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Foreword

from the Editor-in-Chief

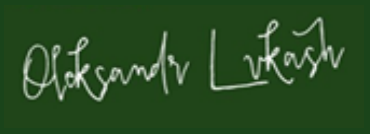
There is no need to convince readers of the first our issue that the natural environment is created and maintained by living organisms, the totality of which is biota. The study of the diversity of living, which began since the day of Hippocrates, Aristotle, and Theophrastus, has not lost its relevance in the modern scientific world. In the 21st century, the search for scientists in quite diverse – from inventory species diversity of ecosystems to the study of adaptation mechanisms of organisms and biota metagenomic studies.

The biota, for which there are no administrative boundaries, compensates for any environmental disturbances that do not exceed the threshold of destruction of the biota itself. This implies the need for international cooperation in various fields of living research. In order to bring together scholars who study different aspects of biotic potential of the environment and its conservation, we are launching the international scientific journal Biota. Human. Technology. We are the part of the Editorial Board of the Journal attracted scientists from different countries, who carry out scientific research in various fields of Biology, Ecology, Health, Food and Chemical Technologies.

We expect from our potential authors original articles dedicated to the results of diverse studies of living matter at different levels of the organization – from molecular to biosphere. We look forward to articles on the problems of the functioning of biological systems (including the human body), biodiversity protection of the environment, as well as healthy human nutrition and technological processes.

The BHT Journal pages always have a place to cover the results of scientific discussions which were made by researchers from all the world.

Respectfully Yours,
Prof. O. Lukash



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ABSTRACT

The issue of environmental problems is particularly important today. The relevance is determined by the fact that global challenges arise every day, and global warming causes serious climate change and threatens the disappearance of the ecosystem.

The purpose of the article is to analyze current trends and consequences of global and regional climate change.

Methodology. A set of general scientific methods (analytical and synthetic hermeneutic, pragmatic, and generalization techniques) was employed to achieve the research goal and ensure the scientific reliability of the results.

Scientific novelty. The study reveals the main problems of nature management and changes in nature caused by anthropogenic activities. The importance of the population's counteraction to negative impacts on the planet's ecosystem is emphasized. The study examines the main causes of climate change and substantiates the global risks associated with this phenomenon. The impact of climate change on the economic sector is analyzed. Special attention is paid to the terms "climate crisis" and "global climate change". It is found that modern environmental problems include an increase in the number of wars, ocean pollution, global warming, resource shortages, and others. Each of these problems poses a serious threat to the development of any state. It is proved that in the context of political instability, Ukraine does not have the full potential to implement scientifically based balanced measures. The absence of an effective state policy on sustainable environmental management poses a threat to the economy and environment of Ukraine. It is necessary to find ways to solve the identified problems and consider promising areas for improving the factors that affect the environment and the environmental situation in general. Improving the environmental situation will allow Ukraine to rise to a new level in the global ranking.

The conclusions state that climate change threatens not only the economic and environmental security of the state, but also national security in general.

Key words: impact on ecosystems, emission reduction, resource conservation, green energy, alternative energy sources, habitat loss, climate change policy, health risks, socio-economic impacts

АНОТАЦІЯ

Питання екологічних проблем сьогодні є особливо важливим. Актуальність визначається тим, що глобальні виклики постають щодня, а глобальне потепління спричиняє серйозні кліматичні зміни та загрожує зникненням екосистеми.

Метою статті є аналіз сучасних тенденцій та потенційних наслідків глобальної та регіональної зміни клімату шляхом вивчення змін температури в різних регіонах України, оцінки адаптаційних заходів, розроблених в Україні, та надання методичних рекомендацій.

Методологія. Для досягнення поставленої мети дослідження та забезпечення наукової достовірності результатів застосовано набір загальнонаукових методів (аналітичних і синтетичних герменевтичних, прагматичних і узагальнюючих прийомів).

Наукова новизна. У дослідженні розкрито основні проблеми природокористування та зміни у природі, викликані антропогенною діяльністю. Підкреслено важливість у протидії населення щодо негативним впливам на екосистему планети. У дослідженні розглянуто основні причини зміни клімату та обґрунтовано глобальні ризики, пов'язані з цим явищем. Проаналізовано вплив кліматичних змін на економічний сектор. Окрему увагу приділено термінам «кліматична криза» та «глобальна зміна клімату». Виявлено, що сучасні екологічні проблеми включають зростання кількості воєн, забруднення океанів, глобальне потепління, нестача ресурсів та інші. Кожна із цим проблем становить серйозну загрозу для розвитку будь-якої держави.

Доведено, що за умов політичної нестабільності Україна не має повного потенціалу для впровадження науково обґрунтованих збалансованих заходів. Відсутність ефективної державної політики щодо збалансованого природокористування становить загрозу економіці та довкіллю України. Необхідно знайти шляхи розв'язання виділених проблем та розглянути перспективні напрями покращення чинників, які впливають на навколишнє середовище і екологічну ситуацію загалом. Покращення екологічної ситуації дозволить Україні піднятися на новий рівень у світовому рейтингу.

У **висновках** зазначено, що зміни клімату загрожує не лише економічній та екологічній безпеці держави, а й національній безпеці в цілому.

Ключові слова: вплив на екосистеми, зменшення викидів, консервація ресурсів, зелена енергетика, альтернативні джерела енергії, втрата середовищ існування, політика кліматичних змін, ризики для здоров'я, соціально-економічні впливи

Introduction

Global climate change is one of the most serious environmental challenges facing humanity. The International Center for Climate Research estimates that temperatures will rise by 2-5 degrees Celsius over the next 100 years. This rate of global warming will cause significant climate change and threaten the extinction of various ecosystems. Serious climate change is already happening today. Citizens of all countries must acknowledge that humanity has no right to use the earth's atmosphere for pollution. Without immediate action, stopping global climate change will become impossible, and future generations will face life-threatening conditions on Earth.

Climate change has emerged as a critical global challenge and a top priority on the international agenda in the 21st century. From a scientific perspective, this issue is interdisciplinary and complex, encompassing key environmental, economic and social aspects of sustainable development. Timely and preventive adaptation measures can yield substantial benefits by reducing the risks and potential damages associated with weather and climate-related impacts, including climate change. Ukraine is already facing challenges in adapting to the current climate and needs to enhance its capacity to adapt to future climate conditions.

Many domestic researchers have studied the environmental consequences of climate change. In particular, Tolkachova and Kononenko (2021) argue that each state faces issues related to ensuring environmental human rights. They note that inefficient use of natural resources and the widespread use of environmentally harmful and defective technologies, substances, and materials cause significant anthropogenic disturbances and technological overload on the planet.

Basok et al. (2021) examine the adaptation of the population to climate change and clearly describe the factors of global warming. Drakohrust (2022) explores the deep inequalities in our world by analyzing one of the most devastating consequences of climate change for people - forced migration. Climate change is the defining crisis of our time, and its effects disproportionately affect vulnerable groups in society, including those fleeing war and persecution.

Drakohrust and Martsenko (2022) discuss the need to understand the impact of climate change on migration processes, emphasizing the timely management of migration caused by climate change. They analyze the factors causing climate change, including solar flares, storms, solar winds, and the eccentricity of the Earth's orbit (natural factors), as well as environmental pollution and global warming caused by greenhouse gases (anthropogenic factors), which leads to melting glaciers, rising sea levels, and changes in animal populations and habitats.

Osadchii (2021) examines Ukraine's climate program as the foundation for a comprehensive national environmental policy on climate change. He also analyzes the main causes and consequences of global warming, highlighting its negative impacts, particularly on the fisheries sector.

Sarvas et al. (2023) analyze the socio-economic impacts of global climate change on our lives and the global economy. Their study demonstrates that global climate change will have significant social and economic consequences.

Tanasienko et al. (2019) consider global environmental issues within the national security system, classifying and analyzing the main problems. They argue that the irrational use of natural resources leads to the depletion of mineral resources and could cause a crisis in the near future. Hazardous production proces-

ses pollutes the environment and the authors identify key areas that need to be managed to protect and restore resources.

Karabinyuk and Markanych (2020) determined that the current trend in climatic conditions in Montenegro shows an increase (by 5-10 %) in average monthly temperature, maximum temperature, minimum temperature, precipitation, wind speed, and other climatic indicators. Tsitsyura (2017) presents the results of an analysis of changes in climatic parameters in Ukraine overall and specifically in the Right-Bank Forest-Steppe region. The analysis focuses on indicators such as average daily temperature, precipitation, and thermohaline coefficient. The author concludes about the projected development of climatic phenomena in the study area and their impact on the efficiency of agriculture and crop production. Shevchenko (2023) examines the conceptual elements of climate communication and determines that climate communication highlighting that it is a crucial component of climate policy implementation. This involves raising public awareness at all levels about global climate change and climate policy, as well as adaptation and mitigation measures, in the current context of global climate change.

The purpose of this study is to analyze current trends and consequences of global and regional climate change.

Materials and methods

Due to the complex and multidimensional nature of the research topic, a set of general scientific methods was employed to achieve the research goal and ensure the scientific reliability of the results. These methods include analytical and synthetic hermeneutic, pragmatic, and generalization techniques. The application of the analytical and synthetic methods allowed us to determine the current state of the ecological system in Ukraine. The use of the hermeneutic method enabled an analysis of the negative impact of environmental challenges affecting climate change, particular global warming. Conclusions, recommendations and suggestions are based on practical generalization.

Results and discussion

Climate change is driven by disturbances in the energy balance of the biosphere and its components, notably natural ecosystems, under the significant influence of anthropogenic factors. Ecosystems function to bind energy and maintain structural organization, but imbalance occurs when there is a significant gradient in the energy reserves of biosphere components.

Today's global warming is progressing 10 times faster than historical natural phenomena. Scientists increasingly refer to the situation as a «climate crisis» to emphasize its severity and the urgent need for action. The climate crisis, characterized by rising global average temperatures, necessitates achieving carbon neutrality and adapting to climate change by 2050 (Sarvas et al., 2023).

Global climate change presents one of humanity's most pressing challenges. Increased seasonal pollution is expected to lead to more allergies and asthma. Climate change will impact crop yield, leading to food shortages, and disrupt precipitation patterns, increasing the frequency and intensity of extreme weather events (Sarvas et al., 2023).

The natural ecosystem's inability to stabilize leads to external factors displacing horizontal and vertical energy, causing storms, cyclones, increased average annual temperatures, and other catastrophic events. When the system's internal organization cannot withstand external influences, it collapses. The World Economic Forum's Global Risks Report highlights the negative impacts on human mortality, ecosystem stress, food and water crises, climate-induced migration, geopolitical tensions, economic losses, capital market risks, and trade disruptions.

Rychak and Kizilova (2021) emphasize the impact of global climate change on air, water, and soil pollution, increased surface water salinity, industrial and drinking water quality, and the frequency of catastrophic events such as heavy rains, floods, snowfalls, tornadoes, large fires, and deadly heat waves. These issues adversely affect everyone.

Climate change is accelerating faster than previously predicted, manifesting in rising global temperatures, more frequent natural disasters, and accelerated polar ice melting (Osadchii, 2021). Agriculture, closely linked to climate change, contributes to global warming by releasing carbon dioxide during land cultivation. Extreme temperatures, droughts, and irregular seasonal weather significantly impact food production and consumption, reducing nutritional value and food safety.

Heat and humidity exacerbate agricultural challenges by increasing pest activity and the spread of fungal diseases, releasing dangerous toxins. As agriculture accounts for 10% of GDP, improving agricultural production models and management practices to address climate change into account.

The primary causes of climate change include:

1. The Greenhouse effect: this natural process, which keeps Earth's average temperature at +15°C instead of -18°C, has intensified due to increased greenhouse gas concentrations from burning fossil fuels since the Industrial Revolution.

2. Greenhouse gas emissions: Fossil fuel combustion releases carbon dioxide, increasing atmospheric CO_2 concentrations from 280 ppm to over 400 ppm in 150 years (Tanasienko et al., 2019).

Human activities, such as fossil fuel use and inefficient energy consumption, exacerbate the greenhouse effect. Excessive greenhouse gases from power plants, transportation, agriculture, industry, and forest fires trap solar heat in the lower atmosphere.

Russia's invasion of Ukraine has exacerbated the climate crisis by releasing significant amounts of CO_2 and other greenhouse gases. The Ministry of Ecology and international experts estimate at least 33 million tons of CO_2-equivalents have been emitted due to the war, with potential indirect emissions from post-war recovery estimated at 48.7 million tons of CO_2-equivalents (Shevchenko, 2023).

In 2019, the European Commission introduced the "European Economic Direction with Environmental Risks" to address environmental risks in the European economy (Table 1).

Table 1

Risks of climate change on the ecosystem of Ukraine (compiled by the author based on data from Tolkachova & Kononenko (2021), Drakochrust (2022))

Element	Characteristics
Water	Reduced summer rainfall causing water shortages, more floods from high winter rainfall, increased frequency of severe droughts.
Food	Higher winter temperatures reduce crop losses, potential for increased food production if managed properly, more floods leading to crop losses, increased summer irrigation needs.
Energy	Reduced winter heating needs, increased summer cooling needs, decreased efficiency of electricity generation and distribution, industry must adapt to climate change and invest in infrastructure.
Health	Increased deaths from heat, fewer deaths during cold periods, increased surface and ozone pollution with serious health consequences, changes in disease distribution such as Lyme disease.
Other	Increased tourism as other regions become less attractive, coastal flooding, erosion, and saltwater inundation from rising sea levels, impact on forests and important international ecosystems.

Despite these risks, businesses and institutions often underestimate the seriousness of climate change. The global climate system's change affects the atmosphere, oceans, ice cover, and land surface, intensifying the hydrological cycle and leading to extreme weather events and rising sea levels, causing soil erosion and flooding. Extreme sea-level changes, once occurring every 100 years, are now projected to happen annually by the end of the century (Shkurat and Tukila, 2021).

Effective climate communication, awareness, and public concern about environmental risks can drive a new green social contract, influencing political and business life toward climate-friendly practices. British scientists cited by Tolkachova and Kononenko (2021) predict significant impacts on Ukraine's economic sector:

Energy Infrastructure: Vulnerable to climate change, particularly thermal power plants facing reduced efficiency and water availability for cooling.

Infrastructure: Outdated mining infrastructure is at risk from extreme weather events and sea-level rise, threatening coastal areas.

Agriculture and Food Supply: Winter crop yields may increase, but greater variability and extreme events pose significant risks. Ukraine's grain yields lag behind global trends, with a fourfold difference between potential and actual yields.

Water Supply and Floods: Summer river flows could decrease by up to 50 %, leading to severe droughts and increased flooding, exacerbating health risks.

In recent years, cases of leptospirosis, cholera, hepatitis A, and salmonellosis have been reported in flooded areas of Ukraine. In general, the issue of rational environmental management of lake ecosystems is of particular importance for water conservation. This problem is especially relevant due to the dry climate in the steppe zones (Poleva et al., 2023).

Inadequate water balance, poorly developed waterway networks, and insufficient reservoir areas, as well as adjacent areas where water quality is deteriorating, exacerbate the issue. The study of water bodies is one of the most important priorities in Ukraine.

Sea Level Rise and Coastal Erosion: Increased erosion and toxic algae outbreaks threaten Ukraine's coastline and marine ecosystems.

1. **Tourism**: As southern European regions become less attractive, Ukraine may see increased tourism.

2. **Ecosystems and Biodiversity**: Climate change will exacerbate threats to biodiversity, leading to species extinction and altering ecosystems.

3. The flora and fauna of the Carpathians have already begun to adapt to climate change. Trees are starting to grow at higher altitudes, and other species are following suit. The lack of water will lead to a reduction in forest areas and a decrease in soil fertility.

4. **Human Health**: Rising temperatures and frequent heat waves increase morbidity and mortality from heat-related illnesses. Poor water quality will raise the incidence of bacterial diseases, though warmer winters may reduce hypothermia deaths. The impact of climate change in Ukraine, compounded by military operations, threatens public health, ecosystems, water and forest resources, and energy infrastructure. The lack of balanced, scientifically sound measures and effective state policy exacerbates these risks, jeopardizing Ukraine's economy and environment.

Conclusions and Prospects

The main causes of climate change are the greenhouse effect, greenhouse gas emissions, and continuous missile explosions worldwide. Given Ukraine's political instability, various risks impact both the national and global ecosystems.

There are currently insufficient opportunities to implement balanced and scientifically sound measures. The absence of an effective state policy on balanced environmental management poses threats to Ukraine's economy and environment, with broader implications for national security. Without substantial intervention, Ukraine risks being sidelined in the global progression towards sustainable development.

Заява інституційної ревізійної ради / Institutional Review Board Statement

Не застосовується / Not applicable.

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