

Hydropolitics of Amu Darya River:

Prospects of Conflict & Cooperation Between Riparian Nations

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Mohammad Iqbal & M. Dawood Mohammadi

Abstract:

The lack of transboundary water agreements/institutions between Afghanistan and its northern neighboring countries over the ADRB is significantly affecting the inter-state multilateral cooperation and the status of the water resources. No water resource sharing schemes were ever stipulated. If the Amu Darya River does not manage sustainably, in that case, it can turn over to be the prime cause of tension among the riparian countries connected through historical, cultural, environmental, and economic ties. The potential of interstate conflict and the opportunities of cooperation between the riparian's on the water is mainly sourced in the state's national interest.

This policy paper's primary focus is to answer the reasons for Afghanistan's exclusion from the ADRB and current hydropolitics over the ADRB. It also focuses on inter-state cooperation as a catalyst for settlement water conflicts among the riparian nations. This research suggests that effective and multi-sectorial cooperation on Amu Darya River Basin is imperative rather than water-related conflicts. It put forward that water, energy, trade routes, and other sources of connectivity can bring Afghanistan and CARs together to initiate the potentials that they have. It would also help Amu Darya River Basin equitable and reasonable water resources utilization and help the Aral Sea in sustainable development. Despite the hydro-connectivity, the geo-economics connectivity is also promising in the region.

1. Introduction

Freshwater is vital for the survival of living beings and is considered a significant component of national assets. The lack of proportional freshwater availability and water crisis seems impending. Transboundary Rivers are usually a significant source of freshwater, utilized by upstream and downstream riparian nations. There have been abundant conflicts and cooperation in the international river basins and between many riparian countries. The authors of this article argue that if the Amu Darya River does not manage sustainably, it can be the prime cause of tension among the riparian countries connected through historical, cultural, environmental, and economic ties. It is this backdrop that the argument on international rivers is becoming a powerful catalyst for conflict and cooperation gains credibility (Sadoff and Grey, 2002, p. 391). It has been predicted that increasing demand for freshwater resources, climate change impacts, scarcity of water resources, and rapid population growth will cause water scarcity, escalating the "war on water" among the co-riparian nations. From the geopolitical sense, water will be the oil of the next century (Starr, 1991).

According to Uri Shamir, if there is a political will for peace, water will not be a hindrance. “If you want reasons to fight, water will give you ample opportunities” (as quoted by Lonergan, 2001, p. 124).

Afghanistan was a critical intermediate region between Iran, central Asia, and India and has been the center of great civilizations, empires, and trade routes along the land route. The need to expand empires to control or block access made Afghanistan the center of a Great Game on routes (Ispahani, 1989, p. 87). The Great Game between the British and Russia and later between Russia and the U.S, and some regional powers like India and Pakistan have had some inevitable geopolitical implications on Afghanistan (Nagheeb and Warner, 2018, p. 840). After 9/11, the “U.S and NATO military operations in Afghanistan” had a critical impact on the region’s geostrategic map (Akbarzadeh, 2003, p. 227). Although the importance of water in the 21st century also reformed and reconstructed Afghanistan’s significance in the region. In the 21st century, Afghanistan’s transboundary water reformed and reconstructed its importance and role in regional geopolitics. Significantly, Afghanistan’s water infrastructure has been a hostage to decades-long war and insecurity. The projected impacts of climate change on stream flows, increased demand inside the country to meet the food, industrial, and municipal requirements are the areas that are expected to trigger complications in the near future. It can be argued that these emergent factors could result in a substantial geopolitical disconnect, mistrust, and serious conflicts. Inversely, in the case of a cooperative framework, it can boost regional political and economic ties. Thus, water can be defined as a double-edged sword, which could become the source of water-induced conflicts, but also the basis of cooperation between riparian states to find solutions and identify alternatives.

Traditionally, upstream countries’ transboundary river management has always raised riparian downstream riparian concerns, leading to distrust and water conflicts. Given that resource nationalism, public awareness, and water resource management are gradually growing in the country, examining new dynamics in Afghanistan’s hydro-politics becomes an important question. These dynamics of water management initiatives not only raise concerns about sharing and regulating water between Afghanistan and its neighbors imminent but also make institutional engagement around negotiated water agreement an urgent site for contemplation. In this backdrop, existing protocols and treaties regarding the Amu Darya River Basin (ADRB) need to be examined afresh based on multi-disciplinary knowledge. Moreover, many new treaties need to be signed based on the ground realities of each riparian nation. The lack of transboundary water

agreements between Afghanistan and its neighboring north-western countries over the ADRB is significantly affecting the inter-state multilateral cooperation and the status of the water resources.

It is significant to note that the Central Asian Republics (CARs) have established several institutions and organizations to implement the Almaty Agreement¹. Afghanistan is not a party to any of these regional agreements which govern the Amu Darya river. While Afghanistan contributes a considerable amount of water to this river annually, the discussion has evaded the 'Afghanistan question.' It has been observed that post-1960 water-related challenges and the enormous environmental problems in the Central Asian republics have mostly been due to the uneconomic use of water and lack of efficient policies. However, they have not considered issues such as sustainable development of water and agriculture. (Varis and Rahaman 2008).

1.1 Research Questions

The research will address the following questions:

- 1- What factors and forces reinforce mistrust and fuel conflicts between upper riparian Afghanistan and its lower riparian's in Amu Darya River Basin? In what ways is the hydro political past of Amu Darya Basin responsible for marginalizing Afghanistan?
- 2- What could be the potential drivers for facilitating cooperation in the Amu Darya River Basin? In what ways do these drivers help in revisiting the notion of 'national security'?

1.2. Methodology and Data Collection:

The study employs a qualitative methodology and applies empirical and single-case study method. The basis of the selection of qualitative research methodology is that "qualitative studies" are equal or superior for generating valid theory. It will also help the researcher on how to construct and present analytical explanations based on qualitative data (Mason, 2002:1). Even though the selection of a single-case study will provide comprehensive and more detailed contact with substantial illustrations of the events, "Within a single case study, however, defined, multiple observations of theoretically relevant variables normally can be made. Selecting one case of a phenomenon need not mean making only one theoretically relevant observation

¹ After the USSR disintegration in 1991, the newly independent CARs then concluded a new agreement over the management of the Amu Darya and the Syr Darya, usually referred to as the Almaty agreement of 1992. The Almaty agreement acknowledged the 'equal rights and responsibilities' of the parties to use and protect the water.

(Odell, 2001:162). Therefore, taking the Amu Darya River Basin as a case, this methodology will help the researcher investigate how the regional hydro-politics played or continue to play a role in Afghanistan's regional connectivity through the dynamics of the transboundary water cooperation. This research is mostly contingent on secondary sources of data from relevant books, journal articles, official statements, speeches of public and officials, news reports, and information data indexes that focused on Afghanistan's transboundary water and regional hydro-politics, which assess the data related to the transboundary river basins and its politics. It covered Afghanistan's Transboundary water and regional hydro-politics on transboundary river basins. The gathered data contribute towards answering the research questions of this paper.

1.3 Conceptual Framework

Transboundary water is the most debated issue in hydro-politics and international relations pursued by the riparian states. The discussion mostly begins with water scarcity and increasing demand for water, raising concerns of the communities and the riparian states. Water cooperation is discussed widely through the lens of different theories. The new-realists see cooperation as an anomaly, which is less likely to happen because of the complexity in scarcity and interdependency. It also emphasizes that states are primarily "concerned with their survival, (and thus) will not enter into arrangements that may provide more gains to another party" (Dinar, 2007, pp. 15-16).

On the other hand, Julien (2012) argued that "when decision-makers look at international relations through a neo-realist lens, they tend to see transboundary water resources development as a "zero-sum security issue." Adversely, the liberals perceive cooperation as a norm and often overshadowed by interstate confusions. According to them, chaos hinders cooperation, and states concerned with maximizing their interests, and wants to achieve absolute benefits, can realize the cooperation through regimes such as institutions and agreements (Dinar, 2007, p. 16). Zawahri (2004) argues that states must communicate and establish formal or informal institutions to minimize the losses.

Environmental scarcity is an indirect root of violence, and this violence is mainly internal to countries. "It seems reasonable to claim that transboundary waters are an object both of interstate conflict and cooperation, to varying degrees and mostly independently of the riparian's hydrological conditions" (Julien, 2012, p. 55). Water scarcity and water as a shared resource cause interstate conflict because it influences the actor's behavior. "On the contrary, there is evidence that water may also become the unifying resource around which

countries cooperate" (Uitto, and Duda, 2002, p. 367); it depends on both the parties' good bilateral relations that how they solve the problems through the consensus (Haftendorn, 2000, p.63).

Nonetheless, certain factors and forces can lead the water scarcity and acute conflict. In the international river basin, water scarcity and acute conflict are bound to be highly complex, hence for the approach of analyzing, the significant determinants and significances have to be focused on to find how these lead to acute conflict (Elhance, 1999, p. 253). In the international river basin, all-natural processes like climate changes, population growth, and basin-wide human activities are the primary instigators of water scarcity, impacting the water's quantity and quality. Hence, water scarcity can trigger economic and environmental crises, reduced quality of life, and domestic disorders. As a result, the consequences mentioned above can reinforce national insecurity that can probably create acute conflicts in one or more riparian states (ibid, pp. 253-257).

Meanwhile, the main decisive factor of freshwater scarcity is population growth, with the economies growing. The per capita water use is increasing globally (Uitto, and Duda, 2002, p. 366), which creates some conflictual, complex, and unrest scenario in the transboundary river basin between the riparian states. Alternatively, "for the same reasons that scarcity can lead to interstate conflict, it can also lead to cooperation" (Dinar, 2007, p.10). Therefore, the riparian states must emerge from the conflict zone and find the determinant factors and forces to cooperate; correspondingly, "it is predicted that riparian states will cooperate because they have a shared interest in doing so" (Julien, 2012, p. 50). It has also claimed that economic integration and regional security are linked with transboundary water cooperation. Jägerskog and Zeitoun (2009) argued that "[states] contribution deepen the concept of "benefit sharing" [and] recognize that collective action may be driven as much by common goals to reduce risk as it is to share benefits" (pp. 15-16). It is also assuming that recognizing a threat to the international waters through the collaborative structures can create a benefit-sharing and cooperation; instead of a zone of conflict (Uitto, and Duda, 2002, p.365).

Nonetheless, the cooperation must be effective and multi-sectorial, which can be called Effective Cooperation, defined as a "set of actions by riparian states that lead to enhanced management or development of the watercourse to their mutual satisfaction" (Waters, 2009, p. 19). Effective Cooperation "built through strong and equitable structures and institutions for collaboration at the community, national and regional levels" (ibid, p. 7-8). To enhance such effective cooperation and prevent coming acute conflicts, it is obvious to join and form institutions and claim fair and reasonable water use for better social, economic, political, and

environmental stability in the shared river basin. It will also suggest that for better sustainable solutions, “the geopolitical nature of the basin and outside interventions can center on a normative understanding of the regional interests, identities, and commonalities of all the riparian states” (Nagheeby and Warner, 2018, p.839).

Effective cooperation in the river basin can be enhanced by the help of diplomatic and also new technological endeavors and advancement in all the scope regarding the low politics of water scarcity, and that could guide the cooperation rather than conflict (Sadof and Grey 2002; Alam 2002; Dinar 2006; De Stefano et al. 2010). Moreover, through new technology, water management practices can reduce hydro-political tensions and facilitate the efficient allocation of scarce water resources (Elhance, 1999, p. 245).

2. Water and Conflict

The potential of interstate conflict and the opportunities of cooperation between the riparians on the water is mainly sourced in the state’s national interest. Transboundary rivers flow and meandering is complex and challenging states’ main interests and scrutinize esteemed goals such as: “sovereignty, territorial integrity, national security, economic development, and social welfare” (Elhance, 1999, p. 230). On the other hand, the state expected to chase the imperatives of the national self-interest and nation-building and further to drive the multinational rights to the ownership and control of the transboundary waters (Waterbury, 1979)

Beyond the traditional definition of national security, now the water scarcity and water security is an essential component of the national security threat because food security, human security, and environmental security are destabilized by water security that is generally arrived at the national security (Elhance, 1999, p. 230). Despite that, water scarcity container leads to severe interstate conflicts because the water scarcity and security related tensions can create domestic instability in a riparian state that could be perused as a national security threat.

An inclusive realization is a must by scientists, political leaders, engineers, and the public is vital for future transboundary water resources management. Due to the lack of human capacity and hydro-meteorological data, Afghanistan’s unwillingness to participate in regional discourses on water has to be credited (Yildiz, 2015, p. 51). According to Ahmadzai (2016, p. 406), for Afghanistan, “getting into political debate and

negotiations with its neighbors regarding transboundary water resources is an uncharted field both internally and externally because Afghanistan has historically been long ignored by the powers surrounding it.”

2.1 Revisiting the Discourse on International Rivers and National Security

In this section, the research foreground perspectives that highlight transboundary water’s role in determining national security. It underlines that the state’s self-sufficiency, domestic needs for food and potable water, and irrigation are highly dependent on the state’s survival and stability. Such a dependency on international rivers makes the state’s national security more vulnerable (Zawahri, 2004, p. 9). Significantly, the deteriorating ecological affairs, manifested in droughts and floods, could lead the countries in the future could face to witness famines perpetuating food, water, and livelihood security. In turn, it can lead governments to acquire emergency grains, thus being hostage to conditionalities from the donor states or agencies (ibid, p. 10).

Thus it is not an exaggeration to mention that a state is secure until its core values are not sacrificed (Wolfers, 1952). Seemingly, a national security threat can be induced by a lack of water availability and jeopardize the core values that a state depends on it. It has been highlighted that the degradation of resources and the global environment could lead to “economic stress-inflation, unemployment, capital scarcity, and monetary instability and these stresses could transform to social unrest and political instability” (Brown, 1977. Quoted in Zawahri, 2004, p. 7). Such implications also contribute to both international and intra-national conflicts. These conflicts occur where states become interdependent in transboundary waters.

For this reason, “every upstream activity influences the quality and quantity of water available to the downstream state. Similarly, downstream activities influence the upstream state’s ability to develop the river. Moreover, rivers bestow onto their states the potential use of the water weapon” (Zawahri, 2004, p. 4).

The international rivers have been called the ‘next oil.’ In the coming decades, water supply can influence geopolitics, diplomacy, and even conflict (Lufkin, 2017). Meanwhile, “some rivers have the habit of meandering from their established courses, violating and distorting international borders in the process. Thus, rivers raise three major concerns for the riparian states, sovereignty, territorial integrity, and national security” (Elhance, 1999, p. 12-13). As a result, conflict is expected when the dependency on the river between adversaries riparian is high and faces water insufficiency (Zawahri, 2004. p. 4). It can lead states towards

acute conflicts, and one can use water as a tool of power and tie-up water on the national security issue. Subsequently, rivers became a source of development and accomplishment of domestic needs; it was also instrumentally used by upstream nations to trade foreign policy and bargaining chip toward downstream countries. Due to increasing domestic demands and its scarce nature, freshwater forms a critical element of every nation's national security agenda, which redefines the traditional understanding of security and introduces a human-dimension of security.

3. Hydrology of Amu Darya

Afghanistan has a substantial amount of water that originates from precipitation in its high mountains, and 80 percent of its runoff is from snowmelt at the elevations of 2000 meters above sea level (ANDS, 2008, p. 4). According to the World Bank Report (2019), Afghanistan has 65 billion cubic meters (BCM) of renewable water resources annually in 2014, of which about 85 percent is surface water. Afghanistan National Development Strategy (ANDS) points that Afghanistan consumes 35 percent of its total surface water, which originates in its five river basins: Amu Darya River Basin, Helmand river basin, Kabul river basin, Harrirud-Marhab river basin, and Northern river basin. Among these river basins, four are transboundary, shared with their neighbors, and amounts to 90 percent of its total surface water (Thomas et al., 2016, p. 6).

Water-Flow shares of the Amu Darya River Basin by Country				
Riparian Country	Generated Average Annual Flow (million m ³)	Share of Total Average Annual Flow (%)	Average Annual Water Use (million m ³)	Share of Total Average Annual Water Use (%)
Tajikistan	50,000	62.5	7500	11
Afghanistan	22,000*	27.5	5000	7
Uzbekistan	50,000	6.3	33,000	47
Kyrgyzstan	1,500	1.9	1500	2
Turkmenistan	1,500	1.9	23,000	33
Total	800,000	100	70,000*	100

*According to NWARA data, the current annual flow of ADRB from Afghanistan is 19 BCM.

*The missing 10,000 million m³ is probably "lost" along the Amu Darya and in its delta at the Aral Depression (Shobair, 2010, p.4).

Source: (Shobair, 2010, p.4). And (Ahmadzai, 2016, p.409)

The Amu Darya river, *aka* the Oxus, is the longest in Central Asia, which originates from the Hindu Kush and Wakhan in the Pamir Highlands in Afghanistan and flows 2,540 km to the Aral Sea in Central Asia. It flows 1,250 km within Afghanistan or along its border (Ahmad and Wasiq, 2004, p. 10) and has a catchment area of 309000 km² (Wegerich, 2009, p.119). The upper part of the river (after the headwaters' confluence, namely the Wakhan River with the Pamir River) flows from Zor-Kul Lake is called the Panj River. When the river joins its tributary, the Vakhsh River, it is called the Amu Darya (ibid, p. 10). Hydro-logically, the northern rivers belong to Amu Darya Basin, subdivided into two river basins, called the Panj-Amu Darya River Basin and Northeast River Basin -Kokcha and Kunduz rivers- (Klemm and Shobair, 2010, p. 3).

Country	Basin Area of the country (km ²)	% of the total area
Afghanistan	167,473	25.4
Tajikistan	125,450	88
Kyrgyzstan	7,800	3.9
Uzbekistan	362,630	81.5
Turkmenistan	359,730	73.7

Source: (Klemm, 2010) and (Hassani, 2017)

The Amu Darya forms a border of 1800 km between Afghanistan and its northern neighbors, beginning from Zor-Kul and ends at Khamaab. The main tributaries of Amu Darya are Pamir, Wakhan, Shiwa, Kokacha, Kunduz, Vakhsh, Kafiernigann, Surkhandarya, and Sherabaddarya Rivers. The Payandzh and Wakhsh are the most significant tributaries to Amu Darya (Fahim, 2017, p. 3). These rivers are tributaries to the Amu Darya, and it has no significant tributaries along the 1,200 km length that flows through the plain (Ahmad and Wasiq, 2004, p. 12)

The annual average flow of Amu Darya is 75 BCM. It reaches as high as 108 BCM in summer and 47 BCM (winter) during dry or low water years (ibid). The ADRB is the most productive water source for Afghanistan and the region. The total Basin area is 309,400km² and the total irrigated area of Amu Darya is estimated at 6 million hectares. It irrigates around 1.16 million hectares of land in Afghanistan only (Ahmad and Wasiq, 2004, p. 25). Uzbekistan has the largest (2.3 million hectares) irrigated area, followed by Turkmenistan, where the Amu Darya is utilized to irrigate 1.7 million hectares of land. In Tajikistan, the Amu Darya is used for its

0.5 million hectares of land, but about 0.1 hectares of Kyrgyz land is being irrigated from Amu Darya water (ibid).

3.1 Climate Change, Population Growth, & Increases Water Demand

Afghanistan's climate and precipitation patterns are determined by dry continental climate by its topography of the high mountains in the middle of the country and subtropical latitudes. "In the northern valleys, annual precipitation averages 300 mm, most falling from December to May, while in the north overall, annual precipitation averages 400 mm per year... Average annual precipitation on the northern plains is 125 mm" (Ahmad and Wasiq, 2004, p. 06). Subsequently, Afghanistan receives about 327 mm rain/year, on average, engender more than 200 BCM of freshwater, leading to 75 BCM of useful, available freshwater in the country. But the National Water Affairs Regulatory Authority (NWARA) estimation indicates that the annual availability of freshwater reduced 75 BCM to 67 BCM in recent decades (NWARA, 2021). Most of the Amu Darya water comes from the Pamir and Tian Shan mountains' snowmelt and glaciers. Climate change-related recurrent droughts and reduced river flow from earlier snowmelt will likely increase pressure on scarce water resources (Price, 2019, p. 10). The snowfall pattern and the available water for irrigation will negatively affect the Hindu Kush region's central highlands compared to the lowlands. According to the Representative Concentration Pathways (RCP 4.5) calculation, by 2020, 'Afghanistan is estimated to warm by roughly 1.5°C and warming of approximately 2.5°C until 2100, respectively. However, under (RCP 8.5), the country will warm by approximately 3°C, by 2050, and 7°C by 2100 is the more gloomy scenario' (NEPA & UNEP, 2015). Such temperature increases will negatively impact the hydrological cycle, will accelerate the evapotranspiration rate, affect agricultural production, and challenge water resources (Akhtar and Shah, 2020).

On the other hand, the groundwater recharge will decline because of the increased temperature, the snowmelt which feeds the rivers will be melting earlier (NEPA & UNEP, 2015). Droughts will also negatively impact and will put long term threats to the water. It has historically shown that the low winter rainfall happened at least every 10-15 years, and such a climate change can carry additional risks to the water sector (ANDS, 2008, p. 8). Although, the "climate change scenarios for Afghanistan project [worsens] the existing conditions, affecting crops, livestock, access potable water, or industrial use. Consequently, there are gaps between water

supply and demand, which ultimately causes failure to meet the growing food demand across the country” (Akhtar and Shah, 2020).

According to a report produced by the United Nations Environment Program (2007), “Afghan glaciers have receded more than 50% since the 1930s”. That would probably harm the future availability of water in Afghanistan and its transboundary rivers. “Any Afghan effort to harness its waters will alarm its neighbors, who depend on the waters originating from Afghanistan” (Ahmadzai, 2016, p.418). During the year 2004-2012, the groundwater in Kabul has decreased by an average of 1.5 meters per year (Mack, 2018)

The natural population growth rate is high, and the returning of Afghan refugees from Pakistan and Iran has increased (U.N. News, 2018). Moreover, the highest population growth rate in Central Asia, including Afghanistan, will undoubtedly increase the water demand (Hassani, 2017, p. 39). More specifically, Afghanistan’s population has grown from about 11 million in the late 1980s to over 32 million in 2015. Forecasts showed that by 2050, it would reach over 63 million (USCB, 2015). According to the World Bank census in 2019, Afghanistan’s total population is about 38 million (World Bank, 2020). With an increasing population, the demand for industrial use water has also increased for domestic needs. Beyond that, the competition between the rural and urban communities has increased since the rural communities need more water for irrigation, though the urban communities are primarily demanding water for industrial and domestic consumption, at a result; the groundwater level has declined because of the unwarranted commercial and domestic pumping in recent years (Akhtar and Shah, 2020), anyhow; the natural disasters such as flood, can cause epidemics, take lives, destroy infrastructure, and considerable impact on the economic development, in those countries that are heavily dependent on agriculture (ANDS, 2008, pp. 26-27) “Extreme droughts and flooding are expected to occur more frequently in the coming decades, and this may cause major economic losses and social and environmental disasters” (ANDS, 2008, p. 7)

Amu Darya river basin is not let off from estimated challenges and go through bitter disputes. This river “considered likely to experience degradation in food security, increased regional tensions over water sharing before 2040 as a result of inadequate water-sharing agreements, poor water quality and disruption of flows as well as poor water management practices” (Intelligence Community, 2012: cited in Akhtar and Shah, 2020). Finally, climate change would seriously impact the availability of freshwater in the Amu Darya. Because of water scarcity, the water demand will increase rapidly therefor; “water is becoming an increasingly scarce,

economically prized, politically charged, and environmentally degraded natural resource” (Elhance, 1999, p. 225).

3.2 Afghanistan’s Potential for the Amu Darya Basin Water Usage

The Amu Darya is a crucial source of freshwater for all riparians. All the riparians are mostly dependent on water for their agriculture, especially cotton crop, being grown in most Central Asian states, needs more water. Misused of water and high demand for cotton crops create the quantity and quality of water that worsen. Due to unreliable potential in future water withdrawal, the future water supply is uncertain (Haleemzai, and Sediqi, 2018, p. 1013). In Afghanistan, an essential resource for domestic water consumption is groundwater. Consequently, its unsustainable exploitation, population growth, and the potential impacts of climate change can worsen the surface water availability, and it can count to the future less availability of surface water and increased air pollution (Akhtar and Shah, 2020)

A significant volume of water resources (more than 80 percent) eventually originates from the Hindu Kush’s high mountain precipitation and snowmelts. Attributable to high mountains and topography, a considerable potential for hydropower generation is possible, but unlikely little has been developed so far (Ahmad, and Wasiq, 2004, p. 2). “Yet Afghanistan uses only around 33 percent of the 57 billion m³ of surface water available each year” (Thomas et al., 2016, p. 5); when the demand increases, the water use would also increase.

Based on the Ministry of Agriculture, Irrigation, and Livestock (MAIL) data, out of 7.9 million hectares of arable land in Afghanistan, only 3.6 million hectares of the land is being utilized for agriculture (Salehi, 2017). The total irrigated land in Northern Afghanistan is about 1.16 million ha (Ahmad and Wasiq, 2004, p. 25). The current irrigated area on Northern Afghanistan left bank of Amu Darya, is estimated at 385,000 ha, while the estimated potential of irrigated land is about 800,000 ha (Klemm and Shobair, 2010, p. 5). It is expected that the irrigation area would be expended by a relatively small 32870 ha and increase access to water by a further 99500 ha, increasing water demand. It also assumed that Afghanistan’s water demand would rise to roughly 6.09 km³ through the 132370 ha of newly irrigated land for the double-cropping (Wegerich, 2009, p. 120).

On the other hand, the demand for hydropower increases, and the potential to generate electricity through hydropower dams are available. The feasibility study of the 21 medium and small dams had been completed.

The Afghan government has formulated a five-year plan to control water flow and produce electricity through the two large dams on the Amu Darya tributary river (Kokcha). Both can produce 500MW electricity (Salehi, 2017). Another long term responsibility for the Afghan government is to pump water through a canal to the city of Mazar-e-Sharif from the Amu Darya, which will probably impact the water initiatives in Central Asian Republics (Allouche, 2007, p, 52)

According to Da Afghanistan Brishna Shirkat (DABS), the current power production is 280MW to 320MW. About 1,000MW electricity is imported from Iran and Central Asian Republics, while the country also can produce 500MW electricity from wind (Salehi, 2017). The current electricity demand is about 3,571 MW and has the estimated potential from its hydropower 23,000 MW (Thomas et al., 2016, p. 5). According to the SIGAR Report (2015), "Afghanistan imports 73% of its total electricity" from neighbors, which is expected to rise in the future. Currently, Afghanistan does not have the demanded electricity and sufficient energy. Thus, it plans to build at least three major Dams that can impact the Amu Darya river's water flow. It intends to build irrigation and hydropower projects on the Kokcha River in Takhar province, the Kelagay Irrigation and Hydropower project on the Kunduz River in Baghlan province, and the Amu Irrigation and Hydropower project on the Amu Darya in Kunduz province (Ahmadzai, 2016, p. 409). All projects combined will be using about 6000 million m³, showing a 1.4% increase in water usage in Afghanistan (Shobair, 2010)

Lower Kokcha Irrigation and Hydropower Project: The project was started before 1980 and was stopped due to war; new feasibility studies were occurred in 2004 and 2009 respectively and shown the potential to supply water for 96,000 ha of existing agricultural land, with providing sufficient water for the new 37,000 ha land, and also will installation of 42 M.W. hydropower (Ahmadzai, 2016, p. 406)

The Kelagay Irrigation and Hydropower Project: It is another extensive infrastructure on the Amu Darya in Afghanistan that can have the potential of reliable irrigation water supply to 43,250² ha of existing agricultural land, provision of reliable irrigation water supply to 25,365 ha of new irrigable land; Hydropower generation with a 60 M.W. plant (Ahmadzai, 2016, p. 406).

² According to update data from NWARA, currently in Kelagay area only 20,000 hectares of land are irrigated and after completion of the Kelagay Irrigation and Hydropower Project, the number will be doubled to 40,000 Hectares.

Upper Amu or Lower Panj Irrigation and Hydropower Project: In the initial planning stage, it is estimated that it will have a 1000 MW hydropower capacity and exceeds 500,000 ha of existing and new land. These three projects are planned on the Kunduz and Kokcha, the Amu Darya's two main tributaries in Afghanistan (Klemm, and Shobair, 2010, pp. 9-10).

Almar Dam is another extensive infrastructure for irrigation proposed on the Amu Darya in Faryab district Northern Afghanistan. In 2010, Pajhwok News mentioned that the Almar site had been surveyed and was awaiting funding from the Afghan Government (PAN, 2010), planned by the Ministry of Energy and Water (MEW) to be done in four phases. Still, its work was post ponded because of the lack of monetary issues and security concerns (Stewart, 2016, p. 257). As mentioned above, large and medium scale infrastructure projects are underway and proposed for better water-resource management and development in the Amu Darya in Afghanistan. Intake from these projects is to supply water for multi-sectorial needs, hydropower generation, and probably better flood control and upcoming environmental disaster. Such developments on Afghan rivers entail risks and offer transboundary cooperation opportunities among riparian states surrounding Afghanistan (Ahmadzai, 2016, p. 407).

However, with the projected climate pattern in the region, such a small proportion of water consumption in these Afghan projects will cause significant unrest in Uzbekistan and Turkmenistan, the most dependent region on the waters of the Amu Darya River. It frightens them of plans for Afghanistan. Irrigated agriculture consuming more water, and the high possibilities of expanding farmland is limited, increasing food and crops' need. The only solution is to increase the yield per unit that can only be done by using high yielding variations that depend on agrochemicals and irrigation water (Uitto, and Duda, 2002, p. 366).

Afghanistan was set aside from the Amu Darya's water use when the Central Asians had doubled their irrigated agriculture land in the Amu Darya and Syr Darya basins from 1960 to 1980. Afghanistan was not able to develop infrastructure in the Amu Darya Basin because of the lack of resources (Ahmad, and Wasiq, 2004, p. 22).

4. Hydropolitics of Amu Darya River Basin

4.1 Hydro Political Past of the Amu Darya River Basin

ADRB played and playing an essential role in the bilateral and multilateral relations between the CARs and Afghanistan. As cooperation and conflict juxtapose in the ADRB case, riparian-states' development and intervention should be forward in a very cautious manner. Even the domestic politics of any riparian-state would induce cooperation or conflict among other riparian states in the ADRB.

Central Asian Republics were ruled as one unit, and resources were centralized under the Soviet Union's regime. However, all-embracing development did not occur until 1953, when the "virgin land" policy implemented by Nikita Krushchev (Wegerich, 2009, p.118) was foremost to a vast expansion of agriculture their water systems managed by the Soviet Ministry of Land Reclamation and Water Resources. O'Hara (2000) interprets that Moscow's Central Asia strategy was a 'divide and rule' strategy through water allocation. First, water disputes strengthen the republics' national distinctiveness and limit the possibility of regional cooperation, which could not threaten the Soviet interests in the region. Second, as water competition increased, the Republics were forced to ask Moscow to intervene (p. 340). But laterally, the immense challenge for the Central Asian state was to replace or re-establish the Soviet water allocation system, in which water and energy resources were freely exchanged between the Central Asian States. After independence, disputes have been raised between the upstream and downstream countries on water use for agriculture and energy generation. (Blagov, 2006).

Since 1873, Afghanistan and its northern neighbors, the Soviet Union, later the Russian Federation, and the Central Asian states have concluded agreements relating to the Amu Darya. For Afghanistan, these agreements focused solely on the river as an international boundary. No water resource sharing schemes were ever stipulated. The most significant agreements are the Frontier Agreement between Afghanistan and Russia (1873); The Frontier Agreement (1946) between Afghanistan and the Union of Soviet Socialist Republics (USSR); and The treaty between the Government of the USSR and the Royal Government of Afghanistan concerning the regime of the Soviet-Afghan state frontier (1958). However, in 1977, Afghanistan sent a delegation to Tashkent (Uzbekistan) to negotiate a water-sharing agreement. The Soviet Union could only

offer 6,000 cubic meters a year, 3,000 cubic meters short of the Afghan demand. An agreement failed to materialize.

Following the Soviet Union's dissolution, the newly independent Central Asian states established several regional cooperation institutions. These institutions all integrated into the International Fund for Saving the Aral Sea later, including the Interstate Coordinating Water Commission (ICWC), the subordinate Amu Darya and Syr Darya Basin Management Authorities, the Interstate Council on the Problems of the Aral Sea Basin (ICAS) and the International Fund for Saving the Aral Sea (IFAS) (King, and Sturtewagen, 2010, pp. 4-5). The 1997 integration of ICWC and ICAS into IFAS indicated the member states' awareness of the Aral Sea environmental crisis's gravity and the need to effectively coordinate their response (Horsman, 2005, p. 66). Unfortunately, several disputes and tensions are unresolved because of the weak institutional framework. The IFAS-ICWC system is not effectively working because the international agencies (World Bank) favored creating these institutions, and states are relatively unwilling to cooperate (Allouche, 2007, p. 48).

Another initiative has been taken by the USSR that created the River Basin Organization (BVO) in 1987. Post-Soviet Union collapse, the CARs have upheld the water quotas set in 1987, even though based on (BVO) the Almaty Agreement (1992) has signed after the independence of Central Asian States and Afghanistan was not taken as a part of the Agreement (Wegerich, 2008). Tajikistan expanded its hydroelectric output, and agriculture production, mostly cotton, has increased by the Turkmenistan and Uzbekistan. Northern Afghanistan has also taken action for the cropland expansion (Babow, 2012, pp. 10-11). That was why the Amu Darya River had lost its precious water availability, and it seems to face water scarcity in the next decades. The Almaty Agreement (1992) has not stimulated cooperation between the states regarding water management (ibid, p. 15).

Currently, Amu Darya is governed by various bilateral and regional treaties: between Afghanistan, Russia/USSR, and Central Asian Republics. The Almaty Agreement signed in February 1992 by representatives of the former Central Asian Soviet Republics in the Syr Darya, and Amu Darya River Basins acknowledged water resources' joint management (Wegerich, 2008, p. 77). The former are boundary treaties and do not cover the use of Amu Darya, and the latter is, among other things, water-sharing agreements and govern the use of water. Afghanistan has signed three border agreements with the former USSR/Russia, Frontier Agreement between Afghanistan and Russia, 1873. Secondly, the Frontier Agreement between

Afghanistan and the Soviet Socialist Republics, 1946, third was a treaty in 1958 between the Royal Government of Afghanistan and the Soviet Socialist Republics (Horsman, 2005, p. 65). "All of these agreements primarily focused on the river as an international boundary. They also dealt with navigation, and water quality issues and usage such as irrigation" (Ahmad & Wasiq, 2004, p. 40). Unfortunately, Afghanistan has been excluded from pre-USSR and post-USSR water-sharing agreements. During the post-USSR water-sharing agreement (1991-96), Afghanistan experienced an internal civil conflict and later the Taliban regime rule, which was not recognized by the CARs. The CARs had not formally recognized the Taliban regime (Haleemzai, Sediq, 2018, p. 1024). Moreover, another reason for the exclusion was that, for the Central Asian countries, cooperation with Afghanistan was not their priority (Horsman, 2005).

The later "[n]either the Central Asian states' [after] independence nor the establishment of the Karzai government in Kabul were seized as an opportunity to recast regional water structures" (Horsman, 2005, p. 65). However, the evidence showed that the Central Asian States established institutions and water bodies, but they never considered Afghanistan's concerns (Ibid, p. 66). Only Tajikistan seems interested in serious dialogue with Afghanistan and held three water-related meetings in 2006-7. Their bilateral dialogue seems interesting because there are strong political and water-related collaborations (Horsman, 2005, p. 67). Another initiative has occurred between Afghanistan and Tajikistan to manage and develop water resources and exchange the Panj-Amu Darya River Basin data in 2010 and 2014 (Hassani, 2017, p. 10). There is no unilateral/bilateral agreement or treaty that could enhance cooperation between Afghanistan and its riparian states. Therefore, it is imperative to take the next steps to bring ties and collaboration between Afghanistan and CARs.

Water allocation in post-Soviet Central Asia was as a The New Great Game. The Karakum canal (the Turkmen Soviet Socialist Republic) and the Rogun Dam construction by Tajikistan were in the USSR's greater benefit instead of paying attention to equitable and reasonable water allocation among the individual Soviet Socialist Republics (SSRs). "The Soviet water management system favored Turkmenistan, and Uzbekistan ignored Afghanistan and used Tajikistan as a water regulator" (Wegerich, 2009, p. 119). As Afghanistan excluded from the Tashkent negotiations (1977), its claims of 9 km³ of the Amu Darya river flow had also declined by Moscow. Moscow single-handedly allotted a meager 2.1 km³ of the river use (ibid). Diminishing the role of Afghanistan as a shareholder in Amu Darya water influenced by the fact that various International Financing Institutions (IFIs) and bilateral treaties counted the country's geography as an South Asian rather than a

Central Asian state; in fact, Northern Afghanistan (the part of Amu Darya river basin) is undoubtedly situated in the realm of Central Asia (Klemm, and Shobair, 2010, p. 2).

4.2 Current Hydropolitics in Amu Darya Basin

Hydro-politics and transboundary water resources are dimensions of the changing behavior of the foreign policy of the states. According to Elhance (1999), "hydro-politics is the systematic study of conflict and cooperation between states over water resources that transcend international borders (p. 3)." It has also claimed that "Hydropolitics is first and foremost about politics, not water.....Hydropolitics is what societies make of it" (Julien, 2012, p. 62). Some academics have argued that it is not only politics that influence water-related processes but also politics influences by the water resources activity (Swyngedouw 2009, p. 57).

The influence of politics over Afghanistan's riparian relations with its water-shared neighbors has impacted cooperation and competition over transboundary water relations. Afghanistan's three transboundary rivers have become a distinctly politicized element within its bilateral ties with northern, east-southern, and Afghanistan's western neighbors. The recent Afghan policy changes about water management have raised concerns from the neighbors with whom the country has transboundary water issues. In his visit to the United States, President Ghani, on March 26, 2015, in his talk at the Center for Foreign Relations in New York City, has determined his national programs in three different sectors indicating his priorities. He marked "harnessing waters of Afghanistan as a second opportunity or program from which Afghanistan can benefit" (Arg, 2015). President Ghani has made it clear that the top national priority is to improve water availability via Dams (Hessami, 2018). While the Afghan government also sees Dams as a sign of nation-building and a means of staying in power (Nagheeby and Warner, 2018, p. 841).

Since then, water management and water containment strategy have placed Afghan policymakers as a sign of power and water nationalism. Hence, public awareness about the water's importance is going to build. However, "large Dams have been promoted as instruments of development to meet water and energy needs while supporting economic development" (Stewart, 2016, p. 218).

Many scholars have studied the hydropolitics of Central Asia and particularly the Aral Sea basin (see Smith 1995; O'Hara 2000; Wegerich 2008; Dukhovny and Sokolov 2003, 2011). However, in the case of the Panj-Amu Darya, there are very unambiguous revisions of the hydropolitics. Moreover, the complexity,

interdependency, and geopolitical significance of the Basin are not well addressed. Because of the Great Game's shadow, the basin integrated approach to serve riparian's water demand has been overlooked for their resource controlling interests by the external actors, and water is highly politicized (Nagheeby and Warner, 2018, p. 841). Such strategies eventually loom the water management and development in Afghanistan, mainly in the Amu Darya basin, and the opportunities for transboundary water cooperation with Central Asian states. Henceforth, due to domestic political disorder, decades of war, and conflicts, Afghanistan could not develop its institutional and human capacity, so the lack of enthusiasm in hydro-politics was due to weak bargaining power over its neighbors. That is why Afghanistan has stayed aside from water management; however, it will proclaim its presence in the water management system in case of political stability (Allouche, 2007, p. 47). Without the inclusion of Afghanistan into the ADRB treaties, if it "start to develop water resources; the regional stability balance will be threatened" (Yildiz, 2015, Pp. 46-47).

In the absence of Afghanistan's membership, the Central Asian states established the transboundary water management appliances; moreover, the re-establishing of Afghanistan and its growing demand for water will give a chance to join the established institutions on the Amu-Darya river basin that would impact the downstream states (Ahmadzai, 2016, p. 403)

The future regional discussions on sharing water will not be uncomplicated and controversy-free because Afghanistan will change its current 'non-player and outsider' status in Central Asian hydro-politics when it starts to water-management and builds infrastructures (Yıldız, 2015, p. 41). While "this development won't be so easy if the current amount of water use of riparian states will be same when Afghanistan plans to release a smaller amount of water" (ibid, p. 41).

4.2.1 Tajikistan

Like Afghanistan, Tajikistan is also an upper riparian state in the Amu Darya River and mostly depends on the water from the Amu Darya for energy generation and irrigation. Therefore, Tajikistan is keen to develop its current irrigation land and hydropower resources to break the flow of electricity imports from its neighbors (Ahmad and Wasiq, 2004, p. 27). Tajikistan has the potential for electricity generation, but with considerable controversy and objection from the downstream countries such as Uzbekistan (ibid, p. 26).

The Tajikistan government has two primary objectives. First, it would like to expand irrigated land. Therefore, post-independence, the irrigated land has expanded about 200,000 HA. It anticipates increasing

this area further with plans to increase it by an additional 500000 HA (Allouche, 2007, p. 49 and Krutov and Spoor, 2003). It has also planned to divert the Zarafshan River to increase the quota of water use, and it will raise some severe tensions with Uzbekistan, which uses 95 percent of the flow of Zarafshan River. The current underdeveloped agriculture is the legacy of the Soviet Union's water allocation, which uses water inefficiency. Thus, a large area is planned to expand agricultural land, which is very costly and probably will increase the water use from Amu Darya (Ahmad, and Wasiq, 2004, p. 27). Secondly, it aims to "increase hydropower capacity for domestic use as well as to export to other countries" (Haleemzai and Sediqi, 2018:1024). However, riparian countries are further worried by Tajikistan's second objective to increase its hydropower capacity (Allouche, 2007, p. 49 and Haleemzai and Sediqi, 2018, p. 1024).

For many years, Tajikistan is trying to build the Rogun Dam, which can generate 3600 MW of electricity, which would help Tajikistan enhance its energy shortages; moreover, it can help Tajikistan export electricity (Ahmad, and Wasiq, 2004, pp. 27-28). The Rogun Dam construction was a big challenge for Tajikistan because its construction has already opposed by Uzbekistan³ (Wegerich, 2009, p. 121). Regardless of Uzbekistan, the international financial institutions were also vague and unsure in constructing stage three of the Rogun Dam (ibid). In such a scenario, the Tajik Government would hardly triumph to convince any donor country to build phase three of the Rogun Dam, unless with more conditionality or pay the cost of huge imposed cooperation. Tajikistan will produce enough electricity, but downstream Uzbekistan will be affected negatively because the water flow will be reduced in the summer to the downstream countries (Ahmad and Wasiq, 2004, pp. 27-28). As a result, Tajikistan has been starting to build the Rogun Dam at a high cost. "Tajikistan was – and remains – disastrously impoverished. So it was that the government issued shares to fund construction of the Roghun dam, which is currently slated to cost around \$3.9 billion" (Eurasianet, 2018).

³ Even though, the opposition of Uzbekistan on the first and second phases is not clear, however, Uzbekistan main concern is the third phase of the Rogun Dam. Uzbekistan claims that Rogun Dam would give Tajikistan control of the flow of water to Uzbekistan's Surxondaryo (Surkhandarya) and Qashqadaryo (Kashkadarya) provinces. See details of the each phase below:

- First phase: 225m tall, 2.78 km³ total design capacity, 1.92 km³ operational storage;
- Second phase: 285m tall, 6.78km³ total design capacity 3.98 km³ operational storage;
- Third phase: 335m tall, 13.3 km³ total design capacity, 10.3 km³ operational storage;

Moreover, suppose Tajikistan plans to build two hydropower dams (the Dasht-i-Jum and the Upper Amu Darya River) on the Panj River. In that case, it will also impact Afghanistan's proposed projects on the lower Amu Darya River. For that reason, both the developments will need to join and establish an agreement with Afghanistan (Haleemzai, Sediqi, 2018; p. 1026).

4.2.2 Uzbekistan

Uzbekistan is mostly dependent on agriculture that is vastly using water of the Amu Darya. Uzbekistan has the largest irrigated area with 2.3 million H.A. and the largest population in the Amu Darya Basin; it generates little water to the river than others but consumes the most considerable water. The river runs through the Surkhandarya, Bukhara, and Khorezm, three Uzbek provinces, and ends in the Aral Sea (Ahmad and Wasiq, 2004, p. 28).

As per the hydropolitics in Central Asia, "Uzbekistan was the centerpiece of Russian and then Soviet strategy to reduce dependence on British and U.S. cotton" (Allouche, 2007, p. 50). With the Russians' massive support, 'Uzbekistan is the second-largest exporter of the cotton and exports about 800,000 metric tons every year' (ibid). Cotton production needs enormous water use, and poor water management misuses an extensive volume of water. Thus, water is not used on the supply and demand based (Ahmad and Wasiq, 2004, p. 28). "Cotton is, therefore, a key source of hard currency for the Uzbek government and an important component of state control over its population, as land tenure and cotton sales are tightly managed by the state or quasi-state bodies" (ICG, 2005, p. 93).

Uzbekistan's policy is to expand and develop its irrigated areas to enhance a food production surplus for export, helping Uzbekistan maintain its established position during the Soviet era. Beyond Amu Darya's water use, it seems possible to divert the Ob and Irtysh rivers through Siberia's canal across Kazakhstan to Uzbekistan. The project was an old Soviet plan, and it would help solve the water scarcity problem in Uzbekistan. Beyond that, it may have havoc environmental impacts (Allouche, 2007, p. 51). Uzbekistan, in particular, faces serious problems. Agriculture is the cornerstone of the country's economy, and thirsty crops such as cotton and rice require intensive irrigation. Uzbekistan's agricultural infrastructure is dependent on irrigation, which consumes about 90% of the country's water resources.

4.2.3 Turkmenistan

With having 1.7 million H.A. of irrigated land, Turkmenistan is the largest per capita consumer of water from the Amu Darya. The Karakum canal is one of the most massive irrigation water supply canal globally, completed in 1988. It is the most crucial water source supplied from the Amu Darya (Ahmad and Wasiq, 2004, p. 28-29). Similar to Uzbekistan or other Central Asian countries, Turkmenistan also wants to expand its irrigated area. Therefore, its primary objective is to manage water and ensure food security; thus, the government wants to expand more than 450,000 hectares of land (Allouche, 2007, p.50).

Moreover, Turkmenistan's agricultural area increased from 1,329,000 ha to 1,843,000 ha. Its total water use increased from 22435 km³ to 27958 km³ between 1990 and 2003 (Krutov, and Spoor, 2003). Such new initiatives will probably create some regional tensions. Even though both Uzbekistan and Turkmenistan are mostly dependent on the Amu Darya waters for irrigation agriculture, every large-scale water development project can impact each other. "Both countries have routinely engaged in accusations of overuse and misuse of water supplies" (Allouche, 2007, p. 50). Turkmenistan, like the other riparian countries in the region, misuses water for agriculture. However, Turkmenistan overuses water from the amount suggested for the actual need by the international practices. The current developing plan of the artificial lake (Golden Century Lake) on the Karakum desert is challenging for Turkmenistan. It will escalate tensions with Uzbekistan because the project will take off water from the Amu Darya, which has flowed to the Aral Sea (Ahmad and Wasiq, 2004, Pp. 28-29).

Several interstate worries are to be happening related to the construction of the Golden Century Lake. According to the International Crisis Group (2002), "there is also an ethnic dimension to the project—an estimated one million ethnic Uzbeks living in the Dashkhowuz Province of Turkmenistan are to be resettled to the Karakum Desert once the lake has been completed" (pp. 24-25).

4.3 Amu Darya's Geopolitical Significance & the Potential of Geoeconomic Connectivity

Afghanistan has been a buffer state for the superpowers and some regional powers during the 19th and 20th centuries. The geopolitical competition and the great powers' strategic rivalry as the Great Game, namely the British and Russians and earlier the U.S. and Soviet Union, and regional powers like India and Pakistan have been pursued different strategies for seeking their geopolitical interests. Beyond that, the water issues have

also shaped the geopolitical dynamics in Afghanistan. (Nagheeby and Warner, 2018:840). Furthermore, the new Great Game is mostly on resource capture and natural resources competition, such as (water, pipelines, routes, and energy transmission) in Central Asia. Afghanistan is a crucial state in the new great game of the regional powers.

On several fronts, Central Asian active engagement with Afghanistan paves the way to join with its neighbors as a normal country, hence some large projects such as Turkmenistan-Afghanistan-Pakistan-India (TAPI) gas pipeline. Central Asia and Afghanistan can be called “in-between” states; hereafter, they can successfully deal with the regional hegemons, Russia, China, Pakistan, Iran, regional influencers, the United States, and the E.U., Turkey, and India (Durso, 2018). It is expected that TAPI will increase all member countries’ economies or offer assistance to all contributing countries and promote cooperation. It would be a revenue source for Turkmenistan, Pakistan, and India; it would solve energy deficits. In Afghanistan, it would make available a source of income and gas for industry, with the further advantage of connecting Afghanistan with Gwadar’s Pakistani port (Foster, 2010). Although “consistent with the U.S. declared policy of linking Central and South Asia and diversifying export routes for Turkmen gas” (Ibid), TAPI has its importance to the U.S. Such connectivity and disconnectivity in South Asia and Central Asia mostly depend on Afghanistan’s strategic location.

“Connecting Afghanistan to Central Asia will most immediately offer Afghanistan a northern route to Central Asia, across the Caspian Sea to Azerbaijan, and on to Europe. The northern option will motivate Pakistan and Iran to upgrade their infrastructure, secure their territory, and reduce corruption if they want to take part in the export of Afghanistan’s abundant minerals, estimated to be worth more than \$3 trillion (Durso. 2018).”

For the additional trade facilities, Afghanistan and Kazakhstan have worked to improve trade, and they created a joint transit company. Post-2016, Uzbekistan also upgraded ties with its neighbors. Concluding that Uzbekistan is willing to offer host peace talks between Kabul and the Taliban, Uzbek President Mirziyoyev declared, “Afghanistan’s security is Uzbekistan’s security” (Durso, 2018). Uzbekistan is also constructing a 657 km rail line that connects Afghanistan with the northwest ports. The 150-megawatt electric transmission line from Tashkent to Kabul In 2009 is another effort towards connectivity (Ibid). The two governments have confirmed 20 bilateral agreements in numerous areas during Ghani’s first visit to Tashkent in December 2017. “What do the region’s leaders want? They want to create a zone of trade and tolerance” (Durso, 2018). Both the Central Asian countries, Kyrgyz Republic and Tajikistan, have a surplus of electricity during summer; on

the other side, both the South Asian countries Afghanistan and Pakistan are the electricity shortages. The new electricity transmission system, called CASA-1000, would support the efficient use of clean hydropower resources in the Central Asian states to connect all four countries. The CASA-1000 project would also balance the countries to improve electricity access, increase trade through market expansion, and find sustainable solutions to water resources management (CASA-1000 Project, 2017).

Afghanistan's domestic situation and the implications for its relations with its neighbors is a crucial factor. In the last four decades, Afghanistan's unstable and weak political situation affected the transboundary water's cooperation with its neighbors. As Gleick (1995), Notes the political context is essential for trans-state water management. "During this period, relations with Moscow and the Central Asian capitals have fluctuated between clientism and antagonism" (p. 85), their little respect towards the weak Kabul government during 1991-96, and ignoring Kabul from consulting (Horsman, 2005, p. 70). However, post-2001 cooperation is also low, and Kabul has been denied they form the various water-related initiatives on the Amu Darya River. Implementing the water sector strategy (WSS) 2008, especially its major infrastructure plans, will impact Central Asia's water supplies. Cooperation on the Amu Darya river is possible if riparian states engaged with Afghanistan. Their collective efforts would enhance collective interest in the areas of regional stability, water security, and access to South Asian markets (King, and Sturtewagen, 2010, p. 6).

Furthermore, jointly working on renewable energy and seeking alternatives in the basin could be achievable in the Amu Darya River Basin. Despite this, Tajikistan and Turkmenistan plan to add 50,000 HA and 450,000 HA irrigated land for growing cotton, wheat, and rice (Wegerich, 2008). On the other side, northern Afghanistan controlled 385,000 HA of irrigated land and will have the potential to expand more into 100,000 HA in the next two decades (Ibid). The planned expansion of agriculture will require that more water be diverted from both surface and groundwater sources. Any increase in water use will put enormous strain on the water system in the ADRB and could cause droughts (Babow, 2012, p. 14). Therefore the riparian's must find some alternative implications to seek better opportunities to participate in every possible cooperative framework. One reasonable step could be investing in renewable energy sources, which could act as insurance against future climate, water, and energy shocks.

Tajikistan's electricity production is mostly through hydroelectric stations in the Pamir Mountains and very few natural gas plants. Tajikistan has a high potential to expand its electricity production by investing in wind

and solar power, easing the Amu Darya River (Babow, 2012, Pp. 19-20). Although Turkmenistan has precious natural gas resources, generating its electricity through burning natural gas. It is expected that the natural gas reserves will decline in the next three or four decades and will face economic and energy crises. Therefore, the “Development of hydropower, solar, and wind resources could help prevent future energy crises while insuring the country against price shocks and environmental change” (Ibid, p. 20).

Uzbekistan’s energy is also dependent on natural gas, “about 81% of Uzbekistan’s energy comes from fossil fuels” (Ibid, p. 21). The Uzbek Government must develop its renewable energy resources that could help prevent energy and economic crisis. Furthermore, securing renewable energy sources could guarantee some degree of political stability in the future. It will help shift away from fossil fuels entirely while endeavoring to be energy independent (ibid, p. 21).

It is expected that Afghanistan will use more water from the Amu Darya River shortly. Furthermore, climate change, disagreement of the riparians on water distribution, energy, and irrigation will cause decreases irrevocably in water availability (Libert, 2008, p. 35). However, Afghanistan cannot be ignored because it is the second-largest contributor to the river after Tajikistan (Ahmad & Wasiq, 2004). Northern Afghanistan accounts for 15% of the Amu Darya River Basin area and 17 % of its population (Micklin, 2000, p. 4). The Afghan government needs to convince the regional and international actors to support its claim to enter the Amu Darya River Basin Agreement or work on any other supportive framework. It had to consider that trade routes (TAPI) or energy transmission projects (CASA-1000) can be used as the bargaining chip and improve regional hydro-political connectivity.

The country needs to handle reliable water management to improve agriculture (80 percent of the nation depends upon agriculture), the mining sector, and drinking water for its rapidly growing population. However, climate change and weak governance will escalate the conflict and impact political stability and relations with neighbors (Hessami, 2018). Finally, it can be suggested that water, energy, trade routes, and other connectivity sources can bring Afghanistan and CARs together to initiate their potentials. It would also help Amu Darya River Basin equitable and reasonable water resources utilization and help the Aral Sea in sustainable development. Despite the hydro-connectivity, the geoeconomic connectivity is also promising in the region

5. Challenges & Opportunities for Cooperation on Amu Darya Basin

If the countries attain a water management strategy, it could use water as a force of peace and stability rather than an instrument that perpetuates conflict. Subsequently, Afghanistan can step towards better cooperation through its water management strategy, rather than conflicts. It is evident that effective cooperation can lead the riparian states towards better water management and probably promote economic and political stability. “There are many intervening variables geographic, political, economic, cultural, and so forth that mediate any resource scarcity acute conflict relationship” (Elhance, 1999, p. 6). The study of variables has to be grasped in the debate of transboundary water cooperation. These variables can be challenges for cooperation and even though it could be count as opportunities. For instance, population growth, rapid climate change, water pollution, regional hydropolitics, lack of trust between the CARs on water allocation and utilization, old techniques of irrigation, regional geopolitical consequences, the decline in groundwater levels, unnecessary use and loss of water, reduction of snowfall and rainfall, and inter-sectoral competition and lack of viable diplomacy between the riparian states, will cause the disconnectivity and unhealthy relations between Afghanistan and riparian countries in the Amu Darya Basin.

On the other hand, such variables can be count as opportunities for interstate cooperation. Therefore, the future flooding threats; upcoming risks of climate change; population growth; increasing demand for water; new diplomacy; infrastructure building; capacity building; the unique potential of the young generation in water management; and hydro-diplomacy can be taken as opportunities that could enhance cooperation and connectivity in the regional hydro-political milieu. For instance, in the international basins, hydrological interdependencies can build connectivity between the riparian states in terms of droughts in downstream countries (Elhance, 1999, p. 13).

Afghanistan’s geography has the capacity of geoeconomic, geopolitical, and ecological connectivity. To seek cooperation opportunities, the Afghan government must link the transboundary water cooperation with the potential opportunities in regional connectivity’s economic and political realm. Despite challenges and political tensions, focusing on the regional platform of trade, security, and regional connectivity through trade routes, there are many opportunities and potential areas.

Compare to other neighbors, such as Pakistan and Iran, Afghanistan has amicable and healthy relations with the Central Asian Republics. It is argued that “Countries that cooperate in general also cooperate over water,

and countries with overall unfriendly relations are also unfriendly over water issues" (Yoffe et al., 2003, p. 1117). An integrated water approach and any bilateral framework are necessary, such as the benefit-sharing, where riparian states are inclined to share the river's benefits instead of focusing on the river's geography.

Some issues are domestic that did not enhance cooperation in the Amu Darya River Basin. Severe concerns that stand about effective water management were the institutional weakness and the weak state context. Rather than that, effective governance, research-based management, and water development averted by the four decades of war and armed conflict (Akhtar and Shah, 2020). Another countable challenge for asserting negotiation for a cooperative deal is the limited human capacity at Afghanistan's institutions. Despite that, a severe issue is the absence of overall research, particularly in water resources, compared to other regions. For instance, from 1996-2014, by Pakistan, 78,219 citable works, and 278,388 citable works counted by Iran, only 604 citable works were done by the Afghans, which is the lowest number (Scimago Journal & Country Rank Website, 2016; Malyar, 2016).

Many countries in the third world cannot implement large-scale projects or unilaterally manage their water resources. However, developed countries and international organizations are reluctant to financially support such a large-scale water infrastructure because of riparian's concerns (Elhance, 1999, p. 13). Therefore, the third world countries argently need multi-level efforts in small projects and a cooperative framework. Cooperation must not be seen as the goal of coercion or any other one-sided benefits. Effective cooperation can meet all stakeholders' benefits and be enhanced from the national level to the international level.

Afghanistan's dependency on foreign assistance aid is not assured; hence it needs to take further steps to meet national development goals. Several existing processes have shown the potential for bilateral - if not regional - cooperation on water. Additionally, recent agreements in the framework of Economic Cooperation Organization (ECO), Regional Economic Cooperation Conference on Afghanistan (RECCA), and other forums could start to serve as a fertile ground for bilateral and regional water diplomacy" (Yildiz, 2015, p. 46-51). Not only have that but transboundary watered management and development of sound hydro-policy liable for regional security. Small Dams are lifelines for rural communities across Afghanistan to produce electricity, irrigate fields, and divert water for drinking.

Afghan scientists and policymakers were not quite ready to take any initiative for the long term negotiations process with any riparian state (rather than a treaty with Iran) because they well-acknowledged the fact that

until Afghanistan must build large scale infrastructure on its water, develop hydro metrological data, and capacity building (Shroder, 2016, p. 356)

At this juncture, the study suggests that Afghan decision-makers, policymakers, and Think Tanks have to concentrate on the challenges that can transform conflict to cooperation in Amu Darya Basin and convert all risk to opportunities. The Afghan government must work on hydro-diplomacy to preclude problems and prevent disproportionate water use by its riparians. Furthermore, Afghanistan's managing policies on the water resources can reduce water tensions and improve communication between riparian states.

5.2 Domestic Level Challenges & Constraints

- Lack of reliable data (hydrological, metrological) and water quality data.
- Lack of financial resources for the extensive infrastructure.
- Inadequate resources (financially and human capacity) for surface, groundwater survey and data collection.
- Lack of coordination and cooperation between the water-related institutions.
- Lack of a National Level Water Resources Master Plan in general, particularly in the Panj-Amu Darya basin.
- Present institutions in the water sector are fragmented, poorly coordinated, or organized. There is no clear delineation of responsibilities between existing institutions.
- The water sector is diminished by an absence of sufficiently experienced, trained staff and an inequitable gender balance.
- Fear of accessing and joining the national, regional, and international institutions and bilateral and multilateral dialogues regarding the transboundary waters.
- Lack of comprehensive human capacity to induce donors because most of the donors are involved in small and urgent projects that could decline in the interest of the feasibility study of investing in an extensive infrastructure.

5.3 Regional Level Constraints for Cooperation

- Future climate change, rapid population growth, water scarcity, and security issues in Amu Darya River Basin.
- Riparian's perception and consideration of the Future water resources management, development, growth, and improvements.
- The existing treaties, institutions, and legal frameworks regarding the Amu Darya are questionable by the stakeholders.
- Afghanistan was excluded from such institutions and legal frameworks on the Amu Darya.
- Regional hydropolitics (post-USSR and Pre-USSR), in the Amu Darya River Basin.
- Soviet-imposed water allocation/distribution mechanisms in Central Asia.
- Lack of trust between the riparian states.
- Large-scale infrastructure is planned and constructed by the Upstreams and vehemently opposed by the downstream.
- Failed to save the Aral Sea from the environmental disaster (The Amu Darya is a primary contributor to the Aral Sea).
- Misuse and mismanagement of the water of the Amu Darya in the Central Asian states.
- Prioritized water for agriculture, which needs a vast quantity of water, such as cotton corps.
- Afghanistan has been treated as outside of the ADRB and considered the South Asian States rather than Central Asian.

5.4 The Way Forward

The Amu Darya Basin has a robust regional connectivity volume and can create very warm regional ties between the riparian states. It is also useful for the benefit-sharing framework in the basin. This transboundary river can be linked with the other economic and trade facilities with the neighbors that will need further investigation. Afghanistan must be included in the regional water-energy institutions, discussions, dialogues to avoid future conflict on the Amu Darya basin. Climate change, global warming, floods, droughts, and water-energy-economic nexus in the region should perceive as opportunities for cooperation in the water sector.

Indicators of cooperation such as trade routes and access to the markets of the energy-rich Central Asia and energy-thirsty South Asia must pave the way for cooperation on the Amu Darya with its Central Asian neighbors. A mechanism must be created to strengthen the perceptions about the cost and benefit analyses of cooperation and noncooperation in the Amu Darya Basin.

5.5 What to do?

- Hydro-cognized subjects must be included in the national curriculum of the riparian nations.
- Training and capacity-building bureaucrats, policymakers, and academics must be started in the disciplines of Water Resources Management, Hydropolitics, and Hydro-diplomacy.
- The government departments and international organizations urgently needed to establish water-related conferences, to make a public awareness regarding water usage, management, and critical issues to building scientific capacity.
- Change and reconsider the policymaker's and scientists' perception of the current potential and opportunities about the water-related negotiations with the Central Asian States on the Amu-Darya river Basin.
- Provide links with the regional transboundary water-related institutions for discussion, data sharing, and human capacity training.
- Establish a comprehensive strategy and master plan for each river basin on the national level.
- A joint inter-sectorial database should be created to share, keep, and use data.
- Research opportunities should be provided by the government, universities, research institutions, and academia, and the lesson should be learned from the regional and international transboundary water cooperation.
- Transboundary water relations with Northern neighbors have been perceived as healthy relations compared to Pakistan and Iran's relations.
- Riverbank protection, floods, droughts are the entry points for discussion with Central Asian countries.
- Transboundary water-related risks indicators of the acute conflicts have to be considered from the national security threat. The foreign policy of Afghanistan must be reformulated and articulated for every transboundary river basin.

6. Conclusion

Amu Darya River Basin (ADRB) is an interesting area of hydro-politics and hydro-diplomacy between Afghanistan and its northern neighbors. It also can be a source of regional cooperation between Afghanistan and its neighboring northern nations. The inclusion of Afghanistan in a new multilateral framework on ADRB will be a constructive step in future peaceful hydro-politics among the riparian countries. As Afghanistan was overlooked and denied from the Amu Darya River Basin's agreements/dialogues/institutions, it needs to reconsider Afghanistan's claim to join such a cooperative framework. It is also suggested that there would be a bundle of opportunities and potential for the hydro-connectivity and geopolitical ties in the Amu Darya River Basin. The significance of the large scale economic projects can be an entry point to the water resource-related dialogue. Their new and reconsider policies for the Amu Darya River will probably help the entire Aral Sea from the water shrinking. However, the co-riparians must take alternative plans and strategies in the agriculture field and choose renewable energy. Regional connectivity and disconnectivity are relatively phenomena with the regional water crises and water management. Considering the country's geostrategic and geoeconomic potentials, there are massive potentials for Afghanistan's hydro-connectivity with its riparian neighbor states. Afghanistan can play a role as a bridge between South Asia and Central Asia. Hereafter the cooperation on Amu Darya River Basin is imperative rather than going to water-related conflicts.

The research suggests that there are some factors and forces that can constitute regional cooperation and connectivity. Afghanistan needs to improve its capacity and find new potential in the Amu Darya River Basin for future hydro-diplomacy and bargaining power. It needs assistance and aid from external donors. Therefore, it is initially essential for Afghanistan to bring both low politics and high politics in a frame to do better for its national and regional demand for water and maintain its geoeconomic and geostrategic prosperity and environmental sustainability.

Cooperation is imperative through the river-basin bilateral and regional cooperation, secured in state-centric geopolitical, geoeconomic, and strategic arrangements and incentives. Afghanistan must maintain water management, enhance a cooperative framework towards future water-related negotiations, and prepare for the risks and opportunities. The risks central to dealing with co-riparians on transboundary waters must be handled and transformed into opportunities. It initially draws on water resources management. Meanwhile,

water resources can be used as a source of cooperation and trust-building, although not at a political or economic cost; it should result in collaboration and mutual benefits.

The building of water's institutional and technical capacities could contribute to Afghanistan's hydro-diplomacy, which offers an opportunity for water cooperation and reducing water-driven conflicts with riparian states.

Afghanistan transboundary water could be Afghanistan's next significant leverage in its bilateral and multilateral relations with co-riparian neighbors. Exploring options related to TAPI and CASA-1000 power transmission projects from Central Asia to South Asia as Afghanistan struggles to find a secure transit route to Central Asia, the Middle East, and Europe, ADRB will play a significant role in facilitating power transmission projects from Central Asia to South Asia.

Transboundary water can be the next significant leverage of Afghanistan in its bilateral and multilateral relations with co-riparian neighbors. As Afghanistan struggles to find a safe transit route towards Central Asia, the Middle East, and Europe, explore options related to TAPI and CASA-1000 power transmission projects from Central Asia to South Asia; ADRB can play a significant role in facilitating the broader environment for effective cooperation.

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