

INDIAN AQUA AGGRESSION: INVESTIGATING THE IMPACT OF INDUS WATER TREATY (IWT) ON FUTURE OF INDIA-PAKISTAN WATER DISPUTE

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Abstract

The history of Indo-Pakistan relations is replete with animosity since independence in 1947. Among many conflictual issues, water distribution and water rights have emerged as new dimensions affecting bilateral relations. Indus Water Treaty (IWT) has been holding on since it was formalised in 1960, however, India has manipulated its provisions at will, affecting the flow of western rivers' water to lower riparian Pakistan for past many years. India is now in a position of limiting the vital irrigation resource of Pakistan due to unlawful construction of dams in Indian Occupied Kashmir (IOK) in violation of IWT. Despite wars and standoffs, IWT has sustained, however, Indian ambitions of constructing more dams in Indian Occupied Kashmir (IOK) are clear violations of treaty and threatening postures towards Pakistan for not supplying even a drop of water have created distrust and heightened tension. This research article critically investigates the Indian aqua aggressions in violation of IWT, implications for Pakistan and suggesting a viable framework for safeguarding Pakistan's water rights in the face of antagonising Indian posturing.

Keywords: Indian Aqua Aggression, Indus Water Treaty, Lower Riparian, Water Dispute.

Introduction

Conflict transformation is taking place in fast changing geo-political realities in South Asia, where water is now emerging as a new paradigm of conflict. The former world Bank Vice President Dr Ismail Serageldin has predicted that in the “20th century, countries fought wars on oil but now in the 21st century, water would be the main cause of war”.¹ There is no substitute of water in this world and water the world's scarcest critical resource is now surpassing the oil.² According to the World Health Organizations (WHO), the requirement of water for a good human health is approximately 100 litres per person per day, which is the basic right of every individual.³ Nowadays, the world is divided between the lands with maximum water resources and lands with less water

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resources and Pakistan is facing critical water issues. Being a semi-arid country and agriculture-based economy, water distribution and management has always been a significant but cumbersome process in Pakistan. Unfortunately, right from the independence Pakistan is facing the water problem, and the main reason of this problem is blockage of its water in canals by the eastern neighbour.

Indus basin emerged as the boundary between Pakistan and India making Pakistan lower riparian to India. India is fully capable of cutting-off the vital irrigation resource of Pakistan as headwaters went to India leaving Pakistan vulnerable. As Pakistan is on lower riparian, India is demanding water rights on Western Rivers, while denying the due share of Pakistan. Water flowing into Pakistan was stopped by India on April 1, 1948. On 4 May 1948, an accord was signed between the two countries providing a temporary solution of water crisis but for permanent solution, further negotiations were carried out.⁴ The World Bank later intervened as Pakistan and India could not resolve water issues bilaterally, which gave a proposal in which three Western rivers i.e. Indus, Jhelum and Chenab were given to Pakistan while India retained rights of irrigation and power generation with certain limitations on these rivers. Eastern rivers i.e. Sutlej, Beas and Ravi were given to India in their entirety. Finally, the IWT was signed by Pakistan and India on 19 September 1960. India, being the upper riparian in the river system, has limited interest in ensuring the benefits and sustainability of IWT for Pakistan. However, it has certain humanitarian obligations as a member of the international community. The recent statements by India that it will reduce water supplies to Pakistan are debatable. The humanitarian crisis that could be the outcome of such blockages in Pakistan will immediately create a backlash for India from the international community. The events took a new turn when India threatened Pakistan with unilateral repealing of IWT. The treaty has weathered three wars and numerous disputes raised by Pakistan on India's non-compliance with the terms of the treaty.

In future, the main reasons of clash between Pakistan and India would be on water.⁵ With increase in population, the economic development level also increases and the negative effects of sudden changes in climate become extreme. To meet growing demand, South Asian region will have to struggle more while managing declining water supplies and flowing of rivers trans-boundary, especially Indus River System. The possibility of armed conflict due to water related issues cannot be ruled out as water is a survival commodity and there is no substitute for water. This problem of water distribution has been further aggravated in present Modi's regime which is pursuing the controversial dams construction on western rivers in IOK. The construction of these projects will also impede the power generation capacity of near completion power project (Neelum-Jhelum) in Pakistan.

Water Scarcity; An Evolving National Security Challenge for Pakistan

In the contemporary times, water scarcity has emerged as the most pressing issues faced by Pakistan after defeating the menace of terrorism and addressing power shortages to a large extent. Inefficient water management in the country has played a central role in leading Pakistan towards water scarcity. For several decades, Pakistan's heavy reliance on Indus Basin and its tributaries has made it a vulnerable and persistent source of friction with India. With the excessive strain on the available water resources, a weak structure for effective water storage has contributed to widening the gap between the available resources and the need base. Currently, Pakistan has water storage capacity of only 30 days. The debate surrounding the water scarcity has recently started taking into account two main factors heavily influencing the issue – climate change and environmental degradation. Climate change is affecting the available water resources through rise in temperature, which will increase demand for water in future. Increasing seawater intrusion in coastal areas is threatening cities located in the low-lying region. Changes in monsoon rainfall patterns, which is influenced by climate changes, resulted in the emergence of two distinct weather pattern - heavy rainfall in shorter period of time (causing floods) and no rainfall for longer period of time (causing droughts). Increasing temperature in future will result in more intense droughts which are already impacting several regions in Sindh and Balochistan.

Long-term impacts of water scarcity issue will result in loss of employment opportunities for people employed in the agricultural sector (especially those associated with cotton production) and industrial sector with the textile industry facing the most severe brunt. The issue is increasing the already widened gap between rich and poor regarding accessibility to drinking water. Water management in the country has been inefficient and decentralized to district level which allows large farm owners, who have considerable political influence, to benefit from incompetent water taxation regime. Inefficient management of available water resources has contributed to increased groundwater extraction wasteful patterns of consumption and production. Currently, Pakistan is facing serious challenge to National Security due to ever decreasing water resources and gradual increase in water requirement year on year basis. Mr Shams ul Mulk the former Chairman Water and Power Development Authority (WAPDA) once stated that there will be very less or no clean water in Pakistan by 2025. This indeed rang alarm bells across the country as the recognition of storage, consumption and saving of water was hardly realized before in the country. Such a precarious water situation needs immediate redressal by way of enhancing current storage capacity, constructing new reservoirs and using smart means for water usage and conservation. Pakistan's economy

is agro-based which is hugely dependent on river waters, therefore, for Pakistan it is pressing national security challenge warranting immediate and comprehensive response.

Critical Investigation on Water Sharing Between India and Pakistan and the Viability of Indus Water Treaty (IWT)

Since partition of India and Pakistan, equitable distribution of water resources has remained a tense phenomenon, adding to already existing animosity and hostile relations. It is worth mentioning here that only seven months after the independence of Pakistan, India used water as a weapon of war to subdue Pakistan by stopping the water in Sutlej River flowing across the border to Pakistan's Punjab Province at the expiry of standstill agreement on 31 March 1948.⁶ India shut off water from Ferozpur Headwork flowing to Lahore and Deplaupur canal and upper Bari Doab canal which generated serious water crises for Pakistan and also deprived electricity to large part of Lahore due to shutting down of Mandi hydroelectric project⁷. However, on 4 May 1948, both countries agreed on Inter-Dominion framework agreement for maintenance of status quo on water flows, till Pakistani side is able to construct alternative reservoirs and other means. Later in 1951, David Lilienthal the former chairman of the Tennessee Valley Authority also visited the region and suggested a permanent water distribution mechanism between India and Pakistan based on engineering requirements, which formed the basis of future conflict resolution mechanism for both countries⁸.

In 1960, with the mediation of World Bank, the Indus Water Treaty (IWT) was concluded between Pakistan and India as a permanent dispute resolution mechanism. In the spirit of treaty, the exclusive rights of three Eastern Rivers (the Ravi, the Beas, and the Sutlej) was given to India, whereas the three Western Rivers (the Chenab, the Jhelum, and the Indus) were granted to Pakistan. The IWT contains 12 articles, 79 paragraphs, 8 annexes with 85 pages.⁹ According to IWT all waters of Eastern Rivers, i.e. Sutlej, Ravi and Beas were allocated to India for unobstructed use¹⁰, except from the transition period of 1st April 1960 till 31st March 1970, during which water was to be supplied uninterrupted to Pakistan. (As per detailed specifications in Annexure H). The period of 10 years from 1960-1970 was given to Pakistan to construct replacement works for water of Eastern Rivers. According to the treaty, for the construction of the replacement works from 1960-1970, India agreed for a fixed contribution of US\$ 62 million for the cost of replacement works in 10 annual instalments, payable in November each year. In that era, Pakistan received maximum water without any restriction from the Western Rivers. India was "under obligation to let flow". Under Article VI, both the countries were made responsible for regular exchange of river and canal data and Article VII referred to future collaboration. Under Article VIII, both countries established a permanent post of Commissioner of Indus Waters, who were supposed to be "a high-

ranking engineer competent in the field of hydrology and water reuse.” These two Commissioners have the responsibility to constitute the Permanent Indus Commission and they must meet once a year alternately in India and Pakistan. The Indus water Commission’s terms of reference include; formulation of cooperative mechanism for treaty implementation, development of Indus Water system, resolution of any queries and submission of annual report on activities by 1 June every year to respective governments. The following map indicates the layout of River System and clear delineation of Eastern and Western Rivers which were dedicated to both India and Pakistan.

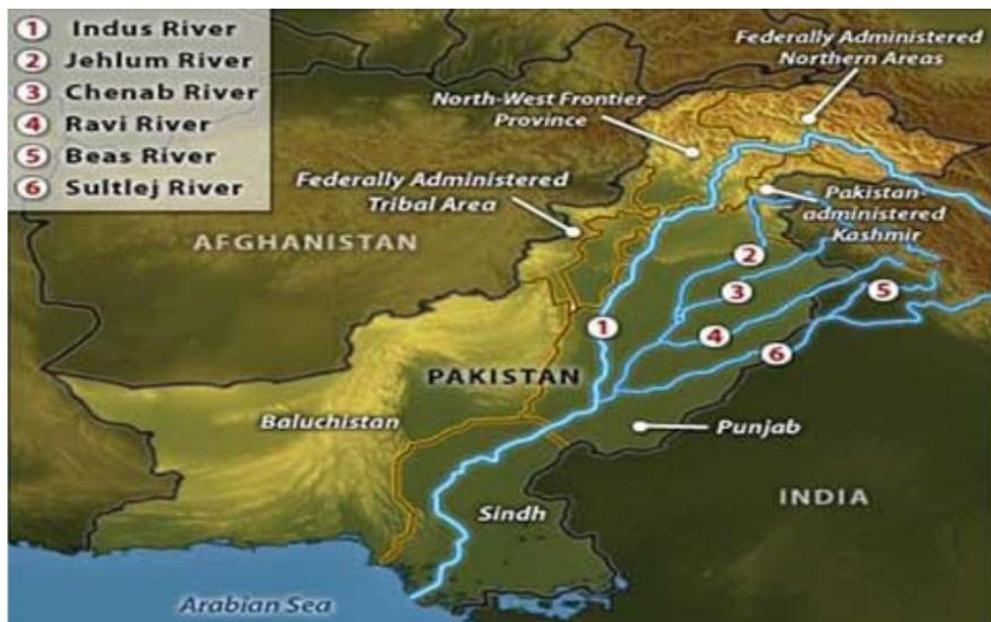


Figure-1: River System

Settlement of differences and disputes coming under the Article IX of IWT. If the problem is not solved by the Commission, a neutral expert is to be appointed for solving of issue under Article IX/Annexure E and if the Neutral Expert also fails to solve the issue, a Court of Arbitration shall be convened under Article IX/Annexure G. On 19 September 1960, World Bank and Pakistan signed the Indus Basin Development Fund Agreement and the Loan Agreement at Karachi, concurrent to the signing of the IWT. More than a decade was utilized to complete the negotiations between Pakistan and India to peacefully administer the waters of the Indus Basin System for their development and prosperity.

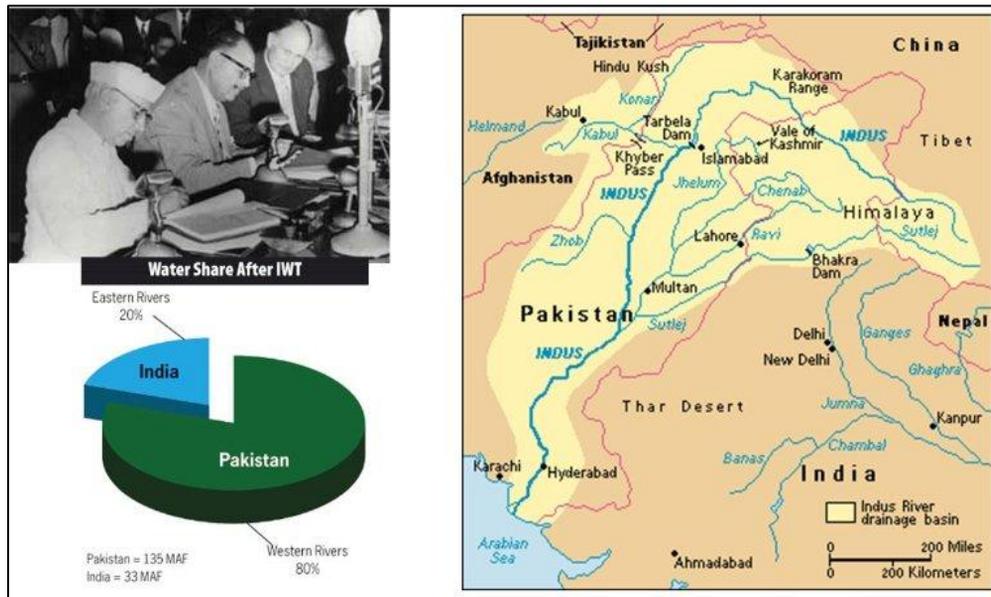


Figure-2: Allocation of Water

Analytical Review of IWT

The signing of IWT at Karachi on 19 September 1960 was in fact a landmark achievement for both India and Pakistan and the international community who remained engaged towards resolution of longstanding water sharing and distribution issue. The same evening, World Bank issued a press statement gratifying all the parties and hoped that this treaty would open new aura of peace and development in South Asia.¹¹ The similar sentiments were expressed by the leaders of India and Pakistan and people of both countries were also satisfied on the final outcome. However, public sentiments on the loss of eastern Rivers water was a concern, but with provisions of treaty it was compensated by the construction of additional replacement facilities funded by international donors to enable the water of Western Rivers to be flown across the country. IWT demarcated and fixed the rights/responsibilities of Pakistan and India with respect to each other, relating the use of the waters of the Indus river systems. The treaty offered certain advantages to both countries for rational distribution of water and also catering the rights of lower riparian Pakistan. It is worth highlighting that just after the completion of the Indus Basin replacement plan works, both Pakistan and India became independent of each other in operating the supplies of their respective rivers. Both countries were organizing and managing their own facilities in their own interests and were free to allot the supplies as per their respective demand of consumption and storage. IWT enabled both countries to efficiently manage the available water. India utilized the resources and raised the storage capacity from 8 million acre feet (MAF) to

30 MAF on her eastern rivers, allocated to her under this treaty. The threat of disputes and tension was reduced because of this treaty, which has been vindicated by subsequent three wars, and yet the IWT stands intact. As per IWT the complete Irrigation system of Indus Basin is based on run-of-the-river supplies and India being upper riparian was not allowed to stop or divert the waters of western Rivers. The supplies of water are difficult to manage during the drought periods, which was addressed by developing additional water reservoirs for increasing the storage capacity. In 1932, the Sukkur barrage was the only barrage on river Indus but presently Pakistan has 19 barrages, 43 canal systems with 48 off-takes on the Indus River system, thus creating the world's largest contiguous manmade system of 61,000 kms of canals, 105,000 water courses which is irrigating 14,165 million hectares of land.¹² Our canal system has been designed in triple layers and dovetailed in the existing defensive mechanism of field formations. Taking the open interpretation of IWT provisions on the use of run of river water of western rivers, India has gradually embarked upon construction of controversial dams in Indian Occupied Kashmir in a phased manner. This has caused escalation of tension in South Asia as India has been manipulating IWT and using it as a political tool to undermine Pakistan's sovereign rights of western rivers.

From Pakistan's perspective, IWT has provided certain challenges due to closure of eastern rivers. Pakistan was using traditional *sailab* irrigation system for the cultivation of lands earlier but with management of water by India in eastern rivers, the system of *sailab* cultivation disappeared. During the construction of new link canal system and reservoirs, Pakistan had to bear extra burden on the cost of maintaining irrigation. The Mangla Dam which was constructed in the area of Mirpur Azad Kashmir led to bitterness among the people of the area as the potentials to generate hydroelectricity went down to lowest level. Because of the treaty, a large area of land became deserted in the southern side of Punjab, which despite link canals still remains far short of full capacity irrigation, especially during summers. The major conclusions can be summarized as under:-

- Distribution of common resources must be distributed on equal bases because such disputes can turn from intra-national conflict into international conflicts.
- Power inequities may delay pace of negotiations. Indian superior riparian position and stronger central government acted as disincentive to reach a fair and timely agreement.
- The total available water from the Indus water system is not sufficient to fulfil too many projects.
- Kashmir got more importance as a result of this treaty because water supply to Pakistan is mainly from Kashmir.

- Kabul River, which is running from Afghanistan, contributes about 16,573 MAF to Indus River. Afghanistan uses 8 MAF on Kabul River which shall reduce the water supply to 116 MAF¹³.
- Currently Pakistan is speedily declining towards 1000 per capita mark, and with this pace, Pakistan would come under the category of a “water short” country.
- During lean period, India can easily interfere with the water supply to Pakistan for about / within 5-6 days.

Implications for Pakistan

The reduced flows of rivers as an outcome of the treaty and repository by India have serious implications for Pakistan. As agriculture sector contributes 30% of the GDP of Pakistan¹⁴, there is serious threat to the economy based on agriculture, due to India’s designs of water. The storage capacity in Mangla and Tarbella Dams has already been reduced by 22%.¹⁵ During a military confrontation, it would provide India a strategic edge by releasing/stopping waters. Pakistan’s 31 Million agriculture land is badly affected due to water scarcity. When the flows will be reduced in Indus River, its assimilative capacity will decrease substantially. Disposing off industrial wastewater from hundreds of industrial facilities coupled with raw sewage shall pose a serious problem. Pakistan’s 25% of irrigated land is saline, out of which 60% is not suitable for cultivation and 30% is suitable for selected cultivation.¹⁶ Pakistan is tackling this problem through SCARPs, ISRP and CWM¹⁷. The water of Indus, which is discharged to the sea, keeps the seawater at bay. Due to decrease in waters of Indus River salt water of Arabian Sea has been observed till 100 kilometres. Deforestation shall continue due to loss of moisture on surface, soil degradation, salinity and erosion. This trend is converting fertile lands to desolate deserts. Rare species of Blind Dolphin used to be in abundance in complete Indus water systems but now it has reduced to a number of hardly 200. Another fish species Shad, Barramundi, Dangri, and numerous other valuable species are threatened of their existence. Mangrove forests, spread in an area of 263,000 hectares are the sixth largest forests in the world. Lowering in the water discharge by Indus River is seriously damaging these Mangroves Forests. Lower basin comprising 810,000 hectares is ideal for forests, poultry, grazing lands, agriculture and animal husbandry. Shortages in Indus River are posing threat to the forests and wildlife.

Critical Analyses of Prime Minister Modi’s Posture towards IWT

Non-permanent solution for water issues with India (Like Baglihar dam, Kishenganga dam, and Wullar), with flooding of Punjab and Sindh by India has forced Pakistan to reiterate her rights of being Lower Riparian as granted in IWT. Pakistan has rights over– Indus, Chenab and Jhelum. Eastern rivers – Ravi, Sutlej and Beas are given to India. As per the Indus Water Treaty, India is not allowed to construct any dam which

shall alter the flow of river waters. However, India can construct a dam on run of river. Pakistan's political disharmony over construction of dams has been fully exploited by India and she has constructed various dams on these eastern rivers owing to her rapid Industrialization in Northern India and pressing needs of irrigation water and power. Such projects are at various stages which include Bursar and Wuller Dam/Lake. Other projects are, Kishanganga, Salal, Dulhusti, and Baghliar. India's design of controlling waters of Western rivers is manifested by the construction of Baghlihar Dam. This dam is just the tip of ice berg as India is working on multiple projects in IOK. Important cardinals of various projects being constructed by India are as under:-

- **Wullar Barrage Issue¹⁸:** Wullar Lake is one of the largest freshwater lake of India and is situated on the Jhelum River. India started constructing a barrage 439 feet in 1985, for an added storage of .3 MAF. Pakistan raised objection and construction was ceased in 1987. Pakistan raised objection for two reasons, one India requires to get approval from Pakistan and second India cannot hold water more than .01 MAF on any western river.

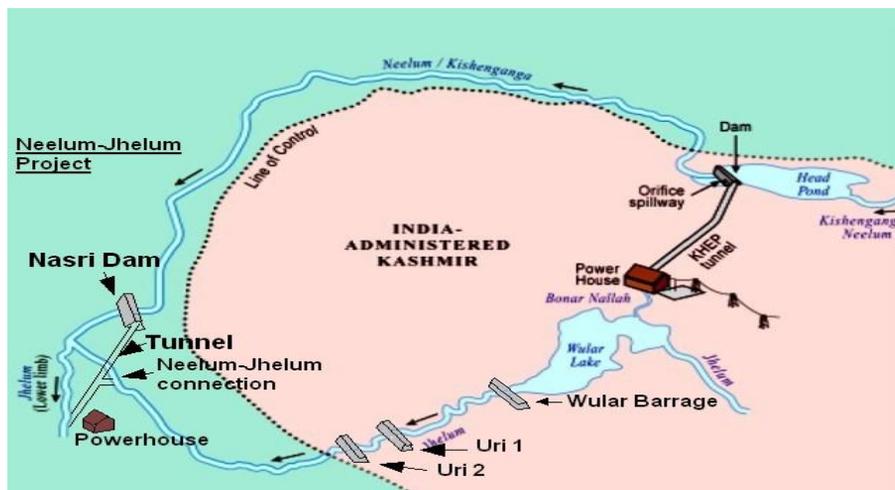


Figure-4: Wullar Barrage Project

- **The Salal Hydroelectric Project:** It is the first major project dispute on Chenab River, which was successfully resolved under IWT. Both governments signed treaty of Salal project on April 14, 1978. This project allowed water flow to Pakistan and involved no diversion or storage by India. However, Pakistan objected on six anti-siltation low level drain gates/outlets, for control of sedimentation. India agreed and lowered the heights of the gates from forty to thirty feet.

- The Kishenganga Dam:** India initiated 330 MW project across River Kishenganga (Neelum River). It includes 103 meter dam and 27 Km tunnel for taking the water to Wullar lake where power station shall be installed. Pakistan showed her concerns and objected the project with a fear of adverse impact its 969-MW Neelum- Jhelum power plant project. Neelum – Jhelum power project was planned in 1994 but could not start because of shortage of funds and lack of political will of Pakistani governments. Due to Indian Kishenganga project Pakistan expects 21% reduction in waters of River Neelum. This reduction in water will effect 9 % reduction in power production.



Figure-5: Kishenganga Project and Baglihar Project

- The Baglihar Project:** This project is constructed on River Chenab in Doda Distt which shall generate 450 MW. Pakistan raised objection that this project shall result in a loss of more than 8000 cusecs of water per day during rabi season. Pakistan is of the view that during flooding season once waters at Dulhasti, Baglihar, and salal will be released it will flood Bajwat sector above Marala Headworks. Upon raising of objections by Pakistan World Bank nominated Professor Raymond Lafitte as an expert under IWT. Settlement clause has been invoked between two countries.

Critical Analysis of IWT

First conclusion is answer to the question that whether India could unilaterally revoke IWT? Answer is that India possesses no legal provision under the Indus Water Treaty to revoke at its own. Article 12(4) of the treaty permits the cessation of the treaty only if both parties (India and Pakistan) agree in writing. In other words, a termination of treaty has to be dictated by both States and then recommended by both, to bring the IWT to an end. The treaty has no provision for one-sided “suspension”. It is of an

unspecified duration and was never intended to be time-specific or event-specific. However, India can shake the flow of water by partial non-adherence to articles of IWT. IWT is State specific instead of being regime specific. It shall not expire with regime change. Therefore it is obligatory on both the States equally and offers no provision of exit. In IWT, there is an arbitration clause which states that any grievance by either party will be taken first to Indus Basin Commission then to unbiased expert and lastly to the forum of arbitrators. Even if there is no presence of IWT under the International law India being an upper riparian has no right to stop the water. If India does so it is setting a regional practise which shall give a reason to China to stop waters of River Brahmaputra. IWT has endured two wars and various conflicts between both the countries. In wars, states append treaties, which include diplomatic relations. If India retracts the treaty, it will be signalling as an act of war against Pakistan. It will give a right to Pakistan for any coercive/non-coercive actions as act of reprisal. As treaties and accords are always state responsibilities and are not bound to regimes. They are free of corrosion in political atmosphere. Secondly, the World Bank and the international community has huge stakes in continuation of treaty, therefore, unilateral withdrawal does not seem a likely course for any country. While India has manipulated some of the provisions due to our Indus Water Commissioner's slackness, which need reappraisal of competency level of staff at the Commission. The Indian Government's revoking of article 370 applies to the status of IOK, therefore, has nothing to do with the status of western rivers, therefore, such administrative re-articulation by India for forcefully changing the status of IOK will instead increase political unrest, but will not provide leverage to India for manipulating water.

Recommendations

Water resources are common assets for both countries, therefore, both countries should consider themselves as guardians of River systems. Instead of two Commissioners sitting across the table and negotiating, the Joint Commission may be considered which should safeguard the interest of both countries, Rhetoric of blood and water may pose serious diplomatic challenges in future. The water crises are the result of mismanagement by each country in their water resources while using Indus River Basin in particular. Now at this stage, both the countries have found themselves in water conflict due to common factors of population growth, urbanization and unproductive polices to tackle the crises. Additionally, enormous impacts of climate change have also resulted in speedy melting of Himalayan glaciers, which has added to the woes of existing water stresses. The abrogation of IWT cannot give security to existing water crisis, therefore, comprehensive plan of action is suggested. Any unilateral step taken by either side would seriously affect the situation of other country especially of Pakistan being a lower riparian. If the present treaty is revoked even then under the prevailing

international law Pakistan shall continue to enjoy its lower riparian rights over the rivers flowing into its territory. India being upper riparian has an important role to play and to address the fears of Pakistan over seizure of waters. Government of Pakistan while diplomatically engaging international community and India should make them realize that in existing circumstances, IWT is the only solution to avoid any further conflict in this region, however, its manipulation by India will not be tolerated in future. It is strongly felt that both India and Pakistan should prefer optimistic approaches in dealing with challenges and at the same time meeting the requirements of existential water scarcity. Some of the possible areas of cooperation are as follows:-

- **Pro-Active Diplomacy:** Pakistan needs to ramp up its trans-boundary water management. We should not only aim to receive our due share under IWT but formulate a plan of action for ensuring a water secure South Asia. This can only be possible if Pakistan involves itself in active diplomacy with regional countries as well. Prior to formulation of a hydro-diplomacy strategy, Pakistani decision makers need to identify potential barriers towards cooperation, CBMs, political sensitivities and avoidance of provocative statements. Trust building and mutual cooperation are the means which can help Pakistan, India and Afghanistan in resolving their trans-boundary water issues. The barriers towards cooperation can be overcome through CBMs, which should establish favourable conditions for dialogue. In wake of current stress on water resources, there is a need to apply solutions derived from international water negotiation frameworks and principles for the Pak-Afghan region. By establishing an institutional framework, both Pakistan and Afghanistan can engage in hydro-diplomacy to avoid any future conflict over shared water.
- **Construction of Small Dams:** Currently, Pakistan does not have the water storage capacity beyond 30 days. The rapid sedimentation is the factor which keeps dams unable to store water for more than 30 days. As the sedimentation issue can't be resolved out rightly, Pakistan should focus on the construction of multiple smaller dams. Although these dams might not address the water scarcity issue in the long run, it will instead contribute as alternative sources of water storage. While the country remains in the need of larger dams, it is viable to build smaller dams in the timeframe needed for construction and operationalization of larger dams. India will continue going against IWT by constructing dams on Western rivers and due to her clout in international community no worthwhile voices will be raised against her. On our side Pakistan due to her internal politics has not been able to construct major dams in the last few decades. 40 MAF annual wastage in Arabian Sea by Pakistan is a major argument which allows India to augment her case in any international

court of arbitration. Pakistan's oblivious stance towards water stress/scarcie situation especially during Kharif season will put our nation in extreme situation of food insecurity. Immediate construction of Kalabagh Dam, Bunji dam and Diamer-Basha Dam is the need of the hour. Pakistan is facing the issue of funds for financing these mega projects, however, these projects can be added in CPEC and all financing can be asked from Chinese government. Chinese firms have huge expertise in construction of dams. Pakistan government should contact Chinese firms for immediate construction of these mega projects. Construction of these dams shall not only add power in national grid but will provide sufficient water for kharif crops and will restrict the damages of floods.

- **Applying the Maharashtra model for desilting dams:** Pakistan needs to adopt an initiative somewhat similar to the one launched by the Maharashtra government for desilting dams. In the initiative launched by Maharashtra government, philanthropists or corporate social responsibility teams work with NGOs or in several cases, villagers come together through village councils for providing funds to hire excavators for desilting dams. The government supplements by providing diesel subsidy for operating machines. The removed silt is carried away by farmers, at their own cost, in tractors to their fields. Four inches of silt is spread on the soil to enrich them. The silt spreading boosts the productivity of the fields for more than 5-7 years and also considerably cuts fertilizer usage. This desilting process is positively impacting entire village ecosystems and consequently have transformed the lives of more than 32,000 farmers so far through socio-economic benefits.¹⁹
- **Reusing effluent for irrigation purposes:** Pakistan needs to learn from Israel about reuse of effluents for irrigation. 40 per cent of land in Israel is irrigated through reusing of effluent. Israel's largest wastewater treatment and reuse facility, Shafan Wastewater Treatment Facility, supplies approximately 140,000,000 m³ per year in southern Israel to irrigate 50,000 acres of land for agricultural use.
- **Joint Academic Ventures:** Various international think tanks and institutions have conducted studies on melting state of Himalayan glaciers. India and Pakistan should consult and follow the recommended course of action to avoid speedy melting of glaciers. This shall help both countries to provide a solution for managing River basin instead of blaming each other. If the basic problem of water crisis is considered through joint efforts, then there will be no point of problems in the Treaty.
- **Commonality of Interests:** Pakistan and India can jointly fight degradation of environment in desert regions all along international border. Both countries may face food shortages due to agricultural losses and desertification which is

already visible in both States. With joint efforts, Pakistan and India can protect agricultural lands open to desertification by adopting water conservative steps and latest irrigation techniques. No doubt, both the neighbouring countries have already shown interest in protecting communities and farming operations that lie on the desert fringes.

- **Regionalization of Effort:** Lot of emphasis should be given on interaction/cooperation within SAARC countries on issues of water management/ agricultural growth. SAARC has focused on regional development and cooperation in agriculture. However during Modi's regime the non-cooperative behaviour of India has left this organization in a state of limbo.
- **Enhanced Provincial Collaborations:** A considerable start in this regard can be initiated by enhancing cooperation between the two PUNJAB provinces of both countries. As the two Punjabs hold same agriculture norms and face same problems. They can draw an effective start line for partnership on the problem of water shortage. Ludhiana based Punjab Agricultural University and University of Faisalabad (Pakistan) are the two premier agricultural alma matters of the region which can collaborate. Students from both countries can be trained to understand water management techniques, hydrological data, watershed management practices, restoration of water bodies, and enhancing the quality of groundwater and through rainwater harvesting can restore water tables. In the formulation of policy sphere Pakistan and India can learn from each other experiences. "For example in 2009, India promulgated the Sub-Soil Water Preservation Act and discouraged its farmers from planting a nursery before 10 May and sowing before 10 June each year, thus bringing down the irrigational requirements of canal water and maximizing the use of monsoon rains. This actually helped in raising water levels in the Indian Punjab". Farmers along both sides of the border can be educated with such knowledge. India has limited awareness about the innovative techniques being used by the Pakistani farmers. It is believed that they can offer similar knowledge to the Indian side as well.

Conclusion

Pakistan is facing multiple situations of water scarcity, lack of water storage facilities and lack of consciousness about preservation of water. Climate change and environmental degradation have further complicated the situation. Pakistani policymakers need to realize the urgency of addressing the water scarcity issue. A comprehensive plan needs to be chalked out for management of available water resources and water storage mechanism. Water storage reservoirs need to be constructed along with immediate measures to preserve available water resources, especially in the

agricultural sector. Pakistan needs to use active diplomacy to engage India and Afghanistan for securing water resource for future use. Inter-provincial differences over water need to be sorted out through constructive engagement. Water crisis and their solutions in this part of region (Pakistan / India) if not considered timely by leadership of both countries, will put these countries in the situation where war on water will be inevitable. Leaving behind the political differences on issues and working together for the better future of coming generations there is a need to adopt conclusive approach especially by India being upper riparian. Pakistan apart from adopting aggressive diplomacy needs to take account of inner difference on various water projects. Continuous engagement of Indian leadership even in the form of Track II diplomacy along with initiation of construction of new dams is the need of an hour. Case of Indian hegemonic designs of depriving Pakistan of its rightful waters can be fought at every international forum if fought with proficient legal experts and all necessary preparations.

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