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CLIMATE WARMING IN THE REPUBLIC OF UZBEKISTAN

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Abstract: This article examines the issue of climate warming as a negative factor affecting the Republic of Uzbekistan. It explores climate warming in the context of atmospheric air pollution and water scarcity—factors that have had an adverse impact on public health. The causes of climate change within Uzbekistan are analyzed. Furthermore, the article highlights various challenges stemming from climate change, which lead to a range of negative consequences, including a decline in agricultural productivity.

Keywords: climate change, surveillance system, desiccation of the Aral Sea, human factor, soil pollution, threat to environmental security, extreme heat, temperature records, anomalous phenomena.

INTRODUCTION

It should be noted that temperature fluctuations have always occurred, though in the past they were exclusively the result of natural causes. With the development of industrial production and transport, as well as an increase in the domestic consumption of primary energy sources, conditions began to emerge that fostered the "greenhouse effect." By the end of the 20th century, this had sparked lively debate.

Discussions surrounding the "greenhouse effect" and climate change—in which many scientists, politicians, and diplomats were actively engaged toward the end of the 20th century—ultimately led to the creation of the 1992 United Nations Framework Convention on Climate Change. The core concept behind this document was the necessity of reducing the volume of carbon dioxide and other "greenhouse" gases released into the atmosphere, an objective that required the combined efforts of all nations. Concrete mechanisms for achieving this goal were outlined in the Kyoto Protocol, signed in 1997 in the Japanese city of Kyoto. The Kyoto Protocol stipulated that signatory states were to undertake specific commitments to reduce carbon dioxide emissions into the atmosphere.

LITERARY RESEARCH

Climate change is one of the negative aspects of the modern world's development. Given its potential impact on many facets of human life, it arguably stands as one of the most critical issues concerning the future of human existence today. Wealthy, long-industrialized nations bear the primary responsibility for the emergence of climate change, yet it is the poorest communities and countries that suffer the most from its consequences; they typically bear the brunt of severe floods, droughts, storms, and other predictable events—disasters for which they lack the resources to mount an effective response. In essence, by trapping people in poverty, climate change threatens to undo the progress achieved in global development.

In this context, it is important to highlight the issue of climate change within the Republic of Uzbekistan. In recent years, as in many other countries, Uzbekistan has experienced a sharp rise in air temperatures. It is well known that such increases in ambient temperature lead to a significant surge in the number of people seeking medical attention—reporting symptoms like shortness of breath and dehydration, or suffering from heatstroke and the exacerbation of chronic health conditions. The most vulnerable groups in this regard are the elderly and low-income individuals, who often lack access to air conditioning or cool indoor environments. The following sections examine and analyze emergency situations linked to climate change that have been recorded across various regions and provinces of the Republic of Uzbekistan.

As noted in source [1], climate change in Uzbekistan is leading to excess morbidity and mortality from cardiovascular and respiratory diseases, as well as acute intestinal infections. Furthermore, a significant number of people live in areas prone to events such as flash floods, mudflows, heatwaves, droughts, and dust storms—phenomena that are becoming increasingly frequent and intense, resulting in higher rates of illness and death. There is a lack of systematic policy measures aimed at protecting human health from climate change and reducing life-threatening risks associated with natural disasters. The healthcare sector's capacity to assess the population's health status and trends related to climate change—which would serve as a foundation for planning preventive measures and monitoring their outcomes and effectiveness—remains insufficient. The current epidemiological surveillance system tends to underreport figures. Surveillance of infectious diseases—particularly waterborne and foodborne illnesses, as well as zoonotic diseases—is severely limited. The detection of pathogens in water and food supplies is quite restricted. The crisis caused by the drying up of the Aral Sea has imposed a heavy burden of disease and disability on the population, particularly in the Republic of Karakalpakstan and the Khorezm Region. In 2017, the incidence of diseases affecting the nervous, cardiovascular, digestive, and urogenital systems (including urolithiasis) in the Khorezm Region was approximately 50% higher than the national average. Data from 2009–2017 indicate that the incidence of acute intestinal infections in the Republic of Karakalpakstan remained significantly above the national average throughout that period (by an average of 60%).

According to the website [2], climate change has caused the average annual temperature in Uzbekistan to rise—over the last sixty years—at a rate nearly three times higher than the global average, leading to more frequent droughts. This is highlighted in a new Atlas of environmental change in the country, published by the United Nations Environment Programme (UNEP). Drawing on sixty years of satellite observation data, the Atlas notes that the average annual temperature in Uzbekistan has already increased by 1.6°C—nearly triple the global average of 0.6°C—with the Aral Sea region experiencing an even greater rise, ranging from 1.8°C to 2.5°C.

In materials from the website [3], climatologist E. Abdulakhatov observes: "Humanity is currently experiencing the hottest period in its 125,000-year history. We are entering an era of record-high air temperatures. Furthermore, temperatures remain high throughout the year, failing to cool down. As we live in an industrial age, our energy production results in the release of excessive gases into the atmosphere. The human factor plays a key role in climate change; 90% of global experts agree that the current warming is driven by anthropogenic factors. The remaining 10% point to other scientific perspectives, suggesting that climate change is influenced by subterranean shifts, astronomical factors, or increased heat output from the Sun itself," the expert stated.

According to source [4], the hottest summers are expected in Uzbekistan between 2023 and 2027. The UN has announced that the period from 2023 to 2027 will be the hottest and most anomalous in global history, a trend that includes Uzbekistan. During hot weather, it is recommended to drink

plenty of water, wear head coverings, and, whenever possible, minimize time spent outdoors during the day.

According to website [5], July 2026 in Uzbekistan (Fig. 1) was anomalously hot. In most regions, temperatures exceeded the norm by 1.3–2.3°C, and on July 18–19, they reached 46–50°C in some areas. Temperature records were broken in 16 regions. In Tashkent, the air temperature climbed to 44.3°C—just 0.3°C below the capital's all-time record. At the same time, several regions experienced heavy downpours, accompanied in some places by hail. Wind gusts of up to 25 m/s and dust storms were also recorded.

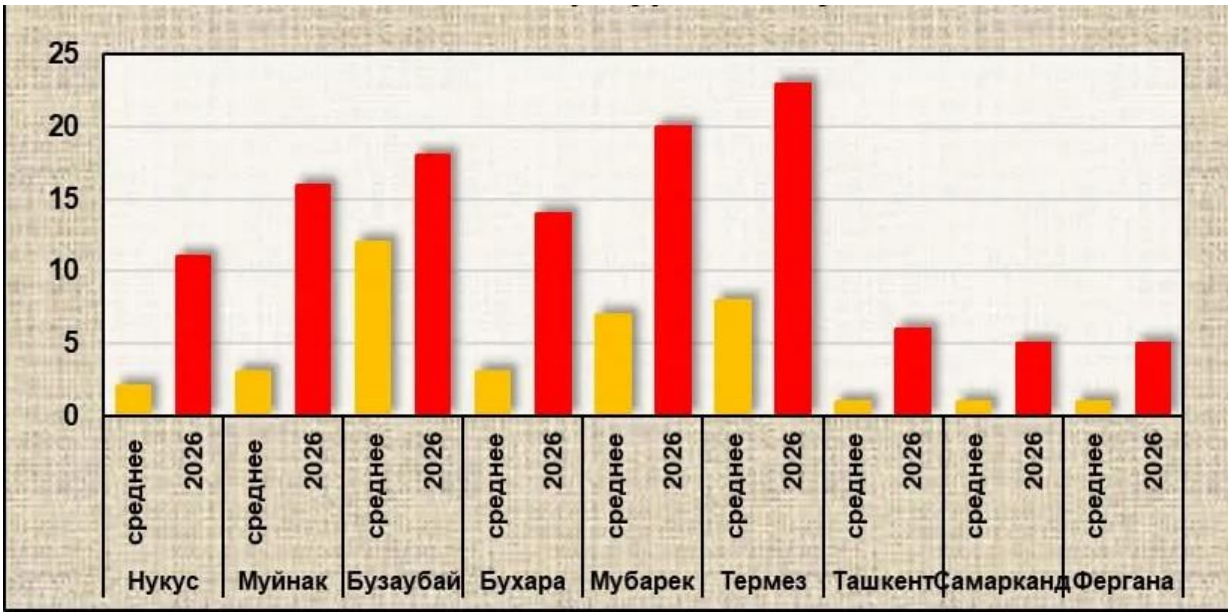


Figure 1. Illustration of the number of days with air temperatures above 40 °C in July 2026.

Analyses of the works [6; 7] indicate that between 1960 and 2020, the average air temperature in Uzbekistan rose from 13.2°C to 14.5°C, while annual precipitation decreased from 220 mm to 180 mm. The area covered by glaciers has shrunk by approximately 70 percent. Projections suggest that by 2050, the temperature could reach +16°C. On a global scale, climate change is having a significant impact on water resources; the melting of glaciers is causing a gradual shift in river flow regimes. Contemporary challenges—such as climate change, shortages of water and natural resources, the socio-economic consequences of the pandemic, and energy and food crises—pose a serious threat to sustainable development. Excessive pollution of soil, water, and the atmosphere, combined with climate change and the degradation of flora and fauna, have turned the processes currently unfolding in developing nations into one of the most critical threats to ecological security. Effective management of water and land resources, the implementation of conservation practices, the development of climate-resilient agricultural technologies, and the use of renewable energy sources represent vital strategic approaches for mitigating the negative impacts of climate change.

Based on the information provided in source [8], it can be stated that on July 19, 2026, air temperatures in the shade were expected to exceed 48 °C within the territory of the Republic of Uzbekistan (Fig. 2). It is also noted that this figure surpasses air temperatures recorded on the

African continent. Such high temperatures are indicative of an anomalous heat event for the month of July.



Figure 2. Illustration of an extreme heatwave in Uzbekistan.

Methodology

It should be noted that the climate is changing, and the consequences of this shift are already being felt: weather patterns are becoming more volatile, air temperatures are rising, and the hydrological regimes of water bodies are shifting. Adverse weather events—such as droughts, mudslides, heatwaves and cold spells, high winds, heavy precipitation, and dust storms—are occurring with increasing frequency. Many developing countries, which lack the necessary social, technological, and financial resources for adaptation, are currently suffering from the impacts of climate change. Millions of people are already facing water and food shortages, as well as mounting climate-related risks that threaten public health.

It is well known that climate change is one of the negative factors affecting global development today. Given its potential impact on many aspects of human life, it is arguably one of the most

critical issues concerning the future of humanity. Wealthy, long-industrialized nations bear the primary responsibility for the emergence of climate change, while the poorest communities and countries suffer the most from its consequences; they are typically the ones to bear the brunt of severe floods, droughts, storms, and other predictable events—disasters for which they lack the resources to mount an effective response. In essence, by trapping people in poverty, climate change threatens to undo the progress achieved in global development.

Uzbekistan is particularly vulnerable to climate change due to its specific geographical and climatic conditions. For instance, an increase in heavy precipitation over the last decade has led to more frequent and destructive floods, while rising temperatures have resulted in a greater number of droughts. These events pose a serious threat to infrastructure and public health, and also jeopardize the country's agricultural productivity. In this context, the establishment of a national framework for hydrometeorological and climate services has become a crucial step toward ensuring sustainable development and protecting the population from the adverse impacts of climate change. The National Framework for Hydrometeorological and Climate Services (NFHCS) is a strategic initiative aimed at enhancing resilience to climate change and natural disasters by improving the use of climate data, modernizing the infrastructure of Uzhydromet (the national hydrometeorological service), and implementing innovative methods for information dissemination. The NFHCS includes recommendations for developing new technical and operational mechanisms to provide climate information and services tailored to the needs of various economic sectors. It is worth noting that the NFHCS was designed as a foundation for a nationwide—rather than department-specific—approach to hydrometeorological and climate services. It is precisely this aspect that underscores its significance for the relevant economic sectors of the Republic of Uzbekistan.

It should be noted that Uzbekistan is one of the Central Asian countries most severely affected by climate change. Specifically:

- Over the last 50 years, the average temperature has risen by 1.5°C.
- In 2023, Uzbekistan ranked 18th globally in terms of air pollution levels.
- More than 5 million people are suffering due to the environmental crisis caused by the drying up of the Aral Sea.
- Each year, over 20,000 people fall ill as a result of air pollution and water scarcity.

It is no secret that climate change is causing a range of negative consequences across all regions of Uzbekistan:

- Rising temperatures increase the rate of water evaporation, leading to a reduction in and a shortage of water resources in these regions;
- Environmental stress has resulted in an increase in the number of days without precipitation throughout the year;
- Decreased soil moisture raises the risk of recurring droughts and leads to lower crop yields;
- A reduction in the volume of water flowing into the Aral Sea accelerates the desertification of the river delta and the emergence of new desert areas on the exposed, dried-up seabed;
- Dust levels in the atmosphere are rising across vast areas;
- Anomalous weather events—such as sudden warming or cold spells—result in the loss of agricultural produce and fruit crops.

Conclusions

From the above, it is clear that the trend of climate change in the Republic of Uzbekistan has reached a concerning state, which negatively impacts public health—most notably the health of the younger generation.

Given this, every effort must be made to ensure that individuals treat the natural environment with care, taking only what is necessary rather than thoughtlessly exploiting nature's wealth. Furthermore, we must strive to prevent the adverse consequences of climate change in the future.

In conclusion, it should be noted that the Earth's natural environment has bestowed upon humanity a wealth of resources, providing us with diverse food, clothing, shelter, fresh water, clean air, fertile soil for agriculture, and many other benefits. For the human population to survive, it must adhere to the rules and laws of the biosphere. Consequently, every individual should treat the natural environment with care, taking only what is required, avoiding the reckless exploitation of nature's riches, and working toward mitigating the negative impacts of climate change in the future.

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