Legal aspects of sharing and management of transboundary waters in South Asia: preventing conflicts and promoting cooperation

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Legal aspects of sharing and management of transboundary waters in South Asia: preventing conflicts and promoting cooperation

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Abstract Historically, the development of cooperation among Bangladesh, India, Nepal and Pakistan with respect to the Indus and the Ganges-Brahmaputra-Meghna river basins, South Asia’s major transboundary rivers, has been a cause of tension, apprehension and ongoing disputes. This paper draws attention to the hydro-politics on transference and allocation, along with the diverging positions and unique concerns of the riparians on bilateral, multilateral, national as well as regional fronts. While examining the official water discourses and the evolution of different international legal instruments applicable to the governance of water relations among the riparians, the paper also sketches the emerging concerns in their relationships, as well as their efforts to cooperate and collaborate to avert disputes and manage water sharing and governance.

Key words water management; transboundary water resources; hydro-politics; conflict management; rivers; water-sharing treaties

Aspects juridiques du partage et de la gestion des eaux transfrontalières en Asie du Sud: prévention des conflits et promotion de la coopération

Résumé Historiquement, le développement de la coopération entre le Bangladesh, l’Inde, le Népal et le Pakistan à l’égard des bassins de l’Indus et du Gange-Brahmapoutre-Meghna, les principaux fleuves transfrontaliers d’Asie du Sud, a été une cause de tension, d’appréhension et de litiges toujours en cours. Cet article attire l’attention sur l’hydro-politique touchant au transfert et à l’allocation, ainsi qu’aux positions divergentes et aux préoccupations particulières des riverains sur les fronts bilatéraux, multilatéraux, nationaux et régionaux. En examinant les discours officiels sur l’eau et l’évolution des différents instruments juridiques internationaux applicables à la gouvernance des relations entre les riverains, cet article esquisse également les nouvelles préoccupations dans leurs relations, ainsi que leurs efforts pour coopérer et collaborer dans le but d’éviter les conflits et de gérer le partage de l’eau et sa gouvernance.

Mots clefs gestion des eaux; ressources en eaux transfrontalières; hydro-politique; gestion des conflits; fleuves; traités sur le partage des eaux

A CONFLICTS OVER TRANSBOUNDARY WATERS IN GENERAL

For more than five millennia, water rules and relationships have evolved in the midst of clashes of local needs, customs, and social, cultural and religious beliefs. Yet all civilizations were able to manage such clashes with agility. The Indus Valley civilization, ancient Egypt and ancient China, all introduced, early on, rules governing floods, irrigation, or water management, with concepts that are even valid today. While water rules and systems in ancient times essentially focused on community rights, the post-industrial revolution period has increasingly stressed private ownership issues. Similarly if, in the late 20th century, the focus of water governance shifted to containing pollution together with allocation, the emphasis in the early 21st century is shifting to...

*The views and opinions expressed herein are those of the authors and should not be attributed to any of the institutions with which they are associated.
managing water resources in an integrated manner and in the context of sustainable development. Indeed, the historical evolution of rules, regulations, rights and responsibilities in respect of water implies a certain path dependency (Getzler 2004, Dellapenna and Gupta 2008), and creation of a balance among the clashes.

Influenced by, and integrated with, the host of above-noted elements, water laws in a number of countries are currently relatively well-developed. In some countries, they are unified as a coherent and comprehensive whole, while in some others, due to recognition of the plurality of sources, they thrive in the midst of different competing legal principles. Whether comprehensive, coherent, or pluralist, the concepts prevalent in any national legal framework always impact on the country’s transnational behaviour. Such behaviour has to address the issue of scarcity due to the considerable increase in global demands, an important source of conflict all over the world. Indeed, whether in the Americas, Europe, Africa, Asia or the Middle East, there have been continual problems of understanding and outbreaks of explicit disagreements over the use of shared rivers, thus leading to greater eventuality for serious conflicts.

Conflicts over water can be interstate or intrastate: interstate conflicts occurring between two or more neighbouring countries that share a transboundary water basin (river, lake or groundwater basin), and intrastate between two or more parties within the same country (conflicts between farmers versus industry, or agricultural versus industrial use of water, or between different provinces of a federated state). Thousands of conflicts, disputes and controversies have dominated the history of water relations. The dispute on the Meuse in connection with its canals, the case concerning the Zwillikon Dam in Switzerland, the issues regarding the Rio Grande, the Chicago diversion, the apportionment of the Nile, or the dispute over the St Laurence, all have had to be dealt with, one way or the other (Smith 1931).

Interstate disputes, in one form or another, are currently occurring in many regions. Whether in the Middle East region (Euphrates and the Tigris rivers dispute among Turkey, Syria and Iraq; and the Jordan River conflict among Israel, Lebanon, Jordan and the Palestinians), in Africa (Nile River dispute among Egypt, Sudan, and Ethiopia), in the former Soviet Union (the Aral Sea conflict among Kazakhstan, Uzbekistan, Turkmenistan, Tajikistan and Kyrgyzstan), or in South Asia (the Ganges and the Indus among India, Bangladesh, Nepal and Pakistan), the disputes, by and large, concern water sharing and governance.

Indeed, increasing scarcity of freshwater in many parts of the world points to the possibility of disagreements over shared water resources as a leading source of conflict in the 21st century (the exaggerated term “water wars” is sometimes used). Typical grounds for disagreement include a lower riparian’s objection to flooding, pollution, water sharing, excessive irrigation, or the construction of dams by an upper riparian, which may decrease the quantity or degrade the quality of water available to the lower riparian. Such grounds also include upstream riparian’s concern that they can be affected, or even harmed, by the potential foreclosure of their future use of water, caused by the prior use, and the claim of rights to such water by the downstream riparians. Not surprisingly, therefore, in some instances, states have even employed militarized force to protect or seize freshwater resources. Multiple incidents between Israel, Syria and Jordan in the 1950s and 1960s surrounding attempts by each side to divert water from the Jordan and Yarmuk rivers, or threats between Turkey, Syria and Iraq over the construction of dams on the Euphrates River, are all noteworthy examples.

However, fortunately only a part of conflicts lead to military intervention. An interesting study, recalling that during the period 1950–2000, a notable 1831 events concerning conflicts over transboundary water basins had occurred, confirms their variable nature and characteristics (Wolf et al. 2001). According to the study, indeed, in most such conflicts, there is no event on the extremes and most interactions are cooperative and mild. Similarly, in such conflicts if water acts as an irritant, it also acts as a unifier. Furthermore, whenever there is a conflict, most nations still cooperate over a wide variety of issues (Wolf et al. 2001, Kuehnast and Dudwick 2008). But, in spite of commonalities found in the midst of variability in characteristics, each and every conflict is also unique in many regards. South Asian conflicts on the sharing and management of shared water resources are no exception, as will be discussed in the rest of this article.

B TRANSBOUNDARY WATER CONFLICTS IN SOUTH ASIA

South Asia’s water coverage is large. However, the distribution of water resources throughout India, Pakistan, Nepal and Bangladesh has constantly been a politically-charged issue, with the tensions mounting over the control of water supplies emanating from
scarcity, ill faith and bad governance. As assessed by some scholars:

[The last fifty years of water management in South Asia has been the story of an unfolding disaster. Throughout the region, the water and energy requirements of cities and villages have confronted decline in the quality and quantity of water. These years have made societies in the region more vulnerable to environmental degradation and jeopardized the future international relations and economic well-being of each of the countries in the region. Particularly, unthinking attempts to mechanically bolster supply have almost invariably ignored existing scientific and social knowledge, and ended up by being a disgrace to the principles of good governance (Ahmed et al. 1999).

The increase in demand continues to be a catalyst for conflict. Also, the divisions of the river basin waters due to political changes and the outcome of decolonization have created deep friction among the countries, as well as among their states and provinces (Swain 1998, Salman and Uprety 2003). As such, South Asian countries have had to deal with both intrastate and interstate conflicts over the sharing of river water in both downstream and upstream regions, and notably in connection with the Indus and the Ganges systems.

B1 THE INDUS RIVER SYSTEM

Spanning 1800 miles (2880 km), the Indus River and its tributaries collectively make up one of the largest irrigation canals in the world (see Table 1). The river begins in the Himalayan Mountains of Tibet in China, in the vicinity of Lake Manasarovar, the highest freshwater lake in the world (15 000 feet or 4500 m). It initially flows 600 miles (960 km) northwest and then turns south, draining an area that includes the high mountains of India. It then flows through Pakistan before emptying into the Arabian Sea, southeast of Karachi, Pakistan.

The Indus is one of the largest sediment-producing rivers in the world. Its flows are highly variable and depend on melting snow from the Himalayan glaciers and on monsoons. About 70% of the total annual runoff occurs between June and September. The river system consists of the main stem Indus and five major tributaries, all of which flow partially or entirely through India before reaching Pakistan, and the Kabul River. India is, therefore, the upper riparian nation on virtually every tributary of significance in the basin, excepting for the Kabul River, which begins in Afghanistan and flows through its capital, Kabul, before converging with the Indus River in Pakistan.

B1.1 The Dispute

The Indus dispute, essentially, resulted from the partition of India and the creation of Pakistan, a partition that largely ignored the topography, ecology and the then existing irrigation infrastructure on the Indus Basin. A situation summary by a reputed magazine depicted a clear picture at that time in the following words:

This 1800-mile long river rises in the Himalayas of Tibet, is fed by six tributaries, and now forms a sort of unwieldy international fire hose with India, at the headwaters, controlling the spigot, and Pakistan, down-country, at the unpredictable nozzle. Further complicating this, the canals and barrages built under British rule to serve a unified area were, under partition, left pretty much on the Pakistani side of the border. The canal system of irrigating lands, originally built by the British, was divided into two to meet a political compromise. As a result, 80% of the land irrigated by the Indus River and its tributaries became part of Pakistan. But the headwaters of the entire river system remained in India. Not surprisingly, the Indus River was a source of tension between the two nations within weeks after Pakistan was established. Partition literally divided one set of canals between the West Punjab in Pakistan and the East Punjab in India.

Table 1 The Indus Basin (source: adapted from Encyclopedia of International Rivers, 2002).

<table>
<thead>
<tr>
<th>Length</th>
<th>1800 miles (2880 km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basin size</td>
<td>418 000 sq. mi. (1 070 080 km²)</td>
</tr>
<tr>
<td>Average discharge</td>
<td>142 MAF* per year (175 154 421 000 m³)</td>
</tr>
<tr>
<td>% of the basin in different countries</td>
<td>Pakistan (52); India (34); China/Tibet (7); Afghanistan (6); Disputed-China-India (&lt;1)</td>
</tr>
</tbody>
</table>

*MAF (million acre feet) = 1 233 481 840 m³.
with India receiving control of upstream rivers that supplies both West and East Punjab. (India and Pakistan, An Atlantic Report, 1960).

As a result of the boundary delineation between Pakistan and India, Punjab was separated into East and West regions. A Punjab Partition Committee was established to resolve disputes regarding division of assets between the divided provinces. Both East and West Punjab agreed, in 1947, that the position existing at the time of partition shall not be disturbed and waters shall be divided equally (commonly referred to as the Standstill Agreement).

However, in 1948, India, claiming absolute sovereignty, unilaterally closed canals in its territory on the Ravi and the Sutlej, cutting off Pakistan’s supply of water. India agreed to re-open the canals as part of an Inter-Dominion Agreement of 1948, but asserted its right to control the entire water supply of the Ravi, Sutlej and Beas rivers. The Inter-Dominion Agreement required India to release, on a temporary basis, sufficient waters to Pakistani regions in return for annual payments. In fact, that same year, East Punjab stopped the flow of water to West Punjab stating absolute sovereignty, and resumed the flows only after Pakistan made a payment to India.

In the midst of such vagaries of bilateral relations over water, after close to ten years of negotiation, India and Pakistan in 1960 signed the Indus Waters Treaty, along with the World Bank, which also became a signatory for certain limited purposes. The Treaty involves the two countries, which occupy 86% of the basin. The two other riparian nations, China and Afghanistan, were not invited to participate in the negotiations and are not party to the Treaty.

B1.2 Treaty Regime The salient features of the Indus Treaty include: (i) three Eastern Rivers (Ravi, Sutlej and Beas) allocated to India; (ii) three Western Rivers (Indus, Jhelum and Chenab) allocated to Pakistan; (iii) Pakistan to meet its Eastern Rivers needs from the Western Rivers by constructing replacement works; (iv) safeguards incorporated in the Treaty to ensure unrestricted flow of waters in the Western Rivers, subject to some uses by India; (v) both parties to regularly exchange flow-data of rivers, canals and streams; and (vi) a Permanent Indus Commission constituted to oversee implementation of the Treaty.

Unlike treaties in other basins that divide rivers by flow or quantity, the Indus Treaty divides the Indus River system into three Eastern Rivers, to which India has “unrestricted use”, and three Western Rivers, to which Pakistan has “unrestricted use”. However, these allocations were both subject to certain exceptions. Pakistan agreed not to interfere with the waters of the Eastern Rivers where they formed boundaries between the two countries, and India retained the right to build upstream, non-storage dams on the Western Rivers. It was agreed under the Treaty that Pakistan would build works during a “transition period” to replace the canals on which it had relied to draw water from the Eastern Rivers. During this transition period, India agreed to supply Pakistan with a minimum amount of water, until Pakistan had completed its infrastructure replacements works. To help defray the costs of building this infrastructure, India agreed to pay a fixed sum of money to Pakistan. In addition, the World Bank and a number of donors provided Pakistan with close to one billion US dollars, which enabled Pakistan to build the Tarbela Dam on the Indus River, and the Mangla Dam on the Jhelum River. These dams created sufficient storage to replace two-thirds of the water lost to Pakistan when India obtained control of the three Eastern Rivers.

B1.2.1 Governance and Treaty implementation The Treaty sets out the procedures for settlement of differences and disputes, including through a Court of Arbitration. It provides for a two-member Permanent Indus Commission, with one commissioner from India and one from Pakistan, vested with the authority to resolve disputes arising out of the Treaty. Thus, if either of the countries has a question regarding Treaty interpretation, the matter can be referred to the Permanent Indus Commission. If the Commission is unable to resolve the question, then the question becomes a “difference” and can be referred to a “Neutral Expert”, to be appointed by the two parties, or by a third party agreed by them. Failing that, the appointment would be carried out by the World Bank. The Neutral Expert’s determination is final. If the question is not within the Expert’s mandate, or if the Expert concludes that the matter is a “dispute” (as opposed to a “difference”), then the parties may refer the matter to a court of arbitration, composed of seven members. Two members would be appointed by each party, while the remaining three would be appointed through a complex process involving, among others, the World Bank and the United Nations (UN).

From an implementation standpoint, the Indus Treaty remains a success story (Wheeler 2009), as confirmed by the fact that it has survived continued regional hostility, including two wars between India and Pakistan. It has succeeded in resolving a bitter and long dispute by dividing the rivers of the Indus River System, establishing an institutional mechanism for overseeing implementation of the Treaty, and putting
in place a comprehensive process for prevention and resolution of differences and disputes. In fact, this process has been invoked a few times in connection with issues of interpretation of the Treaty, as discussed below.

B1.2.1.1 The Wullar Barrage issue Despite detailed rights, obligations, protections and permissions spelled out under the Indus Treaty, a dispute emerged in 1985, when Pakistan learnt through a tender notice in the press about the development of a barrage by India, under the name Tulbul Navigation Project (Pakistan referred to it as the Wullar Barrage). The barrage was to be constructed on the River Jhelum, below Lake Wullar located near Sopore, 25 km north of Srinagar, where the River Jhelum flows into the Lake in the south and flows out of it from the west. For Pakistan, the geo-strategic importance of the site lay in the fact that its possession and control provided India with the means to control water flow to Pakistan. It claimed that a dam on that site had the potential to adversely affect the entire system of the triple canal project within Pakistan, namely: the upper Jhelum Canal, upper Chenab Canal and the lower Bari Doab Canal.

According to the Indian Government, however, the purpose of the Wullar Barrage was to construct a control structure, with a view to improving the navigation in the River Jhelum during winters, in order to connect Srinagar with Baramula for transportation of fruits and timber. It viewed the barrage not as an effort to divert water flowing into Pakistan, but to ensure the navigability of the river during summer (Daily Times, 29 June 2005). India claimed that 90% of the Tulbul project would be beneficial to Pakistan, as it would regulate the water level in the Barrage to attain the full operational level of 5177.90 ft (1578.22 m). Pakistan further alleged that the Wullar Barrage’s capacity is 300 000 acre feet (370 044 551 m³), which is 30 times the permitted capacity. Moreover, regarding the building of a hydro-electric plant, Pakistan alleged that, according to the Treaty, India is only allowed to construct a small runoff water plant with a maximum discharge of 300 cusecs (8.495 054 m³/s) through the turbines, which is insufficient to generate 960 MW of electricity as planned by India (under the Wullar Project).

From Pakistan’s angle, the control of the River Jhelum by India through storage work would also mean a serious threat to Pakistan if India were to decide to withhold the water over an extended period, especially during the dry season, in addition to magnifying the risks of floods and droughts in Pakistan. The Mangla Dam on the River Jhelum, which is a source of irrigation and electricity for Punjab, would be adversely affected. It would further provide India a strategic edge, during a military confrontation, enabling it to control the mobility and retreat of Pakistani troops and enhancing the manoeuvrability of Indian troops. Closing the Barrage gates would render the Pakistani canal system dry and easy to cross. It may be recalled, in this connection, that during the 1965 war, the Indian Army had failed to cross the Bambanwala Ravi Bedian Link Canal, due to its full flow, and that India is already in control of the Chenab River through the Salal Dam constructed in 1976, which many Pakistanis continue to criticize.

Pakistan referred the Wullar Barrage case to the Indus Commission in 1986, but the Commission failed to resolve it. Pakistan then decided to take the case to a Court of Arbitration under the Treaty, but India suspended the construction work. To date, eight rounds of talks have been held. In 1989, Pakistan agreed to the construction of the Barrage conditional to Pakistani inspection, which India rejected. The two sides almost reached an agreement in October 1991, whereby India would keep 6.2 m of the Barrage ungated with a crest level of 5167 ft (1574.90 m), and would forego the storage capacity of 300 000 acre feet (370 044 551 m³), allowing, in return, the water level in the Barrage to attain the full operational level of 5177.90 ft (1578.22 m). However, in February 1992, Pakistan introduced another condition that India should not construct the Kishanganga (390 MW) hydropower-generating
unit on the Neelum River, which would affect the Neelum-Jhelum power-generation project, located in its Punjab province, as discussed later in this paper.

**B1.2.1.2 The Baglihar difference and the role of the Neutral Expert** More recently, another controversy arose, involving a Hydropower Project (Baglihar Dam Project). India planned to construct a dam 60 miles (96 km) upstream from the Pakistani border, on the Chenab River, one of the Western Rivers allocated under the Treaty to Pakistan, claiming India’s right to build upstream non-storage facilities under the Indus Treaty. In protest, Pakistan invoked the Indus Treaty’s dispute-resolution mechanism, as in its view, the water storing capacity of the Baglihar Dam was at a level prohibited by the Treaty, and the design of the hydropower plant violated a number of conditions spelled out therein. Pakistan was further concerned that the Dam would allow India to obstruct and control the flow of the Chenab River. India, on the other hand, disagreeing with the claim of Pakistan, stated that the Baglihar Dam was merely planned to generate power through run-of-the-river without storage, and was thus in conformity with the Treaty specifications. Following failure to resolve the question through the Permanent Indus Commission, Pakistan, on 15 January 2005, approached the World Bank requesting it to appoint, as per the Indus Waters Treaty, a Neutral Expert to resolve the difference over Baglihar (Salman 2008). With a number of iterations and reiterations on the consultation and selection processes, five months after the original request, the Neutral Expert was appointed (Salman 2008).

**B1.2.1.2.1 The difference in the Treaty context** Pakistan claimed that the Baglihar Project did not conform to criteria (a), (c), (e) and (f) of Paragraph 8 of Annexure D to the Treaty. To elaborate, criterion (a) states that the works shall not be capable of raising artificially the water level in the operating pool above the full pondage level specified in the design, and Pakistan alleged that the Baglihar Dam did not meet this requirement. Similarly, criterion (c) requires the maximum pondage in the operating pool not to exceed twice the pondage required for firm power, and Pakistan claimed that it exceeded twice that level. Again similarly, criterion (e) states that if the conditions at the plant site make a gated spillway necessary, the bottom level of the gates in normal closed position shall be located at the highest level consistent with sound and economical design. On this point, Pakistan claimed that the Baglihar Dam design was not based on correct, rational and realistic estimates of maximum flood discharge. Lastly, criterion (f) requires that the intakes for the turbines shall be located at the highest level consistent with satisfactory and economical construction and operation of the plant as a run-of-the-river plant, but Pakistan considered that the intakes for the turbines were not located at the highest level as mandated (Salman 2008).

Following the submission by Pakistan and India of the basic information, the memorandum by Pakistan, and the counter-memorandum by India, the Neutral Expert, together with delegations from India and Pakistan, visited the Baglihar site in early October 2005. Five months later, the Neutral Expert presented a draft determination to the two parties, asking for their written and oral comments. Finally, in Switzerland, on 12 February 2007, the Neutral Expert delivered to the ambassadors of India and Pakistan, signed copies of the final decision on the Baglihar difference (referred to as the Expert Determination). Copies of the decision, which consisted of a full comprehensive report and a separate Executive Summary, were also delivered to the World Bank, as required by the Treaty.

**B1.2.1.2.2 The ruling** The Executive Summary makes two interesting legal points. First, that the rights and obligations of the parties, under the Indus Treaty, had to be read in the light of new technical norms and standards, and interpreted so as to permit the fulfilment of the purpose of the Treaty in “a spirit of goodwill and friendship” taking into account the best and latest practices in the field of construction and operation of hydro-electric plants. And second, that the interpretation of the Treaty was guided by the principles of integration and effectiveness to find effect in its whole and to ensure that each of its objects is given the fullest weight and effect when interpreting the rights and obligations thereunder. Those purposes include attaining the most complete and satisfactory utilization of the waters of the Indus River System, and fixing and delimiting the rights and obligations of each party in relation to the other. The ruling of the Neutral Expert dealt with the contested issues under the four criteria discussed above, under six headings.

The first heading concerned the design flood related to the calculation of the maximum amount of water that can reach the dam. In view of the many uncertainties in flood analysis, the Neutral Expert retained the value of 16 500 m$^3$/s proposed by India, as opposed to 14 900 m$^3$/s proposed by Pakistan, for the peak discharge of the design flood, and further stated that the possibility of increased flooding
due to climate change encouraged such a prudent approach.

The second heading concerned the need for a gated or an ungated spillway. Pakistan considered that a gated spillway was unnecessary, for it would allow India to control the flow of the river, but the Neutral Expert determined that the hydrology, sediment yield, topography, geology and seismicity of the site warranted a gated spillway. The Expert further added that the analysis of 13,000 existing spillways in the world demonstrated that gates on large spillways were common practice, that an ungated spillway could increase the risk of flooding the upstream shores, and that an elevation of the dam crest, which would prevent such a risk, would be too costly.

The third heading concerned the level of the spillway gates. Pakistan was of the view that even if a gated spillway was deemed necessary, the orifice spillway proposed by India had to be located at the highest level consistent with the Treaty. The Indian position, in contrast, was that the design of the chute, sluice and auxiliary spillways was necessary to ensure safe passing of the design flood. The Neutral Expert, agreeing with India, determined that the gated chute spillway on the left wing planned by India is at the highest level consistent with sound and economical design and, therefore, satisfactory. However, the Expert considered that the outlets that form the sluice spillway, planned by India, should be of the minimum size and located at the highest level consistent with a sound and economical design. The Neutral Expert also proposed that the outlets be located 8 m lower to ensure protection against upstream flooding. On this issue, the Neutral Expert deemed that the Indus Treaty lacked detail on the issue of sedimentation, understandably because it reflected the status of technology on reservoir sedimentation of the 1950s, and affirmed that, consequently, the provision of the Treaty, explicitly referring to sedimentation, acquired a special significance.

The fourth heading concerned the artificial raising of the water level. On this issue, the Neutral Expert concurred with Pakistan's position that the dam crest elevation proposed by India was exaggerated and could be lower. The Expert further determined that the crest elevation submitted by India at 844.5 m above sea level (a.s.l.), resulting from a freeboard above the full pondage level of 4.50 m was not at the lowest elevation, and that the freeboard should be 3.0 m above the pondage level, leading to a dam crest elevation of 843.0 m a.s.l.

The volume of the maximum pondage was the fifth heading. Pakistan had argued that the value proposed by India exceeded twice the pondage required for firm power. The Neutral Expert, in contrast, determined that the values for maximum pondage stipulated by both India and Pakistan were not in conformity with the criteria laid down in the Treaty and, therefore, fixed a lower value.

Finally, the sixth heading concerned the level of the power intake. Pakistan had argued that it was not located at the highest level as required by the Treaty. The Neutral Expert agreed with this view and determined that the intake level should be raised by 3 m and fixed it at an elevation of 821 m a.s.l.

No doubt, the Baglihar Difference posed major challenges to the governance of the Indus Treaty. However, the reactions over its resolution were positive, and both India and Pakistan accepted the decision and claimed victory, emphasizing the areas of the verdict which they believed responded positively to their specific claims. The outcome also underscored the positive role of the World Bank in the resolution of the difference.

B1.2.1.3 The Kishanganga issue Another controversy, which has been brewing in the context of the Indus Treaty, is related to the Kishanganga Project. This is a hydropower plant in India, which diverts water to the Jhelum River from the Kishanganga River (called Neelum in Pakistan), a tributary of the Jhelum, before entering Pakistan. Another hydropower plant 140 km downstream in Pakistan (called the Neelum-Jhelum Project) is also in the planning stage and this too diverts water to the Jhelum River from the same tributary (the Neelum) after it enters Pakistan.

Pakistan raised technical and legal objections to Kishanganga and claimed that it is a violation of the Indus Waters Treaty. It claimed that the diverted water would reduce downstream flows and hydropower generation capacity in Neelum-Jhelum, with significant environmental impacts, including on a National Park.

India, on the other hand, claimed that the diversion will not reduce the total flows into Pakistan, and would have no impact because Neelum-Jhelum is not an existing project. India further claimed that the design features are in conformity with the Indus Treaty.

Actually, neither project is completed yet. Each party appears to be building its respective project to claim “prior appropriation” and “existing use” to the water of the tributary. Also noteworthy is that both Annexures F and D of the Indus Treaty include provisions relevant to the Kishanganga Project, but different interpretations have already surfaced. The dispute has intensified in recent months. Reports from
Pakistan and India indicate that the two parties may actually be heading towards treating Kishanganga as a dispute under the Indus Waters Treaty, and thus have it handled by a Court of Arbitration under Annexure G of the Treaty. Indeed, this approach was formally adopted and a Court of Arbitration was established at the beginning of this year. Thus, Kishanganga has become the first case to invoke Annexure G of the treaty, just as Baglihar was the first difference to invoke Annexure F (on the Neutral Expert). This is certainly a welcome approach, as it will contribute tremendously to the process of peaceful settlement of international disputes.

**B1.2.2 Inter-province conflict management**

The allocations of the Indus waters have also proved problematic within Pakistan. Between 1971 and 1991, there was no formal allocation system within the country that specified which province received how much water from the Indus River. Although, as per the Indus Treaty, Pakistan had already built, by the end of 1970, storage reservoirs at Chashma on the Indus and Mangla on the Jhelum, and six new headworks and seven large inter-river link channels, and had completed the Tarbela Dam on the Indus in 1976, the federal government distributed the available water between provinces on an ad hoc basis for each crop season. But, since this arrangement disallowed extension of the irrigation network to new areas and construction of new projects, a Water Apportionment Accord was signed in 1991, among the four provinces.

**B1.2.2.1 The Indus System water apportionment**

The objective of the Accord was to enable the provinces to assess the possibility of, and to determine the location of, water storage projects on the basis of their allotted share, and to satisfy their demands on an equitable basis (see Table 2). In light of the accepted water distributional principles, the apportionment was agreed as shown in Table 2.

<table>
<thead>
<tr>
<th>Province</th>
<th>Kharif (MAF)</th>
<th>Rabi (MAF)</th>
<th>Total (MAF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Punjab</td>
<td>37.07 (45 725.17 hm³)</td>
<td>18.87 (23 275.80 hm³)</td>
<td>55.94 (69 000.97 hm³)</td>
</tr>
<tr>
<td>Sindh*</td>
<td>33.94 (41 864.37 hm³)</td>
<td>14.82 (18 280.20 hm³)</td>
<td>48.76 (60 144.57 hm³)</td>
</tr>
<tr>
<td>(a) North Western Frontier Province (NWFP)</td>
<td>3.48 (4 292.52 hm³)</td>
<td>2.30 (2 837.01 hm³)</td>
<td>5.78 (7 129.53 hm³)</td>
</tr>
<tr>
<td>(b) Civil canals†</td>
<td>1.80 (2 220.27 hm³)</td>
<td>1.20 (1 480.18 hm³)</td>
<td>3.00 (3 700.45 hm³)</td>
</tr>
<tr>
<td>Balochistan</td>
<td>2.85 (3 515.42 hm³)</td>
<td>1.02 (1 258.15 hm³)</td>
<td>3.87 (4 773.58 hm³)</td>
</tr>
<tr>
<td>Total</td>
<td>77.34 (95 397.49 hm³)</td>
<td>37.01 (45 651.16 hm³)</td>
<td>114.35 (141 048.65 hm³)</td>
</tr>
</tbody>
</table>

MAF (million acre feet) = 1 233 481 840 m³.

* Including already sanctioned urban and industrial uses for metropolitan Karachi.
† Ungauged civil canals above the rim stations.
adjusted pro-rata to correspond to the indicated seasonal allocations of the different canal systems and would form the basis for sharing shortages and surpluses on an all-Pakistan basis. Meanwhile, it was agreed to operate the existing reservoirs with priority for the irrigation uses of the provinces, which will also have the freedom within their allocations to modify system-wise and period-wise uses. The Accord stressed on efforts to avoid wastages, and also stated that surpluses, if any, could be used by another province, but without establishing any permanent rights to such uses. Finally, the Accord provided for the establishment of an Indus River System Authority, with headquarters in Lahore and representation from all the four provinces.

**B1.2.2.2 The Indus River System Authority** The Indus River System Authority was established in 1993 with an objective to regulate and distribute water among provinces and to protect their interests by ensuring that each one gets its share according to the Water Apportionment Accord. The creation of the Authority allowed representatives from both the federal government and the provinces within Pakistan to agree on an equitable intra-country allocation.

Although it represents a significant institutional contribution, the Authority has not been able to prevent or resolve conflicts. For instance, it has not been able to resolve the dispute between Sindh and Punjab, as the former demands its share as per the formula in the Accord and the latter on the basis of historical usage. Nonetheless, with the Authority in place, a forum where discussions can be held has been launched, and it can still play a role of a deterrent in any eventuality of conflict amongst provinces.

**B1.3 Conclusion** As can be concluded from the foregoing discussion, implementing the Indus regime has been a difficult exercise for both parties. However, due largely to the Treaty’s in-built mechanisms to address questions, differences and disputes, the parties have been able to manage conflicts and, in spite of the frequent upheavals in bilateral relations between them, the Treaty, so far, has had a relatively smooth sailing.

**B2 THE GANGES-BRAHMAPUTRA-MEGHNA (GBM) RIVER SYSTEM**

The GBM system includes three large rivers: the Ganges, the Brahmaputra and the Meghna. The Ganges River begins in the Himalayas in Nepal and China. It flows southeast through India, where it drains roughly 30% of the country, and then flows through Bangladesh. The Brahmaputra River begins in China and initially flows east before changing direction, breaking through a deep (16 000 feet, or 4876.8 m) gorge, and then turning abruptly southwest to flow through northeastern India and then Bangladesh. The Brahmaputra joins the Ganges near the town of Goaland in Bangladesh, from which point onward it is known as the Padma River. Farther downstream, the river is joined by the Meghna River at Chandpur, Bangladesh. The Padma-Meghna River then empties into the Bay of Bengal.

The existing dams on the Ganges-Brahmaputra system can store 46.5 MAF (57356.9054 Mm) of water. In the Ganges Basin, the largest dam is Rihand, situated on the Son River, a tributary in India. Another large dam, Tehri, is on the Bhagirathi River, another tributary. Other dams are located in the upper basin in Nepal, which is the source of three major tributaries (the Mahakali, Gandaki and Kosi). Nepal, according to some estimates, contributes more than 40% of the annual flow of the Ganges River and 70% of its flow in the dry season.

The combined discharge into the ocean is thus the third largest in the world. The Brahmaputra alone provides 50% of this flow, twice the contribution of the Ganges (Ping and Davlin 2010).

Of the GBM system, the Ganges River has been a source of dispute between India, Bangladesh and, to a limited extent, Nepal. With continual increasing demands for water for industrial, domestic and irrigation uses in the Indian State of West Bengal, tensions between Bangladesh and India over water sharing procrastinate. In a similar vein, Nepal and India have long been bickering over several fragmented

**Table 3** The GBM system (source: adapted from Verghese and Iyer 1994).

<table>
<thead>
<tr>
<th>Length</th>
<th>1800 miles (2880 km) for the Brahmaputra, and 1560 (2496 km) miles for the Ganges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basin size</td>
<td>644 000 sq. mi. (1648 640 km²)</td>
</tr>
<tr>
<td>Average discharge</td>
<td>985 MAF per year (1 214 979.61 hm³)</td>
</tr>
<tr>
<td>Countries and % in the GBM basin</td>
<td>India (58); China (20); Nepal (9); Bangladesh (7); Bhutan (2); Disputed (China/India) (4); Myanmar (&lt;1)</td>
</tr>
</tbody>
</table>
issues on the tributaries of the Ganges, without being able to find a solution satisfactory to both.

Meandering across an immense delta varying between one and five miles (1.6–8 km) in width, the river and the tributaries in the lower part of the basin have changed route dramatically in the last 1000 years. For instance, until the 12th century, the Ganges River flowed south into the Hugli River, and then emptied into the Bay of Bengal near Calcutta. Over time, the river changed its course, and started to flow east, not south. As a result, the Hugli River became considerably smaller, a change that prompted India to build a dam on the Ganges River (the Farakka Barrage) supposedly to re-divert water into the channel of the Hugli; a change that also became the major cause of the Farraka dispute between Bangladesh and India.

B2.1 The dispute and the Ganges Basin Treaty Regime

The genesis of formal water cooperation along the Ganges basin dates back to 29 April 1875, the date of signing of an Agreement between the then British Government and the State of Sindh for regulating the supply of water for irrigation from the Western Jumna Canal (amended on 24 July 1892). On 29 August 1893, another Agreement between the British Government and the Patiala State regarding the Sirsu Branch of the Western Jumna Canal was signed. Since then, a number of bilateral agreements, treaties, or memoranda of understanding have been signed among the riparian countries. Those instruments include the 1920 Agreement between Nepal and India (the then British Empire) for constructing the Sarada Barrage on the Mahakali River; the 1954 Agreement between Nepal and India on the Kosi Project; the 1959 Agreement between Nepal and India on the Gandak Irrigation and Power Project; the 1977 Agreement between Bangladesh and India on sharing of the Ganges waters at Farakka and on augmenting its flows; the two Memoranda of Understanding in 1982 and 1985; the 1996 Treaty between Nepal and India concerning the integrated development of the Mahakali River; and the 1996 Treaty between Bangladesh and India on sharing of the Ganges waters at Farakka.

Hence, there are two sets of agreements pertaining to the Ganges River. The first set is between India and Bangladesh dealing with the operation of the Farakka Barrage and water sharing in the lower basin. The second is between India and Nepal, addressing river governance, power sharing, irrigation, and other issues on its tributaries in the upper basin, as discussed below.

B2.1.1 The India-Bangladesh Ganges Treaty

In 1951, India announced its intention to build the Farakka Barrage at the head of the Ganges River Delta in West Bengal, 11 miles (17.6 km) upstream of the border with then East Pakistan (now Bangladesh). The construction began in 1961 and the Barrage became operational in 1975.

The Barrage, which diverts water into a canal for irrigation and then into a channel of the Hugli River (which flows into Kolkata), became a source of tension between India and Pakistan, and later Bangladesh, who claimed that it prevented water from flowing into its territory, causing serious damage to the water table, and reducing irrigation and domestic supplies. Concomitant to this controversy, India and Bangladesh signed in 1972 the “Statute of the Indo-Bangladesh Joint Rivers Commission” with the view to working together “in harnessing the rivers common to both countries for the benefit of the peoples of the two countries”. However, the Statute, due to its general nature, failed to include any provision obligating India to adapt or change the operation of the Farakka Barrage, which left Bangladesh to continue with its complaints. In 1976, Bangladesh took its case to the United Nations, and sponsored a resolution calling on India to share more water and consider the interests of Bangladesh in the operation of the Farakka Barrage. The resolution failed to pass, but a Statement of Consensus was adopted by the UN General Assembly calling on the parties to resolve the issue peacefully. As a result, in 1977, India and Bangladesh signed an Agreement for a five-year period during which they agreed to seek a long-term solution to the allocation of water of the Ganges River.

The 1977 Agreement expired in 1982, and in that year, India and Bangladesh signed a Memorandum of Understanding, which acknowledged that this Agreement “had not proved suitable for finding a satisfactory and durable solution” to the problems of the Farakka Barrage. To address the river management issues on an interim basis, both nations agreed to a temporary allocation of water for the 1983–1984 dry seasons. This Memorandum also expired, and India continued to operate Farakka Barrage in 1985, without a binding legal document in place. A second Memorandum of Understanding addressed dam operations between 1986 and 1988, but that also expired. The period between 1989 and 1996 passed
without a formal legal instrument. Finally, in 1996, India and Bangladesh signed a treaty on sharing the Ganges River at Farakka (Swain 1998, Salman and Uprety 2003).

The 1996 Ganges Treaty, which expires in 2026, establishes a formula for sharing water (see Table 4). Moreover, the Treaty also calls on both governments to attempt to reach water-sharing agreements on another 53 “common rivers”. That the Treaty calls for future cooperation over the common rivers shared by Bangladesh and India, from a political angle, is significant.

After a number of short-term legal instruments, India and Bangladesh have been able to resolve their long and bitter dispute over the Ganges through a 30-year Treaty. However, almost half of the 30 years during which the Treaty is to remain in force have elapsed. Yet, no agreement has been reached between the two parties on how to augment the flow of the Ganges during the dry season and provide sufficient amounts of water for both parties, which is the crux of the dispute on the Ganges River. It should also be added that no agreement on any of the other 53 shared rivers has thus far been concluded.

B2.1.2 The India-Nepal Gandak Treaty

Originating in Tibet, the Gandaki River flows through central Nepal and then empties into the Ganges River. Draining a large part of Nepal, west of Kathmandu, and the State of Uttar Pradesh, in India, it caused serious flooding problems in its natural condition. In 1959, India and Nepal signed a Treaty to build a dam on the Gandaki River for flood control, irrigation, and power generation. The dam itself lies entirely within Nepal but very close to the border with India. The Treaty requires India to generate power and share it with Nepal, and contains a schedule for the release of water to India for its irrigation canals. Actually, the Gandak Project irrigates approximately 143 000 acres (223.4375 sq. mi.) in Nepal and 4.6 million acres (7187.5 sq. mi.) in India.

Many Nepalese scholars considered the 1959 Gandak Treaty a bad deal for Nepal, because it had the effect of curtailing Nepal’s right to Gandaki water for use inside Nepalese territory, essentially for trans-valley uses in the months of February to April (Thapa, 2002). Article 9 of the Gandak Treaty reads as follows: “His Majesty’s Government will continue to have the right to withdraw for irrigation or any other purpose from the river or its tributaries in Nepal such supplies of water as may be required by them from time to time and His Majesty’s Government agrees that they shall not exercise this right in such manner as is likely, in the opinion of the parties hereto, prejudicially to affect the water requirements of the Project (the Gandak Irrigation Project) as set out in the schedule annexed hereto”.

The monthly water requirements provided in the Schedule to the Treaty were either very close or exceeded the river flows barring a few months of the monsoon season. This provision had the effect of virtually ending all future prospects for irrigation development in the Gandaki basin within Nepalese territory. Therefore, following protests, the Gandak Treaty was slightly revised on 30 April 1964, to lessen its negative impact. Article 9 of the revised Treaty reads as follows: “His Majesty’s Government will continue to have the right to withdraw for irrigation or any other purposes from the river or its tributaries in Nepal such supplies of water as may be required by them from time to time in the valley. For trans-valley uses of Gandak waters separate agreements between His Majesty’s Government and the Government of India will be entered into for the uses of water in the months of February to April”.

Certainly, the revised Treaty was an improvement over the previous one. However, the trans-valley uses of Gandak water for the months of February to April have still been restricted. Therefore, Nepal’s side has been seeking further revision to drop the clause restricting such use inside Nepal, but to no avail.

<table>
<thead>
<tr>
<th>Availability at Farakka</th>
<th>Share of India</th>
<th>Share of Bangladesh</th>
</tr>
</thead>
<tbody>
<tr>
<td>70 000 cfs (1982.18 m³/s), or less</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>70 000–75 000 cfs (1982.18–2123.76 m³/s)</td>
<td>Balance of flow</td>
<td>35 000 cfs (991.09 m³/s)</td>
</tr>
<tr>
<td>75 000 cfs (2123.76 m³/s) or more</td>
<td>40 000 cfs (1132.67 m³/s)</td>
<td>Balance of flow</td>
</tr>
</tbody>
</table>
B2.1.3 The India-Nepal Kosi Treaty

Also originating in Tibet, the Kosi is Nepal’s largest river, and the most important tributary of the Ganges. Draining the area east of Kathmandu, it flows into India in the state of Bihar, where frequent and severe floods have earned it the nickname “the sorrow of Bihar”. In 1954, India and Nepal signed a Treaty to build a dam on the Kosi River to control flooding, generate electricity and provide water for irrigation. The dam, straddling the border between Nepal and India, was completed in 1963, and the responsibility for its operation was vested to India. The Treaty also provided for an Indo-Nepal Kosi Project Commission to implement the agreement and to resolve disputes (Gyawali 2001, Dixit 2008).

The Kosi Treaty, also considered to have restricted Nepal’s use of waters, was revised on 19 December 1966, to re-establish the latter’s rights. Article 4(i) of the Treaty related to the water rights reads as follows: “[His Majesty’s Government] shall have every right to withdraw for irrigation and for any other purpose in Nepal water from the Kosi river and from the Sun-Kosi river or within the Kosi basin from any other tributaries of the Kosi river as may be required from time to time. The Union (meaning India) shall have the right to regulate all the balance of supplies in the Kosi river at the barrage site thus available from time to time and to generate power in the Eastern Canal”.

In spite of the revision, the Kosi Treaty continued to be considered, by the Nepalese, a bad deal with lots of inherent associated risks. To recall, the Kosi Project was a child of the Nehruvian dream driving the great infrastructural projects after Indian Independence, which relied immensely on engineering advances. But, the barrage-building was based on knowledge of an engineering fraternity prevailing on the non-silting rivers of Europe and North America, and inappropriate to the Kosi. The barrage was thus built at Bhimnagar on the Nepal-India border, but the task of management was fully entrusted to the Government of Bihar, for 199 years (till 2153). Miles of embankment were built on both sides upstream of the barrage (known as the “eastern and western afflux bund”) to guide the water to the barrage, to feed two large irrigation canals. Downstream, another 125 km of levees charged southwards on the east and 126 km on the west to safeguard eastern Bihar from floods.

Indeed, as predicted by many, in August 2008, there was a breach at Kusaha on the eastern embankment above the Kosi Barrage in eastern Nepal. Water flowed out first and impacted adjacent Sunsari District of Nepal. Later, the breach widened into a 2-km stretch and the water gushed out, and the inundation affected millions in seven districts of northern and central Bihar (Araria, Katihar, Khagaria, Madhepura, Purnia, Saharsa and Supaul) all the way south to the Ganges.

Sadly, over the last fifty years, the silt had continued to flow and build up as a natural phenomenon. Confined by the embankments, and having slowed down after entering the plains at the point known as Chatara, the Kosi deposited its silt load on its bed. Note that, before the construction of the barrage, much of it would have been spread over the plains of the surrounding region. Over time, as the relentless and natural deposition of silt continued, the Kosi began to flow on a plateau inside the embankments, with the river bed said at places to be up to 5 m above the outlying plains of Nepal and Bihar, ultimately resulting in the breach.

Dipak Gyawali, a prominent international water expert, considers that the Kosi embankment collapse, flooding entire districts, damaging infrastructure and leaving thousands of people homeless in both countries, was not a natural disaster, but a man-made tragedy. The catastrophe resulted from an unholy marriage of three things: the wrong technological choice, bad institutional arrangements and half a century of political misconduct (Agricultura y Medio Ambiente 2008).

Against the backdrop of havoc caused by flood waters of the Kosi River, India and Nepal decided to establish a number of mechanisms, including a Joint River Committee at minister level to avert such calamities in future. The two sides also decided to reactivate a Secretary-level Joint Committee and set up eight technical committees to be in regular touch over various issues concerning sharing of common river waters. With an aim of preventing floods, they also discussed ways to properly implement the Kosi Treaty that governs the usage of Kosi River, and agreed to hold pre-monsoon and post-monsoon meetings to deal with issues of floods and early warnings.

B2.1.4 The India-Nepal Mahakali Treaty

On 12 February 1996, India and Nepal signed a Treaty for the governance of the Mahakali River, a principal tributary of the Ganges (called the Sarada in India), which forms the border between western Nepal and India. The Treaty, which came into force on 5 June 1997, addresses the allocation of power from two existing barrages (the Sarada and the Tanakpur) and...
the allocation of power from a generation plant to be built in the context of the Treaty (Pancheshwar Multipurpose Project, or PMP).

What is interesting is that the Sarada and the Tanakpur barrages were already completed, in 1920 and 1992, respectively. The Mahakali Treaty only absorbed the regime established by the 1920 Sarada Agreement, the 1991 Memorandum of Understanding and the 1992 Joint Communiqué for Tanakpur Barrage. The only new substantive addition was that it endorsed the idea of constructing the PMP. Hence, from a structural viewpoint, the Mahakali Treaty combines three distinct treaties related to the water sharing of the Mahakali River (the Sarada Agreement, the Tanakpur Memorandum of Understanding and the PMP), and extends the validity period of the entire framework for another 75 years from its entry into force.

The Treaty endorses the principles of equitable and reasonable utilization, the equitable distribution of benefits, and an obligation not to cause significant harm. This is also supported by the provision which, acknowledging an obligation not to cause harm, reads: “In order to maintain the flow and level of the waters of the Mahakali River, each Party undertakes not to use or obstruct or divert the waters of the Mahakali River adversely affecting its natural flow and level except by an agreement between the parties.”

The above provision means that each Party has an obligation to maintain the natural flow of the river. However, this obligation does not preclude the use of the waters by the local communities living on both sides of the Mahakali River, not exceeding 5% of the average annual flow at Pancheshwar. The Treaty acknowledges the right of both Parties to independently plan, survey, develop and operate any work on the tributaries of the Mahakali River as long as such use does not affect the rights of the other Party. Thus the Treaty allows each Party to use the water as long as it does not preclude the rights and interests of the co-riparian or cause harm or adverse effect to the other riparian. However, the terms “no harm” and “adverse effect”, not being defined in the Treaty, leave room for controversy.

The Treaty restricts unilateral projects along the Mahakali River. It states that any project to be developed on the Mahakali River, where it is a boundary river, should be designed and implemented by an agreement between the Parties on the principles established by the Treaty. Hence, it is an obligation for either Party to reach an agreement before commencing any project on the Mahakali River. It makes it binding to both Parties to abide by the principles of the Mahakali Treaty (inter alia, the principles of equality, benefit sharing and no harm). Ultimately, it discourages the unilateral development of the river and approves the principles of cooperation, consultation and notification.

Setting forth the general principles, the Treaty states that the PMP shall be designed to produce the maximum total net benefit. All benefits accruing to the Parties with the development of the Project in the forms of power, irrigation, flood control and so forth, shall be assessed, and the costs of the Project shall be borne in proportion to the benefits accruing to each. Thus, assessing the benefits accruing to both Parties from the PMP and sharing the cost in proportion to the benefits, in turn, emphasizes the notion of sharing of benefits from water uses rather than sharing of water. The principles of maximum benefit and benefit sharing, together with the principle of mutual benefit, acknowledge the principle of equitable utilization of benefits. Meanwhile, the Treaty states that both Parties may form joint entities for the development, execution and operation of new projects (Salman and Uperty 1999).

To facilitate information exchange, cooperation and implementation, the Treaty provides for a Mahakali River Commission. In defining the jurisdiction of the Commission, Article 9(1) states: “the Commission shall be guided by the principles of equality, mutual benefit and no harm to either Party”. Paragraphs 2 to 4 of Article 9 set out clear guidelines for the formation of the Commission, as well as its jurisdiction. According to Articles 9(2) and 9(4), the Commission is to be composed of equal numbers of representatives from both Parties and its expenses borne equally by both. According to Article 9(3), its functions include exchanging information and inspecting all structures included in the Treaty, making recommendations for the implementation of the Treaty provisions, evaluating the projects, monitoring and coordinating plans of actions, and examining any differences arising between the Parties concerning its interpretation and application.

B2.2 Governance mechanism of the Farakka and Mahakali treaties At the outset, it must be noted that incorporating a clear mechanism for dispute resolution is a precondition for effective long-term basin management. In many river basins, lack of such a mechanism has made treaties ineffective. In the case of the Ganges, the basin governance is
fragmented between Nepal and India on the upstream part, and between Bangladesh and India on the downstream part. There is no one single commission for the entire river basin.

**B2.2.1 The Ganges** The Ganges Treaty establishes a Joint Committee and defines its jurisdiction for monitoring implementation of the Treaty and exchanging data and information. The Joint Committee, consisting of an equal number of representatives nominated by the Parties, is entrusted to observe and record the daily flows below the Farakka Barrage as well as at Hardinge Bridge. The Joint Committee is required to submit all data collected by it, along with an annual report, to both governments, and is responsible for examining any difficulty arising out of the Treaty implementation as well as the operation of the Farakka Dam. The Treaty recognizes the need to cooperate and to find a solution to the long-term problem of augmenting the flow of the Ganges during the dry season.

The preamble of the Treaty notes that both countries wish to share, and optimally utilize, the water resources of the region in the field of flood management, irrigation, river basin development and hydropower generation for the mutual benefit of their people. Moreover, guided by the principles of equity, fairness and no harm to either Party, both agree to conclude water sharing treaties/agreements with regard to 53 other common rivers. The Treaty discourages unilateral development, and calls for conclusion of water-sharing agreements on the basis of the principles of equity, fairness and no harm, in turn, acknowledging the necessity of coordinated management of the watercourses. The Treaty further states that its sharing arrangements will be reviewed at five years interval or earlier, as required by either Party, and needed adjustments thereto. Both these provisions are important, as they endorsed the principles of “equitable and reasonable utilization” and “no harm, or theory of limited territorial sovereignty”.

The Ganges Treaty does not include a clear and specific dispute resolution and arbitration provision. The preamble of the Treaty mentions that both Parties wish to find a fair and just solution without affecting the rights and entitlements of either country. Article VII states that if the Joint Committee fails to resolve a dispute arising out of the implementation of the Treaty, it should be referred to the Indo-Bangladesh Joint River Commission, an entity established in 1972. The Commission, which has met annually to discuss problems and undertake joint investigations on the lower part of the Ganges River, does not, however, have the power to allocate water. If the dispute still remains unresolved, it should be referred to the two governments, which would meet urgently at an appropriate level to resolve it by mutual discussion. The Treaty, however, fails to specify the level of government involved and the timeframe for the settlement of the dispute, nor does it bind the Parties to seek resolution of the dispute. Hence, the Treaty, it appears, chose political means, not legal, to resolve any dispute arising from its implementation. Undoubtedly, the absence of arbitration mechanisms makes this legal instrument less effective than the Mahakali Treaty.

**B2.2.2 The Mahakali** The Mahakali Treaty provides a detailed dispute resolution and arbitration mechanism if any dispute is not resolvable by the Mahakali Commission. According to Article 11(2), an arbitration tribunal, composed of three members, conducts all arbitration. One arbitrator must be nominated by Nepal, one by India, with neither country able to nominate its own national, and the third arbitrator is to be appointed jointly, who shall preside over such tribunal. In the event that the Parties are unable to agree upon the third arbitrator within 90 days after receipt of a proposal, either Party may request that the Secretary-General of the Permanent Court of Arbitration at The Hague appoint an arbitrator, who shall not be a national of either country.

The inclusion of the Permanent Court of Arbitration in this Article certainly gives a high profile to the Treaty’s dispute-resolution mechanism, which is further strengthened by Article 11(3), according to which the decision of the arbitration tribunal is final, definitive and binding. The Mahakali Treaty, however, is silent regarding the venue of arbitration, the administrative support of the arbitration tribunal, and the remuneration and expenses of its arbitrators. These issues are to be agreed upon by an exchange of notes between the Parties. By providing a relatively elaborate and advanced mechanism, the Mahakali Treaty offers a good example for dispute settlement in international rivers.

**B2.3 The Brahmaputra Regime** To date, no multilateral or basin-wide international treaty has been concluded for the Brahmaputra. The arrangements that exist are all narrow in scope, bilateral, contentious, and mostly fail to deal with water. The earliest legal instrument affecting the Brahmaputra is the 1914 Simla Convention, in which Great Britain, Tibet and China met to negotiate boundaries between
India and Tibet. This resulted in the “McMahon Line”, a line from Bhutan to the Great Bend which substantially moved the border north, making India one of the riparians of the Brahmaputra basin.

In 1949, India and Bhutan signed a Treaty of Friendship, which exchanges Indian non-interference in the internal administration of Bhutan for Bhutanese agreement to seek India’s advice on foreign relations. The Treaty, in fact, is the basis for present-day joint hydropower plants on Brahmaputra tributaries in Bhutan exporting electricity to India, an early example of inter-basin cooperation in the region.

In 1954, China and India signed a Memorandum of Understanding (MOU) for sharing Brahmaputra hydrological data for flood protection purposes, which, however, ended with the 1962 Sino-Indian War. More recently, the two countries have made a number of cooperative arrangements, including a 2002 MOU to provide hydrological data to manage flood control, and a comparable 2005 MOU on the Langquen Zangbo, a tributary of the Brahmaputra. China, on the other hand, has also entered into a comparable MOU in 2006 with Bangladesh in connection with the Brahmaputra.

B2.4 The Teesta Regime

The Teesta River originates from Cholamo Lake at an elevation of 17 487 ft (5330.04 m) above sea level (a.s.l.) in the Himalayas in India. Fed by several rivulets, which rise in the Thangu, Yumthang and Donkia-La ranges, the river then flows up to Teesta Bazaar. At Teesta suspension bridge, the river is met by its main tributary, the Rangeet River. At this point, it changes course southwards flowing entirely into West Bengal. The river hits the plains at Sevoke, where it is spanned by the Coronation Bridge, which links the northeast Indian states to the rest of India. The river then courses its way to Bangladesh, before finally merging with the Brahmaputra at Fulcherry. Among the transboundary rivers, the Teesta is the fourth major river in Bangladesh after the Ganges, Brahmaputra and the Meghna.

An Agreement on the ad hoc sharing of the Teesta waters between India and Bangladesh was finalized during the 25th meeting of the Indo-Bangladesh Joint Rivers Commission (JRC), and was signed on 20 July 1983, in Dhaka. But it was never put into practice. Nonetheless, the JRC discussed the sharing of the Teesta waters and recognized that sharing will need to be based on scientific studies that were to be completed by the Joint Teesta Committee before the end of 1985. Pending completion of scientific studies, in a spirit of friendship and good neighbourliness, an ad hoc sharing of the Teesta flows during the dry season, to be valid until the end of 1985, was agreed by allocating 36% for Bangladesh, 39% for India and a remaining 25% left unallocated for the maintenance of the flows. These ad hoc shares and the unallocated portions were subject to re-allocation after the completion of the scientific studies.

It was further agreed that the secretaries in charge of irrigation of the governments of India and Bangladesh would meet urgently for incorporation of the ad hoc sharing arrangement into a formal document, spelling out the locations at which sharing would be made effective, detailing the modality for flow measurement arrangements for monitoring the implementation, and for presenting their recommendation in 90 days for consideration of the JRC.

In a meeting held in Delhi, in January 2004, Bangladesh raised fresh issues with the Indian side, making a major shift from its earlier stances on the “interim agreement” reached in 1983 on the management of the Teesta. Bangladesh proposed, in the meeting, that 10% of the Teesta waters be kept for natural flow, 39% for India, 36% for Bangladesh and the rest be distributed proportionately. However, India insisted that the scientific studies be first completed.

Whilst discussions are ongoing sporadically, the Teesta has been drying up at different points. Once mighty, it is now bereft of water, following construction of the different barrages and dams causing a negative impact on its free flow on its 414-km journey to the sea. Among such, the Teesta Barrage in Bangladesh, the Teesta Barrage at Gojoldoba in West Bengal, and the two hydro-electricity dams in Sikkim are the most significant ones. Due to the obstructions to its water flow, the Teesta, heavily silted, has changed its courses at many places, especially in the lower catchment, annually eroding both of its banks and then engulfing thousands of hectares of land. The ambitious objective of both the Bangladesh and the Indian authorities of irrigating thousands of hectares of land to increase agricultural production did not help, and the river is gradually dwindling with scarcity of water even during rainy seasons. It is feared that the Teesta barrages, both in Bangladesh and India, may lose their efficacy soon, because the river may die in terms of water flow.

Thus far, although attempts to establish clear regimes in connection with the selected segments in the GBM basin area have been made, the smooth functioning of the regimes has proven to be difficult at best. As such, therefore, contentious issues
transcending countries within the area still remain, leaving room for further tensions.

B3 POTENTIAL FOR FURTHER CONFLICT

B3.1 The river linking project Emboldened by an Order of the Indian Supreme Court issued on 30 October 2002, in response to a public interest litigation writ, and in order to cater for its internal needs for water, the Indian Government has proposed linking the Ganges River with the dry areas of the country in the south and west. This National River Linking Project (NRLP) involves connecting 14 Himalayan rivers in the north and 16 peninsular rivers in the south. The Project would add somewhere between $35 \times 10^6$ ha and $37 \times 10^6$ ha of irrigated land, generate $34 \times 10^6$ MW of electricity and increase navigational efficiency, apart from controlling floods and eliminating chances of drought. If and when completed, the Project would become one of the largest inter-basin transfer projects in the world.

Two points of caution are, however, warranted. First, the Project is still subject to a series of legal and political controversies amongst the different States within India (Khalid 2004, Shawkat 2006). Second, most of these rivers, like the Ganges, begin in the Himalayan Mountains and, therefore, India will need to secure concurrence of other riparians, which may not only be difficult, but also full of tension and conflicting positions.

B3.2 Kalapani issue Worth adding in this context is a dispute between India and Nepal involving about $75 \text{ km}^2$ of land in Kalapani, where China, India and Nepal meet, that has been lingering for many years. Indian forces occupied the area in 1962 after the Sino-Indian border war. Three villages are located in the disputed zone (Kuti, Gunji and Knabe).

The Kalapani River borders the Nepalese zone of Mahakali and the Indian State of Uttarakhand. A Treaty signed by Nepal and British India in 1816 (Sugauli Treaty) described the Mahakali River as Nepal’s western boundary with India. Subsequent maps drawn by the British surveyors showed the source of the boundary river at different places. India and Nepal differ as to which stream constitutes the source of the river: Nepal regarding the Limpiyadhura as the source; India claiming the Lipulekh; Nepal claiming the source of the Mahakali River to be west of Kalapani, while India claiming it to be east. It is this discrepancy in locating the source of the river that has led to a boundary dispute between India and Nepal, with each country producing maps supporting its own claims.

The dispute intensified in 1997 when the Nepalese parliament considered the Mahakali Treaty for ratification. India and Nepal have since held several meetings to resolve the dispute, but no solution has been found. Although this Indo-Nepal dispute appears to be minor, it was aggravated in 1962 by tensions between China and India. Because the disputed area lies near the Sino-Indian frontier, it gained strategic value.

B4 CONCLUSION

As can be concluded from the foregoing discussions, the transboundary water relations amongst the GBM riparians on several of the rivers and tributaries have generally been slow and difficult. If the agreements between India and Bangladesh have mainly focused on water sharing, those between India and Nepal have been more integrated with a specific focus on flood control and irrigation.

However, the transboundary water management complexities that dominate the South Asian countries as a whole essentially result from a series of political changes. Their shares of sufferings, due to specific allocation and governance problems resulting from political changes over time as well as increasing competing needs, have also led to continual conflict. The legal framework developed in the course of time, although moderately successful in deterring and postponing conflicts, has not been able to manage the competing water resource demands by fairly satisfying the concerns of all states and sub-sovereigns.

C MANAGING CONFLICTS THROUGH COOPERATION: A NEW PARADIGM

While legal systems can generally create a framework for national and international cooperation to address common problems, the case of water is special, particularly because, unlike other areas, governance systems on water are highly contextual and excessively dynamic in nature. As such, the implementation deficit for exported water laws is often high because most such transplantations are not tailored to the contexts to which they are transferred. What has worked in Europe is not sure to work in Africa or Asia. Since the individual importance, scope, relevant factors, procedures and forms of management vary from country to country, and since each shared watercourse is unique in its characteristics, a solution
applicable for all will also not be possible. Countries and regions have to find solutions from their own pragmatism. South Asian countries will also, therefore, need to devise, themselves, strategies to deal with their specific types of conflicts and cater for their specific competing needs. They may attempt to do so by learning from others and by being more proactive and creative in their approach, in a number of ways.

C1 TAKING LESSONS FROM EXPERIENCE OF OTHER COUNTRIES

Research on conflicts over transboundary waters suggests that a change in resource environments, which outpaces the capacity of existing institutions to deal with that change, is one major cause of tension. History offers ample examples in which the absence of mechanisms to deal with change has led to conflicts between countries. The 1944 Treaty between the USA and Mexico over three shared rivers (Colorado, Tijuana and the Lower Rio Grande) is one such example. Indeed, even after including a number of mechanisms to address flow variability, the agreement could not cope with 10 consecutive years of low flows in the 1990s. The result was a growing water debt for Mexico and calls on both sides to renegotiate the Treaty. Similarly, low water levels on the Ganges in 1997, combined with historically-engraved mutual suspicion between the parties, threatened the continuation of the Ganges Treaty signed just one year earlier (Salman and Uprety 2003). While both treaties were legally binding on the parties involved, controversies about their implementation led to a general atmosphere of mistrust.

Research further suggests that most conflicts related to water sharing remain unresolved due to lack of norms, in shared-water agreements, to manage water flows. However, while the importance of norms is acknowledged, studies also reveal that many agreements lack mechanisms to deal with changes in resource availability and flexibility in treaty implementation that provide opportunities to defuse the potential conflict between states. In this context, an interesting study (Drieschova et al. 2008) has examined the use of variability management mechanisms in transboundary water treaties. Reviewing how adaptive governance can be achieved through the incorporation of flow variability management mechanisms, it has used the resulting typology to analyse the commonality of mechanisms, and their variation, to address flow variability in 50 treaties signed between 1980 and 2002. Finally, it has presented a model for the choice of governance mechanisms to address variability, discussing the likely advantages and disadvantages of each, and providing insights to elements that can also be beneficial to others. It may, therefore, be useful for South Asian countries to also be cognizant of the main ideas deriving from the above study on experience of other countries and regions in their treaties dealing with the management and sharing of waters, and to take relevant lessons therefrom to adapt to their own needs.

C1.1 Flow variability and sharing management through built-in flexibility Many countries depend upon water originating outside their borders. Downstream riparian states in particular, often stressed by land and water development occurring in the upper parts of the basins, feel vulnerable to rising flow variability (UNEP 2006). Because of this, the concerns about variability and the institutional mechanisms to manage it cooperatively have long been in the agenda of the community of riparians (Drieschova et al. 2008). As early as 1863, the Netherlands and Belgium, for example, made allocation of the Meuse’s water conditional on annual availability.

The capacity of countries to adapt to flow variability largely depends on the degree of flexibility incorporated in governance systems. Flexibility can mean either the ability to change the rules of the game (for instance, allowing for the incorporation of new scientific knowledge), or the option to apply a variety of policies in the face of changing conditions (as it was in the case of Baglihar). Since transboundary agreements are typically rigid instruments that can be modified only under difficult circumstances, the need for flexibility in their design is welcome, if not necessary (McCaffrey 2001). In addition to playing a direct role in resource management, flexibility can also reduce the sovereignty costs of negotiations (most thorny amongst riparians) and allow regime creation to move forward, even if different issues of uncertainty are not fully resolved.

C1.2 Adaptive allocation mechanism While allocation rules and mechanisms to change absolute supply are critical for variability management, there are also other means that have been availed by states to address resource variability. For example, developing formalized communication between parties through the establishment of joint management institutions can overcome the rigidity of water treaties and serve as a venue for conflict resolution. This can be done by including a provision in the treaty itself.
or through separate instruments. Such institutions can waive the need to codify, during the negotiations, exact quanta of current and future resource sharing, thereby reducing the transaction costs associated with sealing agreements. Establishing conflict resolution mechanisms and requiring data exchange are two other means through which communication channels can be strengthened. While conflict resolution mechanisms provide an agreed forum for the discussion of changes in resource conditions not envisioned in the initial agreements, information exchange and clearer communication can reduce the potential impacts of flow variability by facilitating early identification of future trends, and offsetting the problem of asymmetric information between riparians, which can hinder cooperation and lead to sub-optimal outcomes.

Perhaps due to the significance it holds, management of flow variability has often been an important component of water treaties. For instance, article 40(3(d)) of Annex III to the Israeli-Palestinian Interim Agreement of 1995 on the West Bank and the Gaza Strip (now, for all practical purposes, terminated) provided for “adjusting the utilization of the resources according to variable climatological and hydrological conditions”. Similarly, the Agreement between the governments of the Republic of Namibia and the Republic of South Africa on the establishment of a Permanent Water Commission states in Article 3(1(f)) that it is one of the functions of the Commission to advise the parties on “measures that can be implemented by either or both Parties to alleviate short-term problems resulting from water shortages in any river of common interest to the Parties during periods of droughts”. Also, the Agreement on the Teesta Waters between Bangladesh and India established flexible methods for allocation based on percentage shares of flows.

C1.3 Broadening coverage Since states give varying levels of priority to their specific problems (due to geopolitics, supply versus demand situation, ideology and so forth), broadening the scope of cooperation to go beyond water allows concessions to be made by each party on some issues in exchange for gains on matters they perceive of higher priority (borders issues, trade, transit, energy, tourism, peace and friendship and so forth). For example, concurrent discussion on several elements of a treaty or of several treaties can allow trade-offs as one possible mechanism for solving conflicts. The varying stakeholders will be extra vigilant on the gamut of issues before rejecting a treaty provision when conditions change, since they will have more to lose (because of inter-connectivity of issues or treaties in the gamut). Herein, one realizes the obvious advantage of taking an integrated approach in water resources management and negotiations (the Mahakali, and to a lesser extent, the Kosi and the Gandak treaties between India and Nepal are interesting examples).

C1.4 Redefining availability Modifying the level of resource availability has also been an alternative to allocating existing resources. In this context, efforts are made in changing the levels of available water, for jointly developing infrastructure to either increase supply (in the case of shortage) or decrease it (in the case of flooding). This, in turn, can mitigate the risk inherent to changing supply or demand conditions, and reduce the possibility of protracted and unwarranted conflicts (Wolf 1998, 1999). Riparians can take joint measures, for instance, to increase water supply but may avoid specifying, in the agreements, the form that specific cooperation would take. In this spirit, Bangladesh and India stated their intent to increase water supply of the Ganges River during dry periods but did not specify how or when such work would take place, thus avoiding the need for specifying such detail during treaty negotiations. Another set of agreements addresses the opposite force of variability (i.e. flooding). The establishment of joint flood-control mechanisms and warning systems to manage unexpected high flows happens to be a major theme in many international water treaties. The recent decision by India and Nepal to be more proactive in the context of the Kosi flooding is another case in point.

With increasing vulnerability due to constant water variability and scarcity, the ability of countries sharing an international river to adapt will depend partly upon the type, number and effectiveness of mechanisms to address the variability incorporated in water agreements. Countries have built mechanisms to allow changing the rules of the game, or to enhance the capacity to absorb unexpected shocks. Some of the mechanisms are based on flexibility, while some others are based on enforceability (Dinar 2005). However, all ultimately have the same objective of averting and resolving conflicts, by all means available.

The redefinition of availability of water needs also to be viewed in the context of climate change. Indeed, problems of water sharing and management of water resources in South Asia have become even more complex because of the region’s extreme vulnerability
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to the consequences of climate change. According to UNEP, for instance, South Asia is one of the most disaster-prone regions in the world. Climate projections for the future highlight increase in the frequency and intensity of extreme weather events, such as droughts, floods and severe rainstorms (UNEP 2007). The increases in rainfall are likely to have an impact on water recharge rates, and to exacerbate and skew water availability data for those countries that are already water stressed (either shortage of water during dry season or problem of flood during wet season), which may lead to further tension amongst countries.

The Himalayan range also contains high-altitude glaciers that supply water to many rivers in Asia. As such, many people are dependent on glacial melt water (particularly during the dry season). Accelerated glacial melt due to climate change will weaken the perennial nature of many of the rivers, and will likely further adversely affect those dependent on the water resource. In Nepal, for instance, melting glaciers are filling glacial lakes beyond their capacities contributing to Glacial Lake Outburst Floods (UNEP 2007). In the same vein, according to the Intergovernmental Panel on Climate Change, in India, Pakistan, Nepal and Bangladesh, water shortages have been attributed to many issues (rapid urbanization, industrialization, population growth, inefficiency in water use), which will be aggravated by changing climate and its adverse impacts on demand, supply and water quality. As such, changes in climate and its variability will continue to challenge the ability of these countries to meet growing demands for water. (IPCC 2008, p. 86), which will have severe downstream consequences. Available records also suggest that Gangotri Glacier (the source of the Ganges) is retreating continuously (IPCC 2008).

However, given that the existing treaties were signed before the issue of climate change got prominence, they do not provide for an in-built mechanism to deal with the situation. As such, therefore, the co-riparian countries may have to start thinking of managing the emerging problems, associated with climate change, with flexibility, adaptability, and perhaps, re-negotiation or re-interpretation.

C2 CHOOSING AN ADEQUATE METHOD

Because of the limited availability of water, allocating shared waters in a manner acceptable to all parties is one of the most difficult aspects of transboundary water treaty negotiations. And the manner in which allocations are codified can have significant implications on the resilience of agreements. Three mechanisms are commonly suggested for addressing allocations. These mechanisms are direct allocation, indirect allocation and allocation through broad concepts and ideas. The direct allocation, under which the division of the quantum of waters between co-riparians is explicit, implies establishing a correlation between water availability and percentages of flow (which themselves vary depending on water availability), and including a provision in the treaty that in the case of insufficient water, the deficit will be recouped in the following period. The indirect allocation is used to establish a clear process through which allocation will be determined, but without codifying the specific quantities or proportions of shares. Consultations as a step to determine later allocations, an obligation to notify co-riparians when new water needs arise, a requirement for co-riparians to consent to any increased water use, prioritization of water uses and vague commitments on the need to allocate shared-water resources can all be considered the elements of indirect allocation mechanisms. Lastly, establishing broad ideas or concepts, for determining how water should be allocated now or in the future (formula-based), can also be a mechanism chosen by treaties. These principles include concepts such as equitable and reasonable use, rational use, sustainable use, the requirement not to cause significant harm and the protection of existing uses. Water relations among Bangladesh, India, Nepal and Pakistan, it may be noted, all show a mix of the above pattern.

D GENERAL CONCLUSION: VISION FOR COOPERATIVE DEVELOPMENT

No doubt, if allocation has been a major problem for South Asian countries, regime management has been a serious challenge, especially due to sovereignty concerns, competing demands and deeply-rooted mistrust. This has caused these countries to continuously adopt a defensive posture which, instead of facilitating cooperative development, has a tendency to impede development, even on, otherwise, non-controversial areas. Therefore, the time is ripe for the countries of the region to consider new techniques to develop, design and strengthen their legal regimes regarding the shared water resources on the basis of principles established by customary law, the codified law and prevailing international practices. The irony is that none of the South Asian countries is a party or signatory to the UN Watercourses Convention, the only international “framework law” applicable...
to transboundary waters. Also, fostering a regime for broad integrated regional cooperation, which also facilitates the implementation of the different principles and concepts of international law applicable to transboundary water resources, appears warranted. Such a regime, to be more useful, will need to be devised in conjunction with the exercise of harmonizing legal regimes, both intra-regional and national. In this context, the institutional framework of the South Asian Association for Regional Cooperation (commonly referred to as SAARC), which has also launched an initiative for regional water cooperation (Al Habsy and Uprety 2010), should become a useful mechanism.

It is appropriate to note, here, that the “South Asia Regional Water Vision 2025” (a document forming part of the Global Water Vision 2025, prepared under the aegis of the World Water Council (World Water Council and the Global Water Partnership 1999), and “Asia’s Next Challenge: Securing the Region’s Water Future”, a Report by the Leadership Group on Water Security (Leadership Group on Water Security in Asia 2009), have both concluded that there is a need, in South Asia, for a regional water policy as well as for institutions for cooperation in water resource planning and management for the international rivers. According to these documents, which primarily reflect the views of stakeholders and civil society from concerned states, for cooperation on shared water resources to be fruitful, a comprehensive “regional” approach is needed. For these documents, such cooperation requires a series of measures to be taken at the basin level, focusing on watershed management, water quality, and land-water interaction. The documents further suggest that the management of shared river systems should grow beyond the sphere of national sovereignty and bilateralism, and must be addressed at the “regional level” to achieve the best possible planning and use of available water, including through a regional agency.

In this context, the time may be ripe for the establishment of a region-wide institution for shared water resources, an entity that would provide mechanisms and processes for exchange of data and information, and possibly for planning and coordinating actions, measures and projects on the shared watercourses, as well as for dealing with emergencies, such as floods. The experience of the Southern African Development Community (SADC) Water Division, in Botswana, can also provide guidance (Salman 2001). The proposed regional institution will not only serve the interests of all riparians as a group, but should also foster multilateralism and bring regional practice closer to the global one. In this endeavour, one can also foresee a significant and proactive role for international development institutions in providing technical assistance and funds to strengthen such an institution, thus building a valuable and technically motivated counterpart for them on matters of water. These endeavours are certainly difficult, as they revolve around the complexity of sovereignty versus technical necessity, or political strategy versus good faith. However, they are worth trying, particularly among the South Asian countries sitting at a crossroads of water resources issues.

No doubt, relentless regional competition for more water will continue to intensify, fuelled by high population growth and environmental degradation. The challenges of climate change and the melting glaciers will add to the problems already faced by the region. Nonetheless, these problems and challenges can, and indeed should, act as a catalyst for the South Asian countries to nurture cooperative relations and find long-term solutions for managing their transboundary waters, in a manner that would reasonably and equitably address the needs and demands of all of them. Building on their experience over the last 50 years, the countries of the region have the potential to put in place a collaborative governance structure for their shared water resources. However, this would require a major paradigm shift, from a state to a region-centric approach, and from isolated to integrated water resources management. With their experience, the paradigm shift, and the political will, the South Asian countries should be able to build a regime for the sustainable sharing and management of their watercourses, and for reducing, if not eliminating, conflicts, disputes and clashes within the region.

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