THE CHALLENGE OF WATER MANAGEMENT IN CENTRAL ASIA: A CASE STUDY OF ARAL SEA

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ABSTRACT

Aral Sea, which was called as world's fourth freshwater lake has transformed into a manmade disaster since 1960. This happened due to the waters of Amu and Syr rivers, which were a source of supply of water to the Aral Sea, stopped reaching the Sea. Consequently, Aral Sea began to diminish and by 1991 it had lost more than fifty percent of its area. The marginalization of Aral Sea not only led to widespread environmental disaster but also curtailed the flow of fresh water for Kazakhstan and Uzbekistan, the two Central Asian states sharing the waters of Aral Sea. Fishing, flora and fauna also began to diminish with the loss of water from the Aral Sea. This paper will discuss how the Central Asian states, regardless of numerous contentious issues, succeeded in precluding water conflicts in Central Asia which could have destabilized regional peace and security. When the Soviet Central Asian Republics got independence in 1991, there was a strong opinion in some circles that the region would plunge into inter and intra-state territorial, ethnic, lingual and water conflicts

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INTRODUCTION

The post-1991 Soviet disintegration led to the emergence of five independent Central Asian States. Facing the enormous challenges, the Central Asian states also had to cope with the issue of water management. Two rivers of Central Asia, Amu Darya and Syr Darya, originating from the mountains of Hindu Kush, are a major source of irrigation and power generation in the region. However, as a result of industrialization, urbanization and massive cultivation of cotton crop, the gap in demand and supply of water in Central Asia widened. The availability of water for irrigation and cultivation emerged as a major challenge for the Central Asian states as during the Soviet days, a centralized system used to take care of issues which are a cause of conflict now.

Aral Sea, termed as the world's fourth fresh water lake, is also considered as a man-made catastrophe.[1] Since 1960, the waters of Amu and Syr rivers which were a major source of supply of water to the Aral Sea, stopped reaching the sea. Consequently, Aral Sea began to deplete and by 1991 it had lost more than 50% of its area. The erosion of Aral Sea not only led to huge environmental catastrophe but also curtailed the flow of water for Kazakhstan and Uzbekistan, the two Central Asian states sharing the water of the Aral Sea. Items like fishing, flora and fauna also began to disappear with the erosion of Aral Sea. It was in year 1999 that the World Bank presented a strategy to progressively fill Aral Sea by restoring the supply of Amu and Syr River so that the water of the two rivers can reach the sea.

This paper will examine the issue of water crisis in Central Asia with a focus on Aral Sea and will respond to the following questions:

- What is the historical basis and nature of water issue in Central Asia and how is it a source of conflict and cooperation among the Central Asian states?
- How did Aral Sea begin to diminish and how did its erosion cause environmental, economic and social implications?
- How can water scarcity in Central Asia be managed and what are the impediments in this regard?
- What are the challenges of water management in Central Asia?

[1] Dr Moonis Ahmar, "The Ever-shrinking Case of Aral Sea," *Dawn*, January 22, 2017, https://www.dawn.com/news/1309967/the-case-of-the-ever-shrinking-sea.

Furthermore, this paper will also discuss how the Central Asian states, regardless of numerous contentious issues, succeeded in preventing water conflicts which could have destabilized regional peace and security. When the Soviet Central Asian republics got independence in 1991, there was a strong perception in some circles that the region will plunge into inter and intra-state territorial, ethnic, lingual and water conflicts. Tajikistan and Kyrgyzstan witnessed armed conflicts during 1990s but are now at peace. Central Asian regimes, particularly those led by Islam Karimoz of Uzbekistan and Nursultan Nazarbyoz of Kazakhstan, by exercising effective authority, prevented instability in their countries to some extent. The two countries also refused to get bogged down in water conflicts with the upper riparian Central Asian states of Tajikistan and Kyrgyzstan and tried to deal with the issue of Aral Sea and water scarcity through diplomatic means.

HISTORICAL BASIS OF WATER CONFLICTS IN CENTRAL ASIA

No conflict can be without a historical dimension. Same is true with Central Asia where inter and intra-state conflicts spiralled into an alarming situation in the post-Soviet disunion period.

Figure 1: Overview of Central Asian Water Resources[2]

Historically speaking, as long as the consumption of water by the Soviet Central Asian Republics was limited, there was no likelihood of

[2] Philip Micklin, "Introduction to the Aral Sea and Its Region," *Springerlink* (July, 2013): 15-41, doi: 10.1007/978-3-642-02356-9_2.

water conflict in the region. Conflict only ascended when the supply of water from the two rivers was curtailed with the construction of dams, irrigation canals, massive plantation of cotton crop, huge industrialization, and urbanization. Therefore, in the post-Soviet disintegration period, the Central Asian States felt it increasingly difficult to cope with the issue of water resources because of the wrong policies formulated and adopted by Moscow since early 1960s. The water surplus states of Kyrgyzstan, Tajikistan and the water deficient states of Kazakhstan, Turkmenistan and Uzbekistan had to face a difficult situation: how to deal with the mismanagement of water resources and how to cope with the environmental catastrophe of the near disappearance of Aral Sea.[3]

Water management in Central Asia during the Soviet days had its own facets. According to an expert on water resources, the basin-wide approach followed during the Soviet days has become a theatre of competition and conflict between the upstream (Kyrgyzstan, Tajikistan and Afghanistan) and downstream (Uzbekistan, Turkmenistan and Kazakhstan). The hydraulic infrastructure of the region is based on distribution among various independent Central Asian states. Consequently, the water resources' system, collectively and cooperatively, is not properly managed with any substantial political will and determination.

A combination of regional, national and interstate institutions previously administered by a centralized authority during the Soviet era now takes major decisions, It is not surprising to see that water and energy distribution among the various sectors and consumers is not functional. Future water resource development in northern Afghanistan will further fuel and add to the water and energy conflict in the region.[4]

Since it was one country and the Soviet Central Asian Republics adopted the centralized policies, water conflict did not occur between lower and upper riparian republics. Furthermore, the distinctive idea of the Soviets were to run the hydro-infrastructure in irrigation style. It means the water resources of Central Asia were managed so as to maximize the

[3] Moonis Ahmar, "Management of Water Resources in Central Asia: Lessons for the South Asian Countries," *Eurasian Studies,* no. 15 (Summer 1999): 99.

[4] Tobius Siegfried, "Water and Energy Conflict in Central Asia," *State of the Planet* (blog), August 18, 2009, accessed December 11, 2019, http://blogs.ei.columbia.edu/2009/08/18.

production of crops. Part of the hydropower produced during irrigation water-discharges in spring and summer was consumed in the downstream for irrigation and vertical drainage pumps along the 20,000-mile irrigation channels. In return, the upstream states got energy supplies in the form of gas and coal to cope with winter energy demands. The arrangements which were reached during the Soviet days among the Central Asian states to exchange water for electricity, gas and coal were terminated after the Soviet demise.

Consequently, the newly independent Central Asian states abruptly faced a situation which was totally different as they needed to discuss and deal with each other about sharing and distribution of water, electricity, coal and gas. As Tobias rightly remarked that the countries which include Central Asia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan are all interwoven by shared water resources. Yet, most of the Central Asian states are facing major water problems emanating from the erosion of the Aral Sea.

Water resources are curtailed because demand of water is escalating due to population, and competition over water increases among different water users.[5] Like many other regions across the world, Central Asia is adopting ways to make the optimum use of limited water resources. Confidence in the usefulness, accuracy, and timelines of this approach is growing among water practitioners involved in a number of large-scale projects of both lower and middle levels of water management. Issues like global warming and climate change will surely have implications for glaciers providing for water resources in Central Asia. The mountain ranges of Hindu Kush and Pamir are already coping with glacial meltdown, increasing the risk factor of floods and erosion of water resources.

EROSION OF THE ARAL SEA

The term Aral Sea comes from the Turikic word, “aral” meaning ‘island’. The sea’s name illuminates the fact that it is in a huge bowl in Central Asia and lies as an island divided between two deserts of Karakum and the Kyzlkum. The Aral Sea is actually a lake by strict definition based on its physical features.

[5] Ibid

Since the time immemorial Aral Sea was filled primarily by Central Asia's two rivers, the Amudarya and the Syrdarya.[6] Furthermore, it is easy to figure out various ethical issues responsible for half-century of decline in the level of the Aral Sea leading to soil erosion and degeneration of human life.[7] This will help to analyse the choices made as to how, what, and why the Central Asian Republics can develop the methods that Soviet and post-Soviet leaders have followed. One of the most known issues revolves around upstream versus downstream users of the stream course of the Amudarya and the Syrdarya. In the Aral Sea bowl, the upstream users are Tajikistan and Kyrgyzstan. Afghanistan must be included even though it focuses on water consumption from the Amudarya to date.

Moreover, the Aral Sea, considered as the fourth largest lake in the world by area in 1960 has depleted meaningfully in view of the nearly total cut-off of river inflow from Amu Darya and Syr Darya because of heavy use for irrigation.[8] Before 1960, Aral Sea was the world's fourth freshwater lake. It was referred as 'a man-made disaster' of 20th century. Aral Sea was a source of fresh water for Kazakhstan and Uzbekistan and was also useful for the lives of around hundred and thousands of fishermen. It is rightly stated that the Aral Sea, a lake fed by two major rivers, the Syrdarya and Amudarya, constitutes a physical border between Kazakhstan and Uzbekistan. In 1960, it was the fourth largest lake in the world but unfortunately today it is on the brink of shrinking into a small and dirty pool. The steady degeneration and destruction of the Aral Sea is an example of how drastically environmental and humanitarian tragedy can endanger the whole region.[9]

Aral Sea is rightly called as a foremost challenge of environmental disaster and unforeseen Soviet policies to shift the waters of Amu and Syr Darya for cotton plantation in Uzbekistan and Turkmenistan by

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[6] Michael H. Glantz, "Aral Sea Basin: A Sea Dies, a Sea Also Rises" *Ambio* 36, no. 4 (June, 2007): 323.

[7] Phillip Whish-Wilson, "The Aral Sea Environmental Health Crisis," *Journal of Rural and Remote Environmental Health* 1, no. 02 (2002): 29-34.

[8] Philip P. Micklin, "Desiccation of the Aral Sea: A Water Management Disaster in the Soviet Union," *Science, New Series* 241, no. 4870 (September 2, 1988): 11-71.

[9] Rama Sampath Kumar, "Aral Sea: Environmental Tragedy in Central Asia," *Economic and Political Weekly* 37, no. 37 (2002): 37-97.

constructing various canals. Thus, denying the sea a smooth flow of water from two mighty rivers. Before 1960, there were 1,100 islands separated by numerous lagoons and thin straits, which gave the sea its name in Kazakh i.e. 'Aral' which means 'island'. At present the Kok Aral, the largest among the islands (now peninsula) stretches over the Aral Sea and separates the north-eastern part, which is called the Small Aral from the south western part, the Big Aral. This constitutes the borderline between Kazakhstan and Uzbekistan that share the area but is now parched (~dry) because of the steady erosion of Aral Sea.

The steady loss of Aral Sea began years after the Soviet plans for irrigating the Central Asian plains were developed. Therefore, in late 1930s, under the directives of Joseph Stalin, the then Secretary General of Soviet Communist Party, the Soviet water Ministry began an impressive project of water shifting for the purpose of irrigating the plains in Uzbekistan, Kazakhstan and Turkmenistan. The purpose was to prepare them for cotton plantation.[10] The first major irrigation project was functional in 1939 with the construction of the canal encompassing the Ferghana Valley in Uzbekistan, accelerating the process of the depletion of Aral Sea.

The policy of shifting the waters of Amu and Syr Darya towards the infertile lands of Kazakhstan, Uzbekistan and Turkmenistan continued even after the demise of Joseph Stalin in 1953. In fact, the diversion of water from Amu and Syr Darya became more thorough as a number of canals were constructed from the two rivers to get high yield of cotton crop.

The process of the destruction of Aral Sea is an outcome of a process which began during the Soviet era.[11] Therefore, it is obvious that this awful depletion of the Aral Sea began in 1960. That was the year when planners and policy makers in Moscow launched the Aral Sea project without redeeming its lethal consequences. It was a huge economic program to transform a large desert into the cotton basket of the then Soviet Union. The planners allocated Central Asia the role of supplying

[10] Moonis Ahmar, "The Case of Ever-Shrinking Sea," *Dawn*, January 22, 2017, accessed December 11, 2019, https://www.dawn.com/news/1309967/the-case-of-the-ever-shrinking-sea.

[11] Carol Crewdson, Joe Ziemann and Lee Blaney, "The Death of a Sea," *Lehigh Preserve* 13, (2005): 120.

raw materials, notably cotton. This led to enormous erosion in the planting of traditional crops such as Alfalfa and plants grown for vegetable oil.

The ambition to expand cotton production onto desert land increased the dependence of Central Asia, particularly Uzbekistan on irrigation water from numerous canals. In its essence, within just 20 years the fourth largest inland sea on earth transformed into an arid, polluted toxic salt plain. The ecological and environmental disaster in Aral Sea area now covers the once fertile self-governing republic of Karalalpakstan in Uzbekistan and Kzylorda Oblast in western Kazakhstan. This region was a victim of the worst environmental disasters because before 1960, 55 billion cubic meters of water came pouring into the Aral Sea and maintained it at a healthy level. During 1980s, the average flow into the sea was only 7 billion cubic meters.[12]

The endless erosion of Aral Sea had four major consequences. First, the flora and fauna of Aral Sea region ceased to exist having grave environmental perils. Second, the livelihood of thousands of fishermen vanished as the sea withdrew to an alarming proportion due to drying beaches and shallow seashores. Third, sand and dust which replaced the water of Aral Sea, led to environmental dangers thus leading to enormous health problems to the local population. Fourth, Aral Sea which was a mammoth fresh reservoir of water for Kazakhstan and Uzbekistan deprived the two countries of vegetation and greenery which previously existed in the Aral Sea basin for centuries.

Environmental dilapidation is a major ramification of the erosion of Aral Sea because environmental problems created by the drying up of the Aral Sea besides salinization of the soil include steady salinity of sea water, wind erosion, salt full of dust storms, ruined fish spawning grounds, the collapse of the fishing industry, water logging, disruption of navigation, the division of the sea into separate parts, the huge damage to wildlife in the littoral areas, the large drop of stream flow from the two tributaries. Therefore, there is a need for extra-basin water resources to stabilize the sea level; transformation in the regional climate, the loss of pasturelands, and so forth. It is rightly and correctly analysed that these sand dunes are used to form the seabed of the world's fourth largest lake. However, since the water level of the Aral Sea decreased due to

[12] Rama Sampath Kumar, "Aral Sea: Environmental Tragedy in Central Asia," *Economic and Political Weekly* 37, no. 37 (2002): 37-98.

environmental pollution, mouldering wrecks and salt-encrusted seashells are the only leftovers of the area's one-time maritime fineries. It adversely increased the probability for instability among Central Asia's former Soviet Republics.[13]

Paradoxically, no other region of this earth has undergone so much of suffering as Central Asia did, because of the poor management of already fragile water resources. Soviet policy to shift the water from the rivers of Amu and Syr Darya laid the pretext for the erosion of Aral Sea. The authoritarian form of governance made it difficult to raise any dissent against such projects at the expense of the future of Aral Sea and the lives of hundreds and thousands of people dependent for their living.

Following the disintegration of the Soviet Union and the emancipation of five Central Asian states in 1991 the situation transformed as issues previously kept under the carpet during the Soviet days re-surfaced raising serious challenges to post-Soviet disunion era. It was surely an uphill task to restore the original size of Aral Sea which existed before 1960, particularly when the stakes of the cotton growing belt, irrigation canals and the upper riparian states with dams and hydroelectric projects felt it arduous to reach a consensus on dealing with the perilous issue of water resources in Central Asia.

THE CHALLENGE OF WATER MANAGEMENT

How did Central Asia deal with the challenge of managing water resources and the erosion of Aral Sea? With the end of the Soviet era, the five independent Central Asian Republics (CARs) established a joint commission for water coordination to streamline the challenge of water distribution in the Aral Sea basin and strengthen country positions for the adoption of a unified regional water policy and strategy. In 1992, the

[13] Elisa Schaar, "Central Asia's Dead Sea: The Aral Sea's Slow Demise" *Harvard International Review* 23, no. 03 (Fall 2001): 12. She further stated that: the Soviet practice of vehemently misusing natural resources to feed its facories had destructive implications for Aral Sea region. In 1959, under Secretary General of CPSU Nikita Khrushchev's self-sufficiency plan, the Russians diverted the water of Amu and Sry Darya rivers, the Aral Sea's two main feeders, to irrigate newly planted cotton fields in Uzbekistan and elsewhere. With the diversion of two of its rivers, vaporization took its toll on the Aral Sea. In Kazakhstan and Uzbekistan, the depletion of the Aral Sea has led to a socio-economic crisis. Harbours have turned into empty cities and fish tuning factories have closed down, leaving 60,000 people unemployed.

World Bank was requested to manage international assistance in response to the water crisis in the fragile Aral Sea basin. Institutional arrangements to handle water conflict in Central Asia, however, are not possible only by the efforts of World Bank but the involvement of reputed and credible environmental and financial organizations is crucial for effectively dealing with 20th century man-made disaster. Henceforth, it is imperative on Central Asian Republics, now three decades old, to demonstrate enough political will and determination to cope with an issue which is a matter of life and death for more than 60 million people of the region.

The two-pronged threat related to exhaustion of water resources in Central Asia is the erosion of Aral Sea and serious environmental changes taking place all over the world thus accentuating global warming and melting of glaciers. Central Asia, like South Asia, is dependent on water resources which are present in the mountainous regions of Pamir, Hindu Kush Karakoram and Himalaya. Melting of glaciers because of climate change and global warming will diminish water resources in the two regions thus heightening the need for an effective water management.

From the historical point of view, from 1974 to 1990 the management system for the Syr Darya was targeted towards water facility for irrigated agriculture of cotton and wheat production in Uzbekistan and Kazakhstan. Nevertheless, the timing of winter and summer flow releases did not alter drastically as compared to the natural runoff pattern, where peak flows also follow in the agricultural growing season.[14] The post 1990 situation, however, led to a crisis in the so-called water management in Central Asia as the newly independent states of the region were caught in a dreadful situation on dealing with depleted water resources and the steady erosion of the Aral Sea.

The challenge of water management in Central Asia is exhaustively discussed by Tobias Siegfried, an expert on water resources on Central Asia. For him, water resources management in the Central Asia has faced major challenges and must be addressed accordingly. The water conflict of the two major rivers in the region, the Syr Darya and the Amu Darya, may escalate due to climate change. Water diversions to agricultural, industrial and domestic users have meagre flows in downstream regions, resulting in severe ecological damages. The

[14] Thomas Bernauer and Tobias Siegfried, "Climate Change and International Water Conflict in Central Asia," *Journal of Peace Research* 49, No. 01 (January 2012): 2-30.

administrative-institutional system is categorized with six independent countries sharing control, often with rival objectives and conflicting interests.

The Central Asian regimes are mindful of the fact that water conditions cannot go back to pre-1960 when there was hardly any significant threat of water depletion. But, what is possible is the prudent management of water resources by keeping an adequate balance of demand and supply and controlling wastage through evaporation.

Impediments in the way for a proper water management in Central Asia are numerous and include lack of political will on the part of counties excessively using water for cotton plantation, industrialization and urbanization. It is difficult to tell that new Turkmenistan and Uzbekistan, which largely benefited from water distribution policies can agree to cut their share of water consumption because the two countries will face adverse implications if they agree to allow the unrestricted supply of water from the rivers of Amu and Syr Darya to the Aral Sea.

Furthermore, the upper riparian countries of Tajikistan and Kyrgyzstan will not agree to abandon projects on the two rivers for storage of water for power generation. Yet, all the five Central Asian countries are vulnerable to environmental threats like climate change and global warming. If the pace of melting of glaciers accelerates in the Pamir and Hindu Kush mountains, the result will first be an increase in water flow and then a sharp decline in the availability of Amu and Syr Darya in the years to come. In that case, one area, where the Central Asian regimes will focus is on dealing with the threat of global warming and climate change. Like any other region of the world, Central Asia is also vulnerable to gradual erosion of its water resources. Controlling deforestation, industrial and toxic waste on the river bed and pollution released from industries, factories and vehicles. Therefore, these issues must get proper attention by the Central Asian regimes along with conservation of water resources. A comprehensive and a prudent approach, followed at the governmental and non-governmental level towards effectively dealing with environmental threats will certainly go a long way to save water resources in Central Asia.

One plus point for Central Asia in dealing with its water resources is its low population as compared to South Asia. The region, which is almost the size of South Asia, has a population of around 60 million in

comparison to 1.6 billion of South Asia. Yet, despite its low demography, Central Asia will have to adopt short and long term strategies to manage shortage of water resources by seeking regional and international skills and resources so as to reverse the erosion of Aral Sea which used to be the world's fourth largest fresh water reservoir before 1960.

From any standpoint, the prime cause of water dilemma in Central Asia is the erosion of Aral Sea. Therefore, it is essential that adequate measures are taken at regional and international level to replenish the once world's fourth largest fresh water lake. Therefore, a partial reversion of Aral Sea in particular and water supply in Central Asia in general will involve the measures delineated by an expert on Central Asian affairs. These measures include maintaining international interest and commitment in a unique feature of nature in the region, improving health conditions, restoring delta productivity and refurbishment of wetland ecosystems and improving interethnic relationships, encouraging Siberian River diversions only for drinking water by declaring it a World Heritage site. Governments would be receptive to take meaningful interest in a restricted restoration of sea by encouraging additional international development support, fostering tourism and finally expressing government commitment to a healthy Kara kalpak and other people living in the Aral Sea's disaster zone.[15]

Furthermore, Michael H. Glantz, another expert on water resources is of the opinion that the positive dynamics of the sea for society include the availability of abundant river water for human settlement and economic development purposes and a rehabilitation of biodiversity in the delta as well as in the sea.[16] The Aral Sea, once the world's fourth largest freshwater lake and now not even on the list, merits Heritage Status and deserves restoration. How far the suggestions of Michael H. Glantz for the partial restoration of Aral Sea can help deal with this man-made disaster depends on receptiveness and support of countries of the region. Proper planning, political will and determination can go a long way in coping with water management challenges in Central Asia and can help restore depleted Aral Sea to its pre-1960 level.

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[15] Michael H. Glantz, "Tragedy in Aral Sea Basin: Looking Back to Plan Ahead?," *Global Environmental Change* 03, no. 02 (June, 1993): 325.

[16] Ibid.

CONCLUSION

From the analysis above, it appears that the management of water conflicts in Central Asia is an uphill task but not impossible because it requires the following two-pronged strategy. First, Central Asia must agree on a regional water management authority composed of experts from the region and outside so that an incremental approach is followed to effectively deal with such a man-made disaster. The authority needs to conceive a plan focusing on proper distribution of water from the Amu and Syr rivers, the two major sources of fresh water in the region. Furthermore, steps to prevent the wastage of water and water conservation must be seriously taken. Second, the recommended water management authority needs to adopt a professional outlook on the matter of Aral Sea and take tangible steps for the restoration of its pre-1960 status. Without a sound regional approach and a professional approach, the gigantic task of refilling Aral Sea cannot be accomplished in the years to come. At stake is the recovery of Aral Sea by pursing a comprehensive approach of upstream and downstream countries of Central Asia.[17]

Certainly, the daunting challenge of water management in Central Asia can be a useful lesson for South Asia where the melting of Himalayan, Karakorum, Pamir and Hindu Kush glaciers along with global warming can be termed as a major threat to already depleted water resources available for the region. Managing water conflicts between India and Bangladesh, India and Pakistan, Afghanistan and Pakistan needs to be given a high priority by concerned governments. Meaningful and purposeful cooperation involving Central, South and West Asia under the framework of South Asian Association of Regional Cooperation (SAARC) and Economic Cooperation Organization (ECO) can go a long way in establishing a water management regime for preventing an impending drought and water and energy crisis in the three Asias.

[17] Patrick Walters, "Aral Sea Recovery," *National Geographic*, April 23, 2010, accessed August 7, 2019, https://www.nationalgeographic.com/history/article/100402-aral-sea-story