



Importance of Water in Central Asia

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Abstract: This paper will investigate the significance of water in Central Asian politics. It will contend that nations are progressively disposed to participate effectively when water is seen as security interdependence instead of the monetary association. To evaluate the potential for trouble over water assets, the paper depends intensively on the collaboration hypothesis that nations will keep participating and expecting the long-period advantages of participation to fulfill local water needs. While most water differences in Central Asia nations have settled through treaties and diplomacy, the following ten to twenty years will probably display the unrivalled challenges of more prominent difficulty in water sharing endeavors. The paper presents different areas at various phases of cooperative advancement over water.

Keywords: Water, Security, The Syr Darya and The Amu Darya.

1. Introduction

Worldwide issues encompassing environmental tensions and decreasing natural assets have become important in the universal stage. While discussions on the impacts of global weather change in the future, nations are left with the calming vision: In the long period, the battle to give fundamental things, for example, energy and water, will turn out to be troublesome as people' increase and degradation of the environment will proceed. Even when concentrating only on water, the issues emerging from lack can branch into plenty of residential issues—from fundamental sanitation to energy generation setbacks. The problems complexes further when nations shared a similar wellspring of water and were compelled to adjust global sharing deals against their populations' advantages. This paper will investigate the security ramifications of water shortage by assessing water's governmental issues in the nations of Central Asia. The last formal water battle occurred around 4,500 years back,

between two cities over water system rights. At the same time, no complete battle over water happened between independent nations from that point forward. Due to the expanding shortage of water assets, the likelihood of country-to-country strains over water assets seems higher in situations where joint rivers and one nation regulate the downstream. Even though the water-sharing assets are normal in nation relations, the once underestimated exercise may turn out to be progressively dubious as water assets shrivel. This shortage is because of the joint increased demand with the population growth and expanded monetary improvement and unstable supply, emerging from environmental debasement and the typical loophole in the natural generation of water assets. For nations to keep up a predictable degree of improvement, expanding scarcity risks water-sharing deals. With the developing demand on a necessarily unstable asset, these deals' difficulties and constant exchange will stay. In Central Asia, conversely, the upstream nations of Tajikistan and Kyrgyzstan are disadvantageous compared to their water-subordinate yet asset-rich nations of Kazakhstan Uzbekistan, which supplies raw petroleum and petroleum gas. The nations of Central Asia needed to create provincial asset sharing understandings as autonomous countries. Precarious deals between the Central Asian nations have constantly fallen, as local needs have bested pre-set up water arrangements. The test for these nations is to frame binding arrangements while simultaneously enabling each nation to create and benefit from their inside assets and enterprises.

2. Methodology and Sources

The paper depends on news reports and public government statements concerning water, new papers on riparian matters concentrating on the issues confronting downstream and upstream nations, and authority government settlements and reports as sources of information for examination. In particular, the content of the World Bank, United Nations, and Indus Water Treaty reports used.

3. Research Questions

- What does a nation risk to guarantee resources to its populace if water compounds strain with neighboring nations?
- What will be the future participation, if less than the current demands of nations?

4. Water in Central Asia

Although it is abundant in minerals and fossil fuels, water is low in Central Asia. Water plays a crucial position in the five Central Asian states' economies. Hydroelectricity is already a critical energy option in mountainous Tajikistan and Kyrgyzstan; modern dams could also render it a big revenue earner for exports. Downstream, river water irrigates Turkmenistan and Uzbekistan's cotton fields. Water sources are placed under strain by heavy water usage, particularly in agriculture. When juggling the needs of upstream hydroelectricity generation and downstream agriculture, Central Asian countries have to divide scarce capital equally.

Cooperation is important for this cause. However, competition for water has also been a source of tensions, particularly between Uzbekistan and its neighbors upstream. The condition has changed lately, now that Uzbekistan's current president has adopted a more positive path to addressing these regional water issues. There are still several environmental impacts of water consumption. Soviet engineers succeeded in converting deserts into productive farmland, albeit at the detriment of the Aral Bay, a previously enormous freshwater lake that had dried up almost entirely. Intensive irrigation pollutes the soils and rivers of the area, too. Massive volumes of water are being diverted by leaky drainage systems and inefficient greening initiatives. More effective water usage and closer collaboration will become extremely important in the future, as population development and climate change are putting pressure on scarce water supplies in the country. In its development assistance for the region, the EU has made water one of the key goals. EU money funds, among other items, municipal cooperation, and water infrastructure upgrades.

The Syr Darya, Amu Darya, and Ural rivers comprise Central Asia's five big river basins. The Syr Darya and Amu Darya rivers flooded it until a substantial portion of the Aral Sea dried up. In the Caspian Sea, the waters of the Ural basin drain, while those of the Ob-Irtysh basin eventually flow towards the Arctic Ocean. This briefing focuses on the Syr Darya and the Amu Darya, Central Asia's two biggest rivers by far. Among them, the river basins of the Syr Darya and the Amu Darya: provide 90% [1] of the region's river water; cover 37% of the land area of former Soviet Central Asia, including much of Uzbekistan, Tajikistan and, Kyrgyzstan as well as significant parts of Kazakhstan and Turkmenistan. Some northern Afghanistan areas are also within the Amu Darya region, home to almost 80% of Central Asia's population. The Amu Darya originates in a part of the Pamir Mountains, while Syr Darya's source is in the Tien Shan Mountains. Central Asia is largely arid or semi-arid. In Sri Darya and Amu Darya basins, the run-off is heaviest in the Tajikistan and Kyrgyzstan ranges, also the most densely supplied with water [2].

5. Central Asian Nations' Water Policies

There are two key goals of the Tajik administration. First, Central Asian states would like to extend the irrigated land, probably via the Zeravshan River intake, across its region. Tajikistan expanded its irrigated area around 200,000 hectares after independence and planned to further expand this area [3]. However, most downstream states are more worried regarding Tajikistan's second goal of growing its hydropower potential. The President of Tajikistan, at the beginning of the second South Asia/ Central Asia Electricity Trade Conference (2006), recalled that hydroelectric power plants' overall ability in operation in Tajikistan is only 3.2% of its hydro-energy resources and said that this share should be raised [4]. At Sangtuda and Rogun, on the Vakhsh Dam, the Tajik government wishes to relaunch the Soviet hydro plant schemes. The Rogun plant began in the 1980s, but when the Tajik civil war erupted, it ended. Then, a devastating flood in 1993 demolished much of what had already been built.

The nation is pursuing an international strategic partner for the project. It would cost approximately US\$ 2.3 billion to complete the project [5]. At Santa, a smaller hydropower station is expected.

Uzbekistan objected to the building of the Rogun dam as it argues that Tajikistan will allow Qashqadaryo and Surxondaryo provinces of Uzbekistan power of the flow of water. Given Uzbekistan's disapproval, even if Tajikistan were to draw the ventures' requisite investment, the country will face considerable difficulties in selling the produced electricity, as the region's existing electricity grid is based in Tashkent. Tajikistan combines with Kyrgyzstan to establish a north-south transmission line to connect the two nations with Kazakhstan and side-step Uzbekistan to solve this issue. Water and land resources are also an issue [6]. Low-level disputes, especially in the Vorukh and the Fergana Valley in Kyrgyzstan, have occurred along the Tajik-Kyrgyz border. After low-level talks and a contract between the Sughd and the Batken in 2001, conflicts were assumed to have been resolved. However, many events along the border were recorded in 2003, and the Vorukh enclave continues to be a source of contention between the two states [7].

Tajikistan's ties with other Central Asian nations on water issues are in partnership with Syr Darya's downstream nations. A significant stake in its ties with downstream nations is the management of strategic water infrastructure: one study reported in 1996 that Uzbekistan threatened to use military action to capture the Toktogul dam and reservoir Kyrgyz part of the Syr Darya if Kyrgyzstan wanted to reform the current distribution policy [8]. With the Toktogul II scheme, the Kyrgyz government would like to boost its hydropower generation potential. However, downstream nations object when they think that Kyrgyzstan still releases so much water from the new dam during the wintertime and not enough during the season. A formal conference was conducted in 2001 on water allocations, but no consensus was achieved. The second priority of the Kyrgyz government is to maintain nutritional self-sufficiency. Kyrgyzstan wishes to broaden irrigation in Osh, Jalal-Abad, and the Chu provinces, with potential rises in transboundary rivers' intake. As their primary focus remains the hydropower sector, downstream countries have not criticized this project. In reality, there has been a certain amount of cooperation. In yet another new institutional structure, Kazakhstan and Kyrgyzstan have created the Talas and Chu Rivers Commission to negotiate better use of transboundary water supplies [9]. The primary goal of Turkmenistan in the field of water protection is to ensure food security. Through reusing run-off water, the government desires to bring 450,000ha of land under farming. Turkmenistan has a very strained water usage partnership with Uzbekistan; both countries depend strongly on irrigation cultivation, and both rely almost exclusively on the Amu Darya for their irrigation. Rumors spread after independence regarding a small-scale secret battle between the two states for the river's wealth. Over the years, there have been persistent accounts of Uzbek troops taking charge of water facilities by force on the river's Turkmen bank and military conflicts along the frontier between Lebap and Bukhara. They are reflective of simmering conflicts between the two nations, although these claims are baseless. Both nations have regularly created accusations of overuse and exploitation of water sources. A divisive informal friendship between the

Leaders of Turkmenistan and Uzbekistan has exacerbated tensions. These frictions have not yet been converted into transparent, large-scale military conflict. Still, the latest proposal of Turkmenistan to create an artificial lake in the Golden Century, the Kara Kum desert, is likely to aggravate problems [10]. The system, which is expected to be completed in 2010, is intended to guarantee Turkmenistan's water protection and to build some 4,000 km² of farming land; it will also avoid flooding in Turkmenistan, an estimated one million ethnic Uzbeks living in Dashkhovuz Province are to be resettled to the Karakum Desert once the lake has been completed [11]. This project has inevitably raised concerns in Uzbekistan that water will be drained from the lake in addition to concerns about population movements.

The Russian and then Soviet policy to minimize reliance on American and British cotton was based in Uzbekistan. Currently, it is the world's second-largest cotton exporter, exporting over 800,000 metric tons per year. Therefore, cotton is a crucial source of hard currency for the Uzbek government and an essential component of state power over its citizens, as state or quasi-state entities handle land tenure and cotton sales closely [12]. Uzbekistan's water management's key aim is to retain its role during the Soviet period, i.e., growing allocations being awarded. Uzbekistan has achieved food stability and would like to grow additional irrigated areas to create a surplus of food for neighboring nations. The diversion of Irtysh and the Ob rivers is one possibility that Uzbekistan discusses with the Russian Federation and Kazakhstan. The scheme consists of the creation of a canal to Uzbekistan from Siberia. It is currently an old Soviet initiative, and Yuri Luzhkov (Moscow's mayor), several Central Asian leaders, and an increasing number of Russian scientists are among the backers. In principle, the minimal extra water supply accessible to Uzbekistan will be solved by the scheme. The project will also encourage the Russian Federation to play a larger role in the area and particularly in Uzbekistan.

There will be a devastating environmental effect on the canal [13]. During the transition, there are concerns about water salinization, which will make it unusable for irrigation. The possibility of bringing two separate habitats into touch and the climatic threats are other issues. There are still several significant logistical issues: a break between Central Asia and Siberia could fluctuate through broad territories. Also, there will be very high financial and strategic costs for Central Asia. Kazakhstan has had conflictual interactions regarding water usage with Uzbekistan, farther upstream, as the most downstream nation in the Syr Darya basin. Kazakhstan suspects Uzbekistan of illegally restricting the river flow in southern Kazakhstan due to regularly ruining farmland. A more field of focus is boundary problems and water rights. As stated by the ICG, the demarcation of the border is unclear: the border problem is of special significance to Kazakhstan, as the southern provinces are among the most heavily populated areas of the world, and disputes over the area's water, arable land, and pastures come at a time when social tensions are already palpable due to economic decline, deteriorating living standards and pasture conditions [14]. Kazakhstan's last big water challenge involves the use of water from the Ili and Irtysh rivers.

6. Usage and Maintenance of Water

The water market has experienced two radical changes connected to the Soviet Union's creation and eventual dissolution in Central Asia. Similar trends have also taken place in areas, not parts of the Soviet Union, such as the western sections of China, owing to the emergence of communism in the early twentieth century and major socio-economic reforms that started and are generally still underway in the late twentieth century. The communist tradition of central governments' regulated water resources dominates the country's water market [15]. In the Middle Asian republics, there was a very high degree of convergence of the water and energy industries, where the water distribution agreements were mostly focused on two complementary considerations: the central government in Moscow (1) distributed and strictly regulated water sources to the Middle Asian republics and (2) intended to provide the Tajik and Kyrgyz Soviet Republics with energy. Although water conservation was seen as effective in the Soviet era due to strictly controlled relations between water authorities and water consumers in the country, the water delivery mechanism's heavy centralization also neglected to consider local administrations' suggestions and demands. At the same period, transboundary reservoir management concerns were posed by the area's united hydraulic infrastructure over water supplies distribution among the region's nations [16].

Recent changes in Central Asia's water sector have been motivated by endogenous innovations and external factors, such as importing experiences elsewhere. In Central Asian nations, on the one side, water usage and management are still heavily affected by the country's past and customs. On the other side, at least to a degree, most Central Asian nations have adopted the principle of Centralized Control of Water Supplies. Although foreign actors have endorsed the adoption of the IWRM, national actors are the main drivers of reforms in many Central Asian nations [17]. Nevertheless, foreign donors' strong importance to introducing IWRM in Central Asia is troublesome, increasing the need for greater local control of preparation for water resources. Although certain principles such as Participatory Irrigation Management and Irrigation Management Transition have been at the center of international support for Central Asian reforms in the water field, their accomplishments have so far been minimal, and water infrastructures are still de facto in possession of the state in almost all countries. The definition of the nexus, which considers the trade-offs between various water-dependent operations, has recently received a heavy emphasis on mitigating Central Asia's water problems. Strong focus is usually put on food and electricity since (a) hydropower plays an important role in developing regional energy, and (b) irrigation is the largest single user of water. During socialist days, a collectively controlled water-food-energy nexus existed but dissolved with the Soviet Union's dissolution [18].

Although the scope of water challenges in most industrialized countries is still daunting, the above three factors are additional hurdles for water resources planners in Central Asia [19]. Three manuscripts in this thematic topic concentrate on the structural and legal dimensions of water

resources. Rakhmatullaev [20] studied the application of the river basin solution in the Isfara Basin. The author provides an updated account of the difficulties, obstacles, and proposals for applying the area's river basin definition. The same writer describes their vision in an opinion paper about how current structural platforms, such as basin boards, can introduce a nexus solution in local river catchments, provincial watersheds, or national levels. In the sense of Eurasian economic integration, [21] addresses interstate collaboration in the water market. In their opinion, the Central Asian States agree that cross-border cooperation in the water sector needs more changes in the interstate regulatory structure and the regional institutional capability. Kathe studied the role of establishing a school network in a research and development project on water resource management in northern Mongolia and discussed capacity development as a prerequisite for implementing Integrated Water Resources Management.

The dependencies between food processing and water resources are considered in all the remaining reports, providing insights into the various interdependencies between the two sectors. Assessing the availability of water supplies is one significant requirement for sustainable agriculture. Relevant areas of cultivation are defined by geography. Following the Hotan River Basin example, Guo [22] measured future irrigation scales in oases. Their research is focused on the distribution characteristics of the river basin's natural vegetation by remote sensing photographs, water supply data, environment data, socio-economic knowledge, and field surveys. Li [23] has studied recent temperature and precipitation patterns in the Tianshan Mountain Area and their impact on wheat development. The authors have observed (1) the tendency towards severe weather events, (2) the maximum warming trends in the eastern TMR, and the highest wetting trend in the northern TMR slopes. And (3) major associations between the yield of wheat and excessive weather or precipitation occurrences. Water quality is another essential factor of the water-food intersection, in addition to the adequate water supply. Irrigation schemes also require resulting irrigation outflows in drylands such as those in Central Asia, which may adversely impact groundwater or surface water quality due to nutrients and pesticides. Future climate change impacts would decrease rainfall and contribute to a rise in internal nitrogen recirculation levels in Central Asian rivers, thereby lowering instantaneous concentrations, according to Jarsjö [24] results. However, there is a chance of extensive nitrogen deposition in the groundwater around farm fields. Another water and land conservation problem in Central Asia is the arid environment island erosion due to salinization. Based on calculated results, Hu [25] examined the Wigan River irrigation district's salt balance. From 1994 onwards, the irrigation district moved from salt deposition to desalination, according to the writers, and the ratio of drainage to irrigation appeared to be of optimum importance.

7. The Amu Darya and The Syr Darya

The nations of Central Asia, especially Tajikistan, depend on the Amu Darya to complete their energy needs. Tajikistan has depended on its hydropower generation; in any case, it leaves a hole to be

completed by outside bases. Additionally, a vitality swap deal between Tajikistan and Uzbekistan guarantees a common supply of vitality, sporadic due to the Tajik dam's limits [26]. Subsequently, Tajik authorities have proposed reviving the Rogun Dam venture, which started in 1976 under the USSR. The Rogun Dam undertaking tries to give an extra three million hectares for the water system while likewise giving extra hydropower production. Kyrgyzstan, an individual upstream nation, is the main state to help this undertaking since Kyrgyzstan, alongside Tajikistan, advances the possibility of upstream water commoditization. Uzbekistan, then again, sees the undertaking of Tajikistan's different and vague methods. As the Foreign Minister of Uzbekistan stated, Uzbekistan considers all choices on utilizing conduits of transboundary waterways, counting hydro-vitality facilities, should not harm the environment and infringe the enthusiasm of the populace of nations in the regions. As a midway nation, Turkmenistan mainly depends on the downward stream, which starts from Tajikistan and then goes through Uzbekistan. However, Uzbekistan is bigger as far as populace and region, and the two nations have been designated with a similar measure of 22 cubic kilometers of water every year. Besides, Turkmen water wasteful aspects and associations with Uzbekistan have endured due to Turkmenistan's choice to proceed with the Kum Canal development, multiplying the first Soviet limit and undermining expanded Amu water shortfalls. The Amu presents an aggravated issue with three nations, each using the river for favorable financial circumstances and unequipped for changing by a Soviet river collaboration.

The Naryn River is a noteworthy branch of the Syr Darya in Kyrgyzstan, where five power plants are located (Kumasi, Uch-Kurgan, Shamaldysai, Tashkumyr, and Tokotogul) [27] (World Bank Report, 2004). The Tokotogul is the biggest and has functioning storage of 14 BCM and a firm yearly yield of nine BCM (billion cubic meters). The two downstream nations of Uzbekistan and Kazakhstan depend vigorously. During the Soviet Union period, an exacting water system was set up that constrained water to 180 cubic meters for each non-vegetation time, compared with the river's natural progression, while permitting the least power production. After the collapse of the USSR, Kyrgyzstan was never again compelled to the water system. However, this implied that the downstream nations were never obliged to give supplemental non-renewable energy source assets. Considerably, Kyrgyzstan worked its Naryn course in power mode for a more drawn out timeframe throughout the winter to balance the lack in downstream nation vitality imports, which prompted lower water stages throughout the mid-year deficits for horticultural for downstream nations. Kyrgyzstan is shaky to give energy throughout the winter; it requires vitality supplements from different nations and high local hydroelectric production. Kyrgyzstan stays in a condition where it is compelled to either release water to produce important vitality for its citizens, causing inadequacy in water supplies for other states agricultural sectors, or depend all the more vigorously on downstream nations to give vitality supplementation that is not ensured. Kyrgyzstan reliably looked with vulnerability in regards to downstream nations' ability to adequately give vitality supplements. The World Bank stated that the Costs indicted for non-renewable energy sources by Kazakhstan and

Uzbekistan are self-assertive and reasonable. The cost paid for power Kyrgyzstan incorporates a critical component for water storage administrations. In any case, the downstream nations accept to purchase unnecessary summer electricity from the upstream nation at an expense generously more than its generation's expense. However, the downstream nations take the matter with the need to obtain more expensive power. The worries decreasing from the upstream nations are legitimate if they provide the needed amount of water throughout the late spring, making a vitality space in the winter.

8. Water's Potential Scenarios

Managing water supplies in Central Asia will pose more problems over the coming decades. Interlinked global developments and regional socio-economic patterns, including demographic increase, climate change, and industrial development, would contribute to these innovations. Central Asia's population is rising at a modest but steady pace, varying from Turkmenistan's projected growth of 22 per cent between 2015 and 2050 to Tajikistan's 68 per cent growth. This development puts increased demand on water supply for an increasing number of citizens to contribute to energy needs and food production. Therefore, the rivalry between rural, commercial and domestic usage of water is bound to increase. For the duration up to 2030, a recent UNECE' nexus evaluation 'for the Syr Darya basin highlighted a range of secular patterns [28]: although water for irrigation needs will remain reasonably constant, water demand for electricity generation and cooling will grow. Also, there would be a strong increase in energy needs for storing, handling, and transporting water and increasing, storing, preparing, and moving food. Finally, there is also an expected rise in land usage on the water in terms of contamination. The problem would be worsened by climate change. The expected impacts involve altered regimes of precipitation, more intense extremes of heat, and rising aridity. Less secure access to water is likely to contribute to additional problems for safeguarding food protection, human wellbeing, and catastrophe risk management. Thus, climate change serves as a 'danger multiplier,' but political, economic, and technical developments [29].

In contrast to various situations of closer collaboration, the potential risks of inaction are the costs of maintaining 'business as normal.' It needs the possible implications of continuing 'business as normal' to be spelt out, which this first example provides as a baseline. It is anticipated that the Central Asian states will continue to participate only in restricted ad hoc cooperation at sub-regional and regional levels. If climate change and demographic development raise rivalry for diminishing supplies and the existing water system declines, coordination is projected to collapse further as a matter of course. As countries cannot find unified alternatives in this situation, each nation would independently follow its objectives, weakening the incentives and ability to cooperate. In such a situation, it is expected that Tajikistan and Kyrgyzstan would use their water supplies to maximize electricity production and attempt to substantially increase irrigation on newly reclaimed agricultural land. It will hurt the seasonality and flows to downstream countries, contributing to continuing reciprocal accusations that commitments are not being met and suggesting only minimal sharing of

drought and flood details. Such behavior will hurt ties with downstream neighbors and, in response, would restrict exchange in resources and food to the detriment of all countries, particularly the more fragile upstream countries. This example reveals that 'business as normal' will heighten risks as many critical trends are expected to greatly raise the burden. It is an extension of the status quo, but it considers the anticipated consequences of population development, the degradation of facilities, and climate change.

The second scenario implies greater technical coordination on water-related problems between Central Asian states, albeit without big political agreements. In this case, policymakers employ risk-avoidance techniques by encouraging their professionals to work together to reduce hazards and associated political threats. Technical cooperation takes the form of enhanced data and information exchanges relating to the usage of water supplies, the development of mutual surveillance and early warning systems, joint study efforts on topics of mutual concern, such as the melting of glaciers, and the exchanging of expertise, such as increased irrigation production as a shared interest. In brief, it encompasses coordination at the level of technical execution and information-sharing. Still, it stops short of arrangements at the political level that might balance cross-sectorial trade-offs. Whereas early alert and knowledge sharing would mainly favor the downstream countries, upstream countries can also find such technological collaboration desirable.

For one thing, downstream countries might provide the resulting benefits to be exchanged. Where such specific trade-offs are impossible, in other ways, linked or otherwise, upstream countries could use information-sharing as expenditure in and evidence of 'goodwill,' maybe in indirect exchange toward similar expressions of 'economic' help from downstream countries. Workshop participants stated, for example, the involvement of upstream countries in obtaining water-saving technologies available in downstream countries, in investing in facilities for glacier and water tracking, and in closer collaboration in reaction to emergencies and hazards: the geography of both Tajikistan and Kyrgyzstan suggests that some of their northern and southern regions are interested. Reinforced technological collaboration along these lines is likely to contribute to secure, albeit timid, political ties. It will reduce the political, environmental, and social threats arising, in particular, from droughts and floods somewhat, not least by ensuring that current agreements are properly enforced. While reinforced technological collaboration would benefit a range of threats, others would stay relatively untouched. It is true of the indirect economic threats connected with the convergence of the oil market, other trade-related problems, and access to external finance. Beyond preventing negative spill-overs, realizing benefits in these industries would entail a political incentive that could hardly be created by technological cooperation alone. The same is true for the lack of political power, which requires more than technological cooperation to solve political cooperation.

In the third example, technological cooperation in data exchange and information sharing is complemented by sub-regional political cooperation in the context of different deals regulating the maintenance of relevant facilities and the organization of sub-basin water supplies. It would reinforce

collaboration beyond the strictly technological domain, although not in a systemic, geographic manner. Typical agreements include water flow regulations, combined with energy trade, and investments in specific infrastructure projects, such as small-scale hydropower projects or wastewater treatment plants, to improve the cost-sharing and benefit-sharing security of existing dams.

The fourth scenario expands on the third example of stronger cooperation below the regional stage. Still, it suggests that this provides a positive feedback loop contributing to the development or reinvigoration of wider regional cooperation within the context of the structural and legal framework for the collective use of basin resources. In this situation, policymakers must negotiate extensive water supply conservation and agreements addressing related topics, including water. Joint organizations, including all the various countries of the basin, would ensure these agreements' long-term enforcement. Ideally, these institutions will also include Afghanistan as a major riparian area of the Amu Darya, whose future growth of water resources and higher use would affect five countries. Even though considering present reality and the problems of resource management agreements in the past, this idea appears far-fetched, the virtuous cycle assumed by this scenario seems possible. It is anticipated that effective collaboration centered on constructive measures, e.g., based on productive market processes, would take off and result in positive feedback loops contributing to extensive regional exchange in food, electricity, and beyond. This example predicted consequences on the risk factors established would be much more favorable than in previous scenarios. Overall, the control of basin-wide resources is projected to result in optimum basin resource utilization, with increased protection around the nexus of food, energy, and water. Regional unification will reduce dependency on foreign allies, such as Europe, Russia, and China, and improve central Asia's overall strength and negotiating power. Compared to the haphazard realistic cooperation example, it will boost both countries' water, food and electricity stability, minimize economic and social threats related to natural disaster losses, and improve strategic gains by diversifying political and economic relations.

9. Conclusion

Despite the agreement signed in 1992 by all five newly independent Central Asian states on water cooperation, water has become a source of severe tensions in the region. States continuously reiterate their control over water and water usage to accumulate state strength and geopolitical leverage instead of respecting and enforcing the 1992 agreement and the several subsequent agreements. All five states in Central Asia have adopted property legislation classifying land and water as state properties. Water strategies antagonize neighbors and contribute to tension in certain situations. Present water conservation policies are not viable, where each state extracts water at the cost of its neighbors while giving lip service to cooperation. Efforts to create an efficient regional water governance structure have proven unsuccessful and growing tensions challenge regional stability. It will be possible to anticipate economic and political uncertainty and escalated local conflict without genuine coordination in the region. The area remains heavily reliant on agricultural production, so water

would inevitably play a role in conflicts between the numerous populations residing in the region for the near future. Central Asia's dynamic transboundary water infrastructure needs leaders to work together to identify solutions that optimize production, avoid conflicts, and ensure all welfare. Although the national goals for water cooperation are very inevitably, there is some overlap. Many nationally advantageous initiatives mean co-benefits for other riparian's of the basin. E.g., more effective upstream irrigation offers significant energy savings while simultaneously suggesting greater downstream water availability. Similarly, better downstream irrigation control vulnerabilities, leaving greater leeway without incurring downstream costs for upstream usage. Also, shared infrastructure may dramatically reduce costs, particularly as alternatives emerge from updating current, national-border infrastructure, constructing modern or transboundary infrastructure, and being hydrologically productive, sometimes at considerable additional costs. Although such reasoning tends to be self-enforcing, it can be intentionally facilitated by exchanging insights and technology and reducing the barriers correlated with cost and capability constraints. As outlined in the previous segment, global experts surveyed at a regional risk management forum sketched possible fields of overlying interests. The most effective approach for Central Asian countries to address the concerns and constraints examined in this study is to participate in incremental confidence-building mechanisms by having tangible benefits taking shape. Such mechanisms are continuing, as in scientific collaboration, dam protection transfers, or property trade-off arrangements. Although size has the greatest advantages at the international level, certain incremental mechanisms may also be better nurtured at lower stages. It is not appropriate to strengthen bilateral ties at the detriment of regional organizations but rather to supplement them by creating micro-foundations for deeper and wider cooperation. It is also important to balance the current focus on exploiting the established top-down regional structure to improve technological and bilateral political coordination below the regional level. Every future enhancement of collaboration must draw upon national policies and strive to reconcile them. The consequence of a realistic approach to collaboration that draws on national policies is that not all Aral Sea basin countries would inevitably be represented. In reality, as long as the alternative of basin-wide collaboration is exclusive, it allows individual governments to take advantage of any frustration with their relative gains by preventing development. The incentive mechanism toward veto tactics may be nudged by a polycentric approach to collaboration, involving different deals addressing diverse particular water-related problems and institutional stages. In reality, doing so might encourage cooperation at the regional level since the advantages of pragmatic cooperation leave non-participants worrying about being left behind. The advantages of collaboration are always complimentary, even though the threats posed by individual countries are not symmetrical, and provide several entry points for mutually advantageous strategies.

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