

Water-Energy Cooperation and Hydropolitics in Central Asia

Dursun Yıldız

C.E Hydropolitics Expert (M.Sc.)

Director

HPA Hydropolitics Academy Center-Türkiye

July 7 2025

1.Introduction

During the Soviet Union era, the centrally planned management of natural resources and agricultural product transfers in the Turkic World countries of Central Asia led to disagreements over water management after the dissolution of the USSR. Following the independence of the Central Asian states, one of the most pressing issues was how to coordinate the operation of upstream hydroelectric dams and downstream irrigation systems, inherited from the Soviet period. For this reason, in our analyses, the water problem of Central Asia has been defined not as a shortage of water, but rather as a problem of transboundary water management.

In the new conditions of the region, in addition to the operation of existing hydraulic structures, the upstream countries' plans for new dams—some of which were even under construction—caused tensions to escalate. Countries began to defend their water resources and water rights through security-centered policies and often showed reluctance to comply with agreements. In the 35 years since the dissolution of the Soviet Union in 1991, population growth, pollution, the impacts of climate change, and evolving interstate relations and needs have positively influenced the search for cooperation in water management.

For the countries of Central Asia, solving the complex system of water and energy infrastructure inherited from the USSR took considerable time. This was largely because newly independent states initially prioritized protecting national resources and national interests.

The region features a mixture of hydrocarbon-rich but water-poor countries, alongside water-rich but oil- and gas-poor states. The unequal distribution of water resources, combined with political and economic asymmetries, initially fostered competition and conflict, complicating problem-solving efforts. During the Soviet era, irrigation and water rights systems favored downstream states with high quotas. Moreover, these countries also gained an advantage from newly discovered fossil fuel resources, further intensifying the region's economic and political

imbalance. Over the ensuing 35 years, political and social crises and increasing public demands have heightened the importance of cooperative policies for regional stability and security.



2.A General Overview of Central Asian Waters

One of the two major rivers in the region, the Amu Darya, originates in the Pamir Mountains of Tajikistan, Kyrgyzstan, and Afghanistan, fed by snow and glaciers. It travels 2,400 km, passing through the Karakum Desert before reaching the Aral Sea. Along its journey, the Amu Darya traverses or borders five countries: Turkmenistan, Uzbekistan, Kyrgyzstan, Tajikistan, and Afghanistan (Yıldız 2011a).

The contributions to this river's flow are highly uneven: 80% from Tajikistan, 8% from Afghanistan, 6% from Uzbekistan, 3% from Kyrgyzstan, and 3% from Turkmenistan and Iran (Dukhovny, Schutter 2011).

In Central Asia, the main transboundary rivers include the Irtysh and Ishim in the east; Chu, Talas, Syr Darya, and Amu Darya in the south; the Ural in the west; and the Ishim and Tobol in the north (Uslu, Öngel, Sözen 2011).

The Syr Darya originates in the Tien Shan Mountains north of the Pamirs, also fed by snow and glaciers. Flowing approximately 2,500 km through four countries (Kyrgyzstan, Uzbekistan, Tajikistan, then back into Uzbekistan, and finally Kazakhstan), it empties into the Aral Sea. Contributions to its waters are: 74% from Kyrgyzstan, 12% from Kazakhstan, 11% from Uzbekistan, and 3% from Tajikistan (Yıldız 2011a).

The strategic waters of the Central Asian Turkic World reveal two categories of states:

- **Upstream countries:** Kyrgyzstan and Tajikistan, which primarily use water for hydroenergy generation, consuming little since the water is returned to the river channel.
- **Downstream countries:** Uzbekistan, Kazakhstan, and Turkmenistan, which primarily use water for agricultural irrigation, consuming large volumes and reducing inflows to the Aral Sea.

A short profile of water and water management in Central Asia:

- There are 7 countries with transboundary waters, 2 major rivers, and one large lake in the region. Five countries are primary actors in water issues, while two (Iran and Afghanistan) are secondary actors.
- Contributions to rivers are unequal. For example, Turkmenistan contributes nothing to the rivers but consumes the largest per capita share of water annually (OECD 2020).
- About half of irrigated lands in the Aral Basin suffer from salinization.
- Water exists, but there is no rational, planned, and efficient “cooperative water management.”

Recent studies show that agricultural water consumption in Central Asia is about double that of industrialized countries. The main reason is outdated and damaged irrigation infrastructure. Rehabilitation efforts in the past two decades have been insufficient to prevent losses. Furthermore, instead of reducing demand, some countries attempt to guarantee high water consumption for water-intensive industries, perpetuating excessive use.

The water-sharing and usage problem in the Aral Sea Basin is the most significant regional water management dispute in Central Asia. Issues are concentrated on the Syr Darya and Amu Darya, as these rivers are plentiful and flow through more than three countries. However, all major rivers in the region face similar problems.

3.Incomplete Energy Projects of the Soviet Era

A secondary but influential factor was that the regional planning of water and energy resources within the Soviet Union was never fully completed. During that period, the USSR prepared a centralized plan for water and energy in the region. This decision was not made for a single country, but rather as a regional planning effort for the management of natural resources as a whole. As a result, water allocation quotas in the region were determined according to this centralized planning approach.

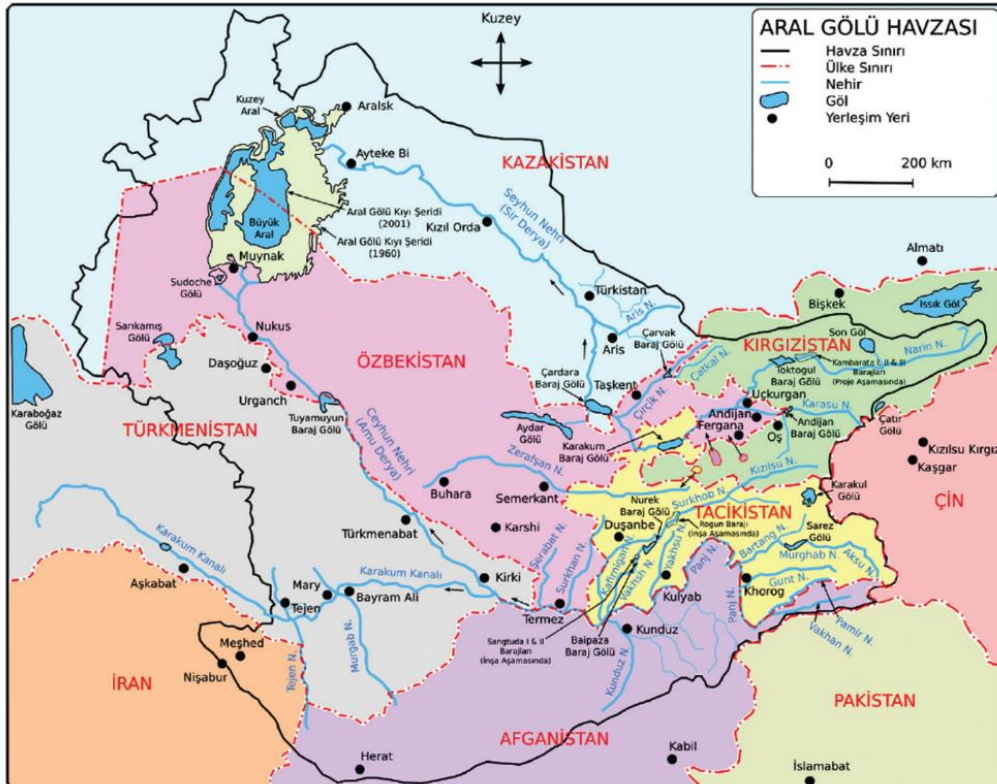
Within this framework, it was decided to construct the Nurek and Rogun Dams in Tajikistan, and the Toktogul Dam in Kyrgyzstan. Construction of the Nurek Dam in Tajikistan began in 1961, and its first turbine started operating in 1972. The dam was fully commissioned in 1980. Built for both energy generation and irrigation purposes, the Nurek Dam, standing at 300 meters, remains the tallest dam in the world.

Upstream of the Nurek Dam, construction of the Rogun Dam, even higher at 335 meters, was initiated in 1976. In other words, after the completion of the world’s tallest dam at the time

(Nurek, in 1972), another even taller dam was started just four years later. This was part of the USSR's attempt to complete the energy infrastructure planned for the region. The Rogun Dam was scheduled to be completed and operational by 1993. However, civil unrest began in 1990, the Soviet Union dissolved in 1991, and a major flood struck the project area in 1993. These events prevented the completion of the dam (Yıldız 2011b).

Had the Rogun Dam been completed, Tajikistan's current energy shortages would have been significantly alleviated. Furthermore, Tajikistan would have been able to counterbalance the downstream states, which had been granted disproportionately large water allocations under de facto Soviet policies, with the advantage of cheap hydroelectric energy production. However, because the Soviet Union collapsed before the entire regional energy plan could be completed, only the irrigation segment of Central Asia's integrated development plan was realized, while the hydroelectric component was left unfinished.

This partial implementation caused the balance of mutual reliance between water and energy needs to collapse. In other words, had all the dams envisaged under the centralized plan been completed, the hydro-politics of the Amu Darya Basin would be quite different today, and part of the energy needs of Tajikistan and Kyrgyzstan would already have been met. Instead, every attempt by these upstream countries to build the dams they desperately need has escalated tensions in the region.



4.The Aral Sea Basin (Syr Darya Projects)

The second important hydropower system in Central Asia was designed on the **Syr Darya River Basin**. The plan was to build a cascade of reservoirs on the Naryn River (the main

tributary of the Syr Darya) to generate electricity, regulate river flows, and support irrigation projects in downstream countries.

The key component of this system was the **Toktogul Dam** in Kyrgyzstan. Construction began in 1964 and the dam was commissioned in 1976. With a storage capacity of 19.5 billion cubic meters and an installed capacity of 1,200 MW, Toktogul was planned as the “heart” of a cascade system consisting of several dams and hydropower stations upstream of the Syr Darya.

Together with other dams (Kurpsai, Tashkumyr, Shamaldysai, Uch-Kurgan), Toktogul was designed not only to generate hydropower but also to regulate seasonal water flows. Under the centralized Soviet planning system, water stored in upstream reservoirs during winter was released in summer for downstream irrigation in Uzbekistan and Kazakhstan. In return, downstream countries supplied Kyrgyzstan with fossil fuels (coal, oil, and natural gas) for heating in winter.

This **water-energy exchange mechanism** was functional under the Soviet Union, but after 1991, the political division into five independent states disrupted this arrangement.

- **Upstream countries (Kyrgyzstan, Tajikistan):** Needed more electricity in winter but had limited fossil fuel resources.
- **Downstream countries (Uzbekistan, Kazakhstan, Turkmenistan):** Needed more irrigation water in summer but controlled fossil fuels.

Because cooperation weakened after independence, the balance between irrigation and hydropower collapsed. In the Syr Darya Basin, winter releases from Toktogul increased (to produce electricity for Kyrgyzstan), but summer releases decreased, harming downstream irrigation.

This shift led to severe disputes between Kyrgyzstan, Uzbekistan, and Kazakhstan. Kyrgyzstan demanded payment or fuel in exchange for releasing water for summer irrigation. Uzbekistan and Kazakhstan, however, insisted that water was a “**common good**” and opposed upstream countries using it as a bargaining tool.

As a result, the **Aral Sea Basin problem** became one of the most pressing hydropolitical conflicts in the region. While the Soviet system had provided a degree of balance, its collapse left the Syr Darya Basin states in a situation of interdependence but without a stable cooperative mechanism.

5.New Hydro-Energy Policies in Central Asia After Independence

After the dissolution of the Soviet Union in 1991, the five Central Asian states—Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan—entered a new era in terms of water and energy policies. With the disappearance of the centralized planning system, each state adopted national approaches in line with its own priorities and needs. This transition, however, generated serious disputes because the region’s water and energy systems had been designed as **interdependent and integrated structures** during the Soviet era.

5.1. Upstream Countries' Energy-Oriented Policies

Kyrgyzstan and Tajikistan, rich in water but poor in hydrocarbons, reoriented their policies towards maximizing the hydropower potential of their rivers. They emphasized that water is not merely a “common good” but also an **economic resource** and a “commodity.” In this context, they demanded that downstream states provide financial compensation or fossil fuels in exchange for summer water releases.

Tajikistan revived the **Rogun Dam project**, which had remained incomplete during the Soviet era. Similarly, Kyrgyzstan developed plans to expand the Toktogul cascade and build new dams on the Naryn River. These initiatives aimed to secure energy independence and economic growth but also increased tension with downstream countries.

5.2. Downstream Countries' Irrigation-Oriented Policies

Uzbekistan, Turkmenistan, and Kazakhstan—hydrocarbon-rich but water-scarce—continued to prioritize **large-scale irrigation agriculture**, especially cotton production. These states insisted on the principle that water is a “**common and indivisible regional resource**”, opposing the idea of water being treated as an economic good. Uzbekistan, in particular, pursued strong policies to prevent upstream projects that could reduce water flows for irrigation.

Turkmenistan expanded the **Karakum Canal** system and developed additional irrigation projects, further increasing water consumption. Kazakhstan, while sharing some concerns with Uzbekistan, adopted a somewhat more moderate stance and occasionally acted as a mediator in regional disputes.

5.3. Search for Regional Cooperation

In the early 1990s, several attempts were made to establish cooperation mechanisms. The most notable was the **Interstate Commission for Water Coordination (ICWC)** founded in 1992, followed by the **International Fund for Saving the Aral Sea (IFAS)** in 1993. These institutions aimed to coordinate water allocation and address environmental problems, particularly the Aral Sea disaster.

However, these organizations faced structural and political challenges. The absence of binding enforcement mechanisms, lack of mutual trust, and conflicting national priorities limited their effectiveness. Instead of long-term cooperation, **short-term bilateral agreements** on water-energy exchanges (such as fuel for water) became more common.

5.4. Growing External Involvement

After independence, external actors—especially international financial institutions (World Bank, Asian Development Bank) and neighboring powers (Russia, China, Turkey)—increased their involvement in the region's hydro-energy sector.

- **World Bank and ADB** supported technical studies and infrastructure rehabilitation projects.

- **Russia** sought influence through energy trade and investment in hydropower projects.
- **China** increased its role under the framework of the **Belt and Road Initiative**, financing dams and energy grids.
- **Turkey** also played an active role, providing technical and financial support, particularly in Kyrgyzstan and Tajikistan.

As a result, hydro-energy projects in Central Asia after independence became not only an internal regional issue but also part of the **geopolitical competition among major powers**.

6. Political Developments and Regional Transformations

In addition to water and energy issues, the **political transformations in Central Asia** after independence have had a decisive impact on hydropolitics. Each country has pursued its own domestic political consolidation and foreign policy orientation, which in turn shaped their water-energy relations.

6.1. Uzbekistan's Dominant Role

Under President Islam Karimov, Uzbekistan pursued a **strong nationalist and security-centered policy**, especially in relation to water. Uzbekistan's position was clear: upstream states should not build new dams that could affect downstream irrigation. Karimov repeatedly emphasized that water should not be "turned into a weapon" and framed the issue as a matter of national security. As a result, Uzbekistan emerged as the most resistant actor to Kyrgyz and Tajik hydropower ambitions.

After 2016, with the rise of Shavkat Mirziyoyev to power, Uzbekistan shifted towards a more **cooperative and pragmatic approach**. Mirziyoyev's government initiated regional dialogue, reopened borders, and signed agreements on trade, energy, and transport with neighbors. This political opening also softened tensions over water management, creating a more favorable environment for cooperation.

6.2. Kazakhstan's Stabilizing Role

Kazakhstan, the largest and economically most powerful country in the region, often acted as a **balancer and mediator** in regional disputes. Thanks to its hydrocarbon wealth, Kazakhstan had less immediate dependence on irrigation compared to Uzbekistan and Turkmenistan, but it still faced serious water challenges in its southern provinces.

Kazakhstan took initiatives under the **International Fund for Saving the Aral Sea (IFAS)** and supported regional integration efforts. It also invested in digital transformation and water monitoring systems, positioning itself as a technological leader in regional water governance.

6.3. Kyrgyzstan and Tajikistan: The Upstream Struggle

Both Kyrgyzstan and Tajikistan remained **structurally dependent** on hydropower to meet their domestic energy needs. Their mountainous geography and limited fossil fuels left them

with little alternative. This pushed them to insist on completing dam projects such as Rogun (Tajikistan) and Kambarata (Kyrgyzstan).

However, their limited financial resources and political instability slowed progress. These countries relied heavily on external actors (Russia, China, Turkey, and international banks) to finance their projects. Domestic political turbulence, such as power struggles and governance crises, also hindered consistent water-energy policy implementation.

6.4. Turkmenistan's Isolationist Policy

Turkmenistan pursued a largely **isolationist and self-sufficient policy** under its authoritarian leadership. While heavily dependent on irrigation water, Turkmenistan refrained from active participation in regional water diplomacy. Instead, it focused on expanding domestic irrigation infrastructure, particularly for cotton and wheat production, regardless of the ecological consequences.

Turkmenistan's large-scale diversion of Amu Darya waters to the **Karakum Canal** worsened the Aral Sea crisis but remained outside any binding cooperative framework.

6.5. Shifting Geopolitical Context

Beyond internal dynamics, the geopolitical environment also influenced hydropolitics:

- **Russia** sought to maintain influence through energy interdependence and dam financing.
- **China** emerged as a new heavyweight investor, particularly after the Belt and Road Initiative.
- **Turkey** played a role through bilateral cooperation, providing technical and institutional support to Turkic states.
- **Western institutions (World Bank, EU, USAID)** promoted integrated water resource management and environmental protection.

These external influences added layers of competition and cooperation, making Central Asia's hydropolitics not only a regional but also a **global strategic issue**.

7. Conclusions and Evaluation

The water-energy relations in Central Asia, shaped by the legacy of the Soviet Union, reveal a **complex interdependence system** that still influences regional politics today. The upstream countries (Kyrgyzstan and Tajikistan) are rich in hydropower potential but lack hydrocarbons, while the downstream countries (Uzbekistan, Turkmenistan, Kazakhstan) are hydrocarbon-rich but dependent on irrigation water. This asymmetric structure makes cooperation both necessary and fragile.

The collapse of the USSR prevented the full implementation of the integrated water-energy plan, which would have balanced hydropower generation with irrigation needs. As a result,

after independence, disputes over dam projects and water allocations became one of the most critical issues in the region.

Key conclusions:

1. **Interdependence is inevitable.** Despite political conflicts, none of the countries can meet their water and energy needs without cooperation.
2. **Unfinished infrastructure projects** (such as Rogun and Kambarata) continue to fuel disputes, but if completed under cooperative frameworks, they could contribute to regional stability.
3. **Climate change, population growth, and environmental degradation** (especially the Aral Sea disaster) make water cooperation more urgent.
4. **Institutional mechanisms (ICWC, IFAS)** exist but lack enforcement capacity. Stronger and binding agreements are required.
5. **External actors** (Russia, China, Turkey, international organizations) play an increasingly important role, making Central Asia's hydropolitics part of the global geopolitical agenda.
6. **Kazakhstan's mediating role and Uzbekistan's policy change after 2016** have opened new opportunities for dialogue and cooperation.

Ultimately, the way forward lies in adopting an **Integrated Water-Energy-Food-Environment Nexus approach**, supported by modern technology, data sharing, and transparent institutions. A shift from competition to cooperation could transform water from a source of conflict into an instrument of peace and sustainable development in Central Asia.

References

Dukhovny, A.V, Schutter J. 2011 Water in Central Asia . Balkema 2011 London.

OECD (2020). Water Use in Central Asia.

Uslu .K, Öngel .V, Sözen .İ, 2011 “Aral Gölü Havzasındaki Su Kaynaklarının Orta Asya Ülkelerinin Sürdürülebilir Büyümlerine Etkisi” Marmara Üniversitesi İ.İ.B.F.Dergisi Yıl:2011 Cilt XXX. Sayı: 1 s. 141-162

World Bank & Asian Development Bank Reports (various years).

YILDIZ Dursun, 2011 a Orta Asya'nın Stratejik Suları. Truva Yayınları.2011 İstanbul

YILDIZ Dursun, 2011 b Orta Asya'nın Saatli Bombası: Su Sorunu. Truva Yayınları.2011 İstanbul.



Dursun Yıldız C.E. (MSc.) is a hydropolitics specialist and Director of the Hydropolitics Academy Association located in Ankara-Turkey. He is a civil engineer and used to be Deputy Director at State Hydraulic Works in Turkey; completed a hydroinformatics post graduate course at the IHE in Delft, a Technical training program in USBR-USA, and a master's degree in Hydropolitics at the Hacettepe University-Turkey. He has over 5 years of teaching experience in some Turkish Universities and now works as head of his own Hydro Energy & Strategy consulting company located in Ankara. He has published several international articles and 15 books. He received the Most Successful Researcher Award on International Water Issues from Turkish Agricultural Association in 2008 and from the Central Union of Irrigation Cooperatives in 2016. He received the Professional Services Award of Excellence from İstanbul Çekmeköy Rotary Club in 2021.

He becomes a part-time lecturer at the IZTECH International Water Resources Department in In the 2020-2021 academic year

July 7 2025