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FORMATION OF AN ORGANIZATIONAL AND ECONOMIC MECHANISM FOR THE GREENING OF ECONOMIC RELATIONS IN THE WATER USE SECTOR

Problem statement. In modern conditions, when issues of environmental protection and sustainable use of natural resources are becoming critically important for ensuring the development of society, a special role is played by mechanisms that contribute to the integration of environmental principles into economic relations. The compliance of economic processes in the water use sector with environmental principles necessitates the formation of effective mechanisms for the integration of environmental approaches into all aspects of water management activities. In particular, this involves the transition to a blue economy, which is based on balanced water resources management, innovative solutions in the field of recycling, increased social responsibility of business entities and the state, as well as verification of water infrastructure.

The relevance of this direction is enhanced by modern socio-economic and environmental conditions. The post-war reconstruction of Ukraine requires the creation of foundations for the reintegration of the affected regions into the national economy, which is accompanied by the restoration of critical infrastructure and increasing its environmental efficiency. The complex challenges that arise in this area involve the formation of a new approach to resource management, specifically the application of the organizational and economic mechanisms of greening.

Analysis of recent research and publications. The concept of the organizational and economic mechanism for the greening of economic relations is characterized by a multiplicity of interpretations, due to the diversity of approaches to the definition of the term "greening" in the context of economic, managerial, and production systems.

The objective of greening every aspect of economic relationships is to achieve an optimal integrated balance between environmental and economic priorities. This involves both improving the quality of the environment and the effective implementation of the chosen model of economic development. Based on this conceptual premise, most of the theoretical and applied approaches to defining the organizational and economic mechanism of greening have been formed.

As noted in scientific research, in particular in the scientific work of O. Veklych [1], the mechanism for the greening of economic relations provides for a set of forms and methods of management based on an economic-ecological approach that takes into account the laws of nature and economic regularities of economic activity. In particular, it is noted that greening is implemented through tools that influence the behavior of business entities and stimulate them to implement environmental practices.

Scientists A. Dubodelova, O. Yurinets, M. Fedoriv [2] note that the economic mechanism for the greening of production is defined as a complex of various levers, standards, and institutional structures, which through financial, economic, and organizational assistance stimulates the implementation of environmental protection measures. At the same time, its effective functioning is ensured by the presence of an effective organizational mechanism both at the intra-economic and national levels.

Thus, in the study [3] the conceptual foundations for the greening mechanism are proposed, which include key components, such as the goal and objectives, objects and subjects of greening, tools of direct and indirect motivation, as well as possible strategies for implementing environmental measures. The authors focus on considering the mechanism of ecological and economic development from a methodological point of view, integrating environmental goals, tools for their implementation, and mechanisms for achieving them into the system of strategic management of the enterprise.

In the work [4] the ecological and economic mechanism of enterprise management is proposed as a multi-vector structure, which involves the formation of a system of mechanisms with adequate levers and tools. This approach emphasizes the need to create complex tools that synergistically take into account the economic and environmental components of management.

M. Petrushenko [5] defines the notion of organizational and economic mechanisms for the greening of enterprise activities as a set of principles, levers, methods, and tools in the enterprise's management system that aim to achieve the best possible balance

between economic development, environmental management rationalization, and the outcomes of implementing enterprise initiatives in the field of environmental protection by coordinating the interests of the enterprise and stakeholders in the enterprise's activities. The conceptual basis of this mechanism includes basic elements: subjects (enterprise management apparatus, stakeholders in the field of enterprise activities); objects (key domains of enterprise activity in the context of ensuring the ecological and economic functioning balance); levers for achieving ecologically balanced development (ecologically oriented sustainable competitive advantages, ecological standardization of the management system, etc.); methods for achieving ecological and economic development (ecological and economic restructuring, greening of product life cycle stages, methods of analysis and monitoring of the enterprise's impact on the environment, etc.); tools for achieving ecological and economic development (program for the ecological and economic restructuring of the enterprise, standards for compliance with product quality and environmental sustainability, etc.).

The article [6] provides detailed proposals for building a mechanism for the greening of the enterprise's activities and indicates that the mechanism for the greening of the enterprise's activities can be defined as the main management tool, the use of which is aimed at the practical implementation of measures for the ecological transformation of the enterprise. The authors indicate that the main elements of the economic mechanism are methods, organizational structure of management, economic levers, and incentives [7]. For the greening mechanism, it is proposed to add management priorities, goals, objective restrictions, environmental impact, environmental procedures, and a program of environmental protection measures. Management priorities determine the directions of action, and goals are guidelines within the framework of the greening strategy. Objective restrictions, such as technological or financial, set the limits for improving the environmental friendliness of the enterprise. The current impact on the environment determines the structure and complexity of the greening mechanism, the growth of which depends on the level of this impact. Environmental procedures are periodic actions that provide monitoring or results, and the program of environmental protection measures provides for a set of organized measures implemented in the operational activities of the enterprise [6].

The article aims to substantiate the theoretical and methodological principles and develop an organizational and economic mechanism for the greening of economic relations in the water use sector in Ukraine.

Results of the study. Taking into account the analyzed scientific approaches, the organizational and economic mechanism for the greening of economic relations in the water use sector can be considered as a set of organizational forms and economic levers aimed at integrating environmental principles into the practice of using water resources and ensuring the stimulation of environmental protection measures through improving the institutional framework, information, and analytical support, technological modernization, and financial-economic instruments to achieve the optimal balance between economic, environmental and social goals of water management development. The interaction of organizational and economic instruments can contribute to increasing the economic and environmental efficiency of water use by introducing innovative technologies, ensuring social responsibility, effective verification of water infrastructure, and considering the specific requirements of post-war reconstruction to achieve sustainable development.

The main goal of the organizational and economic mechanism for the greening of economic relations in the water use sector is to create a comprehensive system that ensures sustainable water resources management based on the integration of the principles of circular, blue economy, and social responsibility.

Within the framework of this mechanism, the relationship between organizational and economic components is ensured to achieve sustainable development.

The organizational component of the mechanism for the greening of economic relations in the water use sector includes:

1. Improving the institutional framework, in particular the legislative regulation of water use in accordance with the principles of the blue economy, which involves the adaptation of national norms and standards to international trends in sustainable water resources management, considering economic and environmental aspects.

Over the past few years, the international community has become increasingly aware of the need for sustainable development of the blue economy, which protects and preserves freshwater, coastal and marine ecosystems. As national governments have the competence in policy areas that affect the sustainability and resilience of the blue economy, this highlights the need for concerted action at all levels of government. However, national blue economy strategies and policies are still at an early stage of development compared to the international level.

In response to the impact of the blue economy on freshwater, coastal and marine ecosystems, the international community, in particular the OECD [8], insists that cities and regions need to develop a sustainable blue economy that is:

– resilient to economic and climate shocks;

– inclusive of local communities and stakeholders;

– environmentally sustainable, by limiting environmental impacts while protecting ecosystems and biodiversity;

– circular, by preventing waste, promoting material efficiency, and transforming waste into resources [8].

To achieve a sustainable blue economy, it is necessary to create a system of enabling governance conditions, which can be roughly divided into three key

categories: policy development, policy coherence, and policy implementation.

Policy development consists of defining clear roles and responsibilities of government bodies, forming appropriate institutional frameworks, and defining strategic directions for the development of blue economy policies. This also includes building and strengthening institutional capacity to ensure effective policy implementation at all levels of government, as well as creating conditions for the collection, processing and dissemination of relevant data and knowledge necessary for making informed decisions in this area.

Policy coherence involves ensuring compatibility of powers, policy initiatives, and objectives between different government institutions that affect the development of the blue economy. An important aspect is also the recognition of the interdependence between blue economy sectors and ecosystems, as well as the relationship with other policy issues, such as climate change, water security, social inequalities, and, in the case of Ukraine, post-conflict reconstruction.

The implementation of the policy focuses on the use of various instruments to ensure the effective implementation of the blue economy. Such instruments include both financial and economic incentives and regulatory mechanisms, including management and control tools. At the same time, it is important to promote the creation of synergies between blue economy participants, including enterprises, scientific institutions, and civil society, which will allow for the effective integration of efforts from different sectors and promote the development of innovative initiatives in this area.

Formation of institutional support for standards of socially responsible business in the water sector. In particular, this is implemented through the implementation of strategic plans that take into account the principles of a circular economy aimed at reducing the negative impact of water use on ecosystems.

2. Technological modernization is an important element of the organizational component of the mechanism for greening economic relations in the water use sector, aimed at ensuring the efficient use of water resources, reducing their negative impact on the environment, and increasing the environmental sustainability of economic activity. It includes the implementation of modern solutions that combine economic feasibility, technological innovation and environmental responsibility. The main components of technological modernization are verification of water infrastructure, the development and implementation of innovative technologies for water treatment and purification, as well as creation of conditions for the development of blue-green infrastructure based on wastewater recycling.

Verification of water infrastructure consists of a comprehensive inspection of the technical condition of water supply, wastewater disposal, and treatment facilities to determine their compliance with modern environmental standards. The results of the verification provide the main basis for making management decisions and determining priorities in infrastructure modernization. For example, the reconstruction of facilities and industries that exceed the limit levels of pollution should be a priority.

Modern challenges in water resources management require the introduction of the latest technologies in the field of water abstraction, water treatment and purification. Technologies of this level should combine a high level of water purification with economic efficiency and minimal impact on the environment.

The introduction of innovative technologies in water abstraction is aimed at reducing resource losses and preventing environmental violations. In particular:

– the use of intelligent systems for controlling water abstraction processes allows optimizing the allocation of resources, taking into account seasonal changes and consumption dynamics [9, 10];

– the development of water abstraction technologies that minimize interference with natural ecosystems and do not disrupt the ecological balance. In particular, the modern scientist-economist G. Pauli described in detail such technologies and solutions inspired by nature in the book "Blue Economy" [11].

Wastewater recycling, along with the development of blue-green infrastructure, are important directions for the modernization of water use systems. They contribute to the creation of closed water use cycles, support ecosystems, and ensure the sustainability of water resources in urban and industrial conditions.

According to the definition of L. Cherchyk and N. Khumarova [12], green infrastructure is a component of the urban ecosystem that combines a set of natural objects that perform economic, environmental, security, aesthetic, cultural, recreational functions and ensures the formation of a favorable living space for all elements of the urban ecosystem. Thus, blue-green infrastructure can be defined as a complex element of the urban ecosystem that combines natural objects (green component) and water resources (blue component), which interact to perform economic, environmental, security, aesthetic, cultural, and recreational functions.

For the functioning of blue-green infrastructure, innovative methods of water management are used, in particular [13]:

– use of treated water for irrigation of green spaces. In urban areas, treated wastewater can be used to maintain parks, squares, or urban gardening;

– bioengineering structures, such as green roofs, not only accumulate rainwater but also contribute to its gradual purification by filtering through layers of substrate;

– construction of multifunctional water and landscape objects. Water tanks for collecting treated or rainwater, combined with green spaces, contribute to effective water conservation and at the same time improve the urban environment.

Combining water recycling technologies with the concept of blue-green infrastructure allows to significant reduce the ecological footprint of water use, improve the quality of the urban environment by reducing the "heat island" and improving the microclimate, and provide water reserves for periods of drought or peak loads.

The development of wastewater recycling and blue-green infrastructure is an important step in ensuring sustainable water use. The implementation of these approaches, in particular within the framework of the organizational and economic mechanism of greening, will effectively combine technological innovations with nature-oriented solutions. This will contribute to the harmonization of relations between the economy and ecology, ensuring the sustainability of water resources for future generations.

3. Information and analytical support contribute to the greening of water use through the use of digital technologies, automated monitoring systems, reporting, and popularization of rational water use. This element of the organizational component of the greening mechanism in the water use sector aims to increase the transparency of water resources management processes, ensure public awareness, and stimulate the environmental awareness of enterprises and the population.

The use of automated data collection systems for continuous monitoring of the state of water is essential for the timely identification of environmental risks and the development of effective management strategies. These systems include:

– automatic sensors located in rivers, lakes, water intakes, and treatment systems that provide data on the physicochemical properties of water: the level of pollution, the content of dissolved oxygen, the concentration of toxic substances, etc. This allows for a prompt response to exceeding limit values [14];

– remote sensing systems: the use of satellite and drone technologies to monitor changes in aquatic ecosystems, such as changes in riverbeds, water levels or the emergence of new sources of pollution, allows us to see a holistic picture of the water balance [14];

– intelligent data analysis systems: the use of artificial intelligence to process large amounts of information provides for the prediction of environmental crises, automatic generation of reports, and modeling of water use scenarios [15].

The formation of reporting by enterprises on the environmental component of their activities in the water use sector is a key element in ensuring the socio-ecological responsibility of enterprises in the water use sector. L. Kupinets and O. Shershun [16] emphasize that in the further development of national environmentally oriented information support, in the form of statistical documents, it is necessary to focus on the "Basic set of environmental statistics". Given the requirements of the Basic Set of Environmental Statistics to ensure that countries that develop and improve national environmental statistics programs are provided with data, it is worth considering the possibility of creating an electronic platform for submitting data on environmental protection expenditures, for example, based on the nationwide automated system "Open Environment". Information should be provided by filling out the State Statistical Observation Form №1 – "Report on Environmental Protection Expenditures and Environmental Payments" online through the Electronic Cabinet.

In the context of Ukraine's accession to the EU and post-war reconstruction, non-financial reporting is gaining particular importance as a tool for attracting investments, including for medium and small enterprises. The introduction of such reports will contribute to increasing business transparency, strengthening investor and public confidence, as well as popularizing the principles of socially responsible business conduct.

Non-financial reporting is in the process of constant improvement, which allows enterprises to independently choose reporting standards. To increase the involvement of organizations in the preparation of Management Reports, it is advisable to introduce modern Internet technologies for the publication of interactive online reports with feedback. In addition, it is important to involve social innovation entities that will contribute to the formation of investment catalogs of socially responsible enterprises in digital format [17]. Greening of all spheres of social activity and consciousness, in particular culture and science, is now a key principle that shapes the attitude of society and the individual to the environment. The holistic structure of ecological culture consists of three interrelated components: cognitive (knowledge about nature), value-motivational (views, beliefs, values, responsible attitude to nature, and motivation for environmentally oriented behavior), and activity (conscious environmental activity in the professional sphere and everyday life). In this context, ecological culture is an indicator of the spiritual maturity of an individual who, understanding the essence of nature, acts by his own knowledge and cultural environment [18].

The formation of an ecological culture, which includes knowledge, values, and conscious activity, is a necessary condition for the promotion of sustainable approaches to the use of natural resources. In this context, rational water use is of particular importance, which, through educational campaigns and other educational activities, contributes to the development of environmental awareness in society.

The main directions for promoting rational and environmentally responsible water use can be:

– information campaigns: dissemination of materials in the media, social networks, and specialized platforms on the rules of rational water consumption and the consequences of water pollution [19];

– educational programs: implementation of training courses for schoolchildren, students, and employees of enterprises with an emphasis on the role of water resources in sustainable development [20];

– public involvement in monitoring: participation of citizens in water resources monitoring projects contributes to increasing their responsibility for the environment. For example, the creation of mobile applications where users can record violations in the use of water resources [21];

– demonstration projects: involve the implementation of effective practices of greening water use based on individual enterprises or territorial communities with their subsequent use as representative models for adaptation and implementation in other business entities or regions.

Information and analytical support are closely interconnected with other elements of the organizational and economic mechanism for greening. Data obtained through automated monitoring systems are used to: improve technologies for modernizing water use infrastructure; assess the effectiveness of environmental measures implemented at enterprises; develop economic instruments to stimulate rational water consumption; popularize rational water use to contribute to increasing the level of public participation in supporting and implementing greening programs.

The economic component of the organizational and economic mechanism for greening economic relations in the water use sector plays a key role in ensuring the effective implementation of environmental protection measures and achieving rational environmentally responsible use of water resources in various sectors of the economy. Its implementation ensures the formation of financial and economic conditions that stimulate business entities to implement environmental technologies, increase the efficiency of water supply and wastewater disposal, and reduce environmental pollution. The author identified the following 3 elements of the economic component of the organizational and economic mechanism:

1. Economic incentives are an integral part of the mechanism for greening economic relations in the water use sector. Its purpose is to create favorable conditions for the implementation of environmental protection measures and ensure the rational use of water resources utilizing economic levers and market mechanisms. Effective economic incentives encourage water users to environmentally responsible activities, modernize infrastructure and introduce innovative technologies. The main areas of economic incentives are the creation of financing funds, the introduction of "green" taxes and subsidies, as well as the implementation of mechanisms for the market distribution of water resources.

One of the key areas of economic incentives is the formation of financial funds that provide support for environmental projects in the water use sector. This initiative is based on the need to accumulate financial resources for the implementation of environmental programs, modernization of water management infrastructure, and the introduction of advanced technologies [22; 23].

Within the framework of the post-war reconstruction of Ukraine's water management, the creation of funds aimed at restoring the destroyed water infrastructure is particularly relevant. Such funds can be formed at the expense of reparations from the aggressor country and international technical and financial assistance. International organizations, such as the EU, the UN, or the World Bank, can allocate grants and loans for projects that contribute to the greening of water use and increase the sustainability of water systems. Priority in financing should be given to modern environmentally responsible projects aimed at implementing a closed cycle of water use, wastewater treatment, and minimizing pollution of water bodies. Given the importance of social and environmental responsibility in the post-war period in Ukraine, financial support should be provided to both local communities and water supply and sewage enterprises (WSSEs) that implement environmentally responsible programs in the water use sector. An important aspect is the integration of the principles of social responsibility of WSSEs aimed at improving water quality and ensuring access to clean water for the population. In the post-war period, when the country is recovering from significant destruction, social and environmental responsibility is a key factor in the reconstruction of regions, guaranteeing sustainable development and improving the well-being of the population.

It is advisable to carry out the reconstruction of Ukraine after the war, relying on the principles of economic instruments of green growth, in compliance with the obligations to fulfill the goals of the European Green Deal. "Green" taxation is becoming widespread, which is aimed primarily at stimulating the transition to environmentally friendly management and rational use of natural resources, and not at purely fiscal filling of the budget [24]. The main task of these taxes is to create an economic mechanism for influencing economic entities that carry out activities with a negative impact on the environment. For example, enterprises that neglect wastewater treatment or demonstrate inefficient use of water resources are forced to pay increased rates of environmental fees. Such a system should ensure the achievement of the so-called “double effect”, when the state of the natural environment improves, and budget revenues increase at the same time [25].

The collected tax funds are directed to specialized environmental funds that finance environmental projects. This ensures support for innovative solutions, such as the development of environmentally friendly technologies, modernization of enterprises considering the requirements of sustainable development, as well as the restoration of natural ecosystems.

Another element of economic and environmental stimulation is “green subsidies”, which are considered a tool of state support aimed at achieving a higher level of sustainability than that which can be provided solely by market mechanisms. Globally, there is a growing use of such subsidies, with the main objectives being to stimulate the development of clean energy sectors,

gradually reduce dependence on fossil fuels, slow down the pace of climate change, and support sustainable production and consumption patterns [26]. Subsidies include compensation for the costs of upgrading equipment, installing automated water monitoring systems, or integrating water recycling systems.

One of the economic incentives aimed at optimizing water use through market mechanisms of supply and demand is water markets, which create a competitive environment that promotes water efficiency and encourages consumers to use water rationally [27]. Water markets operate on the principle of supply and demand, where the price of water is determined through the interaction between buyers and sellers and its availability. Their main goal is to ensure the efficient and sustainable use of water resources. This mechanism is particularly useful in regions where water scarcity is a critical problem [28].

One of the main advantages of water markets, in contrast to monopolistic approaches, is their ability to stimulate entrepreneurial activity in the field of water use. The conditions under which water rights can be transferred or sold create new business opportunities, stimulating the development of innovative solutions for more efficient water use [29].

Economic incentives are critically important on the path of Ukraine's integration into the European Union, as they contribute to the adaptation of national economic mechanisms to European standards of sustainable development, environmental protection, and water use.

2. In the context of growing requirements for the conservation of water resources and improving the efficiency of water management activities, especially in the context of European integration, the introduction of financial mechanisms contributes not only to the conservation of natural resources but also to economic development.

Modernization of water management infrastructure is a key element in increasing the efficiency of water use and minimizing the environmental impact on water resources. However, one of the main barriers to modernization is the lack of sufficient funding at the level of local authorities and water-use enterprises. M. Khvesyk and V. Golyan [30] note that the European Union proposes to apply state-direct incentive mechanisms, in particular soft loans, for the successful implementation of environmental directives in the field of water use. The introduction of financial instruments that provide a reduced cost of loans for such investments can become an important element of an environmental strategy.

The use of new environmental technologies is often associated with a high level of risks, such as imperfection of technical solutions or developments, as well as uncertainty regarding the further implementation of such innovations. Environmental insurance is an effective tool for ensuring environmentally safe use of water resources and an important component of the balanced development of the national economy. It contributes to the formation of financial resources for the implementation of state policy on the protection and restoration of natural resources. In addition, environmental insurance not only provides compensation for losses from environmental pollution but also stimulates the financing of measures to restore ecological characteristics. This also helps to create a culture of environmental responsibility among water resource users. For the effective development of environmental insurance, it is necessary to update national legislation, which will bring Ukrainian practice closer to European standards in the field of environmental protection and water use [31].

For the development of innovative technologies, it is necessary to use instruments aimed at stimulating investments in energy-saving technologies, which should provide financial support for projects to improve energy efficiency and preserve natural resources. The concept of "green" finance is to encourage capital investment in "green" economic growth [24]. According to the definition of UNEP, "green" finance is financial instruments, the income from which is directed to environmentally sustainable projects and initiatives, environmental products and policies, the purpose of which is to support the transition to a low-carbon, sustainable, and inclusive economy [32]. Debt and shares dominate among the main financial instruments of green finance, while investments in renewable energy, financing of sustainable infrastructure, and the issuance of "green" bonds remain the most attractive areas for investors within the framework of "green" finance.

Green bonds were introduced into circulation by the Law of Ukraine “On Amendments to Certain Legislative Acts of Ukraine on Simplifying Investment Attraction and Introducing New Financial Instruments” dated June 19, 2020 No. 738-IX [33] as such, which provided in their prospectus (issue decision, and for government bonds of Ukraine – placement conditions) for the use of the attracted funds exclusively to finance environmental projects or their stages. The basis for the issuance of green bonds is defined as a project that is focused on environmental goals, in particular in the field of alternative energy, energy efficiency, minimizing the generation, utilization, and recycling of waste, developing environmentally friendly transport, organic farming, preserving biodiversity, water, and land resources, adapting to climate change, as well as other measures that contribute to environmental protection, implementing environmental standards and reducing emissions of harmful substances into the environment [34].

Green bonds have become a new tool for attracting investments in environmentally responsible projects, orienting investors to the principles of sustainable development. For the successful implementation of this mechanism in Ukraine, it is necessary to adopt international standards and regulations and develop legislation that will ensure the effective use of funds raised in green projects. The creation of a green bond market will contribute to the integration of the Ukrainian economy into European environmental standards and

will allow attracting financing for domestic environmental initiatives, meeting the requirements of international financial practice [35].

3. Economic regulation of water use includes the utilization of various economic instruments that ensure the effective use of water resources, considering social, economic, and environmental aspects.

One of the important stages of economic regulation of water use is the calculation of the real cost of water, which is based not only on the costs of its abstraction, transportation, and purification but also considers its socio-economic and environmental functions. Water is an important resource not only for industry and agriculture but also for ensuring the well-being of the population and maintaining ecological stability. To effectively integrate all these functions, it is necessary to develop and implement methods for calculating the value of water that takes into consideration its multifaceted nature.

The introduction of tariff and non-tariff regulation methods that consider the level of impact on ecosystems is an important step towards environmentally oriented economic regulation in the water use sector. In particular, the introduction of progressive tariff rates for water use, aimed at stimulating economically efficient and environmentally responsible use of water resources, provides for the differentiation of tariffs depending on the volume of water consumed and the level of its pollution, which, in turn, motivates enterprises and organizations to implement innovative technologies to reduce water consumption and improve the quality of water after its use, in particular by applying modern methods of wastewater treatment. For the effective implementation of such tariffs, it is important to develop systems for monitoring and accounting of water consumption at all stages, from water intake to water treatment and use.

The relationship between the field of environmental protection and the use of natural resources is regulated by various legal acts, in particular the Criminal Code of Ukraine, where environmental crimes are provided for in Chapter VIII "Crimes against the Environment" and some other sections [36]. Significant problems arise with the application of sanctions for such crimes, in particular the lack of clear criteria for calculating fines and their insufficient effectiveness as a tool for prevention.

Similarly, administrative liability for violations in the environmental sphere is regulated by the Code of Ukraine on Administrative Offenses [37]. However, the established fines are not high enough, which does not stimulate business entities to modernize production considering environmental requirements. To ensure the effectiveness of environmental regulation, it is important to increase fines to a level that exceeds the benefit from illegal activities and includes compensation for damage.

In the EU countries, more stringent approaches are in place, where excessive emissions or discharges of pollutants are accompanied by significant fines, up to and including the suspension of the activities of enterprises. This approach stimulates the use of environmentally friendly technologies and is economically disadvantageous for violators. In addition to fines, compensation for damage caused in civil proceedings is provided for [38].

M. Sirant [38] notes that in Ukraine, the lack of sufficient economic levers of influence and the anthropocentric nature of legislation creates obstacles to effective regulation. Legislation is often focused only on property regulation, and environmental requirements are ignored. For the effective implementation of the principle of preventing environmental damage, it is advisable to develop sanctions that will consider environmental priorities, and the economic inexpediency of offenses and will correspond to international agreements and strategies of Ukraine in the field of nature protection.

Thus, the use of appropriate legal liability instruments in combination with investment and tariff incentives ensures the formation of a holistic system of economic regulation aimed at counteracting irresponsible attitudes to water resources and stimulating the development and implementation of environmentally safe technologies and methods of water use.

Stakeholders and objects of the organizational and economic mechanism of water use greening form the basis of its functioning, ensuring interaction between management, production, and natural components to achieve sustainable use of water resources. The stakeholders and objects of the organizational and economic mechanism for greening water use form the basis of its functioning, ensuring interaction between management, production, and natural components to achieve sustainable use of water resources. The stakeholders of the organizational and economic mechanism are: state management bodies that carry out regulatory and legal regulation, develop environmental standards and control in the water use sector; water-using enterprises that directly consume resources and influence the state of the water environment; the population that also directly consumes water resources, and also forms public demand for environmentally friendly practices; scientific research institutions and higher education institutions that provide the scientific basis for greening; environmental audit entities responsible for assessing the environmental efficiency of enterprises; financial institutions that provide financial support for environmental projects; public organizations that play an important role in raising environmental awareness and public control.

The objects of the mechanism are: water and near-water resources, which are the basic components of the natural environment, and require preservation, restoration, and rational use; technical infrastructure of water use, which includes structures, equipment, and technologies aimed at optimizing water consumption and reducing the negative impact on ecosystems; social awareness and behavior, which determine the level of

environmental culture and the readiness of society to implement innovations in the field of rational water use.

The joint interaction of subjects and objects allows the formation of a comprehensive system focused on ensuring sustainable development of water use and achieving harmony between environmental, economic, and social goals.

Fig. 1 schematically depicts the Organizational and economic mechanism for the greening of economic relations in the field of water use in Ukraine.

Tasks, methods, principles, forms, tools, and levels act are structural elements of the organizational and economic mechanism, ensuring its integrity and functional orientation. Tasks outline strategic guidelines and operational goals that guide the activities of entities. Methods and principles determine approaches to

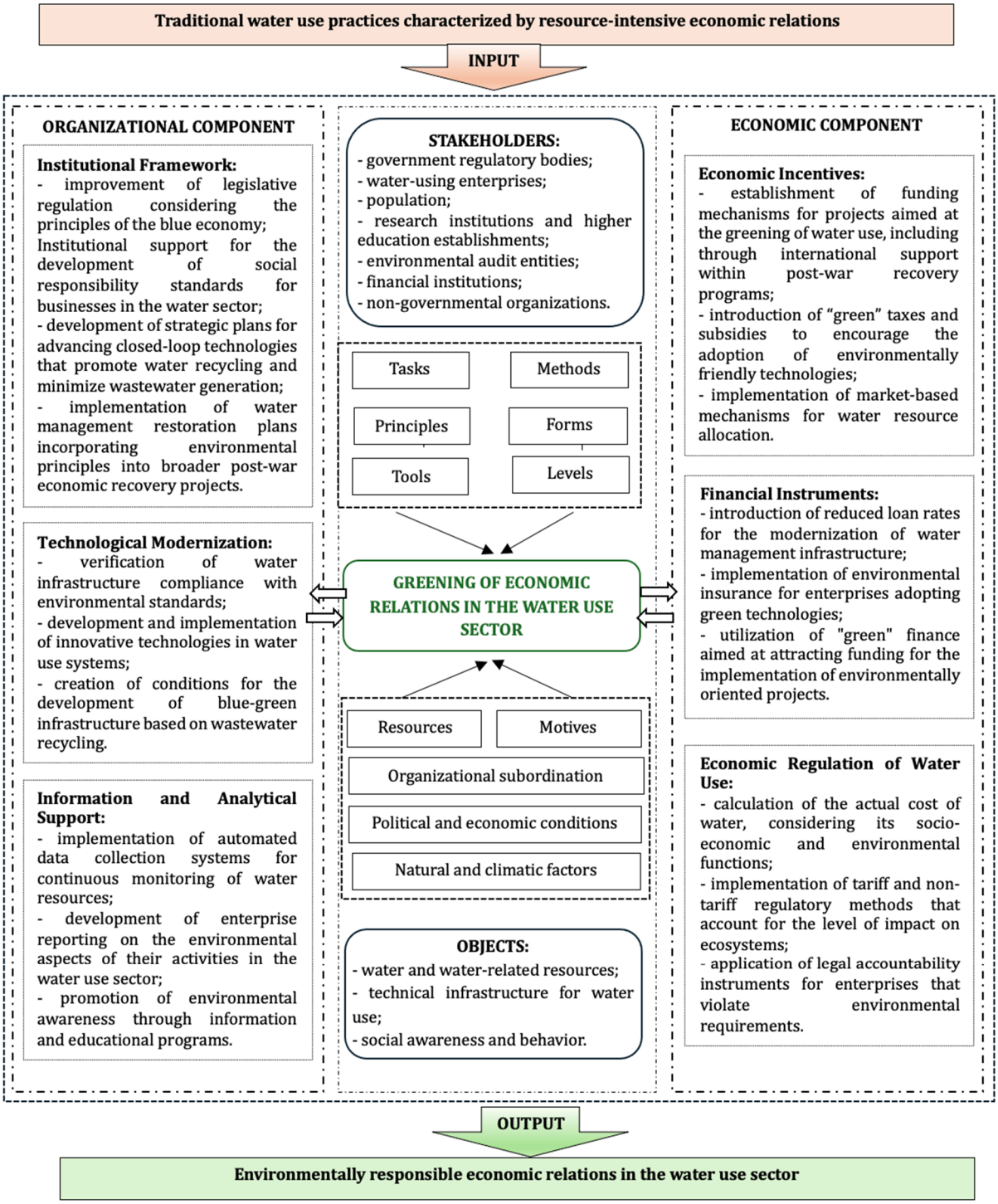

Fig. 1. Organizational and economic mechanism for the greening of economic relations in water use. sector in Ukraine

Source: author's development based on [1-40].

decision-making and establish rules for their implementation, which allows for maintaining a balance between economic efficiency and environmental responsibility. Forms and tools are practical means of implementing the mechanism, contributing to adaptation to the specifics of water management processes. The implementation of all elements at different levels of management allows for a multi-vector impact on the greening of water use.

Resources, motives, organizational subordination, political and economic conditions, and natural and climatic factors are external and internal factors that affect the effectiveness of the organizational and economic mechanism for greening. They form the conditions in which this mechanism functions and determine its adaptability and dynamism.

Resources, such as financing, technology, and human resources, are the basis for the implementation of tasks and achieving the goals of the greening mechanism, without which the effective implementation of the planned changes is impossible. Motives act as internal or external motivating factors that stimulate participants to act within the framework of greening, different for each group of stakeholders. Organizational subordination determines the hierarchy of interaction and responsibility of stakeholders, which is important for the implementation of planned measures within the framework of the overall strategy. Political and economic conditions directly affect decision-making, resources, and the legal framework, forming a favorable or restrictive environment for initiatives. Natural and climatic factors, in turn, determine the specifics of water use and affect the need to adapt the mechanism to environmental changes.

Conclusions and prospects for further research. In the conditions of Ukraine, where traditional water use practices characterized by resource-intensive economic relations in the water use sector predominate, the comprehensive implementation of components and elements of the organizational and economic mechanism plays a key role in the process of greening economic relations. The organizational and economic mechanism is a determining factor in the process of transforming economic relations in the field of water use in Ukraine, as it creates conditions for the transition from traditional resource-intensive practices to environmentally responsible economic relations. The process of greening the economy of water use occurs through the integration of environmental principles and standards into the regulatory framework, management, and economic activities, which determines the increase in the efficiency of water use in the context of sustainable development.

The impact of this mechanism is manifested through the adaptation of organizational structures and the distribution of responsibility among water users, the efficient use of resources, ensuring balanced development, and reducing the negative impact on the natural environment. The use of economic instruments contributes to the optimal allocation of resources for the implementation of environmentally friendly technologies that ensure the efficiency and sustainability of water use processes.

The purpose of the organizational and economic mechanism is to achieve the integration of economic and environmental goals through the development of a clear policy in the water use sector and the creation of conditions for its implementation. The effectiveness of this mechanism is determined not only by the application of regulatory and organizational methods but also by the successful implementation of control instruments and incentives for investments in water-saving and environmental technologies.

The greening mechanism also requires the active participation of various groups of stakeholders, including state authorities, water user enterprises, research institutions, public organizations, and local communities, which is important for ensuring an integrated approach and comprehensive control. Given the changes in the global and local environment, it is necessary to review the current water use standards and adapt to new challenges, in particular war and post-war in Ukraine, as well as global climatic and technological.

Through a comprehensive approach that integrates legal, economic, investment, and organizational instruments, the developed organizational and economic mechanism for greening can contribute to ensuring the achievement of sustainable development of water management within the framework of implementing the goals of the blue economy, introducing effective and environmentally safe technologies, and increasing social responsibility in the use of water resources.

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Магац Н. Формування організаційно-економічного механізму екологізації економічних відносин у сфері водокористування

Актуальність. В умовах сучасних екологічних викликів, посилення вимог до раціонального природокористування та необхідності інтеграції природоохоронних принципів у сферу водокористування особливої значущості набуває розробка ефективного організаційно-економічного механізму екологізації економічних відносин. Екологізація водокористування є важливим напрямом державної політики України в контексті адаптації до європейських стандартів сталого розвитку, що передбачає впровадження інноваційних технологій, підвищення екологічної відповідальності суб'єктів господарювання та вдосконалення інституційної підтримки. У воєнний та повоєнний період Україна стикатиметься з масштабними викли-

ками щодо відновлення критичної інфраструктури, що потребує розробки механізмів, які сприятимуть ефективному управлінню водними ресурсами та екологічній трансформації підприємств.

Мета та завдання. Метою дослідження є обґрунтування теоретико-методичних засад та розробка організаційно-економічного механізму екологізації економічних відносин у сфері водокористування в Україні. До основних завдань належать: визначення ключових структурних елементів механізму, дослідження інституційних, економічних і технологічних аспектів його функціонування, обґрунтування інструментів регулювання та стимулювання екологізації у сфері водокористування України.

Результати. Визначено сутність поняття організаційно-економічного механізму екологізації економічних відносин як сукупність організаційних форм та економічних важелів, спрямованих на інтеграцію екологічних принципів у практику використання водних ресурсів та забезпечення стимулювання природоохоронних заходів через удосконалення інституційного підґрунтя, інформаційно-аналітичного забезпечення, технологічну модернізацію та фінансово-економічні інструменти для досягнення. Визначено, що інституційне середовище водокористування в Україні потребує гармонізації з європейськими екологічними стандартами, що передбачає адаптацію нормативно-правової бази до засад блакитної економіки, інституційну підтримку формування стандартів соціальної відповідальності бізнесу у водному секторі та впровадження планів відновлення водного господарства із врахування екологічних принципів у загальні проекти повоєнного відновлення економіки. Обґрунтовано необхідність технологічної модернізації, спрямованої на верифікацію та реконструкцію водної інфраструктури відповідно до сучасних екологічних стандартів, розвиток замкнутих циклів використання води та блакитно-зеленої інфраструктури на основі альтернативних джерел водопостачання. Запропоновано застосування фінансово-економічних важелів, зокрема фінансових інструментів «зеленого» зростання, механізмів ринкового розподілу водних ресурсів, екологічного страхування та залучення міжнародних інвестиційних ресурсів для підтримки екологічних реформ.

Висновки. Реалізація запропонованого механізму сприятиме переходу від традиційних ресурсомістких моделей водокористування до екологічно відповідальних економічних відносин, посилить інтеграцію екологічних принципів у систему управління водними ресурсами, забезпечуючи гармонізацію економічних та екологічних інтересів. Його реалізація дозволить підвищити ефективність використання водних ресурсів, стимулювати підприємства до впровадження екологічних технологій, зміцнити інституційну підтримку екологізації та залучити додаткові фінансові ресурси для модернізації водної інфраструктури. Застосування економічних важелів, зокрема фінансових інструментів «зеленого» зростання, механізмів ринкового розподілу водних ресурсів та залучення міжнародної фінансової підтримки, сприятиме забезпеченню формування належних умов для екологічної трансформації водного сектора України.

Ключові слова: екологізація, економічні відносини, верифікація інфраструктури, водокористування, організаційно-економічний механізм, сталий розвиток, соціально-екологічна відповідальність, блакитна економіка, технологічна модернізація, ринковий розподіл.

Mahats N. Formation of an Organizational and Economic Mechanism for the Greening of Economic Relations in the Water Use Sector

Relevance of the study. In the context of modern environmental challenges, increasing requirements for rational environmental management, and the need to integrate environmental principles into the water use sector, the development of an effective organizational and economic mechanism for the greening of economic relations is of particular importance. The greening of water use is an important direction of the state policy of Ukraine in the context of adaptation to European standards of sustainable development, which involves introducing innovative technologies, increasing the environmental responsibility of business entities, and improving institutional support. In the war and post-war period, Ukraine will face large-scale challenges in restoring critical infrastructure, which requires the development of mechanisms that will contribute to the effective management of water resources and the ecological transformation of enterprises.

Aim and objectives of the study. The study aims to substantiate the theoretical and methodological foundations and develop an organizational and economic mechanism for greening economic relations in the water use sector in Ukraine. The main objectives include: identifying key structural elements of the mechanism, studying the institutional, economic, and technological aspects of its functioning, and substantiating instruments for regulating and stimulating greening in the water use sector in Ukraine.

Results. The essence of the concept of an organizational and economic mechanism for the greening of economic relations is determined as a set of organizational forms and economic levers aimed at integrating environmental principles into the practice of using water resources and ensuring the stimulation of environmental protection measures through improving the institutional basis, information and analytical support, technological modernization and financial and economic instruments to achieve the optimal balance between economic, environmental and social goals of water management development. It is determined that the institutional environment of water use in Ukraine requires harmonization with European environmental standards, which involves adapting the regulatory framework to the principles of the blue economy, institutional support for the formation of standards of social responsibility of business in the water sector and the implementation of water management restoration plans considering environmental principles into general projects of post-war economic recovery. The need for technological modernization aimed at the verification and reconstruction of water infrastructure by modern environmental standards, the development of closed cycles of water use, and blue-green infrastructure based on alternative sources of water supply is substantiated. The use of financial and economic levers is proposed financial instruments of "green" growth, mechanisms for market distribution of water resources, environmental insurance, and attraction of international investment resources to support environmental reforms.

Conclusions. The implementation of the proposed mechanism will facilitate the transition from traditional resource-intensive models of water use to environmentally responsible economic relations and strengthen the integration of environmental principles into the water resources management system, ensuring the harmonization of economic and environmental interests. Its implementation will allow us to increase the efficiency of water resources use, stimulate enterprises to implement environmental technologies, strengthen institutional support for greening, and attract additional financial resources for the modernization of water infrastructure. The use of economic levers, in particular financial instruments for "green" growth, mechanisms for market allocation of water resources, and the attraction of international financial support, will contribute to ensuring the formation of appropriate conditions for the ecological transformation of the water sector of Ukraine.

Keywords: greening, economic relations, infrastructure verification, water use, organizational and economic mechanism, sustainable development, social and environmental responsibility, blue economy, technological modernization, market distribution.

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