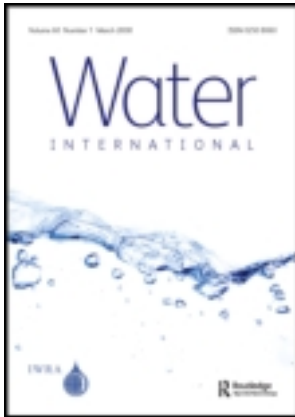


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Revisiting the 1960 Indus Waters Treaty

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This article analyzes the strengths and weaknesses of the Indus Waters Treaty (IWT) in light of the UN Watercourses Convention. The IWT is, to a large extent, still relevant but must incorporate contemporary environmental standards and the social realities that are impacting water resources. Proposals for improving the IWT include the incorporation of provisions related to joint research initiatives, optimal use of available resources through mutually negotiated trade-offs, a joint climate change adaptation strategy, consideration of environmental flow needs, and joint water development and energy generation.

Keywords: Indus Waters; treaty; watercourses convention; Pakistan; India; transboundary waters

Introduction

Pakistan and India share not only a 1610 km border, languages, food, dress code and culture, but also the waters from six watercourses: the Indus, Jhelum, Chenab, Ravi, Sutlej and Beas Rivers, along with their numerous tributaries (Swain, 2004, p. 46). The growing populations of both countries and the resultant increased demand for water have made the sharing of transboundary water increasingly complex.

This paper takes a fresh look at the 1960 Indus Waters Treaty (IWT) between the governments of India and Pakistan in view of the new environmental and social realities facing water resources. The analysis is conducted against the backdrop of recent developments in international water law with a view to analyzing the IWT's strengths and weaknesses, and in turn proposing a path for its future development and practical implementation.

The Indus River system is the source for the largest contiguous irrigation system in the world, with a command area of 20 million hectares and an annual irrigation capacity of over 12 million hectares (Swain, 2004, p. 46). Although the main source of the Indus River is located in China (Tibet), the headwaters of the basin lie in India and the bulk of the command area falls in Pakistan (Jaitly, 2009). Of the Indus Basin's 1,138,800 km² area, 52% is in Pakistan and 34% in India; the remaining 14% lies in China, Afghanistan and Nepal (UNEP, 2002).

The partition of the Indian subcontinent in 1947 set Pakistan and India at odds regarding rights over the shared waters of the Indus, especially given that the headworks of two major canals irrigating Pakistani lands (Central Bari Doab and Dipalpur) were within

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India's territorial borders. Through the "good offices" of the World Bank, Pakistan and India finally agreed on the IWT. It was signed on 19 September 1960, effective retroactively as of 1 April 1960, and ratified in January 1961 (Wolf & Newton, 2008).

The IWT within a contemporary setting

Despite some controversies and negative public sentiment on both sides since its commencement, the IWT has survived for more than half a century. In its longevity and its role in helping both countries resolve their transboundary water issues (amicably for the most part), the IWT is "regarded as one of the most successful settlements of a transboundary water basin conflict" (McKinney, Pittman, Kulis, & Shaw, 2011, p. 97). The Permanent Indus Commission, established under the IWT, continued to meet even during the wars of 1965 and 1971. Given such positive results, can, or should, this treaty be further strengthened to reflect today's realities?

In particular, the IWT would seem to have become inadequate in its ability to address climatic variability and hydrological uncertainty; environmental flows; and the exigencies of growing demand, driven by significant increases in population.

Climatic variability and uncertainty (and the resultant hydrological extremes) are not addressed in the treaty. The unpredictable variations of river inflow necessitate the storage of water and at the same time increase the need for improved transboundary water cooperation and the exploration of shared opportunities for joint climate change adaptation within the basin in order to avoid shared climatic threats, such as glacial lake outburst floods (Bates, Kundzewicz, Wu, & Palutikof, 2008).¹ In this respect, Vivekanandan and Nair formed the view that "one of the more obvious impacts of climate change will be on the world's river systems, many of which will initially see increased flows due to glacial melt followed by decreases as their source runs out" (2009, p. 4). Climatic impacts on river systems may thus subsequently lead to desertification of large agricultural tracts, resulting in food insecurity and conflict over scarce resources. Climate uncertainty and variability also result in unexpectedly high or low river flows. One such example is the recent flooding of the Sutlej River. Under "normal" conditions the Sutlej River runs dry, which has resulted in people settling on the river bed. When India released extra water into the river, flooding within Pakistan's territory caused property loss and the displacement of adjacent communities (*The Nation*, 2011). Had there been a cooperative arrangement allowing the river to flow at a minimum level and a procedure for the timely exchange of information, this problem could have been avoided.

The IWT does not address *environmental flows*. These refer to the water regime established within a river, wetland or coastal zone in order to maintain ecosystems and their benefits in situations where competing water uses exist and where flows are regulated (Dyson, Bergkamp, & Scanlon, 2008). They run counter to a common belief that water is wasted if any is left unconsumed to flow into the sea. For example, mangroves benefiting from the Indus are a source of livelihood for thousands of delta fishermen. Arguably, this emerging concept would require an environmental perspective to be incorporated into the water storage, management and drainage regimes under the IWT.

The total *population* of both countries increased threefold, from 485 million in 1961 to 1390 million in 2011 (GeoHive, 2012). Hence, water demand for irrigation and energy generation is much larger now. Given that the inflow of water into the Indus Basin is more or less fixed (though at times somewhat erratic), population pressure on water resources necessitates intra-basin cooperative water sharing and management.

Because of the high rates of water extraction (surpassing recharge rates) in both Pakistan and India, groundwater tables on both sides of the border are falling rapidly. This

has put even more pressure on surface-water resources and often led to unilateral upstream responses, such as the diversion of natural water flows and the construction of more water reservoirs, with the potential for significant transboundary impacts.

Expansion of agricultural production, along with the introduction of new *rabi* crop varieties² has resulted in higher demand for irrigation water. To meet this demand where the flow of the Indus falls by 80% during the winter, Pakistan will need more reservoirs for essential water storage and regulatory mechanisms for water management all year round.

Both countries need electricity to run their large industrial sectors, foster rural development and meet the needs of rapidly urbanizing populations. With hydropower being the cheapest option for electricity generation, and high demand from the increasing populations, both nations have ambitious hydropower development plans and may eventually end up with surplus energy. Hence, it would be to the benefit of both countries to use the available water resources in a mutually beneficial manner for electricity generation, as is being done by India and Bhutan.

Unlike the 1997 UN Convention on the Law of the Non-navigational Uses of International Watercourses (UN Watercourses Convention, or UNWC), the IWT is a water-apportionment treaty rather than a framework for water cooperation and benefit sharing. This difference has considerable influence on the way both parties ensure treaty compliance, and in turn restricts the scope for converting the IWT into a broader cooperative regime. Had the IWT been established as a framework in which to formulate water-sharing arrangements, it would have required only a few minor adjustments in both the western and the eastern rivers in order to fulfil immediate water demands for local populations.

More importantly, while the implementation of the IWT has continued relatively uninhibited, a number of contentious issues have surfaced over the last decade. In the past, India and Pakistan have resolved controversial issues using bilateral mechanisms. More recently, however, both nations have found the scope of the IWT's bilateral conflict-resolution mechanisms to be limited and have therefore chosen to resort to third-party mechanisms.

This new trend towards third-party dispute resolution is evidenced by two separate cases, regarding the Baglihar Hydro-electric Power Project and the Kishenganga Hydro-electric Power Project, for which Pakistan had to invoke Article IX (Annexures F and G, respectively) of the IWT. In the case of the Baglihar project, a neutral expert was approached under Article IX, Annexure F, to give an expert determination, which was accepted by both parties (*Baglihar Hydroelectric Plant*, 2007). In the case of the Kishenganga project, the Permanent Court of Arbitration (PCA) was approached under Article IX, Annexure G. On 18 February 2013, the PCA issued a partial award stating that "India may accordingly divert water from the Kishenganga/Neelum River for power generation by the Kishenganga Hydro-Electric Plant . . . in such a way as to maintain a minimum flow of water in the Kishenganga/Neelum River, at a rate to be determined by the Court in a Final Award" (*Kishenganga Arbitration*, 2013, p. 201).

In light of these changes, this paper takes an international water law perspective to consider whether the IWT continues to be relevant and viable from a water management perspective, and to explore additional means to enhance cooperation in the management of the Indus River.

Analyzing the 1960 Indus Waters Treaty

At the time of its adoption, the IWT could be considered an example of best practices given the available science and the status of international water law in the 1950s and that the treaty covered most aspects of water apportionment between both basin states. Now,

however, over half a century after its adoption, it would be useful to review the IWT against the baseline of the UNWC. In so doing, gaps might be identified and addressed, and the IWT would be more relevant to the contemporary realities facing India and Pakistan.

The following analysis adopts the legal assessment model, an “analytical framework designed to identify and examine the most important elements of the majority of water-course agreements” (Wouters, Vinogradov, Allan, Jones, & Rieu-Clarke, 2005, p. 18), developed by the IHP-HELP Centre for Water Law, Policy and Science at the University of Dundee. It categorizes treaty provisions with respect to their scope; substantive rules; procedural rules; institutional mechanisms; and dispute avoidance and resolution. As noted previously, it should be kept in mind that the UNWC is a framework convention designed to be generic and flexible in nature, whereas the IWT is a basin-specific treaty between two co-riparians, with very specific background, requirements and modalities. Table 1 provides an overview of the IWT using the legal assessment model framework.

Scope

The geographic scope of the IWT is determined in its Preamble, Article I (Definitions), and Article XI (General Provisions), which provide that the treaty applies to the eastern rivers (Sutlej, Beas and Ravi) and the western rivers (Indus, Jhelum and Chenab), along with all of the tributaries and lakes contributing to those rivers. Article I defines the terminology used in the treaty, including: article, annexure, tributary, Indus, Jhelum, Chenab, Sutlej, Beas, Ravi, main, eastern rivers, western rivers, the rivers, connecting lake, agricultural use, domestic use, non-consumptive use, transition period, bank, commissioners, interference

Table 1. Summary of the 1960 Indus Waters Treaty through the legal analytical framework.

Scope	<ul style="list-style-type: none"> ● Preamble ● Article I: Definitions ● Article XI: General Provisions <ul style="list-style-type: none"> ● Annexure A: Exchange of Notes between Government of India and Government of Pakistan
Substantive rules	<ul style="list-style-type: none"> ● Article II: Provisions Regarding Eastern Rivers <ul style="list-style-type: none"> ● Annexure B: Agricultural Use by Pakistan from Certain Tributaries of the Ravi ● Annexure H: Transitional Arrangements ● Article III: Provisions Regarding Western Rivers <ul style="list-style-type: none"> ● Annexure C: Agricultural Use by India from the Western Rivers ● Annexure D: Generation of Hydro-electric Power by India on the Western Rivers ● Annexure E: Storage of Waters by India on the Western Rivers ● Article IV: Provisions Regarding Eastern Rivers and Western Rivers
Procedural rules	<ul style="list-style-type: none"> ● Article V: Financial Provisions ● Article VI: Exchange of Data ● Article VII: Future Co-operation ● Article X: Emergency Provisions ● Article XII: Final Provisions
Institutional mechanisms	<ul style="list-style-type: none"> ● Article VIII: Permanent Indus Commission
Dispute avoidance and resolution	<ul style="list-style-type: none"> ● Article IX: Settlement of Differences and Disputes <ul style="list-style-type: none"> ● Annexure F: Neutral Expert ● Annexure G: Court of Arbitration

with the waters and effective date. Article XI defines the applicability of the IWT and any limitations of the provisions as to the rights and obligations of the state parties.

Under Article 4 of the UNWC (1997),

every watercourse state is entitled to participate in the negotiation of and to become a party to any watercourse agreement that applies to the entire international watercourse, as well as to participate in any relevant consultations

and

a watercourse state whose use of an international watercourse may be affected to a significant extent by the implementation of a proposed watercourse agreement that applies only to a part of the watercourse or to a particular project, programme or use is entitled to participate in consultations on such an agreement and, where appropriate, in the negotiation thereof in good faith with a view to becoming a party thereto, to the extent that its use is thereby affected.

The IWT, on the other hand, is clearly limited to India and Pakistan (as state parties) and does not allow any other country to become a party to the treaty. However, due to the specific nature of the IWT, the International Bank for Reconstruction and Development is also a signatory to the treaty in reference to Articles V and X as well as Annexures F, G and H. The bank's participation brings an element of third-party mediation to the treaty.

A striking difference in scope between the UNWC and the IWT is that the latter deals with navigational uses in its provisions on "Non-consumptive Use". In contrast, the UNWC only "applies to uses of international watercourses and of their waters for purposes other than navigation . . . except insofar as other uses affect navigation or are affected by navigation" (Art. 1(1–2)). Navigational uses are therefore not directly covered by the UNWC; they are addressed only indirectly, when such uses have an impact on non-navigational uses or vice versa (Art. 1(2)).

Both the IWT and the UNWC use the term "watercourses", in contrast to the "international drainage basin" terminology employed in the 1966 Helsinki Rules. The drainage basin approach was not utilized as part of the UNWC because, in negotiating the UNWC, a "number of States were reluctant to endorse this [latter] term, which they perceived as being too broad, implicitly extending not only to water resources but to the land mass as well" (Wouters et al., 2005, p. 20). Reflecting that concern, the IWT states that "this Treaty governs the rights and obligations of each Party in relation to the other with respect only to the use of the waters of the Rivers and matters incidental thereto" (Art. XI (1)(a)).

The IWT is thus compatible with the UNWC, which states that "where a watercourse agreement is concluded between two or more watercourse states, it shall define the waters to which it applies" (Art. 3(4)). In this sense the IWT fulfils the basic parameters of defining the scope of a watercourse treaty, as set by the UNWC.

Substantive rules

Articles II–IV of the IWT contain provisions that specifically apply to either the eastern or western rivers of the Indus River system as a whole. Those articles also determine the rights and obligations of the state parties with regard to water apportionment. Article II gives India rights of unrestricted use of the eastern rivers, whilst allowing Pakistan non-consumptive and domestic use of these tributaries before they return to Indian territory. Pakistan is also allowed non-consumptive, domestic, and limited agricultural use (per Annexure B), and unrestricted use of leftover river flows with no claim or rights over water.

Partially acknowledging Pakistan's historic rights, a "Transition Period of 10 years" (Art. II and Annexure H), with detailed provision of allocations and types of uses, was agreed upon to allow unrestricted use of the eastern rivers' water. This interim arrangement was also linked with Article V regarding how infrastructure replacement was to be funded during the transition period.

With regard to the western rivers, Article III gives Pakistan rights for unrestricted use, allowing India non-consumptive, domestic and limited agricultural use (per Annexure C) and hydropower generation (Annexure D). The same article allows India limited storage (per Annexure E) of up to 1.25 million acre-feet (MAF) for general purposes, 1.6 MAF for power, and 0.75 MAF for flood protection.

Comparing the above provisions to Articles 5–6 of the UNWC (1997), the water-apportionment approach taken by the IWT seems to be contrary to the principles of "correlative right and obligation" to equitable use and of "optimal utilization" of transboundary waters. Indeed, the approach to apportionment was such that: "The three (3) eastern rivers allocated to India had a cumulative flow of 33 million acre feet (MAF) out of which India was only utilising 3 MAF and left with 30 MAF for future expansion. Against this, Pakistan did not get any additional water and had to develop storages for its future requirements" (Tariq, 2010, p. 9).

Whereas Articles II and III of the IWT establish legal entitlements for both countries regarding what water may be used by whom, Article IV sets the basic principles of water management by India and Pakistan, primarily through no harm (Art. IV(9)), prior information about development (Annexure D(9)), and pollution control (Art. IV(10)), all applicable to both eastern and western rivers. This is in accord with the principles of equitable and reasonable utilization and participation (Art. 5 of the UNWC), the obligation not to cause significant harm (Art. 7 of the UNWC), and the pledge to protect and preserve ecosystems of international watercourses (Art. 20 of the UNWC).

However, the IWT does not provide a list of factors to be considered in a determination of entitlements (Art. 6 of the UNWC). Instead, the IWT specifies entitlements and concessions, under Annexures B–E. While acknowledging the needs of both parties, the IWT provides concessions and compensations for both Pakistan and India. Water was made available from the eastern rivers to Pakistan (Article II) during the transition period (Annexures B and H), and financial arrangements were made for infrastructure replacement (Art. V). At the same time, India was allocated a limited quantity of water from the western rivers (Article III) for agriculture, generation of hydro-electricity and storage (Annexures C–E). In line with the UNWC's Articles 6 and 10, both countries factor in domestic, human and industrial needs for water through the abovementioned articles and annexures. Annexure D, dealing with generation of hydro-electric power by India on the western rivers (in conjunction with Annexure E), has been the most referred to in terms of the differences between India and Pakistan – for example, in the case of the Baglihar Hydro-electric Plant (2007).

Comparing the substantial rules under the IWT to those of the UNWC, it appears that the IWT was more cautious, using the "no harm" principle as compared to the "significant harm prevention" principle, which provides flexibility in defining harm. The use of the term "significant harm" has been one of the key factors restraining Pakistan from joining the UNWC (UNGA, 1997).

More recently, Pakistan has used the IWT's "no harm" provision (Annexure D) in requesting support from the neutral expert (Art. IX(2)(a), Annexure F (Part 2)) and the PCA (Art. IX(5), Annexure G). In the Baglihar case, Pakistan referred to criteria (a), (c), (e) and (f) of Paragraph 8 of Annexure D, which ensure no harm to the lower riparian. In the

Kishenganga case, Pakistan invoked Article IX of the IWT for the establishment of a court of arbitration and petitioned the PCA for interim measures as provided under Annexure G(28) (*Kishenganga Arbitration*, 2011).

Procedural rules

In the IWT, procedural rules are provided in Articles V–VII, X and XII, which are further elaborated in Annexures C–E, as a basis for the implementation of the substantive rules covered under Articles II–IV. Linked with Article IV(1) on construction of water works, Article V provided the mechanism to fund infrastructure replacement through the Indus Basin Development Fund, to which India contributed £62.06 million in 10 yearly instalments during the transition period up to 31 March 1970.

Consistent with the “good faith” principle, the IWT creates a mechanism for the monthly exchange of daily data on flows, extractions, withdrawals, escapages (water flow from water infrastructures such as headworks, barrages or dams) and deliveries (Art. VI), and emphasizes future cooperation on water management (Art. VII), to the extent that each country can set up hydrological and meteorological stations on the other’s territory. These provisions are in line with the UNWC’s Article 8 (General Obligation to Cooperate) and Article 9 (Regular Exchange of Data and Information). Also, the IWT can only be modified or terminated through a duly ratified treaty (Art. XII).

The IWT was adopted 37 years earlier than the UNWC, when international water law was still in the early stages of its development. Still, the IWT is elaborate in its provisions for prior notification of planned measures, permission, concessions and restrictions (Annexures C–E). Though most of the procedural provisions of the UNWC (Arts. 9 and 11–32) are incorporated into the IWT’s articles and annexures, the IWT does not factor in environmental and ecological considerations. Specifically, the IWT does not require that an environmental impact assessment (EIA), if available, be shared with co-riparian states (as in Article 12 of the UNWC). Other than prohibiting water pollution (Art. IV(10)), the IWT does not have elaborate provisions on environmental protection, preservation and management as given in Part IV of the UNWC. However, recent developments in international law have started factoring into the interpretation or application of the IWT. For example, the PCA asked India to submit an EIA for the Kishenganga Hydro-electric Project (*Kishenganga Arbitration*, 2011).

Also, the UNWC provides that the notifying state, during the “period for reply to notification” (Art. 13), “shall not implement or permit the implementation of the planned measures without the consent of the notified States” (Art. 14(b)). The IWT does not include this requirement, but provides that “either Party may request the [Permanent] Court [of Arbitration] . . . , pending its Award, such interim measures as . . . are necessary to safeguard its interests under the Treaty with respect to the matter in dispute, or to avoid prejudice to the final solution or aggravation or extension of the dispute” (Annexure G(28)). This provision has been invoked in the Kishenganga case.

Institutional mechanisms

The UNWC recommends that “watercourse States may consider the establishment of joint mechanisms or commissions” (Art. 8(2)), and clarifies that “consultations concerning the management of an international watercourse . . . may include the establishment of a joint management mechanism” (Art. 24(1)). In turn, the IWT establishes the Permanent Indus Commission (Art. VIII), requiring parties to appoint “commissioners of Indus Waters”

as their representatives (Art. VIII(1)). The commissioners are responsible for cooperative implementation of the treaty (Art. VIII(4)) and are assisted by two advisors (Art. VIII(7)). The commissioners have privileges and immunities under the 1946 Convention on the Privileges and Immunities of the United Nations (Art. VIII(6), IWT). The commissioners must submit an annual report of the commission's work to their respective governments by 1 June each year (Art. VIII(8)).

The commission is required to meet at least once each year, alternating in India and Pakistan (Art. VIII(5)). As an indication of the treaty's success, this commission has continued to meet regularly despite two full-scale wars between the two countries. The commission has been an effective mechanism in resolving bilateral differences over the management of the Indus waters, except in the case of the Baglihar and Kishenganga projects, where Pakistan decided to use the dispute-settlement mechanisms provided under Article IX.

Dispute avoidance and resolution

Given the sensitive nature of the relationship between India and Pakistan, the IWT is very particular with regard to the settlement of differences and disputes (Art. IX). It provides a step-by-step approach to resolve issues – first through the commission, then by a neutral expert to be appointed by the World Bank (Annexure F), and then by the PCA (Annexure G). The most important aspect of this mechanism is the emphasis on mutual agreement. The IWT also provides that:

Except as the Parties may otherwise agree, the law to be applied by the Court shall be this Treaty and, whenever necessary for its interpretation or application, but only to the extent necessary for that purpose, the following in the order in which they are listed: International conventions establishing rules which are expressly recognized by the Parties; and customary international law. (Annexure G, 29(a) and (b))

This has a far-reaching effect on how the treaty is interpreted and applied against the backdrop of emerging issues and challenges between India and Pakistan and the development of international water law. A recent example is the Kishenganga case before the PCA, in which the *Pulp Mills* decision of the ICJ (2006) was referenced.

The dispute-resolution mechanism laid down in the IWT is completely in line with that provided under the UNWC's Article 33, which "offers a range of dispute resolution mechanisms. States are free to select the means to settle their differences, including negotiation, good offices, mediation, conciliation, joint watercourse institutions, and so forth. However, if these attempts fail, any State to the dispute can unilaterally invoke the compulsory fact-finding procedure provided for under Article 33" (Wouters et al., 2005, p. 27).

In this regard, an interesting fact is that both India and Pakistan, despite being parties to the IWT, which provides a mandatory dispute-resolution mechanism, abstained in the vote for the adoption of the UNWC on account of contrasting interpretations of its Article 33. The Pakistani delegate declared that "the mechanism provided therein was not binding" (UNGA, 1997, p. 3), while the Indian delegate opined that "Article 33, on dispute settlement, contained an element of compulsion" (p. 4). Though not mentioned explicitly by both parties, their experience with the IWT may be a key factor behind their respective positions in relation to Article 33 at the time of the UNWC's adoption.

Conclusion and recommendations

So, is the IWT still relevant and viable against the backdrop of developments in international water law? Yes, in part, but it requires certain adjustments and addenda to respond to changed realities.

Professor Lafitte, as neutral expert, declared the IWT “the successful document” (*Baglihar Hydroelectric Plant*, 2007, p. 20) because it has effectively sustained dialogue between India and Pakistan on water issues; only two unilateral projects have been referred to third parties for resolution in more than 50 years since its adoption. Lafitte noted:

The Treaty was negotiated and concluded during a period of tension between India and Pakistan. . . . Those who drafted the Treaty aimed for predictability and legal certainty in its drafting, so as to ensure sound implementation . . . The Treaty contains clear language and wording on how and to what extent India and Pakistan may be allowed to utilize the waters of the Indus system of rivers. The Treaty also gives a clear indication of the rights and obligations of both Pakistan and India. (*Baglihar Hydroelectric Plant*, 2007, p. 5)

However, when giving his expert determination on the Baglihar case, Lafitte did suggest that “these rights and obligations should be read in the light of new technical norms and new standards as provided for by the Treaty” (*Baglihar Hydroelectric Plant*, 2007, p. 5).

The prime motive behind the IWT is given as the desire to attain

the most complete and satisfactory utilisation of the waters of the Indus system of rivers . . . fixing and delimiting, in a spirit of goodwill and friendship, the rights and obligations of each in relation to the other concerning the use of these waters and of making provision for the settlement, in a cooperative spirit, of all such questions as may hereafter arise in regard to the interpretation or application of the provisions agreed upon herein. (Preamble, IWT, 1960)

However, the IWT is not a water-sharing treaty which could facilitate the “equitable and reasonable utilization” of water as envisaged by the UNWC’s Articles 5 and 6. As explained earlier, climate change, with its resultant uncertainty and unpredictability, is not factored into the treaty’s prescriptive provisions for the allocation of waters, which are set in fixed quantities. The share of India from western rivers has been fixed at 3.6 MAF, despite wide fluctuations in precipitation and runoff. This issue threatens to be aggravated by increasing glacier melt in the Himalayas because quick glacial melt results in reduction of sustained water supply over longer periods (IPCC, 2007).

An obvious shortcoming of the IWT, compared to the UNWC and in view of recent developments in international water law, is in the area of environmental protection, preservation and management. Since the adoption of the IWT, a great amount of work has been undertaken on sustainable river development. The IWT treats this aspect cursorily, providing only that “each party declares its intention to prevent, as far as practicable, undue pollution” (Art. IV(10)). In contrast, the UNWC gives comprehensive treatment to the protection and presentation of international watercourses and related ecosystems (Part IV: Arts. 20–23).

The IWT is also silent about transboundary environmental impact assessment, as introduced by Principle 21 of the Stockholm Declaration (1972) and formally codified by the UNECE Convention on Environmental Impact Assessment in a Transboundary Context 1991 (Espoo Convention, 1991). As mentioned above, this tool has been factored into the application of the IWT in a recent case (the Kishenganga case of the PCA). The UNWC makes explicit reference to the EIA process (Art. 12). In addition, the recent ICJ decisions

in the *Gabčíkovo–Nagymaros* (1997) and *Pulp Mills* (2010) cases, along with the PCA's Optional Rules of 2001, further proceduralize environmental considerations in the interpretation and application of treaty law (Vinogradov, Wouters, & Jones, 2005; McIntyre, 2010). As commented by McIntyre on the ICJ judgment in *Pulp Mills*, "EIA is an essential requirement of customary international law in respect of projects or activities potentially having transboundary effects" (2010, p. 475).

Yet, the IWT has a number of strengths. It includes many provisions which would be hard to negotiate and agree upon today, for example the no-harm principle (Article IV), third-party arbitration (Article IX; Annexures F and G), and ratification of an amendment being required for modification or termination of the treaty (Article XII). Also, throughout the treaty, mutual agreement and consensus building have been emphasized, laying foundations for the peaceful coexistence of the riparian states.

As noted by Michel and Pandya, "for countries to participate in a cooperative framework, benefit sharing must offer rewards greater than those of unilateral action" (2009, p. 10). The IWT offers a number of avenues for cooperation and mutual benefit seeking, especially in setting its objectives (Preamble) and foreseeing future cooperation (Art. VII). In this it anticipates the recent realization that "in most cases involving the utilization of transboundary waters or environmental obligations generally, non-compliance is not the result of a wilful act but a consequence of ambiguous treaty provisions or, more often, of the lack of capacity and resources to properly implement it" (Vinogradov et al., 2005, p. 67).

From this analysis of the strengths and weaknesses of the IWT in relation to the UNWC, it appears that the treaty would need to be amended to account for emerging needs and to promote cooperative water management between the two countries, for which the treaty itself provides guidance under Article XII(3). While the UNWC, as noted above, provides a sound basis for such progression, additional aspects must also be taken into account. Joint research on this aspect can in fact pave the way for better understanding of the UNWC within and among both countries. Both India and Pakistan abstained from voting when the UNWC was adopted, each for its own specific reasons (UNGA, 1997). Article 3(1) of the UNWC provides that "parties to [watercourse] agreements . . . may . . . consider harmonizing such agreements with the basic principles of the present Convention". This creates an avenue for India and Pakistan to re-examine the IWT in light of the UNWC, especially if both basin states accede to the convention.

In building upon the provisions under Article VII of the IWT, both countries should undertake joint research in the areas of climate change, hydrogeology, glaciology and geoinformatics. This should also be augmented through GIS-based data-collection and data-sharing systems. The mandate of the Permanent Indus Commission (Art. VIII) should be further expanded to accommodate such functions.

Through the expert determination in the Baglihar case, India has been allowed to store water for sediment flushing in its hydro-electric projects. With seasonal variations in river flows, this would have a great impact on the availability of water for crops in Pakistan. Through a mutual understanding, India and Pakistan must agree on a time-frame for the storage and release of water so that the availability of water for irrigation and energy generation remains optimal through mutually negotiated trade-offs.

Both countries, being highly vulnerable to climate change, should develop a joint adaptation strategy to offset the impacts of surplus and deficient water supplies (Tariq, 2010). In conjunction with improved predictability through climate change research, both countries should agree on a formula which reduces the cost of maintaining water-storage structures and allows the each riparian to use the other's surplus water with mutual consent.

Vinogradov et al. (2005, p. 24) maintain that:

Ecological use, as a special sort of water “use”, is gradually being recognized in international law as having a certain priority over other demands on water. . . . The maintenance of a minimum stream flow protects the ecological, chemical, and physical integrity of an international water resource. This is not incompatible with, and is subject to, the primary international water law rule of “equitable and reasonable utilization”.

Environmental flow requirements should therefore be factored into any sharing arrangement between India and Pakistan for the Indus. This would require some adjustments in the clear-cut formula of allocating the eastern rivers to India and the western rivers to Pakistan, which has rendered the Ravi a running sewer and the Sutlej a veritable “river of sand” in their Pakistan stretches.

With rapid population growth and expanding industrialization, both countries need water for irrigation and energy generation. Hence, both countries have extensive plans for both uses. Joint water development for energy generation is a viable option, provided that both countries create an atmosphere of trust beyond the populist media frenzy (Ahmad & Sarfraz, 2011). Article VII(1)(c) of the IWT already provides that “at the request of either Party, the two Parties may, by mutual agreement, co-operate in undertaking engineering works on the Rivers”. The type of joint initiative that could achieve sustainable development within both countries needs only political will.

In order to realize the above recommendations, both countries should start building confidence through Track II diplomacy, paving the way for a duly ratified treaty amending the IWT. At the same time, both India and Pakistan should start discussing the possibility of acceding to the UNWC so that a broader framework is available to both countries for resolving their transboundary water issues.

Notes

1. A type of outburst flood occurring when water dammed by a glacier or a moraine is released (Wikipedia: http://en.wikipedia.org/wiki/Glacial_lake_outburst_flood).
2. *Rabi* means “spring” in Arabic; the *rabi* crops are grown from mid-November to April (Wikipedia: http://en.wikipedia.org/wiki/Rabi_crop).

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