Indus River System: Climate-proofing Indus Water Treaty

Ali Tauqeer Sheikh

Pakistan Climate Change Council, Islamabad, Pakistan Email; atauqeersheikh@gmail.com

Abstract

Pakistan and India reached a treaty in 1960 regarding the apportionment of the waters of the Indus River System. Over the years, because of climate change and demand for water use due to population growth, many new issues have arisen beyond the scope of the original Treaty. The IWT is based on the assumption that future water supply and quality will not change. In India and Pakistan, climate change-induced hydrological and hydro-climatological variabilities are upsetting the historical trends. As climate change alters the pattern of the monsoon system, past climate conditions are a less reliable predictor of the future. Adapting to climate change will require changes in the institutions and policies that have been put in place since the signing of the Treaty. It has become a matter of common knowledge that where the change exceeds the institutional capacity to absorb it, the setting is rife with conflict. This paper discusses the challenges to the Treaty and provides suggestions for a workable situation for the peaceful sharing of the Indus waters.

Keywords: Indus Water Treaty, climate change challenges, strategy for peaceful water sharing

1. Introduction

Climatic change has brought many new issues on the horizon of India-Pakistan water relations that are beyond the scope of the Indus Water Treaty: changing patterns of the monsoons, increasing precipitation and variability, cloud outbursts, glacial melt and outbursts (especially lake outbursts), more frequent heatwaves, droughts, cloud outbursts, tropical storms in the Indus delta and subsequent seawater intrusion. These issues continue growing in their importance and reflect fundamental shifts in the economic, social and ecological health of the Indus basin. Barring rainfall, since Pakistan gets a high proportion of its surface water from its neighbors, it is imperative to ensure that the country's shared water resources with its four neighbors (Afghanistan, China, India and Iran) are climate-proofed to serve as a source of cooperation rather than allowing unilateral actions by a single stakeholder. As water neighbors, Pakistan and India share the Indus River System,

Jan, M.Q., Shafique, M., Raynolds, R.G., Jan, I.U., Ghani, M. (Eds.) Indus Water System. National Centre of Excellence in Geology, University of Peshawar & Pakistan Academy of Sciences, Islamabad, Pakistan (2024) weblink: http://nceg.uop.edu.pk/books/IWS.html

the single largest source of water for Pakistan (Fig. 1). Pakistan gets an estimated 78% of her surface waters from/through India, a percentage that has been declining steadily and perceptibly over the years owing to a combination of climate and non-climatic factors.

This article focuses on the India-Pakistan water relations in the context of the Indus Water Treaty (IWT) and global warming/climate change. The article probes some policy options to address the emerging nexus of the changing climate and water issues, and their implementation mechanisms within the scope of the (IWT). It is argued that the water security of Pakistan will hinge on proactively addressing climatic challenges to the IWT and India-Pakistan water relations.



Figure 1. The Indus River and its tributaries.

2. The Indus Water Treaty

An assumption at the time of signing the IWT in 1960 was that climate will not change so rapidly, hence water quantity, quality and operations will not become ongoing issues of growing concern (World Bank, 1960). Many of the assumptions that existed at the time of the signing of the Treaty have changed. The institutions

that were initially set up have not evolved to meet the growing stresses and demands of the Treaty. The two sides have seldom raised issues of water quantity and quality except in an accusatory way, instead of problem-solving mode. The system of operation has been overlooked over time. Factors such as climatic change and a host of other dynamics, such as growing population, water consumption habits, urbanization, water contamination, water-intensive agriculture, and cropping patterns have not been dealt with in the context of the Treaty. However, from a climate change perspective, the increased temperatures and the changing monsoon precipitation trends, make it essential that many of these assumptions are revisited.

Climate-proofing the IWT is a sensitive but important issue that has a bearing on the economy of Pakistan, its growing population and climate vulnerability, both in terms of poverty and socio-economic well-being. Policymakers in the country have generally dismissed climate change as a dangerous distraction rather than an opportunity that needs to be captured to add to the life and vitality of the Treaty. The IWT is now exposed to several climate change-induced stresses that impose new water governance complications. It also poses a wide range of threats to freshwater resources that are Pakistan's lifeline, including water quantity, quality, and system operations. Presently, the Treaty lacks important tools for dealing with climate-induced social, economic, social and operational conditions. The Parliamentary Committee in India in its first-ever review of IWT in August 2021, recognized these new challenges. Its report, however, made an ill-founded and hasty conclusion that the IWT "renegotiation was essential" to establish a framework that addresses "pressing issues such as climate change, global warming and environmental impact assessment" (Parvaiz, 2021).

The present article argues that Article 7 of the Treaty has the provisions, or that it can provide the framework, to deal with many of the climate change-triggered issues that have emerged in recent years. While this is true that knowledge and information on climate change did not exist when the Treaty was signed, and awareness of the environmental issues was so limited that no mention of environment or environmental flows or minimum flows was made. The Treaty does not use the word ecosystem. Although it was written at a completely different time, these issues can still be tackled jointly within the scope of the Treaty. Instead of negotiating new agreements, the experts favored building upon the existing instruments to respond to climate change, particularly the Extreme Weather Events (EWEs), hoping that this would over time improve the scope of the existing water agreements and make them climate-smart. At the heart of such endeavors is the desire to cope with the changing climatic conditions by crafting flexible water

management strategies. An overriding challenge is to agree on how best to integrate information on future hydro-climatological conditions into the politically complex system of transboundary water agreement.

3. Emerging Trends

Both India and Pakistan need to view the IWT in its historical context and leap forward to the contemporary context. This was a post-partition gift and an opportunity to make our new country a viable entity for an agrarian economy. There was no time, scientific knowledge, or expertise available to discuss the importance of e-flows for sustainable ecosystems, watershed protection, or groundwater and aquifer management.

In Pakistan, there is generally a mindset that the Treaty has served us well and a better Treaty cannot be secured from India in the changed circumstances. Hence, it is best not to talk about it to avoid controversies that a new debate can generate. This cautious approach is a result of many years of weak scholarship in the country on water issues. There is-a need to raise questions, and then strive for answers, particularly since India-Pakistan water relations have become more complex over the years and go beyond the Indus Water Treaty. Therefore, there is a need to reassess our perspective and find or devise new policy instruments to manage water resources and water relations. It is important for both countries, but perhaps more for Pakistan as most of our waters are mostly transboundary, with the largest percentage coming from India.

The changing patterns of monsoons have some characteristics that are particularly problematic, especially the increasing variability in river flows. Extreme Weather Events (EWE) have become increasingly frequent, savagely fierce, and overly exposing Pakistan to high risks and damages. The water flows in the Indus River are decreasing. According to a study by MDPI, the trend in the magnitude of the high flows decreased at most of the sub-basins, including the Jhelum, Indus and Kabul River basins. The upstream construction of a chain of water reservoirs and other infrastructures has also adversely affected the regime of regular flows. This has resulted in parts of the rivers drying up, if not dying. Also, global warming is, and shall be, contributing to this decrease, as i) snow cover is receding, and ii) glaciers in the Karakoram-Hindu Kush-Himalaya as a whole are retreating and river flows are expected to decline after reaching a peak by 2050. The management challenges in the Indus River basin are many indeed, and the key in most instances rests in the effective management of the IWT.

For India and Pakistan, the climate change-induced hydrological and hydroclimatological variabilities are upsetting historical trends. As climate change alters the monsoon system, past climate conditions are a less reliable predictor of the future. However, the IWT is based on the assumption that future water supply and quality will not change. Adapting to climate change will require changes in the institutions and policies that have been put in place since the signing of the Treaty. It has become a matter of common knowledge that where the change exceeds institutional capacity to absorb the setting is rife for conflict.

4. The Global Context

India and Pakistan are not the only neighboring countries in the world that share transboundary water resources. Political borders and national boundaries rarely coincide with borders of watersheds, as countless rivers, lakes, and groundwater aquifers are shared by two or more nations. It is estimated that about 40% of the world's population relies on shared water sources and that some 70% of the world's transboundary basin areas are governed by treaties and agreements (Giordano et al., 2014). An assessment by the United Nations has mapped 214 such shared basins. A Registry prepared by Professor Aaron Wolf in 2003 identified over 260 major transboundary river basins shared by no less than 145 countries. An estimated 300 agreements govern multistate transboundary water rights.

It is obvious that while the violation of these agreements can spark conflicts, wellmanaged water agreements can serve as anchors of stability, particularly during changing times. It is in this context that some of these riparian countries have begun to revisit their accords to find mutually beneficial responses to climateinduced challenges. The IWT divided rivers in 1960, three years after the partition of subcontinental India. This Treaty divided the use of rivers and canals between the two countries. Pakistan obtained exclusive rights for the three western rivers, namely Indus, Jhelum and Chenab, while India retained rights to the three eastern rivers, namely Ravi, Sutluj and Beas. The Treaty specifically divided not only the rivers but also the quantities of water. Most other treaties and agreements, on the other hand, are about sharing rivers, making IWT a unique example. Hence, there may be some lessons for IWT signatories from other stories.

Most of the transboundary agreements are very different from each other. Globally, most water agreements and treaties are extremely diverse in their approaches and solutions. Unlike IWT which has divided rivers between India and Pakistan, almost all water agreements share waters based on fixed or flexible volumetric allocations. Some accords have also covered groundwater whereas others, e.g., IWT, have not. Many transboundary agreements have provisions for floods, some have for droughts, and fewer for both. Droughts and climate change have become synonymous in many regions, including India and Pakistan where incidences of droughts are increasing. In general, droughts are more clearly attributable to climate change than floods, which are often considered management and governance failures even if there have been very significant breakthroughs in attributive sciences. The present management systems and structures that the two countries have adopted are not always in sync with new and emerging practices and sciences.

Until recently, very little information was available on shared groundwater basins. It is estimated that almost 99% of the Earth's accessible freshwater is found in aquifers. UNESCO (2009) has released an Atlas of Transboundary Aquifers (2009) that identified 269 shared groundwater basins. It has since become increasingly apparent that shared groundwater basins may also be vulnerable to climate change as well as catalysts for political differences between countries. Groundwater is typically excluded from most transboundary agreements. In some agreements, however, it is mentioned about contamination rather than the use of groundwater resources. As mentioned, very few transboundary agreements have specifically covered groundwater, even if several countries, including India and Pakistan, have begun to map and monitor the patterns of groundwater flows, recharging, depletion and contamination.

Fixed volumetric, likewise, have become more perplexing during periods of scarcity. The room for flexibility for changing flow conditions can be very limited in periods of weaker or delayed monsoons. Fixed allocations can become politicized during periods of water scarcity or drought years. However, volumetric allocation will be under less stress if the monsoons are heavy, or there is increased frequency and intensity of floods. In either case, since there is less predictability in the system, the issue has assumed a greater importance to have strategies for adjusting allocations to flows, or to respond to increasing frequency and ferocity of extreme weather events such as floods, droughts, and cloud outbursts. to protect local populations and to reduce the risks of political conflicts over shared waters.

UNECE (undated) has stated that countries and other stakeholders of a shared water basin can work towards an effective, adaptable and sustainable agreement that typically applies to both surface- and groundwater. UN-Water (2024, and others) has provided a practical guide in this regard for the development of agreements or other arrangements for transboundary water cooperation. Danube River is often cited as an example where shared water, contested a few decades

ago, has become a lifeline of prosperity for many societies and many sectors of the economy of many countries. The river has become an emblem of peace and cooperation.

5. Emerging Approaches to Climate Change

Adapting to climate change will require changes in the institutions and policies that have been put in place since the signing of the Treaty. The mechanisms can be discussed under Article 7 and incorporated into the existing system to allow flexibility in the face of climate change. Fischhendler (2004) and McCaffrey (2003) have identified four types of issues that have emerged globally in managing increasing scarcity in transboundary water agreements: 1) flexible allocation strategies, 2) drought provisions, 3) amendment and review procedures and, 4) joint management institutions. The relative importance or weight of each of these will vary from region to region, or over the years even in the same region. Whereas all four are important categories in the India-Pakistan or the IWT contexts, the two countries will need to first agree and prioritize their preferences based on their specific needs. Emerging examples of flexible water management strategies include:

5.1. Ganges Water Treaty (GWT)

The GWT between Bangladesh and India, for example, has the provisions to share water during dry or drought periods. The Joint Water Commission, established under the treaty, is mandated to support the bilateral treaty with studies and reports on the sharing of waters, irrigation, flood and cyclone control. The GWT is an example of several elements that can be tackled under Article 7 of the Indus Water Treaty. It is a relatively new treaty but has the provision of joint research that is important from a climate change angle. Like IWT, the GWT also has provisions on data sharing and it will be important to draw lessons on the challenges that IWT had historically faced on data sharing between the upper and lower riparian.

5.2. Grand Ethiopian Renaissance Dam

The Grand Ethiopian Renaissance Dam, also known as the Millennium Dam, has a complex negotiating agenda between Ethiopia, Egypt, and several other riparian countries. Despite the Permanent Joint Technical Commission (PJTC) on the Nile Basin, the Millennium Dam has created several controversies. Thanks to mediation by some international powers, the downstream countries were able to negotiate on the design of the upstream reservoir. The PJTC on the Nile Basin is mandated to make recommendations for new water allocations in response to an extraordinary drought. In other words, the treaty has a provision to discuss and manage the anticipated scarcity, rather than just dividing the available water. Further, the upstream and downstream countries not only discussed and negotiated the design but also the time of filing of the reservoir to avoid downstream scarcity and drought. There have even been discussions on generating electricity that downstream countries could utilize. Not all issues have been resolved, but the parties have remained engaged in finding amicable solutions, agreed on preferred approaches, and helped diffuse political tensions.

5.3. Opportunities under Article 7 of the IWT

Article 7 is the most promising, but regrettably one of the least used instruments of the IWT. India and Pakistan are averse to thinking about water research in each other's countries, let alone collaborative research. India and Pakistan agree under the Treaty to exchange data and cooperate in the optimum use of water from the Indus River System. For this purpose, the Treaty created the Permanent Indus Commission (PIC), with a commissioner appointed by each country.

The PIC is mandated to meet at least twice a year, and it has had 120 meetings since the signing of the Treaty. There is, however, no bar on more frequent meetings if the two sides decide. Likewise, there is no restriction on constituting working groups or sub-committees, and for them to meet more frequently for their work. If it is considered as a robust treaty, then it needs to have a robust mechanism in place.

It is argued that issues can be discussed under Article 7, under the following five headings:

- i) devising strategies for adjustable allocations and water-quality standards,
- ii) devising strategies for response to extreme weather events,
- iii) developing shared research portfolios in each country,
- iv) undertaking review and amendment of procedures, and
- v) initiating discussions on strengthening the Commissioner's office for it to transform into an institution of the future.

While the two sides may not readily agree to include such challenging issues to the agenda of the PIC meetings, Pakistan will surely benefit by initiating preparatory research on the above-mentioned issuers. Additionally, there are several other issues mentioned in the Treaty, like river pollution, and River Ravi is specifically

mentioned. Based on the changing assumptions, there are a few important issues that both countries need to think in the context of the Indus Water Treaty, even though the presently difficult political relationship provides limited space to talk about water issues.

Time is of the essence. First, the situation will become more complex if the issues outlined above are kept on the back burner. Many of the EWEs need India and Pakistan to devise response strategies, particularly given the changes in precipitation and heat causing glacial melt, floods, droughts, heatwaves, tropical storms and cloud bursts. There is a need to jointly study the phenomena and trends in extreme weather events that are becoming much more frequent and devastating. Multi-national collaboration is considered to be important for addressing regional issues. Second, there is a need to review water quality standards and arrest water degradation. That has become detrimental to the existing and future infrastructure. Third, we our two countries need to explore changes in monitoring and review procedures to jointly deliberate on the shared climate concerns to enhance the effectiveness of the Indus Water Treaty. Fourth, there is a need to envision the joint management institutions. The ones existing are being used sub-optimally. Nations and treaties fail with the failure of institutions. Without investing in institutions, we cannot respond to many of the emerging challenges and issues.

6. Recommendations

Experts recommend many mechanisms that can be incorporated into the existing mandate of the Treaty, particularly under Article 7. The Treaty allows for flexibility in the face of fast-creeping climatic changes. The following five key global trends merit closer review:

- i. Devising response strategies for EWE floods, drought, tropical storms or cloud outbursts,
- ii. Reviewing water-quality standards to arrest water degradation that has become particularly detrimental to the existing and future infrastructure,
- iii. Exploring changes in monitoring and review procedures to deliberate jointly on shared climate concerns to enhance the effectiveness of the IWT,
- iv. Strengthening joint management institutions, particularly PIC. Presently, the Commission barely meets twice a year, primarily to exchange Pakistani objections and Indian rebuttals on the proposed infrastructural projects. This zero-sum approach cannot keep the Treaty alive, even effective. It is in the larger interest of India and Pakistan to ensure that the Permanent

Commission meets more frequently rather than the minimum required in the Treaty, and for it to constitute ad-hoc expert groups and sub-committees to table climate-smart options. An otherwise robust water treaty should not become hostage to weak institutions and an unimaginative treaty implementation strategy by either side.

v. India and Pakistan, both the countries, need to consider a ministerial-level commission to revitalize the IWT, by formulating a refreshed bilateral water agenda to strengthen and fully utilize instruments available in the IWT. The present low ebb in relations is probably the best time for such an initiative.

Let's accept that as climate change alters the form, intensity, and timing of water demands, precipitation, and runoff, meaning past climate conditions are no longer an adequate predictor of the future.

References

- Fischhendler, I. 2004. Legal and institutional adaptation to climate uncertainty: a study of international rivers. Water Policy, 6(4): 281–302.
- Giordano, M., Drieschova, A., Duncan, J., Sayama, Y., De Stefano, L., Wolf, A.T., 2014. A Review of the evolution and state of transboundary freshwater treaties. International Environmental Agreements, 14, 245–264.
- McCaffrey, S.C. 2003. The need for flexibility in freshwater treaty regimes. Natural Resources Forum, 27(2): 156–162. https://doi.org/10.1111/1477-8947.00050
- Parvaiz, A. 2021. India, Pakistan cross-border water treaty needs climate change revision. Nature India, 16 September 2021.
- UNESCO, 2009. Atlas of Transboundary Aquifers'
- UN-Water, 2024. Water for prosperity and peace. UN World Water Development Report, 2024.
- World Bank, 1960. The Indus Waters Treaty 1960 between the Government of India, The government of Pakistan and the International Bank for Reconstruction and Development. Signed at Karachi, on 19 September 1960, UN Treaty Series No. 6032, 1962.