



HISTORICAL ROOTS OF WATER RESOURCES AND TRANSBOUNDARY POLITICS IN CENTRAL ASIA

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Abstract: This article provides a scientific analysis of the historical roots of water resources use and transboundary policy in Central Asia. The period covered is from the irrigation systems of the ancient Bactrian, Khorezmian, and Sogdian civilizations to the centralized water management system of the Soviet era. The article examines the distribution of water in the Amu Darya and Syr Darya basins, its social, economic, and political consequences, as well as the trends of conflict and cooperation in water policy after independence. The study analyzes historical sources, contemporary political documents, and evaluates historical experiences of sustainable water resource use.

Keywords: Central Asia, water policy, transboundary cooperation, Amu Darya, Syr Darya, historical roots, regional policy.

**Introduction:**

Water has been one of the main factors shaping the development, state systems, and economic life of Central Asian civilizations. Agriculture, organized through ancient irrigation systems, laid the foundation for the emergence of the first urban culture in the region. Even today, water resources are a key geopolitical factor determining political, economic, and environmental relations between the countries of Central Asia. Therefore, studying the historical roots of the system of water resource use and management is of great importance in understanding today's transboundary problems.

Today, Central Asian countries are developing new approaches to water resource management by analyzing their historical experience, in particular, ancient irrigation systems and hydropolitical models of the Soviet era. Water distribution issues in the region are seen as a key indicator of not only economic, but also political stability and environmental security. The issue of water resources has become one of the strategic directions of interstate relations in Central Asia, and its solution requires a deep analysis of historical, legal, and institutional factors.

From this point of view, the main goal of this article is to scientifically analyze the evolution of the water management system in Central Asia, its historical sources and its reflection in modern transboundary politics.

Literature analysis and research methods:

Scientific research on water resources and transboundary politics in Central Asia has been actively conducted since the second half of the 20th century. In this direction, scientists such as P. Miklin, V. Dukhovny, J. Sehring, I. Abdullaev have deeply analyzed the problems of the Aral Sea basin and water distribution. The main attention in their works is paid to the centralized water policy of the Soviet era and its environmental consequences [1].

The water relations of the Central Asian states after independence are widely covered in the studies of M. Spur and S. Rahmatullaev [2]. In these scientific sources, an important place is occupied by the geopolitical importance of water resources, their impact on regional stability, and their analysis from the point of view of international law. At the same time, analytical reports of the UN, IFAS and CAREC organizations on the formation of water diplomacy in Central Asia served as a source of practical information [3]. The article analyzes these scientific sources and, based on them, reveals the coherence of historical processes and their relevance to current problems. The methods of source research, historical comparative analysis and content analysis were used in the research process. The method of source research studied ancient irrigation systems, archival documents and historical maps. The method of comparative analysis revealed differences between water policy in the Soviet period and after independence. The method of content analysis analyzed the content of international agreements, political statements and scientific reports. The study also combined ecological and geopolitical approaches, achieving a comprehensive study of the history of water resources. The author of the article explained historical reality not only through chronological, but also through systematic analysis.

As a result of scientific analysis, it was substantiated that the issue of water resources is closely related not only to natural, but also to political and cultural factors.

Thus, this study aims to analyze previously existing scientific developments, enrich them with new data, and implement an integrative approach to historical processes.

Results:

The Central Asian region is considered the cradle of irrigation civilizations. In ancient times, through the rational use of the Amu Darya and Syr Darya basins, agriculture and urban culture emerged. According to archaeological data, irrigation systems were formed in the



territories of Bactria, Khorezm and Sogd in the 2nd millennium BC. The first information about this process is found in Herodotus's "History" and Strabo's "Geography". They wrote about the ancient canals in the Khorezm oasis, the agricultural system and the distribution of water through rivers. Also, the research of archaeologists Y. Gulyamov and M. Masson scientifically studied the ancient irrigation networks of the Amu Darya delta and Khorezm [4].

In ancient Bactria and Sogd, irrigation systems were formed as the main element of state governance. For example, in the cities of Poikend, Afrosiyab, and Toprakkalā, special administrative positions - "mirabs" - were in charge of distributing water. They not only organized irrigation works, but were also responsible for distributing water on the basis of social justice.

According to sources, the construction and repair of water structures in Khorezm was carried out at the expense of the state budget, which indicates the advanced level of the state system [4].

In the 8th-12th centuries, that is, during the heyday of Islamic civilization, water management in Central Asia became a scientifically based system. Scientists such as Al-Khwarizmi, Ahmad al-Farghani, Aburaykhan Beruni put irrigation on a scientific basis through their discoveries in the fields of hydrology, geodesy, and astronomy. For example, Ahmad al-Farghani's work "The Book on the Movement of Bodies and the Science of the Stars in the Sky" contains information on methods for calculating water levels in irrigation.

In his works "Mineralogy" and "India", Beruni provides valuable information on the physical properties of water, energy consumption in transporting water through underground pipes, and methods for calculating river flows.

During the Timurid period (14th–15th centuries), irrigation systems were further improved. Engineering solutions were at a high level in the construction of canals around Samarkand, Shakhrisabz, and Herat. The Timurid sultans considered water a symbol of state power and justice. For example, in Amir Timur's work "Tuzuklar," the principle of justice in water distribution was emphasized.

In the 17th–19th centuries, during the reign of the Bukhara, Khiva, and Kokand khanates, water management was carried out on the basis of a local "mirabchilik system." In this system, traditional legal norms ("customary law") and Islamic laws ("sharia") were combined in water distribution. Specially responsible persons - mirabbashis - were appointed to supervise water facilities, and their activities were supervised by councils consisting of judges and local residents.

At the end of the 19th century, the Russian Empire began to reform the irrigation systems in Central Asia. During this period, Russian engineers rebuilt the Yangi Margilan, Kyzyltepa, and Zarafshan canals. At the same time, centralized administrative management clashed with local traditions in water distribution. This process later served as the basis for water policy in the Soviet era [5].

Historical sources show that water management in Central Asia was not only an economic or engineering issue, but also an integral part of the socio-political system. Irrigation systems served as the main factor ensuring the economic power of the state, since through water distribution, the use of land resources and the labor activity of the population were fully controlled. Control over water resources determined the legitimacy and degree of centralization of power, which was considered the main indicator of state stability.

The construction of water structures and the effectiveness of irrigation systems were linked to the political influence of the ruler, and the construction of large canals, ditches, or dams was often perceived as a political symbol that enhanced the ruler's prestige. For example,



At the same time, the observance of the principles of social justice in the process of water distribution strengthened the population's trust in the state. Injustices in water distribution often caused social discontent and local conflicts. The institution of mirab and mirabbashi played an important role in maintaining this balance. They were not only technical specialists, but also acted as intermediaries between the local community and the state.

Irrigation systems were not only the basis of agricultural development, but also a guarantee of the stability of power. The state ensured political territorial integrity by controlling water resources, since each river or canal was of strategic importance. Therefore, water management had not only economic but also ideological significance, it was considered an expression of the idea of statehood.

After the establishment of Soviet power in 1917, the water management system in Central Asia changed radically. The new regime designated water as state property and introduced a system of its distribution based on a centralized plan [6].

In the 1920s and 1930s, the Soviet government identified cotton as a strategic resource and directed its entire irrigation policy in this direction. During this period, water distribution was managed through the Main Irrigation Committee (Glavvodkhoz) in Moscow, and the Central Asian republics were subordinate to it [7].

In 1939, it was planned to build large-scale hydroelectric facilities covering the Amu Darya and Syr Darya basins. As a result, new irrigation areas were developed - the Fergana Valley, Mirzachul, and Karakalpakstan [8].

Among the main structures built during the Soviet era were the Kairakkum reservoir (1959), the Tugankul reservoir (1965), and the Karakul canals. They played an important role in providing water to cotton-growing regions, but this process led to a disruption of the natural water balance [9].

In the area of water distribution, strict quotas were introduced among the Central Asian republics, which were regulated by the General Water Distribution Scheme of the 1980s [10]. Under this system, each republic was allocated a certain amount of water, but the center of decision-making remained in Moscow.

Such centralization limited regional autonomy and led to a lack of consideration for local needs. Even water planning processes were carried out in accordance with political and ideological objectives, not economic efficiency.

Soviet water policy was based on the principle of the "hydraulic mission", which viewed water not as a natural resource, but as a means of production. The main goal of this policy was to turn Central Asia into a center for cotton production [10].

In the 1960s–1980s, most of the water from the Amu Darya and Syr Darya rivers was diverted to cotton fields, and the flow of water from the Aral Sea almost stopped. The result was the Aral Sea disaster, which was considered a global environmental crisis [18].

The Soviet-era water management system lost local traditions of "feudalism" and was replaced by administrative bureaucratic management. Since this system was ineffective, in the late 1980s, UN and UNESCO experts proposed its revision [7].

After the collapse of the Soviet Union, this centralized water system lost its economic and institutional foundation. However, its main ideological and technical traces still remain in the water management system of Central Asia [9].

After the collapse of the Soviet Union in 1991, the Central Asian republics gained independence and there was a need to create a new legal and institutional system for water



resources management. However, the previously existing single centralized irrigation system disintegrated and disputes began between the states over water distribution [7].

The principle of “joint basin management” that existed during the Soviet era was separated by state borders after independence. As water flows through the Amu Darya and Syr Darya basins, water sharing cooperation has become a problematic process, as it disrupts the balance between national interests and regional needs.

While Uzbekistan, Kazakhstan, and Turkmenistan are primarily water users (irrigators), Kyrgyzstan and Tajikistan have emerged as water resource owners (not consumers, but suppliers). The interests of these two groups have often clashed, especially in the use of water for energy and agriculture [9]. For example, the construction of the Rogun Hydroelectric Power Plant in Tajikistan and the Kambarata-1 Hydroelectric Power Plant in Kyrgyzstan have caused water flow to be blocked in winter and reduced in summer, which has exacerbated water shortages in downstream countries. Therefore, the coordination of energy and irrigation interests has become a regional political issue. To address these issues, the International Fund for the Aral Sea (IFAS) was established by the Central Asian countries in 1993. IFAS aims to coordinate cooperation on water distribution, ecology, and the Aral Sea crisis (CAREC, 2020). However, the political authority of the organization was limited, and the sovereignty of the states prevailed. In 1998, the states tried to establish a water-energy exchange system in the Syrdarya basin: Kyrgyzstan was supposed to release water for energy purposes in the winter and receive compensation in the form of oil and gas from the states that needed water for cotton in the summer. However, these agreements did not bear practical fruit and were almost discontinued after the 2000s.

At the same time, the issue of water became an important direction of international diplomacy. Organizations such as the UN, CAREC, and the OSCE have promoted a number of initiatives on water diplomacy. In particular, CAREC organized trainings to build trust between states within the framework of the “Regional Dialogue on Transboundary Water Cooperation” project (CAREC, 2020).

One of the biggest problems during the years of independence was the lack of a clear legal mechanism for water distribution. Each state declared water as a national asset in its domestic legislation, which complicated regional agreements. At the same time, cooperation between watershed management agencies has become institutionally weak [9].

Since the 2010s, Central Asian countries have begun to adopt a pragmatic approach to their relations. Especially since 2016, Uzbekistan and Kyrgyzstan have been rapprochement and joint projects have been implemented on water and energy issues. This process has initiated a new stage in regional diplomacy. However, even today, problems surrounding transboundary water resources have not been fully resolved. Conflicts between water distribution, environmental security, and energy interests are still an important factor in the geopolitical stability of Central Asia.



Central In Asia water management of the system historical stages and their characteristics

Historical era	Of the era main feature	Water management shape	Main structures / projects
Ancient period (2nd millennium BC – 1st millennium BC)	Amu Darya and Syrdarya in the basins irrigation systems appearance to be	Mirabism and local team management	Typroqkala, Afrosiyab channels
Islam period (VIII – XII centuries)	Water management scientific based, justice principled dominant	Mirab and judges with the participation of collective distribution	Castle and urban irrigation networks
Timurids period (14th–15th century)	State power and justice symbol as irrigation	State centralized management	Samarkand surroundings channels, Zarafshan system
Khanates period (17th–19th century)	Tradition and to Sharia based management	Mirabbashilik system	Karadaryo, Zarafshan channels
Soviet period (1920–1991)	Centralized water politics cotton monoculture	State central to the plan based management	Qairaqum, Togonkol, Karakol channels
Independence period (1991–present)	National sovereignty and cross-border problems	Interstate cooperation and IFAS system	Rogun, Kambarota HPP; IFAS programs

The history of water resources management in Central Asia has a thousand-year tradition, and this process has played an important role in the political culture and social relations of the peoples of the region. From ancient times, the principles of equitable distribution of water, management based on the common good, and harmonious relations with nature have been formed [4]. Irrigation systems were considered not only an economic activity, but also a symbol of a culture of collective responsibility and cooperation [12].

The institution of mirab, formed during the Islamic era, can be interpreted as the first form of today's water diplomacy. Mirabs acted as mediators in the equitable distribution of water, preventing conflicts, and protecting the collective interest [13]. This tradition determines the cultural roots of the principle of "trust-based governance" in Central Asia.

Although during the Soviet era this system was transformed into centralized administrative control, after independence, states began to rely again on the historical culture of cooperation. This process gave impetus to the formation of modern water diplomacy [7].

In the post-independence period, water issues have acquired strategic importance in international relations. Although states considered national sovereignty to be the priority in the



use of water resources, this approach later clashed with the need for regional cooperation. On this basis, institutions such as IFAS (International Fund for Saving the Aral Sea) and CAREC (Regional Environmental Centre for Central Asia) were established [14].

The activities of IFAS and CAREC made it possible to view water not only as an economic resource, but also as a means of “diplomatic trust”. Within the framework of CAREC’s “Water Diplomacy Talks” program, a culture of dialogue between states and experts was formed, and historical traditions were combined with modern international mechanisms [14].

Initiatives within the framework of the UN “Water Convention” [15] and “Sustainable Development Goal 6” strengthened the legal basis for water diplomacy in Central Asia. These documents called on states to adhere to the principles of equality, openness and trust in water management [15].

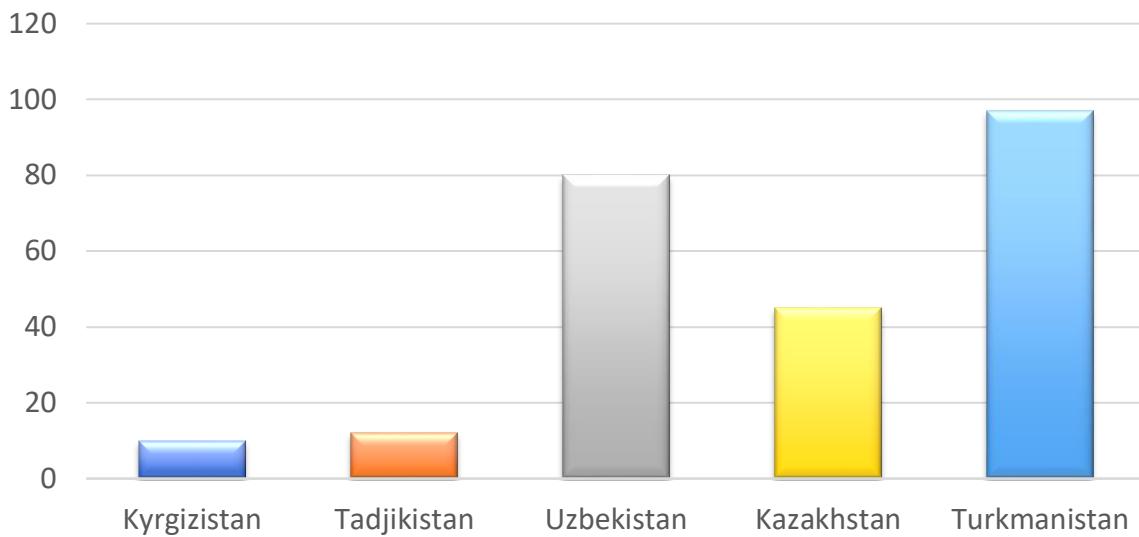
In today's conditions, Central Asian states are experimenting with new integration formats by combining water diplomacy with historical traditions. For example, Uzbekistan's “Green Aral Sea Region” initiative is aimed not only at restoring the environment, but also at creating an environment of trust and cooperation in the region [16].

From this perspective, water diplomacy in Central Asia is developing by combining historical experiences with modern international approaches. This process allows us to reinterpret water not as a geopolitical resource, but as a means of peace, sustainable development and integration [17].

In modern conditions, water diplomacy, inspired by these historical traditions, has become an important area of interstate cooperation. In particular, in Central Asia, water resources have become a strategic factor of not only economic, but also geopolitical and environmental importance. Since the beginning of the 21st century, new mechanisms for water diplomacy have been formed in the region. Among these, organizations such as IFAS (International Fund for Saving the Aral Sea) and CAREC (Regional Environmental Centre for Central Asia) occupy a special place. Their activities are aimed at solving transboundary water-related problems, building trust and developing a culture of cooperation.

**Central In Asia water from resources use and cross-border dependency level (1991–2024)**

Dependence on transboundary water sources (%)



The diagram shows the level of water resource use and their dependence on transboundary water sources in five Central Asian countries for the period 1991–2024, expressed in percentages. The data show that the countries of the region are in a very uneven and asymmetric situation in terms of water distribution. According to the analysis, Kyrgyzstan and Tajikistan are water-rich countries, and their domestic water resources cover almost 90 percent of their total needs. These countries provide water flows to neighboring countries by storing water mainly for hydropower purposes in winter and releasing it in summer [15]. Therefore, they are considered “supply countries”. In contrast, Uzbekistan, Kazakhstan, and especially Turkmenistan are highly dependent on transboundary water sources. For example, Uzbekistan meets 75–80 percent of its water needs through external flows from the Amu Darya and Syr Darya basins [9], while Turkmenistan receives almost 95 percent of its water through the Amu Darya River [8]. This puts them in the category of “irrigation-dependent countries.” In Kazakhstan, about half of its water resources come from external sources. Water allocation in this country is closely linked not only to the development of agriculture, but also to the development of the industrial and energy sectors [7]. The diagram shows that the political and economic interests of countries differ due to the different levels of dependence on water resources in the region. Countries that control water through multiple sources (Kyrgyzstan, Tajikistan) have the opportunity to turn water into a geopolitical instrument as a means of energy pressure. At the same time, countries that are highly dependent on water (Uzbekistan, Turkmenistan) are interested in diplomatic and economic cooperation to ensure a stable water supply. This situation further emphasizes the need to develop a culture of cooperation in water management in Central Asia. In this regard, the activities of regional organizations such as IFAS and CAREC serve to view water not as a political competition, but as a tool for diplomacy based on mutual trust and benefit.

**Conclusions:**

The issue of water resources in Central Asia is not only an ecological or economic problem, but also a multifaceted issue that encompasses historical, political and cultural processes. Its analysis shows that the regional water management system has been formed over the centuries and has been combined with different political and social models in each era.

Water management in Central Asia has long been based on the principles of collective justice, equality and solidarity. Ancient irrigation systems and the institution of mirab are important as the spiritual foundation of today's water diplomacy. They interpreted water not only as an economic resource, but also as a symbol of social responsibility and state power.

In the 20th century, the centralized, administrative model of water management increased the dependence of the countries of the region on natural resources. Although this system provided stability, its economic and institutional foundations weakened after independence. Therefore, independent states were forced to look for new mechanisms for transboundary cooperation.

After 1991, water resources were blocked by state borders and a clash of interests over water distribution emerged. Kyrgyzstan and Tajikistan sought to use water resources as a source of energy, while Uzbekistan and Turkmenistan sought to use them as a means of irrigation. Organizations such as IFAS and CAREC emerged as important tools to overcome these contradictions.

In recent years, the countries of the region have been developing "water diplomacy", combining the historical culture of cooperation and international legal mechanisms. The CAREC and IFAS initiatives help to interpret water not as a political competition, but as a means of trust and cooperation. The UN "Water Convention" and "SDG-6" programs strengthen this process at the international level.

In the current environment, transboundary dependence on water resources further strengthens the interconnectedness between countries. Therefore, in the future, it will be important for the countries of the region to implement the concept of "diplomacy of common interests" in the management of water basins. This is a key factor not only for environmental sustainability, but also for regional political stability.

Combining historical traditions, local governance culture, and modern international approaches is the most effective way to improve the effectiveness of water policy in Central Asia. In this process, building trust between states, increasing information exchange, and expanding public participation should become the main pillars of water diplomacy.

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