Volume 3, Issue 3, March - 2025 **ISSN (E):** 2938-3811

CLIMATE CHANGE ISSUES IN UZBEKISTAN

Madraim Khasanovich Sarikulov
Senior Lecturer, of the Almalik branch of the Tashkent State Technical University, Almalyk, Uzbekistan
sarikulov.madraim4@gmail.com

Abstract
This article is devoted to the study of the issue of climate change in Uzbekistan in the context of global climate change in the world. Currently, the most vulnerable part of nature and society has become the process of climate change at the present stage. An analysis of the causes of climate change in general throughout the world and in the territory of Uzbekistan and its possible consequences in the modern world is given. The article also considers the possible influx of climate migrants in all countries, including Uzbekistan, due to climate change.

Keywords: Climate migrants, destruction of humanity, World Meteorological Organization, climate catastrophe, arid zone, tropical air, Turanian tropical air mass.

Introduction

Temperature fluctuations have occurred throughout the history of humanity, but in the past they were associated exclusively with natural causes. With the development of industrial production, transport, and the increase in the consumption of primary energy sources in everyday life, conditions began to develop for the development of the "greenhouse effect". At the end of the 20th century, this caused lively discussions.

Discussions on the issues of the “greenhouse effect” and climate change, in which many scientists, politicians, and diplomats actively participated at the end of the 20th century, eventually led to the development of the UN Framework Convention on Climate Change in 1992. The main idea underlying this document was the need to reduce the volumes of carbon dioxide and other “greenhouse” gases emitted into the atmosphere. To achieve this, it was assumed that all countries in the world would need to unite their efforts. The real mechanisms that would allow this goal to be achieved were reflected in the Kyoto Protocol, signed in 1997 in the Japanese city of Kyoto. The Kyoto Protocol stipulated that the countries that signed it must take on specific obligations to reduce carbon dioxide emissions into the atmosphere.

LITERARY RESEARCH

Discussions around the climate change problem continue. Much here remains controversial. Moreover, not all experts agree with the thesis about global warming. Opinions are expressed about the possibility of global cooling or about the cyclical nature of these processes. There is an opinion that the role of "greenhouse" gases emitted into the atmosphere is not as great as is usually estimated. Since science does not yet have sufficient reliable data on many global processes occurring in living and non-living nature, the existence of opposing points of view on the problem of climate change is quite understandable.

Scientists have predicted the destruction of humanity due to global warming. In this context, I would like to draw public attention to climate change in the conditions of Uzbekistan. In recent years, as in other countries and throughout the territory of the Republic of Uzbekistan, climate change has been observed. It is no secret that due to climate change, a certain influx of "climate" migrants is possible. According to experts, by 2050, up to 5.1 million "climate" migrants or 2.3 percent of the total projected population in the upper part of the pessimistic baseline scenario may appear in Eastern Europe and Central Asia. Of these, up to 2.4 million "climate" migrants will live in Central Asia.

The materials on the website [1] present information about a study by a group of scientists from Britain and Canada, who stated that due to global warming, the Earth could become uninhabitable for humans in 500 years. With these forecasts, the scientists predicted the destruction of humanity due to global warming (Fig. 1). "If global warming is not stopped, in five hundred years the Earth will have changed so much that we will be forced to fight for survival and the preservation of our historically and geographically rooted cultures," says the article published on the website The Conversation. The experts also drew attention to the UN document on climate strategies, according to which countries must immediately increase their efforts to combat the increase in global average temperature.

Figure 1. Illustration of global warming.

Based on the data from the website [2], it can be stated that the average global surface temperature of the Earth in 2024 was 1.55 degrees Celsius above the average for the period 1850-1900, with an error margin of 0.13 degrees, according to the consolidated analysis of the World Meteorological Organization (WMO). This means that the world has likely experienced

the first calendar year when the average annual temperature exceeded the pre-industrial period level by more than 1.5 degrees. “Today’s analysis by the World Meteorological Organization once again proves that global warming is a harsh reality,” said UN Secretary-General António Guterres. He also noted “Exceeding the 1.5 degree Celsius mark in some years does not mean that this goal cannot be achieved in the long term. It means that we need to work even harder to get back on track. Record temperatures in 2024 require transformative climate action in 2025. We still have a chance to avoid the worst of the climate emergency, but leaders must act – and act now.” Guterres called on governments to submit new national climate plans this year to keep long-term global temperature rise to 1.5 degrees Celsius and help the most vulnerable communities cope with the devastating impacts of climate change.

According to the authors [3], a positive temperature trend was also established for Uzbekistan, which has been increasing oscillatingly since the 1930s and corresponded to fluctuations in global temperature. The trend values of warming, calculated for 100 years of the 20th century, are within 0.5-1 ° C. Significant fluctuations in annual precipitation were recorded on the territory of Uzbekistan, while on average there was a weak tendency for them to increase across the territory.

According to the source [4], 2023-2027 will be the hottest years in history in Uzbekistan.

The UN announced that from 2023 to 2027, every summer throughout the world, including Uzbekistan, will be the hottest and most abnormal in history. On hot days, it is recommended to drink more water, wear a hat and, if possible, spend less time outdoors during the day.

In the materials of the site [5], climatologist E. Abdulakhatov notes that “Right now, humanity is experiencing the hottest period in its 125,000-year history. We are entering a period when the air temperature is the highest. At the same time, the temperature remains hot throughout the year, and then does not cool down. Since we live in the industrial era, we produce energy by releasing too many gases into the atmosphere. The human factor plays a key role in climate change. 90% of world experts agree that the current global warming is caused by the anthropogenic factor. The remaining 10 percent adhere to the opinion of scientists that the climate is changing due to changes underground, astronomical reasons and excess heat from the Sun itself,” the expert said.

The website’s forecasts [6] note that the Fergana Valley (in the territory of Kyrgyzstan, Tajikistan and Uzbekistan), the lands around the city of Tashkent and the lowlands of southern Tajikistan (including the city of Dushanbe), as well as the more densely populated cities of northern Kazakhstan (Karaganda, Nur-Sultan and Kostanay) will become zones of influx of “climate” migrants. “This is due to the expected increase in water availability and agricultural productivity in these parts of Central Asia,” the experts said. The zones of outflow of “climate” migrants are expected to be the territories along the southern border of Kazakhstan, the areas adjacent to the Fergana Valley in Uzbekistan and Tajikistan, as well as the lands around Bishkek. “This is due to the projected decrease in water availability and agricultural productivity in these parts of Central Asia. For the same reasons, smaller areas of eastern Turkmenistan and southern Uzbekistan located along the Amu Darya River are also considered potential zones of outflow of “climate” migrants,” the conclusion says.

Climate change in Uzbekistan [7] leads to excess morbidity and mortality from cardiovascular and respiratory diseases, as well as acute intestinal infections. In addition, a significant number of people live in areas prone to events such as flash floods, mudflows, heat waves, droughts and dust storms, which are becoming more frequent and intense, leading to excess morbidity and mortality. Systematic policies to protect human health from climate change and reduce life-threatening risks associated with natural disasters are lacking. The capacity of the health sector to assess the health status and trends of the population associated with climate change as a basis for planning preventive measures and monitoring their results and effectiveness is insufficient. The current surveillance system tends to underestimate indicators. Surveillance of infectious diseases, in particular water-borne and food-borne diseases, as well as human zoonoses, has serious limitations. Pathogen detection in water and food products is quite limited. The Aral Sea crisis has resulted in a high burden of disease and disability for the population, particularly in the Republic of Karakalpakstan and Khorezm region. In 2017, the incidence of diseases of the nervous, cardiovascular, digestive and genitourinary (urolithiasis) systems in Khorezm region was approximately 50% higher than the national average. According to data for 2009–2017, the incidence of acute intestinal infections in the Republic of Karakalpakstan significantly exceeded the national average throughout the period (on average by 60%).

Methodology

The Republic of Uzbekistan is located in the central part of the Eurasian continent and belongs to the arid zone of Central Asia. Almost four-fifths of the country's territory is located within vast semi-deserts and deserts, bordered by powerful mountain systems from the southeast and east. The high level of solar radiation in combination with the features of the underlying surface and atmospheric circulation forms a continental climate type, characterized by significant fluctuations in air temperature, long dry and hot summers, humid springs and unstable winters. The country's territory is open to the invasion of various air masses. Atlantic and Arctic air masses enter the vast plains from the north, northwest and west. Intensive warming in winter is caused by the penetration of tropical air masses in the warm sectors of southern cyclones, which are followed by sharp cold snaps. The average air temperature in July varies across the territory from 26 °C in the north to 30 °C in the south of the republic, with maximum temperatures reaching 47-49 °C. The average January temperature drops to -8 °C in the north and to 0 °C in the south, with the minimum temperature reaching -38 °C (Ustyurt Plateau).

In summer, continental tropical air, which is very dry, forms over the very hot desert areas. There is very little precipitation here (within 80-200 mm/year), but its variability is very high. The Aral Sea does not have a significant impact on the amount of precipitation; only an increase in humidity is noted in a narrow coastal zone. In the foothills, the amount of precipitation increases. On the slopes of mountain ranges open to humid air masses, it is up to 600-800 mm or more. In the mountains, avalanches are possible in the spring months. Particularly intense rains lead to the formation of mudflows.

The geographical position of Uzbekistan, located far from oceans and seas, in the interior of the Eurasian continent, determines the continentality of its climate. The continental climate is expressed in cloudless weather for most of the year, high temperatures in summer, low precipitation, high evaporation of moisture, long and hot summers, as well as relatively cold winters for these latitudes, and large daily and annual air temperature amplitudes. These features of the climate of Uzbekistan were formed under the influence of climate-forming factors.

The formation of the climate of the republic is influenced by its geographical location (in the south of the temperate and in the north of the subtropical zones), the intensity of solar radiation, atmospheric circulation, and the terrain. Atmospheric circulation plays a major role in the formation of the climate of Uzbekistan. In winter, arctic cold air masses penetrate the territory of Uzbekistan from the north and northeast and reach the southern borders of the republic. As a result, there is clear and cold weather. In winter, air fronts of moderate latitudes form over the territory of Uzbekistan, cyclones form, precipitation falls in the form of rain and snow.

In summer, a local Turanian tropical air mass is formed on the flat part of the republic. The air becomes dry and hot, saturated with fine dust. A low-pressure area is formed here, which facilitates the penetration of warm and more humid air from the northwest and west. However, this air quickly heats up, and precipitation does not fall.

The formation of the climate of Uzbekistan is also influenced by the relief. The territory of the republic to the north and northwest is open. As a result, in winter, cold air masses from the north and northwest freely penetrate into the territory of Uzbekistan. The closed territory by mountains from the south, in turn, prevents the penetration of warm tropical air. In the mountains in summer, compared to the plains, it is relatively cool and there is more precipitation, while winter is cold and long.

It should be noted that due to climate change in the territory of the Republic of Uzbekistan, there will be a process of increasing the duration of the dry hot period, an increase in the number of days with temperatures above 40 ºC. In addition, there is a reduction in snow reserves in the mountains and degradation of glaciers, an increase in the frequency of climate-dependent hazardous phenomena, such as mudflows, floods, droughts and low water. According to experts, global warming will continue to contribute to an increase in the frequency of periods with droughts and high summer heat, a change in the formation of water resources. Such extreme manifestations of climate variability can lead to an increase in water deficit and increased risks associated with a lack of water in agricultural production and a shortage of drinking water in the arid regions of Uzbekistan. All this can lead, along with a shortage of fresh water, to a decrease in the production of agricultural crops.

In recent decades, global warming has been observed, caused by anthropogenic emissions of greenhouse gases into the atmosphere, as well as other climate-forming factors. In 2021, the average annual air temperature in Uzbekistan was 1.4-2.7 ° above normal. The rate of warming in Uzbekistan is more than twice the global rate. Since 1890, the average temperature on a global scale has increased by 0.7 degrees, and in Tashkent - by 1.7 degrees, which significantly exceeds global indicators.

Conclusions

From all of the above, it becomes clear that the growth trend of climate change in the Republic of Uzbekistan is in a deplorable state, which negatively affects the health of the population and, above all, the health of the younger generation.

Based on this, all measures should be taken to ensure that each person should take care of the natural environment, take from it as much as needed and should not thoughtlessly treat all the riches of nature and should strive to eliminate the negative consequences of climate change in the future.

REFERENCE

1. https://radiosputnik.ria.ru/20210928/gibel-1752234418.html
2. UN News https://news.un.org › story › 2025/01
3. Ibatullin S.R., Yasinsky V.A., Mironenkov A.P. The Impact of Climate Change on Water Resources in Central Asia. Industry Review. Almaty: Eurasian Development Bank. 2009.
4. @Qoraxabar 15 05 2023.
5. https://www.youtube.com/watch?v=81Tv3s4FJM0
6.https://kun.uz/ru/news/2021/09/17/stalo-izvestno-kakoy-region-v-uzbekistane-stanet-vozmojnoy-zonoy-pritoka-klimaticheskix-migrantov
7. United Nations Economic Commission for Europe ENVIRONMENTAL PERFORMANCE REVIEW, UZBEKISTAN Third Review Geneva, 2020
8. Toshov J., Baratov B., Sherov K., Mussayev M., Baymirzaev B., Esirkepov A., Ismailov G., Abdugaliyeva G., Burieva J. Ways to optimize the kinetic parameters of tricone drill bits // Material and Mechanical Engineering Technology, Kazakhstan, 2024, No. 1, pp. 35-45
9. Toshov, Javokhir & Toshov, B.R. & Baratov, Bakhtiyor & Haqberdiyev, A.L.. (2022). Designing new generation drill bits with optimal axial eccentricity. Mining informational and analytical bulletin. 133-142. 10.25018/0236_1493_2022_9_0_133.
10. Baratov B. N., Umarov F. Ya., Toshov Zh. B. Assessment of the performance of tricone drill bits / Mining Journal - Moscow, 2021. - No. 12. – P.60-63.
11. O.V. Tuyboyov, N.F. Raxmanova, B.N.Baratov. Investigation into sustainable innovations in mining engineering for resource optimization and environmental efficiency// “Kon mashinalari va tekhologilar” Ilmiy-technik magazine, Toshkent, 2024, No. 1(7), pp.51-58.
12. Toshov, Z.B., Rahutin, M.G., Toshov, B.R., Baratov B.N. Tracking prevention in roller cone bit drilling // Eurasian Mining, 2024, 41(1), pages 62–66. DOI:10.17580/em.2024.01.15
13. Toshov, Javokhir & Baratov, Bakhtiyor & Baynazov, Umid. (2020). Method of calculating the gear ratios of the cones of tricone drill bits. E3S Web of Conferences. 201.01012.10.1051/e3sconf/202020101012.
14. Toshov, B. & Toshov, Javokhir & Akhmedova, L. & Baratov, Bakhtiyor. (2023). The new design scheme of drilling rock cutting tools, working in rotation mode pairs. E3S Web of Conferences. 383. 1-6. 10.1051/e3sconf/202338304069.