

# MP-IDSA

## *Issue Brief*

# The Future of Water Management in Central Asia

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## **S***ummary*

One of the major challenges to water management in Central Asia is the transboundary nature of the water resources combined with conflicting interests of upstream and downstream states. Although regional governments have taken initiatives to strengthen regional water management, much work remains to be done to connect national interests with regional water and energy security goals.

Water management in Central Asia has been a cause of contention between the five neighbouring countries, often generating an uneasy political climate in the region. The Central Asian Republics (CARs) comprise the ‘energy-poor but water-rich’ upstream states (Kyrgyzstan and Tajikistan) and ‘energy-rich but water-poor’ downstream states (Kazakhstan, Uzbekistan, Turkmenistan). The upstream states utilise water resources within their boundaries to generate enormous amounts of energy through hydropower. At the same time, water-intensive crops such as wheat and cotton contribute significantly to the GDP of the downstream countries.

The main sources of water in Central Asia are the two rivers—Amu Darya and Syr Darya—which closely connect the riparian states. The region's five countries collectively consume nearly 127 billion cubic meters (bcm) of water each year, with agriculture accounting for over 80 per cent.<sup>1</sup> However, only about half the water allocated for agriculture is used effectively. Almost 50 per cent of the water is lost along the way as a result of poor irrigation facilities and wasteful farming practices. Unevenly distributed among the five countries, these water sources pose a serious economic and political cost.<sup>2</sup>

This has given rise to various complexities amongst the regional players, with any changes in the water usage of one nation impacting its availability in the other riparian states. This has led to a spurt in regional tensions over water. For example, between Kyrgyzstan and Uzbekistan in the Ferghana Valley, between Tajikistan and Uzbekistan over Rogun dam, and the recent constructions of Qosh Tepa Canal raising tensions between Afghanistan, Uzbekistan and Turkmenistan, among other conflicts. Additionally, the unequal distribution of energy resources further tax the region’s already fragile water resources. The poor infrastructure that was inherited from the Soviet Union raises concerns about climate change and its detrimental effects on water levels.

## Water Management during the Soviet Period

The Soviet Union’s system of water management kept the Central Asian nations closely integrated. This was done by establishing a trade-off linking the glacial mountains of Tajikistan and Kyrgyzstan with the arid lands of Kazakhstan, Uzbekistan and Turkmenistan, which are rich in gas, coal and oil.<sup>3</sup>

The Soviets built 20,000 miles of canals, 45 dams and more than 80 reservoirs across the region, turning the land of sand and dust into one of the world's largest cotton-

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<sup>1</sup> Sanat Kushkumbayev, “[Clock is Ticking as Central Asia Confronts Water Calamity](#)”, *Eurasianet*, 14 February 2024.

<sup>2</sup> S.S. Zhiltsov, I.S. Zonn, A.G. Kostianoy, A.V. Semenov, “Water Resources Management in Central Asia”, *The Handbook of Environmental Chemistry, Vol. 105*, 2020, pp. 1–11.

<sup>3</sup> Anar Khamzayeva, “[Water Resources Management in Central Asia: Security Implications and Prospects for Regional Cooperation](#)”, CIDOB, No. 25, 2009.

growing regions.<sup>4</sup> Since there was an increase in the area of irrigated land for cotton in the 1960s and 1970s, the region experienced a significant increase in its water usage. An impressive network of irrigation canals and reservoirs was constructed to support cotton cultivation. Massive water reservoirs were built in Kyrgyzstan and Tajikistan for cotton production in Kazakhstan and Uzbekistan. However, these developments in the cotton industry had terrible consequences for the ecology. With the main two rivers fully diverted for cotton irrigation, the water level of the Aral Sea significantly shrunk from 68,900 sq kms in the early 1960s to 7,352 sq kms in 2021.<sup>5</sup> Little consideration for the local environment led to drastic consequences, especially for the region's water bodies.

## Post-Soviet Agreements on Water Management

Since gaining independence in 1991, water sharing has become one of the most sensitive issues in the region. The issues surrounding the use and management of water acquired an interstate dimension as the newly independent nations witnessed the fragmentation of the once-unified system of managing water in Central Asia.<sup>6</sup> Their sovereign status brought new socio-economic hardships. For example, Tajikistan and Kyrgyzstan could not bear the costs of maintaining their reservoirs and dams due to their poor financial status and lack of interest. Moreover, the infrastructure mostly benefitted the downstream states.

For a short period of time, the nations continued the water management system that existed in the Soviet period mainly due to the lack of an alternative. This was possible through the ‘Agreement on Cooperation in Joint Management, Use and Protection of Water Resources of Interstate Sources’ in 1992.<sup>7</sup> The agreement created a legal framework for regional water cooperation through the joint management of water distribution. Under the 1992 agreement, the Interstate Commission for Water Cooperation (ICWC) was established ‘to deal with issues related to regulation, rational use and protection of water resources from interstate sources’.<sup>8</sup> It was

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<sup>4</sup> Michael Wines, [“Grand Soviet Scheme for Sharing Water in Central Asia is Foundering”](#), *The New York Times*, 9 December 2002.

<sup>5</sup> Xiaolei Wang, [“Reviving the Aral Sea: A Hydro-Eco-Social Perspective”](#), *Earth’s Future*, Vol. 11, No. 11, November 2023.

<sup>6</sup> Sharmila L. Murthy and Fatima Mendikulova, [“Water, Conflict, and Cooperation in Central Asia: The Role of International Law and Diplomacy”](#), *Vermont Journal of Environmental Law*, Vol. 18, No. 3, 2017, p. 402.

<sup>7</sup> The Agreement outlined the main principles, which corresponded to international practice, among others: equality of rights to use and responsibility of the State for transboundary water resources; obligation to respect the agreed procedure and rules for the use and protection of transboundary water resources; obligation to avoid actions that would affect the interests of other Parties and would be able to harm them, etc. See [“Agreement between the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Tajikistan, Turkmenistan and the Republic of Uzbekistan on Cooperation in the Field of Joint Management on Utilization and Protection of Water Resources from Interstate Sources”](#), Interstate Commission for Water Coordination in Central Asia, 18 February 1992.

<sup>8</sup> *Ibid.*, Article 7.

responsible for determining regional water policy, developing key directions, and approving annual water consumption quotas for each republic. Integrated and rational use of water resources was prioritised alongside long-term regional water supply programmes.

The five republics further signed an ‘Agreement on joint actions to solve the problem of the Aral Sea and the Aral Sea region, environmental rehabilitation and ensuring the socio-economic development of the Aral region’ in 1993.<sup>9</sup> The main objectives of this agreement were rational use of the limited land and water resources in Aral Sea basin, maintaining the quality of water in rivers, reservoirs and underground sources, a guaranteed provision of ample amount of water supply to the Aral Sea for maintaining its reduced but stable water area, amongst others.<sup>10</sup>

In 1998, an agreement on the ‘Use of Water and Energy Resources of the Syr Darya River Basin’ was signed by the republics, except Turkmenistan.<sup>11</sup> One of the reasons for Turkmenistan not signing this agreement was that it followed a ‘Neutrality-based Foreign Policy’ which ensures limited participation in regional initiatives.<sup>12</sup> The agreement related to the sustainable use of energy and water resources in the basin of the Syr Darya River.

International organisations, alongside other nations, have also tried to improve the situation relating to water in Central Asia. One such example is the launch of the Central Asia Water and Energy Program (CAWEP) in 2009 by the World Bank, in partnership with the European Union, Switzerland and the United Kingdom. It aimed to strengthen the enabling environment to promote energy and water security at the regional level and in the beneficiary countries. CAWEP works with governments and civil societies to encourage new projects aimed at improving regional water management.<sup>13</sup>

## Challenges to Water Management

One of the major challenges to water management in Central Asia is the transboundary nature of the water resources combined with conflicting interests of

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<sup>9</sup> Considering the global impact of the Aral Sea's drying and degradation on the natural ecosystem in the region, the agreement reaffirmed to the commitment of the Central Asian republics to the principles of international water law, respecting the mutual interests of each of the sovereign states in matters of the use and protection of the water resources of the basin. See [“Agreement on Joint Actions to Solve the Problem of the Aral Sea and the Aral Sea Region, Environmental Rehabilitation and Ensuring the Socio-economic Development of the Aral Region”](#), Food and Agriculture Organization of the United Nations, 1993.

<sup>10</sup> Ibid.

<sup>11</sup> See [“Agreement between the Government of the Republic of Kazakhstan, the Government of the Kyrgyz Republic and the Government of the Republic of Uzbekistan on the Use of Water and Energy Resources of the Syrdarya River Basin”](#), Asia Pacific Energy Portal, 1998.

<sup>12</sup> Jason Wahlang, [“Turkmenistan’s Neutrality-Based Foreign Policy: Issues and Challenges”](#), Issue Brief, Manohar Parrikar Institute for Defence Studies and Analyses (MP-IDSA), 20 July 2022.

<sup>13</sup> [“Central Asia Water & Energy Program”](#), The World Bank.

upstream and downstream states. After the collapse of the resource-sharing system of the past, upstream states increased their hydropower production. Water releases from the reservoirs were increasingly driven by upstream winter electricity requirements rather than downstream summer irrigation needs. The change in water release patterns severely impacted downstream countries, resulting in reduced irrigation, water availability and uncontrolled winter flooding. The construction of more dams by the upstream states will lead to more altered release patterns and increase the vulnerability of downstream states to seasonal scarcity.

Climate change is another major concern for the region’s water reserves. Central Asia is already suffering from a seasonally warming climate, increased air temperatures, precipitation changes, and extreme weather events. These changes in weather patterns are leading to the melting of key glaciers, irregularities in water availability, increased competition for water resources, and changes in energy demand and production capacity. These changes in the recent decades are expected to accelerate in the 21st century.<sup>14</sup> Furthermore, higher temperatures will have an impact on the natural vegetation and evaporation from these areas will lead to less water availability in the streams and rivers.<sup>15</sup>

One of the most prominent examples is the drying up of Aral Sea. It has led to numerous environmental problems in the region, including the collapse of the fishing industry, contamination of drinking water and salinization of soil.<sup>16</sup> The Aralkum Desert, which has appeared on the seabed once occupied by the Aral Sea, also contributes to the proliferation of dust storms. The surface area of the salty soils and barren areas around the Aral Sea expanded from 40 per cent in 2000 to 54 per cent in 2008, contributing to a more arid local climate, with hotter summers and colder winters.<sup>17</sup> The negative consequences of climate change would intensify competition for water among countries in the region, with long-term and severe repercussions for the region’s food, energy and environmental security that would have a bearing on politics.

After the collapse of the Soviet Union in 1991, the CARs made several attempts to reach a consensus on the continuation of water sharing. These attempts led to the creation of several regional water cooperation institutions, particularly the Interstate Commission for Water Coordination (ICWC) in 1992 and the Interstate Fund for saving the Aral Sea (IFAS) in 1993. However, these agreements were undermined as the countries failed to balance regional water cooperation with the requirements of energy sector. This alienated the upstream countries whose interests lie more in

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<sup>14</sup> [“Climate Change and Sustainable Water Management in Central Asia”](#), Asian Development Bank, No. 5, 2014.

<sup>15</sup> Ibid.

<sup>16</sup> [“The Future of Aral Sea Lies in Transboundary Cooperation”](#), *Bulletin*, Vol. 63, No. 1, 2014, pp. 6–9.

<sup>17</sup> Ibid.

hydropower than the water storage function of existing and potential reservoirs. The ICWC and IFAS have been unable to fully reflect the evolving national interests of the CARs.

In seeking to strengthen their cooperation, governments have tried to establish more ‘explicit trade systems of water against energy’, like the 1998 Syr Darya framework agreement.<sup>18</sup> This agreement called for the mutual supply of fuel, electricity and other energy resources amongst the basin countries with an aim to resolve disputes over water and energy. The agreement also set the scope of future regional cooperation actions related to the rational use of water, fuel and energy resources.<sup>19</sup> However, these inter-sectoral agreements were not systematically implemented. This non-implementation due to the lack of capacity and an inability to ensure inter-sectoral coherence at the national level became a major factor for undermining cooperation in the region.<sup>20</sup>

## Water Management: Prospects and Recommendations

The current water management in Central Asia is facing obstacles due to the misaligned national interests between the downstream and upstream countries, their differences in preferences of water release schedules, and the lack of clear enforcement in the interstate agreements. At an interstate level, the effectiveness of water management systems in Central Asia depends on a variety of factors. These include appropriate estimation of water demands, accurate forecasting of water availability, proper scheduling of water release and coordination of inter-sectoral requirements.

Water resource forecasting, which includes estimating supply, demand and losses, is frequently violated at river reaches, resulting in erroneous water balances throughout the water system.<sup>21</sup> This results in an inaccurate estimate of useable water quantity due to underestimating open channel losses and low-accuracy seasonal flow forecasts, especially the long-term ones. Despite the Central Asian states having undertaken legal reforms to implement integrated water resources management (IWRM)—the full implementation of all IWRM components still remains low.<sup>22</sup>

Although regional governments have taken initiatives to strengthen regional water management, much work remains to be done to connect national interests with

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<sup>18</sup> [“Rethinking Water in Central Asia”](#), CAREC, Swiss Agency for Development and Cooperation (SDC), 2017.

<sup>19</sup> Elena Antipova, Alexi Zyryanov, Daene McKinney and Andre Savitsky, [“Optimization of Syr Darya Water and Energy Uses”](#), *Water International*, Vol. 27, No. 4, 2020, pp. 504–516.

<sup>20</sup> [“Rethinking Water in Central Asia”](#), no. 18.

<sup>21</sup> [“The Use and Management of Water Resources in Central Asia”](#), OECD Policy Perspectives, 2021.

<sup>22</sup> Ibid.

regional water and energy security goals. Inefficiencies in water consumption and inappropriate irrigation systems continue to be key barriers to providing sustainable water supplies in an increasingly scarce environment.

Considering the region's high agricultural water demand and inefficient resource management, including water loss due to flooding, seepage and evaporation, new irrigation practices must be implemented to increase water productivity. Introducing advanced technologies and water management practices like drip irrigation and sprinklers could prove beneficial for agriculture, as it could reduce water consumption by 30–70 per cent compared to flood irrigation.<sup>23</sup>

The region could shift its agricultural production from cotton to less water-intensive alternatives. An increase in the production of fruits, vegetables and nuts could significantly help decrease the water footprint of cotton production. However, in countries such as Uzbekistan, which is one of the largest producers and exporters of cotton, this could seem less plausible. Rather, Uzbekistan could increase cotton yields through “drip irrigation, the use of improved or more salt-tolerant varieties, the introduction of conservation agriculture, and the promotion of appropriate crop rotations”.<sup>24</sup>

Cooperation among the CARs is critical for overcoming the water crisis. As previous initiatives have not been as successful, countries must develop and implement action plans based on efficient and sustainable use of water resources. Strengthening regional cooperation and institutional and functioning legal frameworks will provide clear guidelines on how to efficiently manage regional water resources. These frameworks could focus on aligning national priorities, learning from past successful regional projects, and highlighting the potential benefits of regional cooperation.

Interstate dialogues should seek to encourage technical cooperation in the form of data exchange to predict or avert floods and dam failures. Strengthened technical cooperation can decrease the social, environmental and political risks associated with seasonal water scarcity and floods, including ensuring better implementation of existing agreements. The establishment of cooperative monitoring and early warning systems and combined research efforts have the potential to minimise present inefficiencies. A recent example of this is the installation of upgraded flow-monitoring stations by Tajikistan and Uzbekistan on transboundary canals as a measure to lay the ground for improved collective water resource management in the region. This aims to provide automated and real-time data on volumes of water passing through the two countries.<sup>25</sup>

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<sup>23</sup> Abror Kurbonmuratov, [“Uzbekistan Seeks to Introduce New Technologies for Irrigation of Agricultural Lands”](#), CABAR, 9 February 2024.

<sup>24</sup> N. Djanibekov, I. Rudenko, J. Lamers and I. Bobojonov, [“Pros and Cons of Cotton Production in Uzbekistan”](#), Food Policy for Developing Countries: Case Studies, Cornell University, 2010.

<sup>25</sup> [“Tajikistan, Uzbekistan Install Water-Monitoring Stations on Border”](#), *Eurasianet*, 26 February 2024.

Agreements on energy trade, cooperative management and investment, particularly in infrastructure projects could be clubbed with various new agreements on hydropower projects, wastewater treatment plants and safety upgradation of current dams. Arrangements regarding the cost-benefit sharing of these projects can be discussed among the nations at length. This would broaden the possible scope of advantageous trade-offs and boost expectations for future cooperation, thereby improving the basis for investments.

## **Conclusion**

The Central Asian water crisis is primarily a product of climate change, inefficient water management, and lack of cooperation and coordination. Water mismanagement has significant economic implications in the form of reduced agricultural productivity and poses significant security, political and health risks. Poor water infrastructure, wasteful water usage and outdated irrigation techniques exacerbate the region's already stressed water resources. As a result, Central Asian states must strengthen their regional water cooperation and review their national interests in lieu of the common regional goals.

The future of water management in Central Asia remains one of the key concerns in the region. Timely implementation of reforms will not only improve the water security of the region, but also the energy and food security. Efficient governance and greater coordination between the five republics is required for reaching mutually beneficial approaches to water management. It is crucial to note that advancement in water cooperation will occur when the focus shifts from previous disagreements to future prospects and from defending entrenched positions to realising core interests.



## About the Author

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