

# A New Stage in Water Management: Uzbekistan's Experience

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**Abstract:** This article analyzes the institutional reforms implemented in the water management system of the Republic of Uzbekistan in the post-independence period, their legal foundations, governance mechanisms, and effectiveness. The achievements and existing challenges are examined on the example of the Kashkadarya oasis. The research results show that the basin-based approach, the system of water consumers' associations (WCAs), digitalization processes, and the introduction of economic mechanisms have played a significant role in water resources management. In addition, by comparing the water management models of Australia, Turkey, Israel, and the European Union, the directions for applying international experience in Uzbekistan are explored. Existing problems in the system are identified, and proposals for their elimination are put forward.

**Keywords:** Water management, institutional reforms, basin management, water consumers' associations (WCAs), water resources, irrigation, land reclamation, digitalization, water security, international experience.

**Introduction:** After the Republic of Uzbekistan gained independence, fundamental reforms were implemented in all sectors of the economy. The water management system was no exception to these processes. During the Soviet era, water resources management was carried out on the basis of a centralized system, and regional needs were not adequately taken into account (Karimov, 2011). As a result, in the early years of independence, problems such as the deterioration of irrigation and reclamation infrastructure, high water losses, and low efficiency of water use emerged. According to Sidorov (2021), by 1989, crisis phenomena had intensified in the Soviet economy.

These problems had a significant negative impact on agricultural production, especially in arid regions such as the Kashkadarya oasis (Materials from Amu-Kashkadarya Basin Administration). Therefore, fundamentally reforming the water resources management system and creating its legal and institutional foundations became a priority of state policy (Mirziyoyev, 2022).

The main purpose of this study is to comprehensively

analyze the institutional reforms in the water management system of Uzbekistan, assess their effectiveness, and compare them with international experience.

The following scientific methods were used in this study:

Historical-analytical method – used to study the post-independence evolution of the water management system (Xoliqulova, 2020; Topildiyev, 2011);

Comparative analysis method – compared the management systems of the Soviet period and the post-independence period, as well as international models (Australia, Turkey, Israel);

Statistical analysis – assessed water use efficiency, losses, and financial indicators;

Institutional approach – analyzed structural changes in the management system (Bazarov, 2005; Raxmatullayev, 2008);

Systemic approach – examined the water management system as a complex socio-economic system.

The following sources served as the basis for the research:

Regulatory legal documents: Law of the Republic of Uzbekistan "On Water and Water Use" (1993), new Water Code (2023), Presidential decrees (PQ-5742, 2019; PF-5853, 2019), resolutions of the Cabinet of Ministers (No. 195 of July 20, 1991; No. 47 of February 5, 1992; resolution of December 12, 2003; No. 982 of December 11, 2019);

State programs: Concept for the development of water management for 2020-2030;

Statistical data: ICWC data, reports of the Ministry of Water Management;

Scientific sources: local and international studies (Migranyan, Khasanova et al., 2025; Yusupov, 2022);

Practical materials: Materials from Amu-Kashkadarya Basin Administration.

Stage 1 (1991-1995): The centralized system inherited from the Soviet era was preserved. In 1991, the Water Management Committee was established, followed by management under the Ministry of Agriculture and Water Management. On July 20, 1991, the Institute of Water Problems of the Academy of Sciences of the Uzbek SSR was established (Resolution No. 195). In 1993, the Law "On Water and Water Use" was adopted.

Stage 2 (1996-2002): Water Consumers' Associations (WCAs) began to be established. The first WCAs were introduced as an experiment in the Fergana Valley in 1996 based on an agreement between the Central Asian Irrigation Research Institute (SANIIRI) and governments.

Stage 3 (2003-2018): On December 12, 2003, the Ministry of Agriculture and Water Management was reorganized, and an independent Ministry of Water Management was established. The same year, the Amu-Kashkadarya Irrigation Systems Basin Administration was established in the Kashkadarya oasis. In 2005, more than 1,500 WCAs were operating. Water fees were introduced from 2010.

Stage 4 (2019-2024): On June 17, 2019, management system was optimized by Decree No. PQ-5742. Installation of water meters became mandatory from 2020. The new Water Code came into force in 2023.

Currently, 5 basin water administrations operate in Uzbekistan. Basin management made it possible to distribute water resources in accordance with regional characteristics. In the Kashkadarya oasis, water distribution efficiency increased through the Amu-Kashkadarya Basin Administration.

The number of WCAs exceeded 1,500 in 2005, and by 2023 their number exceeded 1,850. However, as noted in Resolution No. 982 of December 11, 2019, there are serious systemic shortcomings in the activities of WCAs: association activities are not organized

proportionally to their assigned tasks; executive bodies are not provided with qualified managers and specialists; contractual relations with water consumers have not been established at the required level.

By Resolution No. 47 of February 5, 1992, the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers (TIAME) was preserved as a single educational-scientific-production complex including the main institute and the Karshi branch. Since 2017, the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers (TIAME) with the status of "National Research University" expanded the training of masters and bachelors in the fields of water management engineering, water resources management, and GIS technologies.

Between 2018 and 2024, a "Unified Geographic Information System" (GIS) was launched and 67 hydrometric posts were automated.

The "Uzsuvloyiha" Institute was reorganized and switched to BIM technologies in the development of design and estimate documentation.

In 2022-2024, annual funding for the water management system averaged 2.5-3.0 trillion soums (approximately 1.5 percent of the republic's budget).

Water productivity (kg/m<sup>3</sup>): 2000 - 0.45, 2023 - 0.78, Change - plus 73 percent.

Water losses in main canals: 2000 - 35-40 percent, 2023 - 20-25 percent, Change - minus 15-15 percent.

Water meter coverage: 2000 - 5 percent, 2023 - 62 percent, Change - plus 57 percent.

The following international models are being used in water management reforms in Uzbekistan:

Australia (Murray-Darling Basin): Basin management, market mechanisms for water rights. Implementation in Uzbekistan: Water license trading introduced since 2010s; automated gates with Rubicon Water.

Turkey: Water consumers' unions, PPP models. Implementation in Uzbekistan: Water Supply and Sewerage PPP projects being implemented.

Israel: Drip irrigation, water-saving technologies, water recycling. Implementation in Uzbekistan: Uzsuvloyiha implementing joint projects with Israeli companies.

European Union (WFD): Integrated basin management, public participation. Implementation in Uzbekistan: Gradually being introduced into water legislation.

The research results show that Uzbekistan's water management system has transitioned from the Soviet-era centralized model to a basin-based, partially decentralized, participatory, and digitalized management model. According to Raxmatullayev (2008), the basin principle is important in water

resources management in Central Asia.

Main institutional achievements:

First, introduction of the basin principle of water resources management and establishment of 5 basin administrations;

Second, development of the Water Consumers' Associations (WCAs) system;

Third, improvement of economic and legal regulation mechanisms for water use (water fees, licenses);

Fourth, strengthening of institutional dialogue in transboundary water relations;

Fifth, introduction of advanced technologies and management models based on international experience (Australia, Turkey, Israel, EU).

As noted by Yusupov (2022), improving land use management in rural settlements is an important factor in increasing the efficiency of water management.

Source analysis and practical observations indicate that a number of systemic problems remain:

First, economically unjustified water tariffs: cover only 40-50 percent of actual costs, which reduces incentives for water conservation (Bazarov, 2005).

Second, financial weakness of WCAs: membership fees and state subsidies are the main sources of income; their debt exceeded 130 billion soums in 2023. The problems noted in Resolution No. 982 of December 11, 2019 (lack of qualified personnel, low level of contractual relations) have not yet been fully resolved.

Third, outdated hydraulic structures: more than 35 percent of pumping stations have been in operation for over 40 years, with energy consumption above standard.

Fourth, institutional divisions: some functions between the Ministry of Water Management and the Ministry of Agriculture (for example, land reclamation status) have not been fully separated.

Fifth, transboundary water problems: According to Migranyan, 70-80 percent of water resources are formed in neighboring countries (Kyrgyzstan, Tajikistan). Climate change and neighbors' hydropower policies directly affect water flow.

Although the implemented reforms helped improve the national economy, shortcomings in the large-scale measures implemented in agriculture in 1996 became clearly evident. According to Xoliqulova (2020), historical processes have shown that the development of the national economy primarily involves creating a generation of worthy specialists in the republic.

Khasanova et al. (2025) argue that it is necessary to comprehensively consider problems, factors, and

modern approaches in restoring ecological balance.

Uzbekistan's water management system has significantly changed during the independence years: it has transitioned from a centralized departmental system to a basin-based, partially decentralized, participatory, and digitalized management model.

A strong legal framework has been created (Water Code, laws, strategies);

Water meter coverage increased from 5 percent to 62 percent;

Water losses decreased from 35-40 percent to 20-25 percent;

Water productivity increased from 0.45 kg/m<sup>3</sup> to 0.78 kg/m<sup>3</sup>;

Advanced technologies based on international experience (Australia, Turkey, Israel) are being introduced.

Economically unjustified water tariffs;

Financial weakness and debts of WCAs;

Outdated infrastructure;

Incomplete separation of interagency functions;

Transboundary disagreements.

The following measures are advisable for the future:

First, improving economic mechanisms: Gradually raise water tariffs to an economically justified level, review subsidies in a targeted manner.

Second, strengthening financial independence of WCAs: Create additional sources of income for WCAs, increase their management capacity, eliminate the shortcomings noted in Resolution No. 982 of 2019.

Third, infrastructure modernization: Automate all hydrometric posts, re-equip pumping stations with energy-efficient technologies.

Fourth, expanding digitalization: Implement the "Unified GIS" system in all regions, fully apply BIM technologies in design processes.

Fifth, deepening international cooperation: Conclude binding international agreements with neighboring countries on water-energy issues, widely implement the principles of the EU Water Framework Directive, Australia's Murray-Darling Basin experience, and Israel's water-saving technologies.

Sixth, developing the personnel training system: Develop modern curricula in water management engineering, GIS technologies, and water resources management at TIAME, establish joint educational programs with foreign universities.

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