

Environmental Problems in Uzbekistan and Ways to Solve Them

A. T. Shermukhamedov

Doctor of Physics and -Mathematical Sciences, Professor of the Department of Economics and Logistics at SBUMIPTK Institute in Tashkent, Tashkent, Uzbekistan

M. A. Abdullayev

PhD. in Economics, Associate Professor of the Department of Economics and Logistics at SBUMIPTK Institute in Tashkent, Tashkent, Uzbekistan

B. Holboev

Doctor of Physics and Mathematical Sciences, Professor of the Department of Higher Mathematics. Tashkent Branch of the Plekhanov Russian University of Economics, Tashkent, Uzbekistan

Abstract. "Green economy" is a field in economics in which it is a component of the natural environment and the efficient use of natural resources. Environmental issues are respected on the basis of environmental standards (IFS, GRI standards). It is based on the efficient use of resources and reducing its negative impact on the environment. The article examines the impact of innovative technologies on the development of the "green" economy.

Keywords: Green economy, innovation, environment, ecological transformation, sustainable development, natural resources.

1. INTRODUCTION

Climate change in Central Asia is one of the global environmental issues of great importance to the peoples of the region. It is known that in recent years climate change has been rapidly progressing throughout the world, having a significant impact not only on natural systems and people's lifestyles, but also on socio-economic conditions and health systems. These changes hinder efforts to ensure food security, poverty reduction and sustainable development. Uzbekistan is actively promoting a number of initiatives aimed at combating these problems and ensuring environmental sustainability in the region.

The concepts of sustainable development and environmental policy in the modern world have acquired special significance, determining the vector of socio-economic development and strategic decisions at the national and international levels. In the context of the Republic of Uzbekistan, these concepts are formed under the influence of not only global environmental challenges and international standards, but also deeply rooted ideological attitudes reflecting the unique cultural, religious and philosophical characteristics of the region.

Ideological aspects play a key role in determining priorities and strategies aimed at achieving sustainable development, adapting to changing climatic conditions and maintaining the ecological balance. In Uzbekistan, traditional values and beliefs that have formed over the centuries have a significant impact on the formation of public consciousness and approaches to environmental management, which is reflected in national environmental initiatives and sustainable development policies.

Attention is paid to the analysis of how cultural and philosophical paradigms characteristic of Uzbek society influence environmental policies and strategies aimed at increasing energy efficiency, developing renewable energy sources and ensuring environmental safety. Such research allows us to identify the underlying mechanisms that facilitate the harmonization of national interests with global environmental goals and to determine ways to improve the effectiveness of environmental management in the context of the growing challenges of the 21st century.

2. LITERATURE REVIEW

Environmental issues have become a global concern due to their impact on ecosystems, human health, and economies. This literature review examines various environmental problems, including climate change, deforestation, pollution, and biodiversity loss, drawing upon scholarly sources and research studies.

Climate change, driven by greenhouse gas emissions, has led to rising global temperatures, extreme weather events, and sea-level rise (IPCC, 2021). Research by NASA (2020) [9] highlights that human activities, such as

fossil fuel combustion and deforestation, significantly contribute to climate change. The Paris Agreement (UNFCCC, 2015) [11] seeks to mitigate these effects by limiting global warming to below 2°C. Deforestation is a major environmental issue resulting in habitat loss, reduced carbon sequestration, and biodiversity decline (FAO, 2020). Studies indicate that the Amazon rainforest, often referred to as the "lungs of the Earth," has been significantly impacted by illegal logging and agricultural expansion (Laurance et al., 2018) [8]. Efforts to combat deforestation include reforestation programs and sustainable land management practices.

Pollution, including air, water, and soil contamination, poses severe threats to both human and environmental health. According to WHO (2019) [13], air pollution causes respiratory diseases and contributes to millions of premature deaths annually. Water pollution, often caused by industrial waste and agricultural runoff, leads to ecosystem degradation and health risks (UNEP, 2021). [12]

Technological advancements and policy measures are essential in addressing pollution issues (Schwarzenbach et al., 2010).[10]

Biodiversity loss is a consequence of habitat destruction, climate change, and pollution. Reports by IUCN (2020) [7] indicate that over one million species face extinction due to human activities. Conservation efforts, including protected areas and species recovery programs, are crucial in preserving global biodiversity (Wilson, 2016).[14]

3. ANALYSIS AND RESULTS

When considering the main environmental problems and ways to solve them in the very near future, we believe that one of the most important problems is the problem of atmospheric air pollution, where industry is the main source of pollution. The main industries polluting the atmosphere of Uzbekistan are thermal power plants and cement production enterprises.

In addition, 1.27 million tons of toxic substances are released into the atmosphere from faulty cars every year. According to the Ministry's calculations, the volume of annual industrial emissions of industrial enterprises into the atmospheric air in Uzbekistan in 2022 amounted to 874 thousand tons. Of the 360.5 thousand tons of emissions, 40% is accounted for by oil and gas, 200 thousand tons – 22.8% by energy, 185.5 thousand tons - 21.2% by metallurgy, 25 thousand tons – 2.8% by construction and 103 thousand tons – 11.7% by other industries. Thermal power plants and cement production plants are the main industries that have an impact on the atmosphere.

There are currently 12 thermal power plants operating in Uzbekistan, the largest of which are the Angren and Yangi Angren coal-fired thermal power plants. In addition, there are 36 cement enterprises, 15 oil and gas processing enterprises and 4 metallurgical industry enterprises. Currently, there are 3,268,480 vehicles owned by individuals in the republic, of which 796,034 (24%) are designed to run on gasoline, 71,088 (2%) on diesel and 2,401,348 (74%) on gas fuel.

100,000 vehicles are defective, of which an average of 1.27 million tons of pollutants are released into the atmosphere per year. As part of the emissions concept, it is planned to switch at least 50% of public transport to gas, electricity and other alternative fuels. This is a very large number, and if this figure is reached, the damage caused by cars to the air will decrease dramatically. Since the 1970s, 25 cities in Uzbekistan have been monitoring the air condition in large industrial zones, regional and district centers. According to these data, Tashkent occupied the 4th-5th place in terms of pollution until 2020.

The first places were traditionally occupied by Navoi, Almalyk, Angren and Ferghana. However, in recent years, due to the expansion of the monitoring and measurement network of various pollutants, Tashkent has come out on top. In 2023, Tashkent took the first place in the Atmospheric Pollution Index. This is due not only to the level of PM2.5 concentration, but also to the excess of standards for phenol, ozone and nitrogen dioxide, the content of which has increased 75 times in five years. Atmospheric air pollution is understood as the formation of harmful substances in it in concentrations exceeding the hygienic and environmental standards of atmospheric air quality established by the state [1].

Polluted air is one of the main environmental risk factors for health, contributing to an increase in premature mortality. Its harm to the cardiovascular and respiratory systems has long been confirmed, as well as a link with multiple sclerosis, Alzheimer's and Parkinson's diseases. The most dangerous pollutant is considered to be PM2.5 [2].

In 2015, it was associated with 4.2 million deaths. The World Health Organization recommends against exceeding the concentration of PM2.5 above 15 micrograms/m³ per day and 5 micrograms/m³ per year. PM2.5, their main sources are: 36% – dust during the year, 28% – thermal power plants, 16% – transport, 13% – industrial enterprises and construction dust. Harmful substances cloud the mind and make it difficult to perform everyday tasks. Moreover, short-term inhalation of polluted air is sufficient for this.

A study conducted by scientists from the Universities of Birmingham and Manchester showed that even

short-term exposure to air with a high concentration of particulate matter (PM) reduces the ability to concentrate and recognize emotions [3]. A prominent representative of the introduction of energy-efficient technologies today is the United States, a country that implements a number of programs and technologies aimed not only at energy conservation, but also at maintaining a favorable environmental environment.

Among the technologies used are: technologies for energy efficiency of construction facilities (buildings, structures), technologies for effective water consumption management, technologies for managing and reducing harmful waste and emissions, and many others. Technology has allowed the US government to reduce the energy intensity of production by 49% and save \$ 50 billion in environmental costs, which has led to a significant reduction in emissions into the atmosphere and soil (in relative terms, it is 50-60%).

Germany is also a leader in the use of energy-efficient technologies, where emphasis is placed on the use of wind energy and great attention is paid to the use of solar energy, which significantly saves energy resources and preserves the balance of the natural balance. An example of already implemented "green" technologies in Russia is the construction of energy-efficient houses, or in other words, a "Smart home" [4].

Regarding the environmental component, this has led to a significant reduction in emissions into the atmosphere and soil (in relative terms, it is 50-60%). The main focus in improving the ecological appearance of Uzbekistan is on increasing green spaces and forest areas, building health paths, as well as supporting initiatives of eco-activists and businesses to protect nature [5].

The President signed a decree on the implementation of the Strategy "Uzbekistan – 2030" in the Year of Environmental Protection and the "green economy". According to the document, large-scale measures are planned in 2025 to improve the ecological appearance of mahallas, increase the level of landscaping of streets and create a comfortable living environment. In particular, a network of "Shady Boulevards" will be created – trees and plants will be planted along new pedestrian and bicycle paths. 80 infrastructure facilities and more than 110 kilometers of health trails will also be built on the shores of reservoirs and rivers [6].

Landscaping will expand due to the efficient use of rain and wastewater, the introduction of modern water-saving technologies for watering trees in mahallas. 200 million trees and shrubs will be planted as part of the Yasil Macon and My Garden national projects, and solar-powered lighting will be installed in green parks and public areas. 100,000 hectares of green spaces will be created in the Aral Sea region, and the total forest area in the region will increase to 2.1 million hectares. The area of forests will be increased to 4.1 million hectares, and protected natural areas will be expanded to 14.5%.

Unused reserves in the field of ecotourism, forestry and medicinal crop production will be identified, which will increase the incomes of the population. Gardens of drought-resistant plants (halophytes) will be created in certain areas of Karakalpakstan, Bukhara, Jizzakh and Kashkadarya regions. In-vitro state laboratories will be opened in Karakalpakstan, Bukhara, Surkhandarya, Jizzakh, Ferghana and Tashkent regions. Small businesses will also be able to obtain loans for the creation of private laboratories, for which at least \$ 30 million will be attracted from international financial institutions [15].

An acceleration system will be introduced to support public, environmental, and business initiatives to protect nature. The Cabinet of Ministers has adopted a special program to reduce industrial emissions into the atmosphere. It is planned to repair and replace 723 units of gas purification and dust collection equipment at 145 industrial enterprises in 2023.

4. CONCLUSIONS

Climate change in Central Asia has a negative impact not only on the natural environment, but also on socio-economic conditions. These changes impede food security, poverty reduction and sustainable development efforts. The Aral Sea disaster and rising air temperatures remain a serious problem for the countries of Central Asia.

The Government of Uzbekistan has put forward a number of initiatives to combat climate change and its negative consequences. In the framework of international cooperation, proposals to develop a Regional Strategy for Adaptation to Climate Change in Central Asia and create a "Central Asian Climate Dialogue" are of great importance. Uzbekistan's active participation in the UN Climate Change Conference (COP28), the call for an early agreement on the Global Adaptation Mechanism under the Paris Agreement and proposals for the transition to a low-carbon economy demonstrate the country's firm position in this direction.

Domestic reforms include the implementation of a strategy for the transition to a "green" economy, improvement of environmental legislation and activities envisaged by the "Uzbekistan – 2030" strategy. The introduction of the national Green Space project and new waste recycling systems demonstrate the country's commitment to achieving environmental sustainability.

It is worth noting that Uzbekistan is actively involved in the fight against climate change and its consequences. Environmental initiatives and government reforms are aimed at creating a healthy and sustainable

environment for the peoples of the region. In addition, initiatives within the framework of international cooperation contribute to the environmental sustainability of the region.

REFERENCES

- [1]. "Transboundary impact of pollutants emitted by State Unitary Enterprise TALCO on the population and environment of certain areas of the Surkhandarya region of Uzbekistan", "Forum International". Tashkent, 2010
- [2]. Narkevich N.P., Pechkovsky V.V. Utilization of technological fluorinated gases abroad // Chemical industry abroad: Review, information. Moscow: NIITEKHIM, 1989, No. 7.
- [3]. Galkin N.P., Zaitsev V.A., Seregin M.B. Capture and processing of fluorinated gases. Moscow: Atomizdat, 1975. - 240 p.
- [4]. Muminova N.I. Environmental problems of Uzbekistan and their monitoring / N.I.Muminova, E.B.Karshiev, H.G. Sidikova, H.T. Saidullaeva. - Text: direct // Young scientist. – 2016. - No. 4 (108). – P. 192-194. - URL: <https://moluch.ru/archive/108/25897/> (date of access: 12.02.2025).
- [5]. FAO. (2020). Global Forest Resources Assessment. Food and Agriculture Organization.
- [6]. IPCC. (2021). Climate Change 2021: The Physical Science Basis. Intergovernmental Panel on Climate Change.
- [7]. IUCN. (2020). Global Species Assessment. International Union for Conservation of Nature.
- [8]. Laurance, W. F., et al. (2018). "The Future of the Amazon." *Science Advances*, 4(2), eaar5452.
- [9]. NASA. (2020). Global Climate Change: Vital Signs of the Planet. National Aeronautics and Space Administration.
- [10]. Schwarzenbach, R. P., et al. (2010). "The Challenge of Micropollutants in Aquatic Systems." *Science*, 327(5964), 1072-1077.
- [11]. UNFCCC. (2015). The Paris Agreement. United Nations Framework Convention on Climate Change.
- [12]. UNEP. (2021). Water Pollution and Its Effects. United Nations Environment Programme.
- [13]. WHO. (2019). Air Pollution and Public Health. World Health Organization.
- [14]. Wilson, E. O. (2016). "Half-Earth: Our Planet's Fight for Life." W.W. Norton & Company.
- [15]. <https://strategy.uz/index.php?news=1955&lang=ru>