

## РАЦІОНАЛЬНЕ ПРИРОДОКОРИСТУВАННЯ І ОХОРОНА ПРИРОДИ

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### ISSUE OF TRANSFORMATION OF WATER USE IN UKRAINE

*Modernization of the management system of water use of Ukraine depends on an adequate analysis of the real situation, calibration of the influence of factors and risks, and especially a multi-faceted, comprehensive understanding of the interrelationships and interdependence of various components of the economy, ecology, law, economic activity, administration, which are united tangentially to the water sphere.*

*Only such an approach is capable of forming a vision of the necessary components of an effective water use policy and preparation of viable action algorithms.*

*In Ukraine, the processes of implementation of international and European standards in the field of ecology, monitoring procedures are ongoing, an agreed national model of water use is being formed, taking into account both ecological and economic principles; constructions of optimal management in the water sphere are being developed. The above aspects focus on achieving a balance between water needs and water conservation and protection.*

**Key words:** water policy, water use sectors, vulnerability, modernization.

**Introduction.** Most of the existing studies, literature and sources analyze individual components of water use. The multifaceted manifestation of the same factors in related industries complicates their assessment and forecasting. In addition, a significant number of parameters of different nature distances the research from a generalized vision of interdependence. In addition, the dynamics of changing parameters over time makes it impossible to characterize linear processes in the field of water use. Creating graphic models of the interdependence of phenomena and factors in the form of an ecosystem allows you to identify the vulnerability of the system, draw the sequence and order of making corrections.

**Literature review.** There are many studies of problematic topics related to water use in Ukraine. Water as an object of legal regulation of use and protection is considered by a team lead by O. Zigrii[8]. The effectiveness of state policy institutions in the field of water use was analyzed by I. Krylov[9]. Medical and hygienic aspects are described in the works of V. Prokopov, A. Mokienko, I. Kovalchuk.[6,7], environmental economic - M. Husiatynskyi, T. Chorna[10]. Tsaryk L.'s[19] works cover a wide range of geoecological and environmental issues. I. Sverlyuk, A. Vasylyuk .[13,14] study the issue of rational use of water resources, L. Grabovska [16] - ecological risks in the field of drinking water supply during water use, A. Yatsyk [11] researches water regulation in land use systems of Ukraine. O. Yarotska [5] deeply studies the issue of water capacity of GDP. S. Skok, V. Khilchevskyi [15,17] - the influence of use on the parameters of water

resources. The works of the team of the Hydrometeorological Institute of the State Emergency Service of Ukraine, in particular V. Osadchyi, N. Osadcha, N. Mostova[18], deserve attention.

**The purpose and objectives of the research.** The main goal of the study is to establish the factors influencing water use in Ukraine, the main threats and risks associated with the existing system of water resources administration, and the determination of the main points of priority efforts in the transformation of relations in the water issues. The task of the research is to substantiate and form a graphic visualization of a complete, comprehensive view of the relationship, cause and effect relationships of factors, environments, management practices, technological level, established water policy, culture of water use, regulatory field, actual state of water management, requirements of legislation, directions of modernization, process of implementation and synchronization of legislation, lines of correlation of parameters of water policy, sanitation, structure of the economy.

**The main material.** Climate change and the associated water crisis have become global challenges for all humankind. A number of countries have already experienced significant shortages of drinking water. According to UNICEF, more than 1.4 billion people, including 450 million children live in places with high vulnerability to water resources. In fact, every 5th child in the world has limited access to water. According to the UNESCO World Water Development Report, 4.3 billion people in the world do not have safe sanitation[1]. According to

experts, by 2030, 40% of the world's population will suffer from global water shortages.

Among the Global Sustainable Development Goals (SDGs), which were adopted at the UN summit in 2015, there is 6 goal - "Clean Water and Good Sanitation". It presents the task of ensuring the availability and rational use of water resources and sanitation for all[2].

Clean water, basic toilet needs and good hygiene are important for children's survival and development. Today, there are about 2.4 billion people who do not have access to basic sanitation and 663 million people who do not able to use improved water sources[3].

Of course, water supply is affected by natural conditions, precipitation. Countries in the world differ significantly in water resources. It is important to balance the consumption of water. Often, a country's water capabilities are affected by the actions of a neighboring country, such as hydropower or agriculture.

The main negative effects of water are related to climate change, but countries and businesses are able to make many changes nationally and globally, not only limiting emissions into the atmosphere. In the conditions of water deficit, the countries are forced to minimize losses and irrational use of water, change the structure of the agricultural sector, reduce water consumption of communal and industrial areas.

There is a great demand in the world for modern technologies, in particular - cleaning and reuse, the leaders of which are Israel and Singapore.

Ukraine as a whole is experiencing a water problem, as it has a low water potential. According to international standards, Ukraine belongs to the low-water countries (less than 1.1 thousand m<sup>3</sup> / year per person) and with uneven territorial distribution of water resources. The situation is complicated by the war. In Ukraine, 3.1 million people in the affected east need help with water, sanitation and hygiene, 14% of them are children (OCHA-HNO 2021). After the beginning of a new Russian invasion on February 24, 2022, this figure increased significantly[4].

Ukraine is characterized by excessive water consumption, a high level of water intensity of the GDP of the national economy, which is 2 times higher than the world level and more than 6 times higher than in developed European countries[5]. Ukraine mainly uses outdated energy-intensive technologies for drinking water purification, which do not ensure the removal of new man-made pollutants from it. Unfortunately, there are no estimates of economic losses and possible

economic effects from solving water problems in the real sector of the economy.

Beside problems with drinking water, about 20% of it (after water treatment) goes to production needs and another 15% is lost during transportation. More than half of these losses are in the housing and communal services sector. In some regions, water losses reach up to 60%, which affects the cost of centralized drinking water supply and tariffs for the population.

The water crisis could ruin Ukraine's agricultural prospects and cause water shortages in the next decade. Predictions about the need to develop models of water imports to certain regions of our country are becoming more and more probable.

Water resources should be considered strategic for Ukraine's development. Implementation of international requirements, raising standards of use and cleaning, improving monitoring and strengthening control over compliance with legal requirements should take their rightful place in the overall national security system of our country.

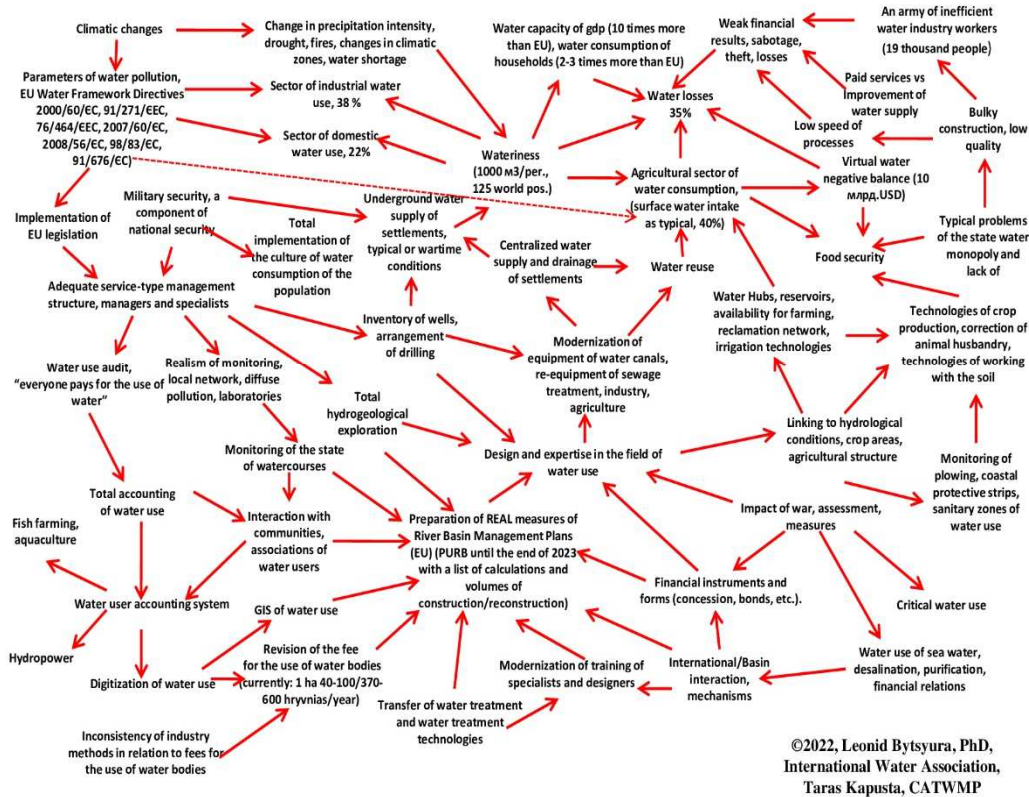
The key task in the development and implementation of an adequate water policy is an objective analysis of actual problems, risks and challenges, determination of the main points of application of transformational efforts in the sphere of water management in Ukraine, as well as a correct understanding of the factors of the external and internal environment, the impact of important changes in the administration of processes in water resources management, implementation of international norms and rules.

Studies show that among the factors of changes in water use parameters, the most specific weight is occupied by: climatic changes, and therefore changes in the intensity and dynamics of precipitation, drought, fires, changes in climatic zones, water deficit, which are manifested in the integrated indicator of water availability. The components of national security are directly dependent on the water potential: food and military security. Changes in regulatory parameters of water pollution (package of water directives 2000/60/EU, 91/271/EU, 76/464/EU, 2007/60/EU, 2008/56/EU, 98/83/EU, 91/676/EU) define technological approaches to design and implementation in the water sector. The main sectors of water use are: the industrial water use sector, the agricultural water consumption sector, the domestic water consumption sector, hydropower and fisheries. Among the proposals arising from the analysis, in particular, the vulnerability to military and terrorist actions - the

definition of surface water intake as typical for the agricultural sector, and underground - for the domestic water consumption sector. A block of

existing risks and vulnerabilities of water use has been formed: water capacity of GDP,

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water consumption of households, impact of war, extremely high indicators of virtual water import, features of the critical water use regime. Among the factors of institutional vulnerability of the water sector, the typical problems of the state water monopoly and lack of competition are identified: weak financial results, sabotage, theft, losses, irrationality of the actions of the "army" of inefficient water sector workers, a distorted understanding of the sector's priorities, low speed of processes, cumbersome structure, low quality, lack of proper accounting. As the model shows, administration is seen as the broadest sector of transformations. Among the priorities: the implementation of EU legislation, the construction of an adequate management structure of the service type, the involvement of motivated managers and specialists; carrying out a total audit of water use, implementing the principle of "everyone pays". The following require management attention: realism of monitoring, inventory of wells, arrangement of drilling; total hydrogeological exploration; monitoring the state of watercourses; international/Basin interaction, mechanisms; modernization of training of specialists and

designers; opportunities for transferring water treatment and water treatment technologies; revision of the fee for the use of water; preparation of real measures of river basin management plans with a list of calculations and volumes of construction/reconstruction; digitization of water use; inconsistency of industry methods in relation to fees for the use of water bodies; setting up interaction with communities, associations of water users; implementation of a transparent water user accounting system; GIS of water use; total accounting of water use; monitoring of plowing, coastal protective strips, sanitary zones of water use; transformation of design and expertise in the field of water use; introduction of new financial instruments and forms; water use of sea water, desalination measures; restructuring of financial relations. Among the technological solutions, attention is drawn to the following tasks: introduction of water reuse; modernization of water supply equipment, re-equipment of industrial and agricultural wastewater treatment; creation of water hubs; ensuring availability for farming; modernization of reclamation networks and irrigation technologies; water planning due to

changes in plant and animal husbandry technology; introduction of advanced technologies for working with soil

**Conclusions.** Ukraine's water policy is currently undergoing a serious transformation. The state undertook to improve the processes of water use and protection of water bodies. One of the key tasks is the creation of river basin management plans. However, practice shows that at the basic level only 5-10% of communities understand such tasks. The issue of ecology and water, unfortunately, is not a priority for the regions. Efforts should be aimed at building cooperation at different levels and building motivation for decision-makers.

**Basic level.** It is at this level that the main tasks of water protection and water use efficiency are implemented. Currently, 80% of communities need to create environmental development programs that include water issues. Accordingly, issues of strategic environmental assessment and environmental impact assessment of developed environmental projects arise. So now is a unique time to create a network of communities for water-based solutions.

**Regional level.** Water bodies require an integrated approach, it should be understood that river basins cover different communities and regions. Formation of the policy of careful water use, protection of water bodies is implemented at the level of regions through industry programs and efforts. Projects of spatial solutions, restoration of natural territories, proper condition of wetlands, sanctuaries and nature reserves are at this level.

**National level.** The main condition for the implementation of an effective water policy at the state level is the construction of a high-quality dialogue between relevant ministries and agencies, legislators and scientific experts. An example of joint efforts can be the Water Strategy of Ukraine,

which was not implemented due to internal contradictions in the industry.

Critically important directions at the national level:

1. Integration of issues of water policy and national security. Preparation of basic predictions for the development of possible situations related to water level changes.

2. Direction "War and water". Overcoming the vulnerability of critical water infrastructure. Support for crisis water use in affected areas. Implementation of war loss compensation scenarios.

3. Overcoming the crisis of the state water monopoly. Implementation of a new management structure, digitization and transparency.

4. Implementation block of EU requirements for water use. New state standards.

5. Possibilities of international structural and expert water interaction. Shared projects and resources.

6. Natural factors of water supply. Wetlands, nature protection measures, release of rivers.

7. Coordination of the water policy of the Ministry of Ecology and the Ministry of Agro-Industrial Complex. Determination of joint tasks, in particular in the creation of water supply reserves.

8. Total implementation of the economy of water use. Rethinking the growth points of the national economy. Taking into account changes in man-made load and use of water resources in connection with migration processes and the relocation of enterprises to the west of the country.

9. Linking the logic of river basin management and "green" reconstruction.

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**Анотація:**

**Леонід БИЦЮРА, Тарас КАПУСТА.** ДО ПРОБЛЕМ ТРАНСФОРМАЦІЇ ВОДОКОРИСТУВАННЯ В УКРАЇНІ.

При вирішенні питань модернізації системи управління сферою водокористування України важливе місце займає адекватний аналіз реального стану, калібрування впливу факторів та ризиків, і особливо – багатоаспектне, всебічне розуміння взаємозв'язків та взаємозалежності різних компонентів економіки, екології, права, господарської діяльності, адміністрування, які об'єднані дотичністю до водної сфери. Лише такий підхід здатний утворити бачення необхідних складових ефективної політики водокористування та підготовки життєздатних алгоритмів дій.

В Україні продовжується процес імплементації міжнародних та європейських норм в сфері екології, моніторингових процедур, формується узгоджена національна модель водокористування, з врахуванням як природоохоронних, так і господарських засад; розробляються конструкції оптимального управління у водній сфері. Згадані аспекти зосереджені на досягненні балансу між потребами у воді й її збереженні та охороні.

Наявні дослідження, література та джерела у своїй більшості подають аналіз окремих компонентів сфери водокористування. Багатоаспектність прояву одних і тих же чинників у пов'язаних галузях ускладнює їх оцінку та прогнозування. Крім того, значна кількість параметрів різної природи віддаляє дослідження від узагальненого бачення взаємозалежності. На додачу до цього, динамічність зміни параметрів у часі унеможливує лінійну характеристику процесів у сфері водокористування. Створення графічних моделей взаємозалежності явищ та чинників у вигляді екосистеми дозволяє виявити вразливість системи, скласти порядок і пріоритетність внесення коригувань.

Основною метою дослідження є встановлення факторів впливу на водокористування в Україні, основних загроз та ризиків, пов'язаних із наявною системою адміністрування водних ресурсів, визначення основних точок прикладення першочергових зусиль при трансформації відносин у водній сфері.

Завдання дослідження полягає у обґрунтуванні та формуванні графічної візуалізації повного, всебічного уявлення про взаємозв'язок, причинно-наслідкові зв'язки факторів, середовищ, управлінської практики, технологічного рівня, усталеної водної політики, культури водокористування, нормативного поля, фактичного стану управління водною сферою, вимог законодавства, напрямів модернізації, процесу імплементації та синхронізації законодавства, ліній кореляції параметрів водної політики, санітарії, структури економіки.

**Ключові слова:** водна політика, сектори водокористування, вразливість, модернізація.

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