

# Main Directions of Improving the Transboundary Water Resources Management with World Experience

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**Abstract:** *In the article on the basis of socio-ekologo-economic necessities and requirements of international normative acts argued necessity of general management transfrontal water resources. As a result of study of world experience basic directions are selected and stages of perfection of mechanisms of water control, placed on the scopes of the states. For creation of the systems and increase of efficiency of general management transfrontal water resources grounded necessity of presence of political readiness and desire of countries to the collaboration, perfection of legal and instituciynoy base, creation of organizational structures of joint management of transboundary water bases are grounded on the basis of integrated approach on the basin principle. It is recognized appropriate to develop and implement joint plans for water basin management, to participate in the management processes of stakeholder representatives, civil society and water users, to provide information on the management of transboundary water resources. The types of needs and basic principles of financial support for the activity of basin organizations as one of the necessary conditions for the functioning of the mechanism for managing transboundary water resources are investigated. A method for determining the share of States' contributions to a transboundary basin organization is proposed based on the application of the principle of proportionality according to the area of the basin within their territories, taking into account the coefficients of interests and opportunities.*

**Keywords:** transboundary water resources, management of transboundary water resources, improvement of management of transboundary water resources, financial support for basin organizations

## 1. Introduction

Water security issues and services provided by aquatic ecosystems within transboundary water basins have economic, environmental, social and cultural value. They have long been the subject of international attention. At the same time, deficiencies in the management of transboundary watercourses cause problems with the provision of water resources, which is constantly emphasized at meetings of the UN and its bodies, international conferences and meetings. In particular, there is an indication of the ineffective departmental approach to water management in many countries, and the formal cooperation of states in managing transboundary water resources. The increasing need for cooperation between water basin countries is driven by the increasing pressure on water resources as a result of global climate change. The above points to the crucial role of joint management of transboundary water resources and enhancing its effectiveness in meeting social, environmental and economic needs, establishing international cooperation of neighboring countries.

## 2. Literature Review

An analysis of the scientific literature on transboundary water management indicates that these processes are insufficiently studied. Scientists and researchers have focused on transboundary water management or on transboundary cooperation. The study and scientific substantiation of theoretical and methodological and practical principles and directions of increasing the efficiency of managing such resources have not been given due attention.

## 3. Methodology

On the basis of a systematic approach using the historical-logical method, analysis and generalization of the existing most successful interstate mechanisms for managing transboundary water resources, the main directions and steps necessary for the development of proposals for directions of improvement of mechanisms for managing transboundary water resources and financial support for the activities created for this organizational structure. Using abstract-logical conclusions, a method for determining the share of state contributions to a transboundary basin organization was developed.

## 4. Results and Discussion

The Water Strategy of Ukraine for the period up to 2025 states that transboundary problems are factors of formation of threats from manifestations of harmful effects of water, both natural and man-made. The single catchment area and the common borders on separate sections of rivers make the need for close cooperation between countries in the field of water management within the transboundary basins [1].

World experience in the formation and implementation of transboundary water management shows that countries are characterized by varying levels of adaptation of the national water management system to current international standards. However, only individual transboundary basins can be considered as being where the level of shared management satisfies the environmentally friendly use of water resources and the reproductive capacity of water. To maintain the EU Water Framework Directive 2000/60 / EC, the Convention for the Protection and Use of Transboundary Watercourses and International Lakes, and to improve the quality of the

aquatic environment, prevent, limit and reduce pollution of transboundary waters and the environment affected by such waters, ensuring the rational use of transboundary water resources, conservation and restoration of ecosystems must be a prerequisite for implementing management improvement measures. transboundary water resources [2, 3]. At the same time, we believe that the management of transboundary water resources should be based on achieving a balance of interests of all stakeholders, that is, meeting the needs of management structures and water consumers of all countries sharing the river basin.

According to the results of the analysis of the world experience of managing transboundary water basins, we have identified the following directions and stages of creation or improvement of mechanisms of water resources management located on the borders of states:

- Formation of political readiness and real desire of the countries of the transboundary water basin for cooperation;
- Strengthening and, in some cases, the establishment of an interstate legal and institutional framework;
- The creation of joint bodies and other organizational structures to coordinate the actions of coastal countries;
- Introduction and use in the management of transboundary water resources of a comprehensive integrated approach based on the basin principle;
- Development and implementation of joint plans / management of water basins;
- Ensuring that representatives of stakeholders, civil society and water users are involved in the management processes;
- Information support of processes of transboundary water management;
- Financial support for the activities of transboundary basin organizations.

The study of the conditions for effective joint management of transboundary water resources shows that the basic basis of this process is formed by the political readiness and willingness of the transboundary water countries to cooperate, which are based on two main ecological and economic elements: the presence of problems to be solved and / or the definition of mutually beneficial objectives. joint management of water resources. Thus, water conflicts can be a driving force for expanding cooperation between countries, as evidenced by the development of political relations and the development of effective mechanisms for managing transboundary water basins in the Middle East, Central and North Africa. At the same time, the study of motivational foundations shows that the more promising for shaping the political will of the states that are in the transboundary basin to improve water management processes, there is a common interest or benefit in using this natural resource.

These goals can be formulated both directly by transboundary water countries through research or project preparation in specific fields, and by international organizations. Examples of such world-wide projects that have fostered transboundary cooperation at the basin level are the development of navigation on the Rhine, research by the Spanish and Portuguese parties in the framework of the

Albufeira agreement on the protection and protection of wetlands and ecological interests in the river basin.

The favorable goals and motives of international cooperation in the field of transboundary water management also provide examples of economic, social and other benefits from effective management in other transboundary water basins. They can also catalyze the integration processes of joining existing treaties and joint management mechanisms on the basis of basic international legal acts of other basin states that are not equal members of such treaties. Examples of this are the formulation of cooperation objectives based on the EU Water Framework Directive of the non-EU countries of the Danube River, the intention to cooperate in China and Myanmar in the Mekong River Basin.

The willingness to cooperate, the motivation of its necessity, the definition of the principles of cooperation, in our opinion, must be the result of mutual trust, which, as Yu. Rysbekov notes, is a prerequisite for concluding agreements and establishing joint bodies [4].

Creating effective systems for joint management of transboundary water resources is only possible if the international legal and institutional framework is strengthened and, in some cases, created. Agreements on the use of international river basins should be an integral part of the water strategy of neighboring countries. The current methodology for creating organizational bases for the management of the TWRM, proposed by the Global Water Partnership, the International Network of Basin Organizations and other international environmental organizations, has already been tested and has positive results of the activities of joint management bodies in a number of international basins in Africa and Asia and includes a minimum of sufficient:

- Preparation of framework or interstate agreements;
- Creation of organizational structure of joint management of water resources of the basin;
- Data management for the assessment of the basin and implementation of relevant works in the future;
- Awareness raising activities [5].

We believe that such foundations can form the basis of creating new or improving existing bases for managing transboundary river basins.

A decisive element in the formation of transboundary water management mechanisms is the creation of joint bodies to coordinate the actions of coastal countries, both in implementing the regulatory provisions of joint management agreements and in resolving issues regarding international watercourses without formal procedures or in the absence of interstate agreements. Studies have shown that there are more than 20 different types of joint organs. However, their organizational structures have many common features and functions, of which coordination and management at the basin level, financing and implementation of projects are crucial. The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes provides for the establishment of bilateral or multilateral commissions or other organizational structures for cooperation between coastal countries [3].

Responsibilities of joint bodies may include both a specific transboundary water body (river basin) and all transboundary catchments between countries. For the vast majority of scientists and practitioners, the highest level of effectiveness of the management mechanism is recognized by basin organizations. By the nature of authority, three levels of such organizations are conditionally distinguished, in order of increasing their importance:

- 1) Purely informational powers related to the exchange of data and tasks, mainly technical and executive content.
- 2) Advisory powers, where the authority is an additional institution for States but is not endowed with any decision-making authority.
- 3) The decision-making power, which accordingly leads to a partial loss of state sovereignty in favor of the organization in the joint management of water resources.

International experience in water management shows that only a comprehensive integrated approach to these processes can serve as a basis for improving transboundary water management. The concept of integrated water management is enshrined in the Convention on the Protection and Use of Transboundary Watercourses and International Lakes and in the EU Water Framework Directive 2000/60 / EC as one of the main policy principles in the relevant field [2, 3].

One of the key elements of the operation of the transboundary water management mechanism is planning. Thus, Article 13 of the EU Water Framework Directive 2000/60 / EC provides for the preparation and adoption of a management / management plan for each international river basin for each international river basin, which would contain specific measures to achieve the objectives. International basin management plans should be reviewed every 6 years [2].

To meet the expectations of stakeholders in the effective management of transboundary water resources, information support is provided for these processes, including monitoring and sharing of information on the real state of water resources. assessment, prevention and notification of transboundary impact. Creating joint monitoring and assessment programs for transboundary waters is one of the main requirements of the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes [3].

These issues need to be given particular attention both at the stage of the creation of transboundary basin organizations and in the process of their activity. Analysis of studies by foreign scientists shows that in the initial stages of the mechanisms of transboundary water management, in order to identify important for monitoring and evaluation of bases, it is necessary to study the functions and types of use of river basin resources, assess their status, determine criteria, targets and assessment of water legislation of countries the pool. It is also advisable to analyze the information needs of partners.

Transboundary basin organizations play an important role in exchange mechanisms within civil society. In view of this peculiarity of the functions of these organizations, it is necessary to see the practice of modern effectively operating

basin management bodies necessary to participate in the management processes of representatives of stakeholders, civil society and water users. In particular, the Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters provides for public access to environmental information, early and ongoing participation in decision-making processes, the duty of the authorities to take into account public opinion [ 6].

Consultation is considered as one of the most effective forms of transparency, accountability and consideration of the interests of all parties when making decisions in the field of transboundary water management. In order to ensure the effective and long-lasting activity of a transboundary basin organization, it must have a stable and proper financing system. The sustainability of the financing system depends directly on covering most of its budget through guaranteed and regular sources. According to the results of the analysis of the practice of activity of transboundary basin organizations, the purpose, functions and financial needs of the basin, we have identified three main areas of financing:

- Operating expenses: payment of salaries to employees, payment for the use of premises, travel expenses, office expenses, financing of activities conducted by the organization (research, databases, seminars, training, etc.);
- Direct activities, including monitoring, planning, etc .;
- The needs of the operation of hydraulic structures and infrastructure, including research, maintenance and operation.

Based on the needs, based on the research of foreign scientists [5], we consider it possible to conditionally distinguish two main mechanisms of financing the management of transboundary water resources: internal and external (Table 1).

The principle of the Member States' contributions to the basin organization is considered to be the most simple and widespread, which is the annual contribution of each state to the budget of the basin organization. The size of the contributions, the timing of their provision, is usually determined by the basin agreement. Both the principle of equality and solidarity are applied, in which the richer state contributes a greater share. The principles based on the conditions of the river share, water intake, population, surface area of the basin, economic activity within the basin are also taken into account. The European Union is characterized by the determination of contributions in proportion to the area of the basin. However, the most logical and fair is the combination of several contributions, including river share, natural river runoff, economic activity within the basin, the level of country involvement in river basin management, and the principle of solidarity. However, using such a comprehensive approach to determining the contribution to a basin organization requires a number of studies in these countries. However, for the sake of objectivity, such studies should be conducted by uninterested specialists or experts.

Given the above, we propose, at the initial stages of the establishment and operation of a transboundary basin organization, to determine and record in agreement the



amounts of the annual contributions of the participating States, to apply the principle of proportionality to the surface area of the basin within their territories, taking into account interest rates and opportunities. Thus, given the environmental and economic conditions and geophysical properties of rivers, the real interest in using transboundary water resources in countries downstream is much higher than in the states that share the upper reaches of the river. In view of the above, it is proposed to use an interest factor ( $k_i$ ) in determining the amount of the annual contribution, which should be predicted in the range from 1.0 (typical for upper river countries) to 1.3 (for states located at the bottom of water bodies downstream which could potentially use this natural resource with greater economic and social benefits). Determining the size of such coefficients should be consensual, according to the agreement of the parties.

To some extent, a similar coefficient is proposed. In particular, the economic potential of using water resources along the entire length of the river is both potentially and virtually different. Therefore, we propose to consider such opportunities and to apply the coefficient of opportunity ( $k_m$ ) to determine the amount of the country's annual contribution to the basin cross-border organization. In this case, it is proposed to divide the river along its entire length into 100 km sections ( $i$ ). In areas that are wholly within national territories, the use of its resources rests solely with that country. In parts of cross-border areas, such opportunities are used by all countries that are relevant to the area. For simplicity of calculation, it is necessary to take parts of transboundary sections shared by only 2 transboundary basin states. To calculate the coefficient of opportunity of the  $j$ -th country is proposed by the formula:

$$k_{mj} = \frac{1}{n} \sum_{i=1}^n \left( 1 + 0.1i \left( \frac{L}{100} + \frac{L_{tr}}{200} \right) \right) \quad (1)$$

where  $i$  - is the ordinal number of the river section,  $L$  - is the length of the part of the river section within the exclusively national territory,  $L_{tr}$  - is the length of the part of the transboundary section of the river,  $n$  - is the number of sections of the river (divided conventionally by 100 km).

The percentage of the surface area of the basin ( $S_j$ ) within the national territory of each  $j$ -th country is then determined as a percentage. The following is determined by the adjusted magnitude of the fraction of this area ( $Q_j$ ) by multiplying by the coefficients of interest ( $k_{ij}$ ) and opportunities ( $k_{mj}$ ):

$$Q_j = k_{ij} k_{mj} S_j \quad (2)$$

The amount of annual contributions of the  $j$ -th state to the basin organization as a percentage will be calculated by the formula:

$$R_j = \frac{100 Q_j}{\sum_{j=1}^n Q_j} \quad (3)$$

where  $n$  - is the number of member states of the transboundary basin organization.

In cases where the methods of determining the amount of contributions are used, it will not be superfluous to fix the minimum annual contribution limit, as well as the conditions for applying penalties in case of non-payment or late payment of the established quota.

## 5. Conclusions and Recommendations

Summarizing, it appears that the most effective method of managing transboundary water resources at the present stage and the prospective way of coordinating their use, which will contribute to the achievement of maximum socio-economic well-being on an equitable basis, is integrated management with active cooperation of all coastal basins. Substantial results are only achieved when there is a strong political will to cooperate between states, confidence and solidarity are achieved. These processes facilitate a shared vision of the real or potential economic, social and other benefits of cooperation.

A clear legal basis for such governance at national and international levels is also a prerequisite. Pools should, where possible, be under the direction of functional transboundary basin organizations with clearly endowed powers, established funding mechanisms, developed mid- and long-term development and management plans. The Governments of the Basin countries should support and support the establishment and operation of such organizations. In such circumstances, the international community can ensure the efficient use, development and management of transboundary aquatic and associated natural resources, their reproduction and environmental safety.

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**Table 1:** Financing mechanisms for the management of transboundary water resources

Internal financing (within the pool)				External financing		
Contributions from Member States of the Basin Organization		Fiscal system	Fee for managing the pool organization	Fee for the sale of services	Public-private partnership	Contributions donors, loans, loans
Direct contribution to the budget in accordance with the principle of distribution parts of each country	Contribution through public Tax meeting	Based on principles "To pay user / pollutant "	Payment for provided services with management by the pool organization of projects	Payment for the service or product swimming pool organization	Financing infrastructure private sector	Based on projects, programs
Not directly related to using resources		Related to using water resources	In connection with activities, what is being done by the pool organization	Related activities swimming pool organization	Connected to the water basin infrastructure	