CHARACTERISTICS OF ACTIVITIES OF GLOBAL ORGANIZATIONS AND COUNTRIES IN THE CONTEXT OF ASSESSING THE IMPACT OF CLIMATE CHANGE ON WATER RESOURCES

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Abstract: *Since water is one of the key resources that humans need, dozens of global organizations around the world are studying the impact of climate on it. It has been determined that due to a significant increase in population, an acute problem of drinking water shortage may arise, and hundreds of thousands of people will be on the verge of dehydration. The situation is further complicated by the rapid development of urbanized areas, whose growth puts significant pressure on the water resources of the surrounding areas. Therefore, climate change, together with population growth, can lead to a shortage of drinking water in densely populated regions of the planet that already suffer from a constant shortage, especially in Africa and Asia, which is why this study is relevant. The aim of the study is to conduct a statistical assessment of the impact of climate change on water resources at the global and country scales. Based on the goal, the following task have been formed: to characterize the activities of global organizations in the context of reducing the impact of climate change on water resources. The following methods were used in writing this paper: content analysis - to study the change in the use of water resources caused by climate change; statistical analysis - to analyze the indicators of water resources assessment; scientific literature method - to determine the impact of climate change on water resources; tabular and graphical methods - to visualize the results obtained and a number of other methods.*

Key words: *between water resources, climate change, sustainable development, water availability*

JEL: C18, C82, Q25, Q53

1. Introduction. The European Union is showing a steady downward trend in water consumption, which may indicate the introduction of water-saving technologies, the transition to sustainable practices, and a reduced dependence on water-intensive production. Europe is experiencing frequent changes in climate conditions, from heat waves to heavy rains, which stimulates adaptive water management. In Latin America, water consumption is growing gradually due to the development of agriculture and infrastructure. At the same time, climate threats, such as Amazonian forest degradation, have a significant impact on the hydrological cycle, changing the seasonality and availability of water. In North America, consumption has remained stable at around 480 billion cubic meters, indicating a balance between high water use and effective management mechanisms.
In general, climate change is increasingly affecting water consumption in the world, both because of the need to adapt to new weather conditions and because of damage to water infrastructure, changes in precipitation seasons, and a decrease in natural resource recovery. That is why it is advisable for global countries to consider increasing investments in technologies that contribute to water conservation and sustainable consumption.

2. Basic content. The activities of global organizations to reduce the impact of climate change on water resources are an extremely important component of global environmental and social strategies. As the climate crisis deepens, manifested through droughts, floods, glacial melting, and disruption of the hydrological cycle, international institutions play a key role in coordinating efforts, implementing innovative approaches, and supporting countries in overcoming water vulnerability.
The European Green Deal envisages that the EU will become climate neutral by 2050, which will

require significant investments from both the public and private sectors. According to an analysis of EU reports, about €350 billion will need to be invested annually in the energy system alone by 2030 to achieve a 55% reduction in emissions (European Commission, 2021). This, in turn, requires significant investment in projects that help conserve water resources and increase the resilience of the water sector to the effects of climate change. The most effective method of attracting investment in EU member states is the issuance of green bonds, the structural volume of which is shown in Fig. 1.

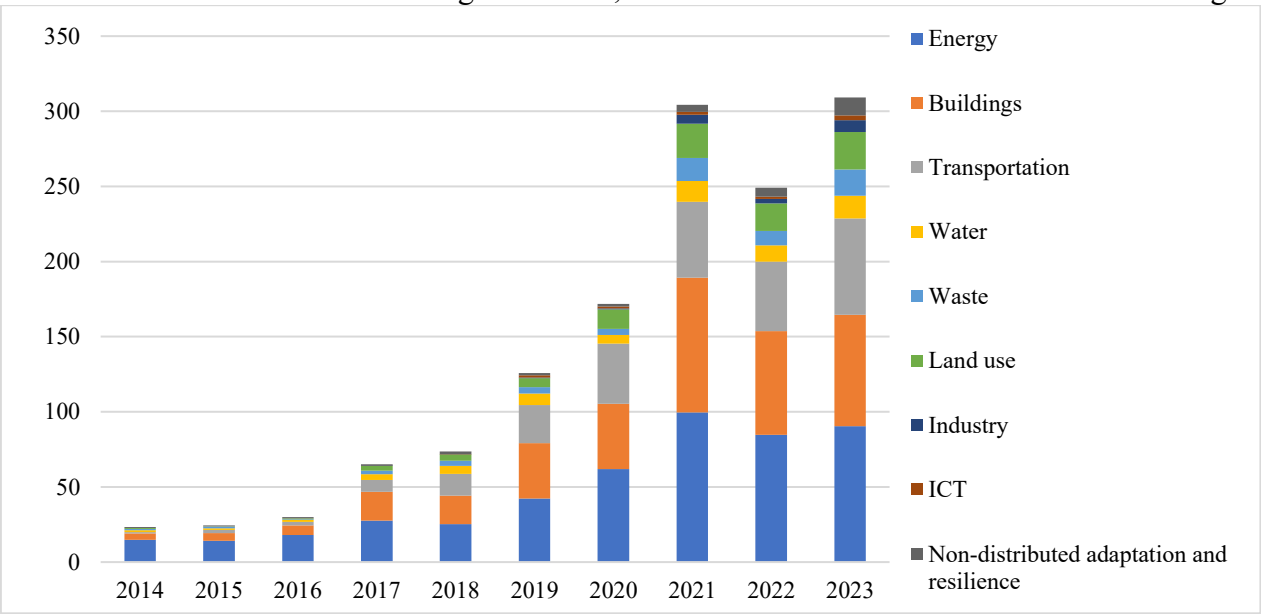

Figure 1. Dynamics of water-related bonds in the overall structure of green bonds in the EU member states for the period 2014-2023, USD billion USD

Source: Climate Bonds, 2024

Analyzing the data in Fig. 1, we can observe a gradual increase in investments in this sector. During this period, the amount of investments in water resources increased from 1.2 billion USD in 2014 to 15.2 billion USD in 2023. USD in 2014 to 15.2 billion USD in 2013. USD in 2023. This indicates the growing attention to the problem of water resources in the context of climate change, as changes in climate conditions significantly affect the water balance, reducing water availability and creating the need for new methods of water management.

The increase in water investments during this period correlates with global trends related to climate change adaptation, which includes projects aimed at improving water quality. For example, in 2019, there was a sharp increase in investments in water resources, which may be due to the active development of water conservation projects in response to the increasing intensity of droughts in many regions of Europe.

As a result, it is proposed to provide data on the volume of green bonds in water resources by world countries (Fig. 2).

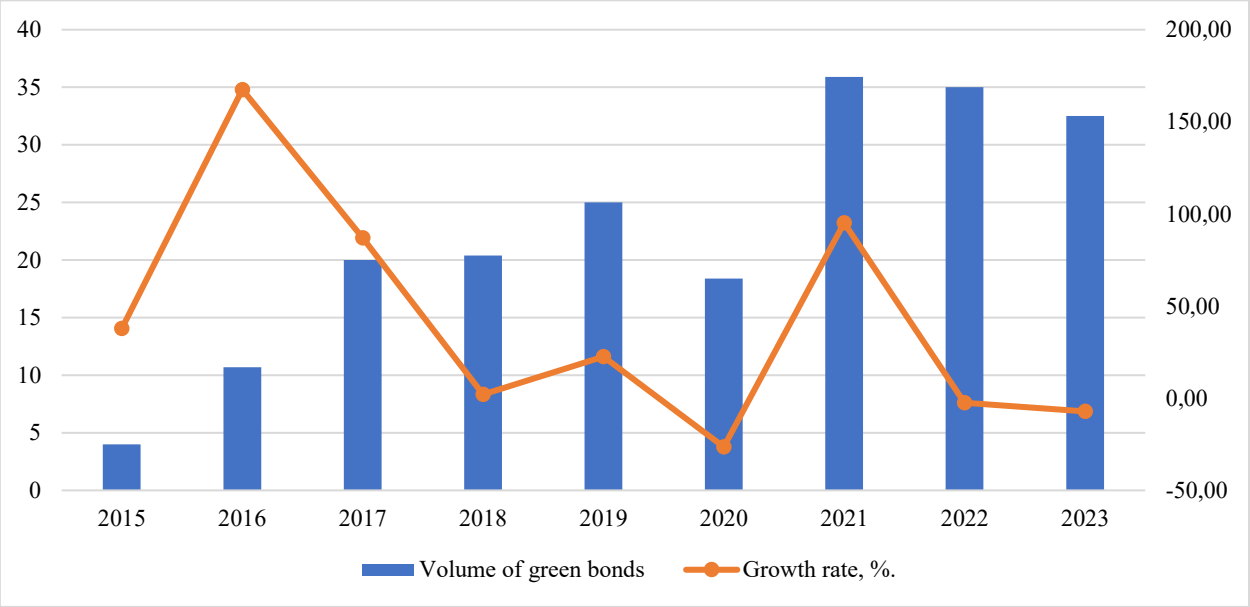

Figure 2. Dynamics of water bonds by world countries in 2014-2023,
USD billion USD
Source: Climate Bonds, 2024

Analyzing the data in Fig. 2, we can note a significant increase in investment, as during this period the volume of green bonds in water resources increased from 2.9 billion USD in 2014 to 32.5 billion USD in 2023. USD in 2014 to 32.5 billion USD in 2023. This indicates the growing importance of investing in water resources in the context of climate change, as the challenges associated with water shortages are increasing every year.

The overall trend shows a steady increase in investment, with the exception of certain downturns in 2020 and 2022. The largest increase in water bonds is observed in 2016 (167.5%), which is likely the result of a significant increase in international efforts to finance projects. Other years also show significant growth, although the pace varies - in 2019, the growth was 22.55%, which confirms the continued focus on investment in this sector in the face of global climate change. In 2020, there was a significant drop in the growth rate of green bonds (-26.4%), which may be the result of the impact of the COVID-19 pandemic, which caused economic instability and the suspension of some environmental initiatives.

Given these trends, it can be concluded that although there has been an increase in investment in water resources, it is uneven and depends on the economic situation, climate conditions, and global initiatives. That is why, to ensure the sustainability of water resources in the future, it is necessary to maintain and increase the volume of investments, as well as focus on the efficient use of these funds for the implementation of adaptation and mitigation measures.

Table 1 summarizes the key areas of action of the world's countries in the context of combating climate change and its impact on water resources.

Table 1. Characteristics of measures taken by world countries in the context of climate change and its impact on water resources.

Country	Characteristics of the events
Germany	A policy of sustainable water use is being implemented, including legislative initiatives to control water consumption and encourage its economical use. Significant investments have been made in modernizing wastewater treatment facilities and technologies. The agricultural sector uses drip irrigation systems and rainwater harvesting methods. The country is also implementing research projects aimed at preserving water in the face of climate change.
Netherlands	The country has one of the most developed water management systems in the world, with special attention paid to combating sea level rise and flood prevention. The "Room for the River" program has been implemented, which provides for the creation of additional space for water in conditions of high risk of flooding. Innovative technologies are also being used to collect, purify and reuse water, which reduces dependence on natural sources.
France	National climate change adaptation plans have been developed that include measures to preserve water resources. These include the modernization of water supply and the introduction of water-saving technologies in industry and utilities. Special government organizations also conduct public awareness campaigns on the rational use of water.
USA	Several climate change adaptation strategies have been developed at the national and regional levels, with a focus on the western and southern states that suffer from prolonged droughts and water shortages. Water conservation programs are being implemented in agriculture, urban planning, and industry, and projects are being funded to clean water and modernize water supply infrastructure.
China	Invests heavily in modernizing irrigation and water supply systems, primarily introducing efficient irrigation systems that reduce water losses and encourage water reuse and treatment.
Australia	The Water for the Future program is being implemented, which includes investments in seawater desalination, wastewater reuse, and rainwater harvesting. Digital technologies are also actively used to monitor the state of water resources.
India	The government funds numerous programs to preserve water in rural areas, especially in arid regions, such as rainwater harvesting projects, reconstruction of traditional wells, and modernization of water supply systems. Farmers are trained on how to use water efficiently.
Canada	The state supports research aimed at adapting to climate change and preserving fresh water and implements projects to purify water, preserve lakes and swamps, and implement water management software.
Japan	The country uses renewable energy for water treatment and supply, including solar panels and hydroelectric power plants. Urban and industrial infrastructure is being modernized with a view to water conservation, including automated systems, water reuse, and filtration.
Brazil	Special attention is paid to the conservation of the Amazon forests, which play a key role in the continent's water cycle. National strategies have been developed to combat droughts, restore reservoirs and protect river systems, and programs are being implemented to improve access to water in rural areas, promote sustainable land use and environmental education.

Source: European Commission, 2019; Ministry of Environment, 2020; Water Europe, 2024; U.S. Environmental Protection Agency, 2021; Ministry of Health & Family Welfare Government of India, 2018; Comisión Económica para América Latina y el Caribe, 2015

The general analysis of the table shows that different countries of the world, taking into account their geographical, climatic, economic and social conditions, are implementing comprehensive measures for the conservation and efficient management of water resources.

Countries with a high level of economic development, such as Germany, the Netherlands, the United States, and Japan, focus on technological innovation, infrastructure modernization, development of national strategies, and implementation of systematic water management. They are actively investing in research, new methods of water purification, reuse, and digital monitoring.

Instead, developing countries such as India, China, and Brazil focus on making water accessible to the public, restoring traditional sources, harvesting rainwater, and modernizing rural networks. Particular attention is paid to droughts that threaten food security and the preservation of natural ecosystems, such as the Amazon forest. The approach of Australia and Canada, which implement comprehensive environmental programs, combining environmental protection measures with technological solutions and actively involving local communities, is unique.

It has been shown that all countries, regardless of their level of development, are striving for integrated water resources management, realizing their critical role in ensuring sustainable development, ecological balance, and quality of life. At the same time, it is important that most of them are already acting proactively by implementing adaptation strategies to climate change, which only

3. Conclusions. The study of the statistical assessment of the impact of climate change on water resources at the global and country scales has led to the following conclusions:

Based on the study of scientific literature, it has been found that climate change has a significant impact on water resources both globally and regionally. The main problems include a reduction in freshwater reserves, deterioration of its quality, and disruption of the natural hydrological regime. These changes have serious environmental and socio-economic consequences that require an integrated approach to water management. Priority tasks are to increase the effectiveness of adaptation strategies, improve the regulatory framework, and intensify research in the field of climate change in order to minimize the negative impact on aquatic ecosystems.

It is also worth noting that climate change is increasingly affecting global water consumption: both due to the need to adapt to new climatic conditions and as a result of damage to water infrastructure, changes in precipitation patterns, and a decrease in the natural recovery of water resources. In this regard, it is advisable for the world's countries to increase investments in the implementation of water-saving technologies and promote sustainable water use.

The article shows that the activities of global organizations and countries in the field of reducing the impact of climate change on water resources are complex and multilevel: from global monitoring and scientific assessments to the practical implementation of infrastructure and financial solutions. Green finance plays a special role, which is actively developing in the context of investments in water projects, in particular through the issuance of green bonds. This approach contributes to water conservation, climate change adaptation, and sustainable development, especially in the face of growing global challenges.

Under the current conditions of military conflict and climate change, the state of water resources in Ukraine is undergoing a significant negative impact, which threatens not only environmental safety but also the overall level of public health. Despite the challenging situation, the country is making some progress in reducing water pollution and water stress, and has significant potential to develop hydropower as part of a green transformation. Thanks to international support, projects to restore and modernize water infrastructure are being actively implemented, which not only ensures access to quality water but also promotes sustainable water management in wartime and under increased climate risks.

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