INTERNATIONAL MULTIDISCIPLINARY JOURNAL FOR RESEARCH & DEVELOPMENT
SJIF 2019: 5.222 2020: 5.552 2021: 5.637 2022:5.479 2023:6.563 2024: 7,805
eISSN :2394-6334 https://www.ijmrd.in/index.php/imjrd Volume 12, issue 06 (2025)

CLIMATE CHANGE AND ITS IMPACT ON THE PHYSICAL GEOGRAPHY OF UZBEKISTAN

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Abstract: This article analyzes the impact of global climate change on the natural and geographical systems of Uzbekistan, particularly water resources, ecosystems, arid regions, flora and fauna. The main causes and consequences of climate warming and local adaptation measures are given special attention.

Keywords: climate change, geography of Uzbekistan, drought, water scarcity, ecological balance, desertification, adaptation strategies.

Global climate change is one of the most pressing challenges facing humanity, and its consequences are particularly evident in countries with continental climates such as Uzbekistan. In recent decades, there has been a noticeable increase in air temperature, shifts in precipitation patterns, more frequent droughts, and environmental crises—all signs of this phenomenon.

Uzbekistan's diverse physical geography, ranging from mountainous areas to broad plains, results in climate change affecting different regions in distinct ways. Areas such as the Aral Sea region, Kyzylkum Desert, Zarafshan Valley, and mountainous zones are especially vulnerable to these changes.

In recent years:

- The average annual temperature has increased by 1–1.5°C, leading to longer vegetation periods and greater evaporation;
- Droughts and water shortages have intensified, particularly in the Amu Darya and Syr Darya basins;
- Ecosystem stability has been compromised – some plant and animal species are under threat;
- Desertification has accelerated, with increased land degradation and more frequent sandstorms.

The melting of glaciers in mountainous areas is a particularly urgent issue, directly affecting Uzbekistan's water resources. The shrinking volume of glaciers reduces the year-round flow of rivers, which creates challenges for agriculture and drinking water supply.

Agriculture is among the sectors most impacted by climate change. Irrigated farming is suffering from water shortages, while crop growing seasons and productivity are shifting. This is particularly evident in cotton, wheat, and fruit and vegetable cultivation, where agrotechnical practices are being revised.

The Government of Uzbekistan has adopted several strategic documents aimed at combating and adapting to climate change. Notably, initiatives such as the development of "green energy,"

water-saving technologies, and the introduction of agrometeorological monitoring systems are being implemented to mitigate negative consequences.

Climate change affects all components of Uzbekistan's physical geography, both directly and indirectly. This process disrupts natural balance and leads to worsening ecological, social, and economic challenges. Therefore, the development and implementation of scientifically grounded monitoring and adaptation strategies are crucial for reducing climate-related risks. Only through collaboration among science, government policy, and the public can sustainable systems be built to withstand the impacts of climate change.

The effects of climate change on Uzbekistan's physical geography are not only environmental but also pose a serious challenge to socio-economic stability. Therefore, the following measures should be prioritized:

- Digitizing and updating climate monitoring and forecasting systems;
- Broad implementation of water-efficient agricultural technologies;
- Launching comprehensive programs to combat desertification through afforestation and halting land degradation;
- Enhancing ecological literacy and education among youth and the population;
- Funding scientific research on climate change and expanding international cooperation.

This article serves as a scientific basis for understanding ongoing environmental-geographic transformations in Uzbekistan and for assessing potential future ecological risks. It provides a foundation for sustainable national development and the rational use of natural resources.

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