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DIGITAL TECHNOLOGIES AND THEIR ROLE IN ENSURING ENVIRONMENTAL SAFETY

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Abstract
This article discusses the importance of digital technologies in all sectors of our society, including their role in ensuring environmental safety. Additionally, the reforms being implemented in our country to ensure environmental safety are also discussed.

Keywords. Ecology, environmental safety, climate change, desertification, digital technology, monitoring, forecasting.

RAQAMLI TEXNOLOGIYALAR VA ULARNING EKOLOGIK XAVFSIZLIKNI TA'MINLASHDAGI ROLI

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Annotatsiya
Ushbu maqolada raqamli texnologiyalarning jamiyatimizning barcha tarmoqlaridagi, jumladan ekologik xavfsizlikni ta'minlashdagi ahamiyati to'g'risida fikr yuritilgan. Shuningdek, shuningdek mamlakatimizda ekologik xavfsizlikni ta'minlash bo'yicha amalga oshirilayotgan islohotlar muhokama qilingan.

Kalit so'zlar. Ekologiya, ekologik xavfsizlik, iqlim o'zgarishi, cho'llanish, raqamli texnologiya, monitoring qilish, prognozlash.

Introduction

By the end of the last century, as a result of the disruption of the balance in the relationship between humans and nature, the environment and ecological situation

faced sharp changes. It is well known that its pollution causes problems of various degrees and forms. Therefore, ecology and environmental protection are among the most pressing and widely discussed issues. Among the proposed solutions to address these problems, the most prominent is the development of ecological culture among the public, providing knowledge and skills to different population groups through the education process, as well as using digital technologies to ensure environmental safety.

Main part. The term “ecology” is derived from the Greek words “oikos” – meaning “habitat” or “place of living” and “logos” - meaning “study” or “discourse”. The term “ecology” was first used by the German scientist Ernst Haeckel in 1866. He defined “ecology as the study of the economy of nature, investigating all relationships of living organisms with their organic and inorganic environment”. The main issue of ecology is to foresee the consequences of the various impacts of human activity on natural events and phenomena, and to solve problems related to the protection of nature.

It is important to emphasize that there are currently global, regional, and local environmental problems on Earth. These include global climate change, desertification, the Aral Sea crisis, and others. As a result, conducting scientific research to find solutions to existing environmental problems, developing ways to address them, monitoring ecological trends, and drawing positive conclusions based on this to ensure environmental safety are required. Environmental safety is the state of protection of the land, atmosphere, and hydrosphere from various types of pollution. Today, ensuring environmental safety is one of the national priorities in our country. The declaration of 2025 as the "Year of Environmental Protection and Green Economy" in our republic is a clear evidence of this.

To ensure environmental safety in the country, improve the ecological situation, maintain a favorable ecological state sustainably, and enhance the effectiveness of state governance in the field of ecology and environmental protection, the following measures are being implemented:

1) implementing a unified state policy in the field of ecology, environmental protection, rational use of natural resources, their restoration, and preventing the negative impact of human activities on nature;
2) ensuring cooperation with the public and civil society institutions in the field of environmental protection, providing methodological assistance and support for public monitoring, and ensuring citizens' rights to a favorable environment;
3) ensuring the favorable ecological condition of the environment, and the protection of ecosystems, natural complexes, and objects;
4) conserving plant and animal life, preserving the diversity of species, the integrity of natural categories, and their habitats, and creating the necessary conditions for their restoration and development;
5) ensuring state control over compliance with legislation in waste management, organizing a system for the collection, transportation, disposal, recycling, and burial of household waste, while actively involving public and private partnerships;
6) establishing state environmental control to ensure compliance with legislation in the protection and use of atmospheric air, land, underground resources, water, forests, wildlife, plant life, and protected natural areas;
7) transforming the field of ecology and environmental protection into a "Corruption-Free Sector," establishing a system of environmental education, promotion, and training, and supporting the activities of research institutes and higher education institutions.
Moreover, as a result of technological development in recent years, the use of digital technologies to ensure environmental safety has become one of the important and essential conditions today.

Digital technology is a set of technologies related to the storage, transmission, and processing of data in digital form. Digital technologies include computer programs, network technologies, databases, artificial intelligence, and other modern technologies. One of their main advantages is the ability to quickly and efficiently process, store, and transmit data.

Digital technologies have great potential in ecological monitoring, resource conservation, pollution reduction, and ensuring sustainable development. Their capabilities in ensuring environmental safety include the following:

1. Environmental monitoring. Digital technologies allow for continuous monitoring of the environment. For example, satellites and sensors are used to observe the state of the land and atmosphere. These technologies help detect toxic gases in the air, water pollution, or changes on the Earth's surface (such as deforestation) and analyze them in real time.

2. Data analysis and forecasting. Digital technologies, particularly in the fields of artificial intelligence and data analysis, assist in forecasting environmental safety. These technologies enable the prediction of natural disasters, such as floods, droughts, or earthquakes. Additionally, they allow for the analysis of large datasets to study climate change or the loss of biodiversity.

3. Development of new energy sources. Digital technologies can enhance the efficiency of using renewable energy sources (such as solar and wind). For example, by monitoring and analyzing the performance of solar panels or wind turbines online, energy production can be maximized.

4. Agrotechnology and ecological agriculture. Digital technologies can be used to develop ecological agriculture. Smart agricultural systems and smart farms enable the efficient use of water, energy, and fertilizers, optimize land use, and introduce more effective methods for pest control.

5. Digital mapping of the environment. Using digital mapping (GIS – Geographic Information Systems) and 3D modeling technologies, changes in ecosystems can be visually observed and analyzed. These technologies are crucial for activities such as forest conservation, water resource management, and the sustainable use of natural resources.

6. Reducing environmental impact. Digital technologies can help reduce energy consumption in production and improve waste recycling. For example, optimizing production processes, managing waste recycling, using resources efficiently, and reducing wastefulness.

7. Local and global environmental notifications. Environmental safety notifications and warnings can be distributed through digital platforms. The public can be

informed about environmental issues, environmental education can be enhanced, and people can be encouraged to protect the environment through the internet, mobile applications, and social media.

Conclusion

During the research, I studied the relevant normative-legal documents and scientific research conducted in the field, as well as compared and analyzed national and international experiences in ensuring environmental safety, and came to the following conclusion. Ecology is the study of the economy of nature, simultaneously examining all the relationships of living organisms with the organic and inorganic components of their environment. Its main issue is to foresee the consequences of the various impacts of human activity on natural events and phenomena and to solve problems related to the protection of nature. Today, several reforms have been implemented in our country to ensure environmental safety, among which the use of digital technologies is considered one of the most effective methods. Because, with their help, it is possible to monitor the environment, analyze and forecast data, develop new energy sources, control agrotechnology and ecological agriculture, maintain digital mapping of the environment, reduce environmental impact, and promote local and global environmental notifications among the public.

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