

CENTRAL ASIAN WATER RESOURCES CRISES AND MANAGEMENT

Hamid Rasool

Abstract

Water has long been a major cause of conflict in Central Asian States. Kyrgyzstan and Tajikistan have a surplus while the other three states strive for their share from the region's great rivers i.e. Syr Darya and Amu Darya, which slice across it from the Tien Shan, Pamir Mountains, and the Hindu Kush to the Aral Sea. The population in the region has increased by almost ten million since 2000, and limited arable land is being depleted by over-use and outdated farming methods. Extensive corruption and failing infrastructure take further toll, while climate change is likely to have long-term negative consequences. As economies become weaker and states more fragile, heightened nationalism, border disputes, and regional tensions complicate the search for a mutually acceptable solution to the region's water needs. A new approach that addresses water and related issues through an interlocking set of individually more modest bilateral agreements instead of the chimera of a single comprehensive one, is urgently needed. The root of the problem is the disintegration of the resource-sharing system, the Soviet Union imposed on the region until its collapse in 1991. Kyrgyzstan and Tajikistan provided water to Kazakhstan, Turkmenistan and Uzbekistan in summer and received Kazakh, Turkmen and Uzbek coal, gas and electricity in winter. The system had broken down by the late 1990s, and a plethora of bilateral and regional agreements and resolutions concluded in that decade, failed to fix it. The inadequate infrastructure, poor water management and outdated irrigation methods remain unaddressed, while the security of environment is bleaker. The unresolved water disputes accumulating day by day, if not addressed properly and promptly, can lead to almost a virtual water war in the region having its far reaching consequences. This imbalanced regional water resource endowment which make states highly interdependent, and being a cause of conflict, can be converted into a conflict resolution measure as well, if stakeholders adopt a positive approach with similar thinking frequency.

Keywords

Water Disputes, Conflict Resolution Measures, Infrastructure Projects, Water Crises, Central Asian States, Irrigation Season, Hydro-carbon Resources, Water Management, Water Energy Cooperation, River Basins, Poverty and Pollution, International Players, Cooperative Formula, Upstream-downstream Dilemma, International Trans-boarder Water Law.

Historical Background

In Central Asia, water, so far, has been more a source of tension than cooperation. While there have been joint efforts to save the Aral Sea, as well as a flood of internationally introduced technical projects, states in the region have spent most of the past two decades squabbling over the use of water. The region is muddling on with outdated allocation quotas from Soviet times, and the creation of new infrastructure projects like the Rogun Dam in Tajikistan has led to diplomatic saber rattling. During the Soviet period, central planning created a “cotton belt” in the lowlands of what is now Kazakhstan, Uzbekistan, and Turkmenistan, irrigated through a complex system of dams, pumps, and channels using water coming from mountains in Kyrgyzstan and Tajikistan. However, the breakup of the Soviet Union left the emerging republics of Central Asia without a regional water management strategy.

The two major regional rivers of Amu Darya and the Syr Darya discharge into the Aral Sea. During the Soviet Union era, a large part (73 percent) of the Amu Darya run-off was formed in the territory of one country, with the remaining part of the run-off coming from the territories of Afghanistan and Iran.¹ The Syr Darya basin was completely located within the Soviet Union. Therefore, the rivers were managed as national rivers, as the administrative borders between the Central Asian Soviet republics (Kazakh, Kyrgyz, Tajik, Turkmen and Uzbek) were considered to be provincial. Large dams and associated reservoirs were constructed in the mountainous upper reaches of the Kyrgyz and Tajik Soviet Republics to accumulate the flow of those rivers during the non-irrigation season. At the same time, irrigation systems were developed on millions of hectares of land in the lower reaches, i.e. in the Uzbek, Kazakh and Turkmen Soviet Republics. The primary goal of regulating the flow of the Amu Darya and the Syr Darya was to provide a reliable water supply for agriculture during the irrigation season (April - September). In total, 60 reservoirs with a total storage volume of 64.5 km³ are found in the Aral Sea basin. The Syr Darya runoff is almost completely regulated and the flow of Amu Darya is regulated to about 80 percent. The generation of electricity at the hydropower stations of the main dams upstream (the Toktogul Dam on the Naryn, the major tributary of the Syr Darya in the Kyrgyz Soviet Republic, and the Nurek Dam on the Vaksh, one of the two major tributaries of the Amu Darya, in the Tajik Soviet Republic) played a secondary role. The electricity was generated mostly during the irrigation season, when large volumes of water were released. The bulk of the generated electricity was supplied to an electricity grid connecting Central Asia and other regions of the Soviet Union. The Amu Darya is not as regulated as the Syr Darya, but the construction of the Rogun Dam on the Vaksh, designed in the 1960s to be the highest in the world and with a large water reservoir, would allow providing a multi-year runoff regulation of this river. However, the construction of the Rogun project was not completed during Soviet times.

Water resources of the Amu Darya and the Syr Darya were allocated between many irrigation projects, some of which extended over the administrative territories of several Soviet republics, according to the quotas established by the USSR Ministry of Water Management and Land Reclamation (USSR Minvodkhoz) and the USSR State Planning Committee (USSR Gosplan) in consultation with the five republics. In 1986, basin water management organizations (BVOs) were set up for the Amu Darya and the Syr Darya basins. The BVOs were in charge of allocation of water resources in accordance with the water release schedules agreed by the republics and approved by USSR Minvodkhoz. The allocation schedules were adjusted twice a year to reflect the projected availability of water in both river basins over the next six months. At the same time, the provision of energy supplies (electricity, coal, gas, oil) arranged for by the central government to the Kyrgyz and Tajik Soviet Republics made it possible to accumulate river flow in the reservoirs during autumn and winter and not use it for hydropower generation. Water allocation arrangements in Central Asia were, thus, based on two complementary components:

- i) Water allocation quotas for each republic and every irrigation project established and strictly controlled by the USSR Government, and
- ii) Planned deliveries of energy to the Kyrgyz and Tajik Soviet Republics for use in winter.

The geopolitical situation in Central Asia changed in 1991 when the USSR collapsed and former Soviet republics proclaimed their sovereignty. As a result, the basins of the Amu Darya and Syr Darya were divided between the respective co-basin countries, and previously national rivers became trans-boundary – changing a domestic matter into an international issue. A few months after declaring their sovereignty, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan entered into their first regional agreement termed “Agreement on Cooperation in Joint Management, Use and Protection of Interstate Sources of Water Resources” signed in February 1992. This agreement confirmed the status quo of the Soviet water allocation arrangements between the countries until new modalities for water cooperation could be agreed upon. The Interstate Commission for Water Coordination (ICWC) was established to implement the Agreement and has since been a stabilizing factor and focal point in the water allocation discussions on the Amu Darya and Syr Darya. However, this agreement, did not stipulate the provision of the energy supplies to Kyrgyzstan and Tajikistan for their use over the winter, when the energy needs there in Kyrgyzstan and Tajikistan are highest. Therefore those countries could not afford to accumulate the winter flow in the dam reservoirs, which later became the principal source of the current water problems in Central Asia. As Kyrgyzstan and Tajikistan have lost the previously delivered winter supplies of energy, they started to rely on their

only readily available source of energy (hydropower). In order to generate electricity at their hydropower stations, they are releasing large amounts of the water from their reservoirs during the winter. The water released in the winter cannot be used productively by the downstream countries and may cause negative effects. Winter flooding is a regular threat in the lower reaches of the Syr Darya in Kazakhstan. Flooding is also common in the Arnasai lowland in Uzbekistan as the result of spillover from the Chardarya Reservoir, located on the border between Kazakhstan and Uzbekistan. The water stored in the Arnasai depression becomes saline and cannot be used further for any purpose.

As a result of winter water releases, much less water is available for the irrigation season, thus, jeopardizing water supply to the population and irrigated agriculture. The shortage of water in the spring-summer season has led to reduced acreages of irrigated land in the downstream countries, and a negative impact on their economy. In this situation the 1992 Agreement becomes less relevant. The water situation in Central Asia is unique, determined in particular by the fact that the main river basins were previously used and developed as national within a single state (USSR) but are presently trans boundary and shared by independent nations. In this situation, it is not easy to provide a straightforward answer as regards the determination and interpretation of the rights and obligations of upstream and downstream countries. "Helsinki Rules" the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes, in force since 1996, and the global United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses, not in force. International water law does provide a general legal framework for transboundary water cooperation, based on the two principal but somewhat conflicting norms: equitable and reasonable utilization of transboundary water resources and the obligation of one State not to cause significant harm to another State through its use of shared water resources. It also requires that cooperation between watercourse States, with a view of attaining optimal and sustainable utilization of the shared resources, should involve consultations between the countries concerned. But if consultations do not result in an agreement, a State can in exceptional cases undertake an action without the explicit consent of its co-basin States. Should significant harm arise, various means of peaceful dispute settlement and possible compensation should be considered.

Relief and Rivers

The physical geography of Central Asian states dictate its water quantity. The overall topography of the region resembles a bowl consisting of elevated grasslands surrounded by high mountain ranges that act as climatic barriers which help to create an arid climate. In the north, modern day Kazakhstan gives way to Siberia, Turkmenistan in the Southwest gives way to the deserts

of Persia, while Kyrgyzstan and Tajikistan bound the mountains of China and Afghanistan to the East and South. The Pamir Mountains in the Southeast are some of the highest and most formidable mountains in the world. Limited precipitation in the plains, combined with high temperatures and low humidity create a “high degree of evaporation and transpiration” which draws away most of the rain that falls in the plains.² Because the bulk of the precipitation occurs in the mountains, the main water source for the entire region is runoff from melting snow and glaciers in the mountains. The Amu Darya is the longer, over 1,500 miles long, and takes in four tributaries. The river encompasses a catchment area of almost 120,000 square miles. Because melting snow provides most of its flow, the heaviest runs occur in the summer. The river’s rapid descent from the heights of the Hindu Kush produces a quick flow rate which causes erosion, delivering loads of fertile sediment all along its path. These deposited silt beds support fruitful fields along the Amu Darya’s banks which invigorate farming and irrigation. The Syr Darya, although not much smaller than the Amu Darya, catches much less water. Just over 1,400 miles long, the Syr Darya’s catchment area includes 57,950 square miles; less than half of the catchment of the Amu Darya. As with the Amu Darya, the Syr Darya originates in the mountains and flows to the plains and eventually into the Aral Sea.

The problems of increasing demand and declining supplies have been compounded by the failure of the region’s nations to work together. Under the Soviet Union, water and energy resources were exchanged freely across what were only administrative borders, and Moscow provided the funds and management to build and maintain infrastructure. Rising nationalism and competition among the five Central Asian states, has meant they have failed to come up with a viable regional approach to replace the Soviet system of management. Indeed, linked water and energy issues have been second only to extremism as a source of tension in recent years. Competition for water is increasing in Central Asia at an alarming rate, adding tension to what is already an uneasy region. Agriculture is the mainstay of the region’s economy, and thirsty crops such as cotton and rice require intensive irrigation. Water use has increased rapidly since the Central Asian states became independent in 1991 and is now at an unsustainable level. Irrigation systems have decayed so severely that half of all water never reaches crops, and several years of drought have cut available water by a fifth even as demand continues to soar. The Amu Darya and its tributaries form part of the border between the Central Asian states and Afghanistan and Afghanistan stakes a claim over water sharing.

Challenges and Opportunities

Water management has suffered from the Soviet legacy of top-down control and general rivalries between the states. The Interstate Coordinating Water Commission (ICWC) that was set up in 1992 has failed to take into account

changing political and economic relations. It is an intergovernmental body with little transparency that focuses almost exclusively on the division of water. There is no representation from agricultural or industrial consumers, non-governmental organizations or other stake holders. Management is dominated by officials from Uzbekistan, leading to suspicions that it favours that country's national interests. This has contributed to a lack of political commitment by other countries to the commission, resulting in a serious shortage of funds. In the meantime, the individual countries have done little to contribute to the maintenance of water systems that benefit the region. Shortly after independence, the five countries agreed to maintain the Soviet-era quota system, but this has become unworkable. The civil war in Tajikistan and the decay of Kyrgyzstan's economy has meant that water-monitoring facilities have fallen into disrepair. Control and enforcement mechanisms no longer function and the various countries now often accuse each other of exceeding quotas. Turkmenistan is using too much water to the detriment of Uzbekistan, which in turn has been accused by Kazakhstan of taking more than its share. Kyrgyzstan and Tajikistan say that the three downstream countries are all exceeding quotas. Even within Uzbekistan, provinces have accused one another of using too much water.

Some of the most serious tensions have centered around barter agreements and payments. The upstream countries trade water to Uzbekistan and Kazakhstan for energy in the form of gas, coal or power. Since energy deliveries have been unreliable, Kyrgyzstan has responded by releasing more water through its hydropower dam in winter, which results in downstream flooding and less water for summer irrigation. Attempts by Kyrgyzstan to demand payment for water have been resisted by the downstream countries. As each country has started to view the problem as a zero-sum game, it has taken steps to increase control over water, often to the detriment of the others. There is increasing uncertainty in Central Asia over plans to build new reservoirs and dams or to expand irrigation. There has been little consultation over most of these projects, leading to intensified suspicions between states. Since the fall of the Taliban in November 2001, there has been concern about the implications of efforts to rebuild agriculture in Afghanistan. Currently that country uses very little of the water from the Amu Darya but reconstruction of irrigation systems will put additional pressure on the river. Tensions over water and energy have contributed to a generally uneasy political climate in Central Asia. Not only do they tend to provoke hostile rhetoric, but they have also prompted suggestions that the countries are willing to defend their interests by force if necessary. Uzbekistan has carried out exercises that look suspiciously like practice runs at capturing the Toktogul Reservoir. The gas shortages and winter flooding that Uzbekistan and Kyrgyzstan have inflicted on each other have a direct and widespread impact on the peoples of those countries and have the potential to inflame ethnic tensions in the Ferghana

Valley. Competition for water can only increase, and tensions will rise unless better mechanisms are put in place to manage the problems.

i) Hydropower VS Agriculture

Upstream-downstream antagonisms are likely to sharpen to the extent that Tajikistan and Afghanistan succeed in boosting their hydropower capacity which could be a major source of income for these poverty stricken countries. With ample hydropower potential, Tajikistan could produce almost 20 times much electricity as it currently does. The government wants to complete unfinished Soviet-era hydropower projects at Rogun and Sangtuda on the Vakhsh River, with Russian and Iranian investment. Uzbekistan worries about these developments, not only because of the potential direct impact on summer irrigation water flows (it has objected to the planned height of the Rogun dam), but also because it stands to lose income (and leverage) from selling natural gas to Tajikistan. In addition, Tajikistan's reduced dependence on imported energy could make it even less interested in coordinating water flows.

ii) Poverty and Pollution

Central Asia is home to a significant amount of natural resources like natural gas, oil, minerals etc. but also to great poverty. The five countries house over 53 million people, of whom at least 50% earn less than PPP\$2.15 per day. Particularly, concentrated in both population and poverty is the Ferghana Valley the small, fertile nexus of Uzbekistan, Tajikistan, and Kyrgyzstan, which experiences poverty levels between 60 to 80%. Agriculture employs 67% of Tajikistan's, 53% of Kyrgyzstan's, and 45% of Uzbekistan's labor force nationally, and much of the agriculture occurs in heavily and unsustainably irrigated land. Because the region's economy is so reliant on agricultural production, it means that the coming water troubles are all the more important to economic security. Even within the Ferghana Valley, there are significant differences in productivity by country. Much of this has to do with differences in government policies in Uzbekistan, Kyrgyzstan, and Tajikistan. In Uzbekistan, there are also government-mandated production targets for cotton and wheat that farmers even some of those not on government owned farmland are forced to grow and sell to the government. Refusal to grow the mandated crops can lead local mayors to cut off water supply to the farmers or farmers' land being taken away. Further, the Uzbek government pays such a low price for the cotton, that it sometimes does not even cover farmers' costs to grow it, and some farmers in the Ferghana Valley have taken to attempting to smuggle the cotton into Kyrgyzstan, just to earn a "living wage," causing escalation in regional tensions. Lack of economic opportunities and crackdowns on democratic freedoms that have occurred in the region encourage not only unrest. But lead to the development of fundamentalist terrorist groups. Over

the past decade Central Asian leaders and security experts worldwide have become worried about the rise of militant groups such as Hizb ut-Tahrir and the Islamic Movement of Uzbekistan, the latter of which is particularly active in the Ferghana Valley. As a result, the Government of Uzbekistan has cracked down fairly hard on perceived Islamic extremism in the Valley and there is a heavy police presence in all parts. Thus, despite the stresses on the population listed above, there is also an inhibiting force in the fact that Uzbekistan is a police state and the population is subject to strong controls on its behavior.

iii) Climate Change

Climate change will dramatically raise the water challenges in Central and South Asia through rising temperatures and drought, more variable rainfall and glacier melt, sea-level rise, as well as changes to the monsoon cycle. As per an estimate, the middle of the century, increasing temperatures and growing water stress may lead to a 30% reduction in crop yields in the region. In Central Asia, climate impact will be felt in terms of reduced rainfall and runoff, leading to increased heat stress, drought and desertification, thus, amplifying the region's existing problems. A 2009 Asian Development Bank Report bleakly concludes: "It is difficult to see anything other than an increase in migration in the region as climate change adds to economic, social, and political pressures." Yet no mitigation and adaptation strategies are in place which can tackle the weather variability and its drastic consequences. The melting of the Hindu Kush-Karakorum-Himalaya glaciers will have serious consequences for hundreds of millions of people. The warming trend in these mountain ranges has been much greater than the global average. As a result of rising temperatures, more precipitation falls as rain instead of snow, will lead to shrinking of glaciers. Two-thirds of the Himalayan glaciers are reported to be receding. Glaciers in Tajikistan have shrunk by a third in the second half of the 20th century. The International Centre for Integrated Mountain Development (ICIMOD) a regional knowledge development and learning centre warns: "It is not unlikely that this will appear as a positive, comforting sign, deterring and delaying required emergency initiatives." However, receding and eventually disappearing high-altitude reservoirs of snow and ice will over time reduce downstream runoff, and increase its variability. As the water flow declines, it compromises hydropower generation. In the agricultural sector, the result is falling production of foodstuffs and commodities like cotton, which in turn may lead to growing poverty and social disparities, escalating rural-urban migration, and rising food prices in cities. There is also potential for conflict between up and downstream states.

Climate change is also expected to cause significant changes to monsoon patterns and increase unpredictability. While much of South, East, and South-East Asia may see increased intensity of these storms and greater rainfall by century's end, for most parts of Pakistan and southeastern Afghanistan a

reduction in precipitation of up to 20% is projected.

iv) Water Energy and International Players

Central Asia's hydropower resources are the object of ongoing great power rivalries among Russia, the United States, China, and India. The United States has sought to turn Central Asia into a supplier of electricity in South Asia, limiting Russian influence; India is keen to secure energy supplies from Central Asia. Within the Eurasian Economic Community (EAEC) that dominates, Russia, attempted to create a Central Asian hydropower consortium to govern the region's inter-connected water and energy problems. However, Uzbekistan's withdrawal from the EAEC in 2008 undermined these plans. Because it groups together Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, Russia and China (with India and Pakistan as observers and Afghanistan as an invited guest). The Shanghai Cooperation Organization (SCO), in principle, could play an important role in addressing the water and energy challenges of Central and South Asia. At the October 2008 SCO summit the issue was overshadowed, however, by efforts to address the impacts of the world financial crisis. In relations between Pakistan and India, the bilateral Indus Water Treaty represents a valuable core mechanism for consultation and conflict resolution. When the South Asian Association for Regional Cooperation was established in the 1980s, contentious topics like water were excluded from its mandate. But the International Centre for Integrated Mountain Development (ICIMOD) does address water issues in the context of transborder environmental problems in the Hindu Kush-Himalayas region (including, among others, Afghanistan, China, India, and Pakistan).

v) Facilitation of Water-energy Cooperation

Most of Central Asian sub-region is embedded in the Aral Sea basin, stretching from what is left of the Aral Sea in the west to the melting glacial "water towers" in the east. The two main rivers of the region, which flow from east to west, are the Syr Darya to the north and the Amu Darya to the south. The former runs from Kyrgyzstan and Tajikistan through Uzbekistan to the northern Aral Sea in Kazakhstan; the latter flows from Kyrgyzstan to Tajikistan, along the latter's border with Afghanistan, through Turkmenistan and finally into the southern Aral Sea in Uzbekistan. These two rivers provide the main source for drinking water, irrigation, and hydropower in the region. A major legacy of the Soviet era in Central Asia was the creation of an electricity-water nexus, whereby the generation of electricity from hydropower in upstream countries was linked to the water needs of those downstream. This system operated in the context of a common management system and shared energy arrangements through regional energy grids and networks. However, this system ended with the collapse of the Soviet Union and the overnight emergence of international borders. Water was increasingly seen as a national

asset rather than a common resource, and the transition to commercial prices for the supply of hydrocarbons to upstream countries (formerly delivered freely as compensation for irrigation water) presented major difficulties for their economies.

There are several organizations involved in the development of water cooperation in the region. The International Fund for the Saving of the Aral Sea (IFAS) founded by the regional Presidents, is the only cooperative structure that includes all five countries. It is a well established structure with branches in each member country, and enjoys the political support at the highest level as the President of each member country serves in turn as Chairman of the body. IFAS provides all its officials with diplomatic privileges and its funding comes from the national budgets of the participating countries. The member countries have pledged to allocate a proportion of their respective GDP to IFAS. In facilitation of Water-energy Cooperation there are several organizations involved in the development of water cooperation in the region.

Conclusion

Central Asian states play a key role in Eurasian geopolitics, because the region is located between East and West, Islam and Christianity, so any small conflict in the region has the potential to spread into more widespread conflict. Resource distribution and allocation exists as a potential catalyst to a conflict; one that could explode into much larger war. The United States policy to prevent regional conflict and state failure applies directly to this situation; however, the possibility of conflict surrounding access to water has not received the attention it deserves. By detailing the Tsarist water policies followed by Soviet and now independent Central Asian policies the unfilled gaps in proposed arrangement have led to a series water disputes. The international community particularly the United Nations, the OSCE, and the European Union has sought to mediate the dispute and find ways to balance the power and water needs of the region. Potential solutions have involved rebuilding cooperative management arrangements, increasing efficiency initiatives in water use, water pricing, and the development of alternative means to generate electricity through a series of much smaller dams. But most of these efforts have shown few results. While de-escalation is needed in the short term, a new comprehensive and fair agreement for sharing water resources that includes Afghanistan also is badly needed. Public participation in the formulation of agreements, as well as new, more inclusive forms of governance PDF, could lead to a long-term settlement. But in the end, it will depend on the political will and readiness of Central Asia's leaders to find a common solution. The Aral Sea cannot be revived, but a more sustainable use of water for drinking and irrigation, to generate energy as well as to better support water ecosystems can be achieved by improving water management even in a perspective of a possibly decreasing access to water due to climate

change. To achieve this, improved cooperation and trust between the countries of the region is essential. The water and energy conflicts in the region cannot be resolved without a willingness from all sides to review their respective positions. Water and energy issues are tightly interconnected in Central Asia. The shortage of alternative energy supplies over the winter in the upstream countries leads to excessive use of water for hydropower. As a result there is a shortage of water over the irrigation period in the downstream countries. Only when the upstream countries have enough energy supplies to at least partly substitute their hydropower generation over the winter season, this vicious circle is likely to be broken. The hydrocarbon resources downstream are, at least in theory, a positive factor, as there are some resources available for investment to improve efficiency of water use and to diversify the economy, as well as to use for exports on favorable terms to upstream countries. Given political view, the imbalanced water resource structure endowed by CAS often leading to inter-state as well as intra-state conflict, can be converted into effective conflict resolution measure which will be in the interest of all stake holders. The basic principle involved in this cooperative formula sounds a genuine humanitarian approach.

References & Notes

1. Bo Libert, Erkin Orolbaev, and Yuri Steklov (2008): "Water and Energy Crisis in Central Asia," *China and Eurasia Forum Quarterly*, 6(3), 9-20.
2. Peter Sinnott, (1992): "The Physical Geography of Soviet Central Asia and the Aral Sea Problem," *Geographic Perspectives on Soviet Central Asia*, Ed., Robert A. Lewis, (London and New York: Rutledge, 82-83.

