

2. ЕКОЛОГІЯ

UDC 504.064.36:351.777

DOI <https://doi.org/10.32782/naturalspu/2025.2.10>

REGULATORY FRAMEWORK OF REGIONAL ENVIRONMENTAL MONITORING IN UKRAINE: CHALLENGES AND IMPROVEMENT PATHWAYS IN THE POST-WAR PERIOD

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This article analyzes the current state of the regulatory framework for creating regional environmental monitoring centers within the framework of developing the state environmental monitoring system in Ukraine. Key provisions of new legislative acts regulating the creation of regional environmental monitoring centers, the functioning of information systems, and the procedure for collecting and using environmental information are reviewed. The study identifies the main shortcomings of the legislative basis: ambiguity in defining the powers and responsibilities of authorities, a lack of funding mechanisms, a lack of standards and monitoring methods, unclear requirements for technical support, and the absence of clear criteria for evaluating the system's effectiveness. Other issues include limited public access to information, insufficient integration with international systems, and personnel and technical shortages (specialists, software, technical, and resource support for regional environmental monitoring centers). Directions for improving the regulatory framework for the functioning of regional environmental monitoring centers for effective environmental management are proposed. These include: a clear hierarchy and division of powers; defining specific tasks and areas of responsibility for each body; establishing stable funding sources; mandatory publication of monitoring results; national standards and monitoring methods that comply with international requirements to ensure data reliability and comparability; unified information exchange protocols to ensure compatibility and operational data transfer; standardized technical requirements for equipment and measurement methods; a system of indicators for regular monitoring effectiveness evaluation; and a set of protocols and management decisions to be activated at the regional level when certain conditions or level exceedances occur.

Key words: environmental monitoring, regional centers, environmental information, management, post-war recovery, legislative framework.

Белоконь Каріна, Пірогова Ірина, Мальований Мирослав, Джигирей Ірина. Нормативно-правова база регіонального моніторингу довкілля в Україні: виклики та шляхи вдосконалення у повоєнний період

У статті проаналізовано сучасний стан нормативно-правового забезпечення створення регіональних центрів моніторингу довкілля в рамках розбудови державної системи моніторингу довкілля в Україні. Розглянуто ключові положення нових законодавчих актів, що регламентують створення регіональних центрів моніторингу, функціонування інформаційних систем, порядок збору та використання екологічної інформації. Визначено основні недоліки законодавчої бази: нечіткість у визначенні повноважень та відповідальності органів, відсутність механізмів фінансування, стандартів та методик моніторингу, чітких вимог до технічного забезпечення, чітких критеріїв оцінки ефективності системи моніторингу, обмежений доступ громадськості до інформації, недостатня інтеграція з міжнародними системами, кадровий та технічний голод (спеціалісти, програмне, технічне та ресурсне забезпечення регіональних центрів моніторингу довкілля). Запропоновано напрями удосконалення нормативно-правової бази функціонування регіональних центрів моніторингу довкілля для ефективного екологічного управління: чітка ієрархія та розподіл повноважень; визначення конкретних завдань та сфери відповідальності кожного органу; визначення сталих джерел фінансування; обов'язок публікування результатів моніторингу; національні стандарти та методики моніторингу, які відповідатимуть міжнародним вимогам та забезпечать достовірність і порівнянність даних; єдині протоколи обміну інформацією з іншими інформаційними системами, сумісність та оперативність передачі інформації; стандартизовані технічні вимоги до обладнання та методів вимірювання; система показників для регулярної оцінки ефективності моніторингу; набір протоколів, управлінських рішень, які запускаються при настанні певних умов або перевищенні рівнів – для запровадження на регіональному рівні.

Ключові слова: моніторинг довкілля, регіональні центри, екологічна інформація, управління, повоєнне відновлення, законодавча база.

Introduction. One of the key components of the state's environmental and socio-economic security system is the system for monitoring, accounting for, and controlling the state of the natural environment and its natural resource potential. Amidst growing global threats caused by climate change, the increased probability of natural phenomena or disasters (such as floods and droughts), a growing scarcity of natural resources, the pollution of habitats for humans, animals, and plants, and the comprehensive and continuously progressing informatization of humanity, the issues of making optimal and prompt decisions in the field of environmental protection are gaining significant importance.

The basis for the creation and existence of the state environmental monitoring system is Article 50 of the Constitution of Ukraine, which guarantees everyone the right to free access to information about the state of the environment, as well as the right to disseminate it. The Law of Ukraine «On Environmental Protection» [1] provides for the creation of a state environmental monitoring system and for conducting observations of the state of the environment and its pollution levels. The performance of these functions is assigned to the Ministry of Environmental Protection and Natural Resources of Ukraine and other central executive bodies that are subjects of the state environmental monitoring system, as well as enterprises, institutions, and organizations whose activities lead or may lead to a deterioration of the state of the environment.

The main principles for the functioning of the state environmental monitoring system are defined in the Resolution of the Cabinet of Ministers of Ukraine dated 30.03.1998 No. 391 «On the Approval of the Regulation on the State Environmental Monitoring System» [2]. According to it, the state environmental monitoring system is a system for observing, collecting, processing, transmitting, storing, and analyzing information about the state of the environment, forecasting its changes, and developing scientifically-based recommendations for making decisions on preventing negative changes to the environment and complying with environmental safety requirements. The said Regula-

tion defines the procedure for the creation and functioning of the state environmental monitoring system in Ukraine, and assigns environmental objects to each of the monitoring subjects at the level of the state system's subsystems.

Currently, the state environmental monitoring system includes the following subsystems: monitoring in the field of atmospheric air protection; state water monitoring; land monitoring (land and soil monitoring); forest monitoring; monitoring of the plant world; monitoring of the animal world; background environmental monitoring (in territories of the nature reserve fund); monitoring of waste generation, storage, and disposal sites; monitoring of the impact of genetically modified organisms on the environment; monitoring of the impact of physical factors (temperature, noise, vibration, ionizing and non-ionizing radiation); background environmental monitoring in territories of the nature reserve fund [3].

Materials and methods. The purpose of the study was to analyze the current state of the regulatory framework for creating regional environmental monitoring centers as part of the development of the state environmental monitoring system in Ukraine. It also aimed to review the key provisions of new legislative acts that regulate the creation of regional environmental monitoring centers, the functioning of information systems, and the procedure for collecting and using environmental information. Additionally, the study sought to identify the main shortcomings of the legislative basis and propose directions for its improvement for effective environmental management.

In the course of the research, we used methods of searching, analysis, systematization, and generalization of the regulatory framework concerning the functioning of the environmental monitoring system in Ukraine.

The study was carried out under cooperation agreement No. 41-s of April 24, 2024, between Zaporizhzhia National University and the Department of Environmental Protection of the Zaporizhzhia Regional State Administration. It was also conducted as part of the work of the commission on state monitoring in the field of atmospheric air protec-

tion and air quality management in the Zaporizhzhia zone (Order No. 467 of August 24, 2023).

Results and Discussion. Environmental monitoring is a fundamental element of environmental policy that ensures the validity of management decisions in environmental protection. In the context of Ukraine's post-war recovery, the creation of a modern, effective, and integrated monitoring system that meets both national needs and international obligations becomes of particular importance [4].

Environmental monitoring is regarded as a system of observations of the state of the environment and its components, changes, and forecasts of situation development, as well as the study and analysis of dynamics occurring within it.

At present, the state environmental monitoring system focuses not only on observation and data preservation but also on modelling changes in component quality and forecasting situations – that is, on the active use of accumulated data volumes [5].

In general, the environmental monitoring system can be represented in a hierarchical information pyramid: «data–information–knowledge–wisdom». Each level of the pyramid adds specific properties to the previous one. At the base is the data level; the next level–information–adds context; knowledge is the level of «how», i.e., the mechanism for using the obtained data; finally, wisdom complements the pyramid with the level of «when», i.e., under what conditions the information will be used.

At the legislative level, the concept and organisational structure of the state environmental monitoring system are regulated by a number of relevant normative and legal acts. The key ones include:

1. Law of Ukraine No. 2973-IX of March 20, 2023 «On Amendments to Certain Legislative Acts of Ukraine Regarding the State System of Environmental Monitoring, Information on the State of the Environment (Environmental Information), and Information Support for Environmental Management» [6], which amends certain legislative acts concerning the state system of environmental monitoring and information support for environmental management. This Law shall enter into force six months after the cancellation or termination of martial law introduced by the Presidential Decree of February 24, 2022, No. 64/2022 «On the Introduction of Martial Law in Ukraine».

2. Resolution of the Cabinet of Ministers of Ukraine dated June 13, 2024, No. 684 approves the Procedure for the Implementation of State Environmental Monitoring [7].

3. Resolution of the Cabinet of Ministers of Ukraine of July 12, 2024, No. 815 «On information interaction between automated information systems of state authorities and the nationwide environmental automated information and an analytical system for ensuring management decision-making and access to environmental information and its network» [8], which regulates the procedure for information exchange.

4. Order of the Ministry of Environmental Protection and Natural Resources of Ukraine dated December 23, 2024, No. 1720 [9], which approves the Procedure for Establishing Regional Environmental Monitoring Centres.

Conceptually, the task of data collection and ensuring the functioning of the observation network is entrusted to regional environmental monitoring centres.

5. The Order of the Ministry of Environmental Protection and Natural Resources of Ukraine No. 230 of February 6, 2025 [10], which approves the model regulation on regional environmental monitoring centres. This document defines the basic principles of their activities, functions, structure, and subordination.

Key aspects of Order No. 230 include the establishment of regional environmental monitoring centres to systematically monitor, analyse, and assess the environmental conditions in the regions of Ukraine. These centres are designed to detect negative environmental changes promptly and to facilitate informed management decisions. Among their main functions are the collection and processing of environmental data, laboratory research, database creation, analytical reporting, and providing information to state authorities and local self-government bodies.

The centres can be established as separate legal entities or as structural subdivisions of existing institutions. They are subordinate to the Ministry of Environmental Protection and Natural Resources of Ukraine, or to the relevant regional state administrations.

The approval of this provision is an important step in building a national environmental monitoring system, which will contribute to strengthening environmental control and ensuring ecological safety in Ukraine.

At the same time, the future of the Concept of the State Targeted Environmental Program for Environmental Monitoring, approved by the Resolution of the Cabinet of Ministers of Ukraine No. 610-r of July 7, 2023 [11], remains uncertain. The Ministry of Environmental Protection and Natural Resources was designated as the customer of the Program, yet its development also depends on the termination or cancellation of martial law.

Despite progress and positive intentions, several key shortcomings and missing elements can be identified in all the above-mentioned documents, which may hinder the effective functioning of the environmental monitoring system. Despite progress and positive intentions, several key shortcomings and missing elements in the above documents may hinder the effective functioning of the environmental monitoring system [12]:

1. Lack of funding mechanisms: the documents do not identify stable funding sources for monitoring, which may lead to insufficient resources. It is noted that funding from the state budget is possible only if explicitly allocated, taking into account the peculiarities of post-war planning and financing. The risk lies in inconsistent prioritisation at the regional level.

2. Lack of monitoring standards and methodologies. There are no unified monitoring standards and methodologies, which may result in data inconsistency and incomparability. There is also an absence of forecasting methodologies and health/environmental impact assessment techniques.

3. Lack of clear technical requirements. The documents do not define specific standards and requirements used

for air quality monitoring, which may affect the accuracy and comparability of the data.

4. Lack of clear performance evaluation criteria: regulatory acts do not establish specific indicators and criteria for assessing the effectiveness and efficiency of the environmental monitoring system.

5. Limited public access to information. The law does not ensure full and timely public access to environmental information, which contradicts the principles of transparency and openness.

6. Insufficient integration with international systems. This limits the ability to exchange data and experiences. For example, a comprehensive air quality monitoring network operated in the Donetsk region until 2022, but its data were not transferred to the European system due to a lack of verification.

Therefore, the pressing unresolved issues regarding the functioning of the environmental monitoring system, as shown in Table 1, remain relevant.

The unresolved issues concerning the financing of the environmental monitoring system are presented in Table 2.

Therefore, proposals for improving the regulatory framework for the functioning of the environmental monitoring system in the post-war period are as follows:

1. Develop a clear hierarchy and distribution of powers among the bodies responsible for environmental monitoring to avoid conflicts and increase efficiency. This will ensure that funding for environmental monitoring is mandatory.

2. Create a financial model with mandatory budgeting. A targeted state program for environmental monitoring should become this model.

3. Develop unified technical standards, observation methodologies, and information exchange protocols that

will meet international requirements and ensure data reliability and comparability. Unified information exchange protocols are needed to integrate the national system into international information networks.

4. Mandate the publication of monitoring data in open access. Enshrine in law a provision for the mandatory publication of monitoring results in open access and create mechanisms to involve the public in the process of assessing the state of the environment.

5. Develop a system of indicators to evaluate monitoring effectiveness. A system of indicators is needed that will allow for the timely detection and elimination of shortcomings in the overall functioning of the monitoring system.

6. Ensure the conduct of applied scientific research to provide scientific support for the functioning and improvement of the monitoring system.

Conclusions. The effective functioning of the environmental monitoring system, especially at the regional level during the post-war period, requires substantial improvements to the regulatory framework and organisational mechanisms. To conduct state monitoring effectively at the regional level and achieve its desired results, it is necessary to develop legal acts that clearly regulate the hierarchy and delineation of powers between the bodies involved in environmental monitoring. This will help avoid duplication of functions, reduce the risks of inter-agency conflicts, and ensure guaranteed funding for monitoring activities.

Establishing a state target program as a financial model will ensure mandatory budget allocation for monitoring activities, increase their effectiveness, and ensure the continuity of information accumulation within the framework of state monitoring.

Table 1

Unregulated Aspects of the Environmental Monitoring System and Official Position of the Ministry of Environmental Protection (as of 2025)

Unregulated Issues	Position of the Ministry of Environmental Protection	As of 2025
Requirements for the structure, software and hardware complex, information security levels, etc.	The structure of the regional environmental monitoring center should be determined individually, depending on the needs of each specific regional environmental monitoring center. They will be approved by separate Cabinet of Ministers of Ukraine resolutions for each subsystem.	The current legal and regulatory acts (the Procedure for Creation, the Regulation) do not provide for regulation by separate Resolutions.
Requirements for the level of information security and the software and hardware complex against unauthorized access.	Information security requirements are stipulated by other legislative and regulatory acts, specifically the Resolution of the Cabinet of Ministers of Ukraine No. 373 dated March 29, 2006, «On the Approval of the Rules for Ensuring Information Security in Information, Electronic Communication, and Information and Communication Systems» (as amended).	The legal and regulatory act that specifies information security requirements is not cited.
The need for standardized software to process the data obtained, as well as corresponding analytical, predictive, mathematical, and statistical models, along with standardized data exchange protocols, and so on.	Procedures for ensuring the technological compatibility and information interaction between the automated information system (AIS) and the national environmental automated information and analytical system (for supporting management decision-making and providing access to environmental information and its network) will be approved by separate resolutions of the Cabinet of Ministers of Ukraine (CMU) for each subsystem.	There are no separate legal and regulatory acts for the subsystems

Table 2

Legal and Organisational Gaps in Funding Mechanisms for Regional Environmental Monitoring Centres

Unregulated Issues	Position of the Ministry of Environmental Protection	As of 2025
A regional environmental monitoring center can be established as a communal enterprise, which is subordinate, accountable, and controlled by the relevant regional council and, based on its sectoral focus, is under the authority of the environmental protection department of the regional state administration.	A regional environmental monitoring center is: - a structural unit for environmental protection issues of the regional state administration... - or an enterprise, institution, or organization that falls under the management of the Autonomous Republic of Crimea, the regional council, or the territorial community of the city of Kyiv...	Conducting environmental monitoring, carrying out analysis, and providing the necessary technical support and maintenance for automated monitoring systems will require organizational and financial support.
The Chairman of the regional, Kyiv, and Sevastopol city councils approves the organizational and logistical support, staffing table, and the budget of revenues and expenditures for the maintenance of the regional environmental monitoring center.	The clause states: «The work of the regional monitoring center is funded by state budget funds and other sources not prohibited by law».	Article 22 of the Law of Ukraine «On Environmental Protection» (in the wording of Law No. 2973) stipulates: «The financing of the state environmental monitoring system and its subsystems is carried out using funds from the state and local budgets, as well as other sources not prohibited by law».
The work of regional environmental monitoring centers should be funded by regional (local) budget funds, specifically from the regional environmental protection fund and other sources not prohibited by law.	Overall, it was excluded in order to take into account the remarks from the Ministry of Agrarian Policy and Food, the StateGeoCadastre, the Ministry of Finance, and the Association of District and Regional Councils.	The issue of funding remains unresolved.

A key area for improvement is the standardization of the technical and methodological framework for monitoring. The development of unified standards, methodologies, monitoring programs, and data exchange protocols, aligned with international requirements, will ensure the reliability of environmental information and the comparability and compatibility of data from all entities of state environmental monitoring. In turn, this data standardization will facilitate the integration of the national system into international information networks.

Furthermore, the improvement of the monitoring system requires the development of indicators to assess its effectiveness and the implementation of mechanisms for scientific support. Applied research will enable the development of new monitoring methods and technologies, identify problematic aspects promptly, and adapt the system to new challenges.

The combination of these measures ensures the creation of a holistic, transparent, and effective environmental monitoring system that can support the country's environmental recovery in the post-war period.

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Дата першого надходження рукопису до видання: 25.08.2025

Дата прийнятого до друку рукопису після рецензування: 26.09.2025

Дата публікації: 31.10.2025