoration” Initiative — targets the re-greening of the dried seabed and improvement of water management systems.
- Environmental Protection Law (2021) — introduces stricter control over industrial emissions and waste disposal.

• ♻ Circular Economy Plan — promotes recycling and efficient resource use.

According to the Ministry of Ecology (2024), these initiatives have already reduced urban air pollutants by 8% compared to 2020 levels.

7. Public Awareness and Environmental Education

Environmental education plays a critical role in promoting sustainable practices.

In Uzbekistan, ecological knowledge is being introduced at all levels of education — from schools to universities.

Media campaigns, volunteer movements, and eco-festivals such as “Green Uzbekistan” and “Eco-Week” are fostering greater environmental awareness among young people.

The establishment of environmental clubs and student-led projects contributes to forming a new generation of ecologically responsible citizens.

8. Discussion

Despite noticeable progress, several challenges remain.

- Many enterprises still operate with outdated technologies.
- Waste recycling facilities are insufficient.
- Cross-border cooperation on water management remains limited.

Nevertheless, Uzbekistan’s transition toward a “Green Economy” and the adoption of renewable energy projects (solar and wind farms) demonstrate a positive shift.

Sustainable environmental management requires long-term monitoring, continuous public engagement, and international collaboration.

9. Conclusion

Environmental pollution in Uzbekistan is a multifaceted problem, affecting air, water, and soil quality.

However, the government’s consistent actions — combined with public awareness and global partnerships — are laying the foundation for a cleaner, greener future.

Continued scientific research, education, and international support will be crucial for ensuring ecological balance and sustainable development in the region.

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