



EFFECTIVENESS OF LEGAL REFORMS IMPLEMENTED IN THE FIELD OF WATER RESOURCES MANAGEMENT DURING 2016- 2026

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Annotation : *The article analyzes the legal and institutional reforms implemented in the field of water resources management in the Republic of Uzbekistan during 2016–2026. It evaluates the outcomes of normative legal acts and institutional changes aimed at modernizing the water management system, digitalizing the sector, improving water use efficiency, and ensuring water security. Furthermore, the study identifies existing challenges such as climate change, water scarcity, transboundary water resource management, and shortcomings within the governance system, and proposes an original conceptual framework by the author for further sectoral development.*

Keywords: *Water resources, water management, legal reforms, institutional governance, water security, digitalization, water-saving technologies.*

Introduction. Global climate change, population growth, and the expansion of economic sectors are significantly increasing pressure on water resources. For Uzbekistan, located in the Central Asian region, effective water resource management is a key factor in ensuring national security and sustainable development. Therefore, since 2016, reforming the water management sector has become one of the priority directions of state policy in the country.

Research Methodology. The study employs methods such as system analysis, comparative legal analysis, the institutional approach, and the generalization of statistical data. Decrees and resolutions of the President of the Republic of Uzbekistan, sectoral strategies, and materials from international organizations constitute the source base of the research.

Main Part. Starting from 2017, large-scale reforms aimed at forming new legal mechanisms in the field of water resources management have been implemented. In particular, new approaches have been introduced regarding the formation of water balance, the digitalization of water accounting and monitoring, ensuring water security, and the rational use of water resources [1].

The Concept for the Development of the Water Management Sector of the Republic of Uzbekistan, adopted on July 10, 2020, defined the strategic framework for reforms in the sector. The Concept outlines tasks such as improving the efficiency of irrigation systems, widely introducing water-saving technologies, creating a digital water accounting system, and developing public-private partnership mechanisms by 2030 [2].

Additionally, within the framework of this Concept, the task of developing a national Water Code was also set. This served to systematize the norms regulating water relations within a unified legal document [3].

The period of 2016–2026 can be characterized as a stage of fundamental improvement of the water resources management system in Uzbekistan, digitalization of the sector, and alignment with international standards. During this period, the legal and institutional foundations of water management were updated, and comprehensive

measures were implemented to ensure rational use of water resources, introduce water-saving technologies, and strengthen water security. In particular, the activities of authorized bodies were reorganized in areas such as water resource accounting, maintaining a unified water balance, forming the state water cadastre, and introducing digital monitoring systems [4].

In accordance with the Presidential Decree adopted in 2024, the Ministry of Water Resources was designated as the main state body responsible for maintaining the unified water balance and the state water cadastre. At the same time, ensuring water security, managing transboundary water resources, the widespread introduction of digital technologies, and the development of market mechanisms were identified as priority tasks [5].

The core essence of these reforms is reflected in the model of “integrated, digitalized, and sustainable water governance.” This model is based on the harmonization of legal mechanisms, institutional reforms, innovative technologies, and public participation.

Analysis shows that over the past decade, a number of positive results have been achieved in the field of water resources management, including:

- the organizational structure of water management has been improved;
- the regulatory and legal framework governing water use relations has been expanded;
- digital mechanisms for water accounting and monitoring have been introduced;

- the use of water-saving technologies, such as drip and sprinkler irrigation, has significantly increased;
- the role of water consumer associations has been strengthened;
- new forms of regional cooperation in the management of transboundary water resources have been developed.

As a result, the efficiency of water use in agriculture has increased, the technical condition of irrigation systems has improved, and the stability of water supply has been ensured to a certain extent.

Existing Problems. At the same time, a number of systemic issues requiring resolution remain in the sector:

First, under the influence of climate change, the volume of the country's water resources is decreasing. According to official data, water scarcity is intensifying year by year, while the demand for water across economic sectors continues to grow [6].

Second, a certain part of the irrigation infrastructure is physically and morally outdated, resulting in high levels of water loss.

Third, there are cases where the distribution of powers among state bodies, local authorities, and water consumers in water resource management is not clearly defined.

Fourth, due to the incomplete digitalization of the water accounting system, there are difficulties in forming an accurate database.

Fifth, the level of implementation of economic mechanisms and market principles in water use remains insufficient.

Additionally, a significant portion of the country's water resources comes from transboundary rivers, which creates a situation directly dependent on the effectiveness of regional cooperation.

Based on the above, it is considered appropriate to implement the following strategic tasks in the future:

Full implementation of the Integrated Water Resources Management (IWRM) system. It is necessary to further develop the management of water resources based on the basin principle and ensure the participation of all stakeholders. This represents a process of coordinated use of water, land, and related resources aimed at maximizing economic and social welfare without compromising ecosystem sustainability.

The main elements of this model include:

- creation of a unified national water data platform;
- introduction of water resource forecasting systems based on artificial intelligence;
- strengthening cooperation between the state, private sector, and civil society;
- improvement of economic mechanisms for water use;
- legal consolidation of climate change adaptation measures;
- development of transboundary water diplomacy.

This concept makes it possible to ensure water security, increase the efficiency of resource use, and achieve sustainable development goals.

Transition to the “Smart Water Management” model. The widespread use of artificial intelligence (AI), geographic information systems (GIS), IoT sensors, and digital platforms enhances the accuracy of water accounting and improves the quality of decision-making. This model represents a process of digital transformation aimed at real-time (online) monitoring of water resources, precise calculations without human interference, and minimizing water losses [7]. These technologies

perform the function of a “transparent eye and intelligent brain” in the water management system.

As a result, water losses can be reduced by up to 30–50% [8], the time required for water delivery is significantly shortened, and the targeted use of public funds is ensured. In recent years, special attention has been paid at the level of state policy to the digitalization of the water resources management sector in the country. During a videoconference meeting held on November 7, 2024, the President emphasized that digitalization is the only effective way to achieve radical transformation in the water management sector [9].

The “Digital Uzbekistan – 2030” Strategy, the Concept for the Development of the Water Management Sector of the Republic of Uzbekistan for 2020–2030, and other regulatory and legal documents aimed at accelerating digitalization processes in the sector define the main directions of current reforms.

Conclusion. In conclusion, digital transformation in the water management sector is not only a technological modernization but also an essential guarantee for ensuring the country’s water security, sustainable development, and the preservation of water resources for future generations.

Improvement of economic mechanisms of water use. It is necessary to introduce tariff policies and economic instruments that encourage water conservation. This approach aims to shape the perception of water not as a free good, but as a limited economic resource (commodity), to economically penalize wastefulness, and to financially incentivize efficient use.

Improving economic mechanisms of water use involves the introduction of a payment system based on the actual volume of water consumed (per cubic meter) for water supply services, as well as providing financial incentives to farmers and хозяйства not merely for installing water-saving technologies, but for achieving measurable results in water conservation [10].

Strengthening climate change adaptation measures.

It is necessary to modernize water reservoirs, expand the use of recycled water, and improve mechanisms for water redistribution. These measures include the introduction of resource-saving technologies to reduce water scarcity, drought, and natural disaster risks, the expansion of green areas, and ensuring population safety in high-risk zones [11].

Development of human capacity and scientific research.

Training highly qualified specialists in modern water management and implementing scientific innovations into practice are of great importance. The development of human capacity and scientific research in the water management sector is the foundation for the rational use of water resources and the widespread introduction of water-saving technologies. Particular attention is being paid to strengthening the integration of science and practice in the sector, as well as to modernizing the system for training engineering personnel [12].

The period of 2016–2026 became a time of deep transformation in Uzbekistan's water management sector. During this stage, the legal foundations of water resources management were improved, institutional structures were reorganized, digital management mechanisms were introduced, and state programs aimed at increasing the efficiency of water use were adopted. In particular, the Concept for

the Development of the Water Management Sector for 2020–2030, adopted in 2020, defined the strategic directions of reforms in the sector.

In the past decade, special attention has been given to improving the regulatory and legal framework for water resource management. By Presidential Decree No. PF–6024, the Concept for the Development of the Water Management Sector was adopted, outlining tasks such as the efficient use of water resources, the introduction of market mechanisms, the широкое use of digital technologies, and ensuring water security. The Concept has served as a unified strategic document aimed at providing sustainable water supply for all sectors of the national economy.

As an important result of legal reforms, new mechanisms for accounting, monitoring, and controlling water use have been established. This has contributed to increasing transparency and accountability in water resource management.

In 2024–2025, tasks were set to establish a unified digital platform for water resource management, automate hydroposts, and implement electronic water accounting systems. Between 2020 and 2024, 60 trillion soums of budget funds and 622 million US dollars of foreign investment were allocated for the introduction of water-saving technologies. As a result, while in 2020 the share of irrigated land using water-saving technologies accounted for 4% of total irrigated areas, by 2025 this figure reached 50% [13].

Legal foundations have been created to increase the efficiency of irrigation systems from 0.63 to 0.73, reduce the area of lands with low water supply, introduce automated water accounting systems, and implement digital management of water facilities [14].

The legal and institutional reforms carried out during 2016-2026 have created a solid foundation for the formation of a new paradigm of water resources management. However, factors such as water scarcity, climate change, and inefficient use of resources require further improvement of the sector. Therefore, the main direction of future development should be the formation of a sustainable management model focused on digitalization, integrated management, strengthening economic mechanisms, and ensuring water security. This, in turn, will contribute to increasing the effectiveness of national water policy and ensuring the country's long-term environmental and economic sustainability.

The improvement of the regulatory and legal framework, the reorganization of the management system, the introduction of digitalization, and the implementation of water-saving technologies have led to positive changes in the sector.

However, issues such as water scarcity, climate change, transboundary water relations, and the deterioration of infrastructure require further deepening of reforms in the sector. From this perspective, an integrated digital water management model can serve as the theoretical and practical basis for the next stage of reforms.

Nevertheless, as a result of the implemented reforms, the scale of introducing water-saving technologies has significantly expanded. While in 2020 such technologies were applied on approximately 4% of irrigated lands, by 2025 this figure had reached 50% [15].

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