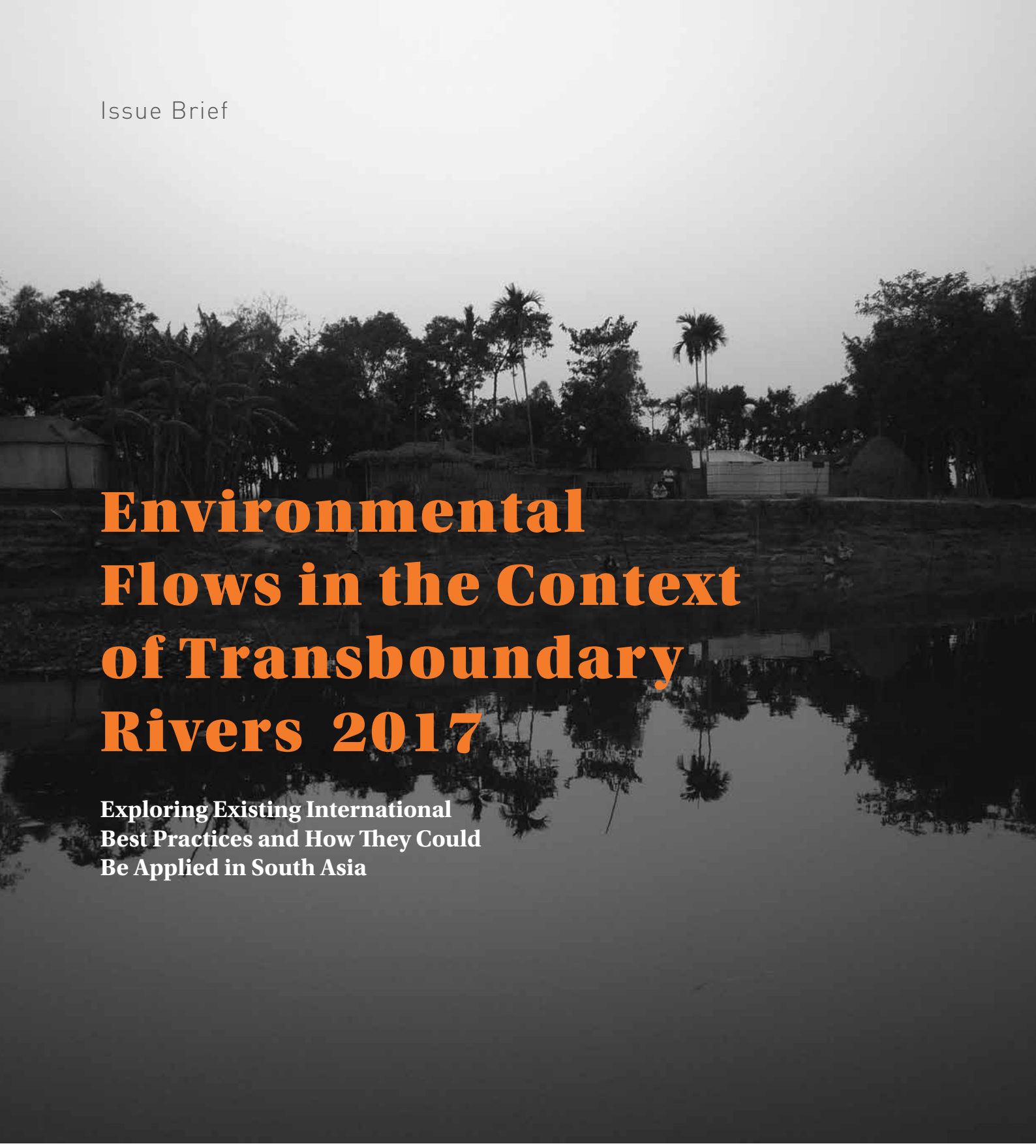
Issue Brief



Environmental Flows in the Context of Transboundary Rivers 2017

Exploring Existing International Best Practices and How They Could Be Applied in South Asia

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About International Rivers

International Rivers protects rivers and defends the rights of communities that depend on them.

We seek a world where healthy rivers and the rights of local river communities are valued and protected. We envision a world where water and energy needs are met without degrading nature or increasing poverty, and where people have the right to participate in decisions that affect their lives.

We are a global organization with regional offices in Asia, Africa and Latin America. We work with river-dependent and dam-affected communities to ensure their voices are heard and their rights are respected. We help to build well-resourced, active networks of civil society groups to demonstrate our collective power and create the change we seek. We undertake independent, investigative research, generating robust data and evidence to inform policies and campaigns. We remain independent and fearless in campaigning to expose and resist destructive projects, while also engaging with all relevant stakeholders to develop a vision that protects rivers and the communities that depend upon them.

Published November 2017

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Introduction

Environmental flows as an approach has evolved globally into a well-developed, scientific, multidisciplinary field where expert-driven specialisations combine with the knowledge and understanding of riparian and other communities to create a scientific as well as a political process. Environmental flows, or e-flows, have emerged as one of the key frameworks for informed, participatory decision-making in river-basin planning to arrive at a balance between extraction, use and conservation of rivers and their waters[1].

A widely accepted definition of environmental flows comes from the Brisbane Declaration[2], which defines environmental flows as:

> "(T)he quantity, timing, and quality of water flows required to sustain freshwater and estuarine ecosystems and the human livelihoods and well-being that depend on these ecosystems."

There are close to 200 methodologies for determining e-flows. While some, like a purely hydrology-based methodology, would ignore several aspects, a holistic methodology takes care of all aspects, including social and "developmental".

Properly implemented, environmental flows can help sustain and generate livelihoods, create economic value, preserve rivers, share benefits of basin development more equitably, and in general contribute to the sustainable management of rivers.

By its very nature, a river is inextricably linked across its length and with its basin. Flows at any point in the river will be significantly influenced by what happens in other parts of the river and the basin, especially in the upstream. Thus, an environmental flow assessment process will deliver optimal results when it is able to consider the river basin in a holistic manner, allowing for the linkages and influences across the basin.

Anything that limits the consideration of these linkages can render the environmental flows assessments inadequate or flawed. Political boundaries – in this paper, taken to mean mainly international boundaries – can often do precisely this.

Political boundaries partition river basins, and basin communities, into artificial – from the ecological perspective – compartments. In cases where assessment and implementation of environmental flows is restricted to within the political boundaries, it can render the process deficient or defective, as the process will not be able to consider or control linkages and interventions beyond the borders. On the other hand, if environmental flows determination and implementation is to be carried out over the river basin transcending borders, complications introduced by boundaries and the related administrative and sovereignty concerns can often impede such holistic considerations as are necessary for a good environmental flows assessment.

Thus, environmental flows assessments in transboundary contexts create unique challenges.

This paper attempts to highlight important ways in which the assessment, allocation and implementation of environmental flows in shared rivers can be made more effective in South Asia, based on an understanding of the international legal regime, international practices and case studies, and the South Asian situation.

Environmental Flows in Transboundary Contexts: Challenges

Some key challenges that can constrain the scope and effectiveness of environmental flows assessments and allocations in international rivers include the following.

1. In the case of international rivers, negotiations or discussions are mainly between governments and therefore can completely eliminate the role of local communities in environmental flows assessments, or prevent adequate consideration of their interests/rights in determining appropriate flows. Stakeholder participation is at the core of environmental flows assessments.
2. Deliberations have to contend with the diversity of cultures, languages and governance systems across boundaries, and need to reconcile differences in national priorities and in national situations. For example, the share of hydropower in the total electricity sector in Nepal and its perceived role in the future is quite different from India, where the hydro option is clearly being recognised as a very expensive one. Developing unified institutional structures for participation, consultation and implementation also have to contend with this diversity, as, for example, in the Mekong basin[3].
3. E-flows objectives are a societal and therefore a political choice[4]. They often end up being reduced to a governmental choice even in purely domestic river basins; in transboundary rivers, this risk is much higher. Further, it is difficult to reconcile the political choices of governments and communities across boundaries.
4. The sharing and verification of data is more difficult, especially for riparian communities.
5. In transboundary rivers, considerations of sovereign control can create difficulty for managing the river basin as a unit, creating problems in environmental flows assessments and implementation. For example, negotiations around the Indus basin treaty started with an attempt to put in place a unified system managed jointly by India and Pakistan, but the difficulties of its operationalisation looked so daunting that the shape of the treaty shifted to a complete bifurcation of the basin between the two countries.
6. Often, the required multilateral legal and institutional frameworks are absent, and are not easy to create and sustain. This can include the absence of ratification or accession to international treaties and conventions, the absence of bilateral treaties or agreements, and/or the absence of transboundary river basin organisations.
7. Ensuring that the downstream states use environmental flows only for the environmental purposes for which they were released is a big challenge.

In spite of all these challenges and the difficulties involved, the successful implementation of an environmental flows program can offer significant benefits in terms of the restoration of rivers, preservation of ecology, sustaining traditional livelihoods and creating new ones like tourism, all of which adds up to significant economic and non-economic value. As examples discussed later on in this paper suggest, environmental flows can often ensure a more equitable distribution of benefits of basin development.

Policy and Legal Frameworks

The UN Watercourses Convention

Policy and legal frameworks for environmental flows in a transboundary context are essentially frameworks that deal with broader issues of sharing and managing international rivers. These include binding and non-binding international treaties, international customary law, international case laws, and bilateral, regional and basin level agreements. Domestic policy and law can also have important bearing on environmental flows in transboundary rivers.

By far the most important global legal agreement is the United Nations' Convention on the Law of the Non-Navigational Uses of International Watercourses (Watercourses Convention), adopted by the UN General Assembly[5] on 21 May 1997. The Convention "applies to uses of international watercourses and of their waters for purposes other than navigation and to measures of protection, preservation and management related to the uses of those watercourses and their waters"[6].

The Watercourses Convention has codified some of the most important principles of international customary law relevant to transboundary rivers, namely, "equitable and reasonable utilization and participation" (Article 5), "obligation not to cause significant harm" (Article 7), "general obligation to cooperate" (Article 8) and "regular exchange of data and information" (Article 9). The Convention does not mention environmental flows as such. However, its principles, particularly the obligation not to cause significant harm, but also the equitable and reasonable utilisation principle, directly imply the necessity, significance and value added of maintaining environmental flows in transboundary rivers.

The Convention came into force only on 17 August 2014. As of August 2017, the Convention had approvals, acceptances, accessions or rati- fications by 39 countries[7]. However, none of the countries of South Asia are amongst these, so the Convention is not legally binding on any of the South Asian countries. It may also be added that when the Convention was adopted in the Gener- al Assembly in 1997, China had voted against it, whereas India and Pakistan had abstained[8].

However, the Convention, and other customary laws - like the Helsinki Rules and Berlin Rules- would be important influences over transboundary negotiations in the region, over and above any bilateral and multilateral treaties. Its principles provide policy guidance for the establishment of e-flows and other watercourse agreements that contribute to equitable use, shared benefits, sustainable development and conservation outcomes.

Helsinki Rules and Berlin Rules

"The Helsinki Rules on the Uses of the Waters of International Rivers" were adopted by the International Law Association (ILA) at the fifty-second conference, held at Helsinki in August 1966. Though the Helsinki Rules 1966 are not legally binding, they have been the most highly regarded and authoritative framework dealing with international watercourses[9].
The Helsinki Rules[10] assert the principle of "reasonable and equitable share" in the waters of an international river. However, the principle of "no significant harm" is not explicitly stated, but is incorporated in the factors relevant to the determination of the reasonable and equitable share (Article V (II) (11) as well as in the article that requires the prevention of pollution causing "substantial injury" in the territory of a co-basin state. (Article XI, X).

In 2004, the ILA adopted the Berlin Rules, which were a revision of the Helsinki Rules capturing progressive developments in relevant international law[11]. The Berlin Rules codify a number of significant progressive provisions which represent an evolution in the understanding of water resources management with the incorporation of stronger provisions for ecological sustainability, right of access to water, participation, etc. For example, the provision of "reasonable and equitable share" of the Helsinki Rules is expanded to "the right to participate in the management of waters of an international drainage basin in an equitable, reasonable, and sustainable manner" (Article 10) and "Basin States shall in their respective territories manage the waters of an international drainage basin in an equitable and reasonable manner having due regard for the obligation not to cause significant harm to other basin States" (Article 12). It is important to note that earlier the basin states had a "share" in the waters, but now the Berlin Rules talk about managing the basin in an equitable and reasonable manner.

The UN Watercourses Convention echoes this shift as it also talks about "Equitable and reasonable utilization" as against the "reasonable and equitable share" that Helsinki Rules talked about.

Salman[12] argues that while the Helsinki Rules subordinate the principle of no significant harm to the equitable and reasonable share provision, the Berlin Rules put them on the same footing.

Most important in the context of environmental flows, the Berlin Rules explicitly provide for "Ecological Flows" to "protect the ecological integrity of the waters of a drainage basin, including estuarine waters" (Article 24). While this provision is in the more general chapter on the protection of aquatic environment rather that in the chapter specific to internationally-shared waters, the "Usage Note" makes it clear that this provision applies to all waters, including international waters.

The reason to dwell at length on customary laws is that in the absence of basin states being part of any binding international convention, or in the absence of bilateral treaties, or with bilateral treaties of limited mandates, it is the customary laws that will determine the contours of any negotiations, agreements and practices. For example, the World Commission on Dams has suggested that in the event there are problems with basin states endorsing the UN Watercourses Convention, then the key principles of equitable and reasonable utilisation, no significant harm and prior information – all key elements of the customary law, along with the Commission's own Strategic Priorities, which also elaborate many of the principles of customary law – can form the basis of arriving at working agreements[13].

Case Laws

Case law and judicial interpretations are an important part of the legal regime governing transboundary rivers[14]. The International Court of Justice (ICJ) has held that when disputes relating to international rivers are being resolved, even if any bilateral or multilateral treaty exists between the party states, customary law should be read into it, as well as the provisions of the Watercourses Convention, even if the parties are not signatories to it or bound by it.

The Convention, and other customary laws - like the Helsinki Rules and Berlin Rules - would be important influence over transboundary negotiations in the region, over and above any bilateral and multilateral treaties

The Gabcikovo-Nagymaros Project on the Danube River

A dispute had arisen between Hungary and Slovakia regarding the Gabcikovo-Nagymaros Project. This barrage system project was being executed under the Budapest Treaty of 1977 between the two countries for the "utilization of the natural resources of the Bratislava-Budapest section of the Danube river…." The two countries took the dispute to the ICJ, which, in its judgement of 25 Sept 1997, noted that[15]:

> "It is for the Parties themselves to find an agreed solution that takes account of the objectives of the Treaty, which must be pur- sued in a joint and integrated way, as well as the norms of international environmental law and the principles of the law of international watercourses."

It may be noted that neither party was a signatory to the Watercourses Convention at that time.

Kishenganga Project

Probably the most significant case in the context of this paper is the Kishenganga case, as it not only deals with two countries from South Asia (India and Pakistan) but it also has an explicit ruling on environmental flows.

The case involves the construction of the 330 MW Kishenganga hydropower project in India on the Kishenganga river, a tributary of the Jhelum. The Kishenganga is a transboundary river and flows from India into Pakistan, where it is known as the Neelum. The construction of the project is governed by the Indus Waters Treaty (IWT) signed between India and Pakistan in 1960. In May 2010, Pakistan moved the Permanent Court of Arbitration (PCA) objecting to the project, arguing that as per the IWT, India was not allowed to construct the project. The details of the case are not relevant here[16]. However, what is important is that the PCA delivered its Partial Award[17] on 18th Feb 2013, directing that India can go ahead with the project, but:

> "India is however under an obligation to construct and operate the Kishenganga Hydro-Electric Plant in such a way as to maintain a minimum flow of water in the Kishenganga/ Neelum River, at a rate to be determined by the Court in a Final Award."

In subsequent proceedings, as a part of the Final Award[18], the PCA determined the quantum of the environmental flows that India needed to release below the dam.

What is important is that the Indus treaty itself has no provision for any such environmental flows. The Treaty does require (Clause 15 (iii) of Annexure D) that if India constructs any project:

> "… located on a Tributary of the Jhelum on which Pakistan has any agricultural use or hydroelectric use, the water released below the Plant may be delivered, if necessary, into another Tributary but only to the extent the then existing agricultural use or hydroelectric use by Pakistan on the former Tributary would not be adversely affected."

Thus, the Treaty required India to release flows only to protect "then existing" "agriculture or hydroelectric" uses, not any environmental needs. The PCA actually ruled that there were no such uses "then existing". However, it still mandated the release of environmental flows, calling them as such.

The PCA justified this by saying that:

"India's duty to ensure that a minimum flow reaches Pakistan also stems from the Treaty's interpretation in light of customary international law." (Para 447, Partial Order).

This is all the more significant because the Indus Waters Treaty itself explicitly and severely limits any use of customary law in interpreting the provisions of the Treaty. Clause 29 in Annexure G of the Treaty states that

> "…the law to be applied by the Court shall be this Treaty and, whenever necessary for its interpretation or application, but only to the extent necessary for that purpose, the following in the order in which they are listed:
>
> (a) International conventions establishing rules which are expressly recognized by the Parties
>
> (b) Customary international law"

However, the PCA brought in the customary law not to interpret the Treaty – whose provisions

with respect to the needs of downstream releases were explicit and limited to agriculture and hydropower uses – but to rule for environmental releases. It justifies such a bringing in of customary law by stating that the Vienna Convention on the Law of Treaties, 1969, 1155 U.N.T.S. 331, requires that apart from the provisions of the Indus Water Treaty itself, the PCA has to take "account of relevant customary international law - including international environmental law - when interpreting the Treaty".

Further, the PCA Order also establishes that even if treaties had been in place before the provisions of customary laws evolved, the customary law provisions would still be applicable. (Para 452, Partial Award). Thus, though the Indus Waters Treaty was signed in 1960 and even if it was argued that the environmental flow was a "new", post-1960 element of customary law, it would be applicable.

The Kishenganga case thus establishes two crucial elements in the legal regime around environmental flows in the context of transboundary rivers, particularly for South Asia. One, that regardless of any treaty or agreement being in place, and regardless of the provisions of any such agreement, customary international laws would necessarily apply, even if they extend the provisions of the treaties or agreements. We have already seen that the environmental flow requirements are implicit in the Watercourses Convention and the Helsinki Rules, and explicit in the Berlin Rules. Second, that even if the provisions of customary laws that mandate environmental flows are new, or put in place after such treaties or agreements, they would still be applicable.

Regardless of any treaty or agreement being in place, and regardless of the provisions of any such agreement, customary international laws would necessarily apply

Lessons from International Practices

There are 261 international river basins in the world[19]. Basin states of such rivers have created a wide variety of arrangements – treaties and agreements, commissions, information-sharing MoUs, etc. – to manage these rivers. Several such efforts also involve environmental flows. Such examples offer important insights about what contributes to effective environmental flows assessments and allocations in transboundary basins. We look at some such international examples to draw useful lessons.

Mekong River Commission

Map showing the Mekong River and its tributaries.

The Mekong is one of the largest rivers of the world, flowing some 4,800 kilometres through six countries: China, Myanmar, Thailand, Lao PDR, Cambodia and Viet Nam. It drains an area of 795,000 sq km and has a mean annual discharge of 475 billion cubic kilometres[20]. It has a very large seasonal variation in its flows. Many of its ecosystems, including its rich wetlands, have developed as a result of this flow variation. The life-cycle of fish in the basin is linked inextricably to this variation. The basin has immense biodiversity, which supports a range of livelihoods for its 60 million inhabitants[21].

On 5 April 1995, Cambodia, Lao PDR, Thailand and Viet Nam signed the Agreement on Cooperation for Sustainable Development of the Mekong River Basin (the Mekong Agreement), which also established the Mekong River Commission as the institutional mechanism for its implementation. The objectives of the Mekong Agreement[22] were "sustainable development, utilisation, conservation and management of the Mekong River Basin water and related resources…." China and Myanmar have the status of "Dialogue Partners" of the Mekong River Commission[23].

Significantly, the Mekong Agreement has a specific provision for the maintenance of flows, in recognition of the critical role played by these flows in maintaining livelihoods and protecting communities against floods and droughts. It required that flows in the mainstream would be maintained, one, "of not less than the acceptable minimum monthly natural flow", two, "to enable the acceptable natural reverse flow of the Tonle Sap to take place" and three, "to prevent average daily peak flows greater than what naturally occur on the average during the flood season." (Article 6). The Mekong Agreement required the developments of certain fundamental procedures for its implementation, and the Procedures for Maintenance of Flows on the Mainstream (PMFM) to implement Article 6 were signed[24] in June 2006.

Though the provisions of Article 6 do not constitute a comprehensive environmental flow framework for the basin, given the size and complexity of the basin, they represent an important step in achieving environmental flows in the basin in two ways. One, they set objectives to maintain some of the flows that are most critical to sustaining the ecology and livelihoods in the basin – e.g., the reverse flow into the Tonle Sap. Second, they provide a legal backing to these objectives by incorporating them into the Mekong Agreement.

However, the actual maintenance of these environmental flows has seen only limited success. As mentioned above, the PMFM needed to implement Article 6 were signed only in June 2006, more than 11 years after the Mekong Agreement was in place. The Technical Guidelines, which are crucial to the actual implementation of the PMFM[25] (Article 5.3), have unfortunately not yet been finalised[26], in spite of a World Bank assistance project which partly aimed to assist the Commission to do this[27].

A detailed case study of environmental flows assessment and allocation in the Mekong was brought out by Hirji and Davis[28] in 2009. It highlighted the limited success of the environmental flows implementation in the Mekong. One of the key reasons mentioned for this was that in spite of including the objectives of flow maintenance in the Mekong Agreement, most countries saw environmental flows as restricting and opposing development and "undue weight being given to the requirements of traditional water users"[29]. Thus, e-flows were being seen as being only "environmental" and not social or developmental.

One reason that benefits of environmental flows are valued less than that of conventional development is that the benefits and risks of the latter are not equitably distributed and often privilege the powerful and decision-making sections.

This suggests the need to bring out the benefits of maintaining environmental flows, to highlight that environmental flows can be maintained along with "development" of the basin (indeed, environmental flows themselves can constitute or support development), and most important, to establish the benefits from traditional water uses and from sustaining the ecology of the river. One important condition to be able to do this is the involvement of local basin communities in the process of transboundary environmental flows assessment.

Another aspect that the Mekong case brings out is the need for all the basin states to be involved in the process. In the case of the Mekong, the absence of China (and Myanmar to an extent) has certainly hampered the process of maintaining environmental flows.

Unfortunately, the latest plans for the basin indicate that even as the Mekong River Commission acknowledges serious problems emerging because of flow modifications due to interventions like dams in the Mekong basin, the dominant vision of basin development for the basin states still remains the conventional model of construction of large dams, hydropower projects, large infrastructure and massive water diversions[30]. A recent study[31] has confirmed that hydropower dams in China have caused major changes to the Mekong river flow, with "exceptionally high dry season flows and low wet season flows in northern Thailand", a smaller annual flood pulse and the blocking of nutrient-rich sediment.

Mekong river basin

Legend

- Capital, town
- International boundary
- Administrative boundary
- Zone of irrigation development
- Dam
- Lake
- River
- Canal
- River basin

0 50 100 200 300 400 km

Albers Equal Area Projection, WGS 1984

FAO - AQUASTAT, 2011

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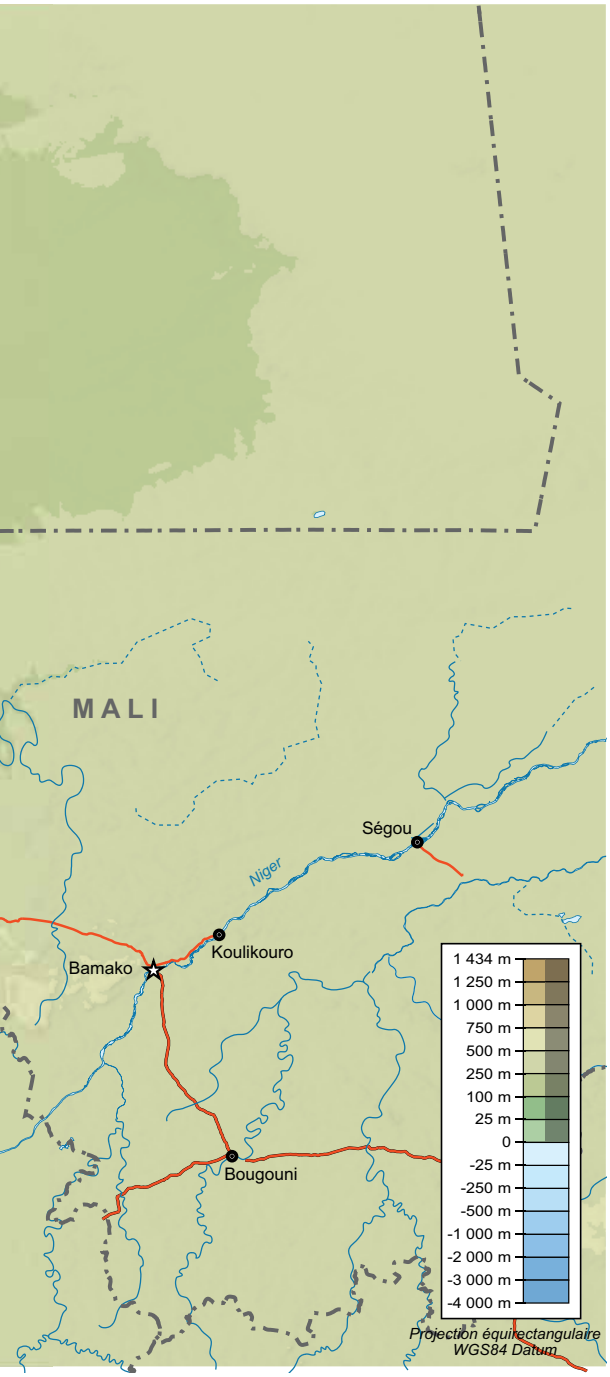
The Senegal Basin and Managed Floods

Map of Senegal River Basin



The Senegal River is 1800 kilometres long, making it the second-longest river in Africa. The basin is spread over four countries: Guinea, Mali, Mauritania and Senegal[32]. The river's average annual flow stands at around 24 billion cubic meters, and the mean monthly natural flows used to fluctuate between the maximum values of 3,320 m^3/s in September and 9 m^3/s in May[33]. Among the most important traditional livelihoods has been flood-recession agriculture, carried out on riverbanks and alluvial plains once the floodwaters have receded. Grazing on the floodplain was another important source of livelihood. One estimate[34] suggested that the average annual area of flood-recession agriculture was around 100,000 ha, whereas others put it at 150,000 ha in an average year, going up to as high as 350,000 in high-flow years[35]. Grazing areas were estimated as being much higher.

On March 11, 1972, the Heads of State of three of the four basin states, Mali, Mauritania and Senegal, signed a Convention reconfirming the Senegal River's international status and establishing the Organization for the Development of the Senegal River (L'Organisation pour la Mise en Valeur du Fleuve Sénégal, or OMVS)[36]. Guinea joined the OMVS in 2006. The OMVS states[37] that its

> "...ambition is to achieve a comprehensive vision of development of the Senegal River basin ... which include hydropower, navigation, drinking water supply and sanitation, transport, rural development, mining and industry."

This represents a highly conventional model of development. The traditional livelihoods seem to be completely missing from this vision. The biggest interventions by the OVMS towards achieving its vision were the Manantali Dam in Mali, and the Diama Dam in the Senegal Delta. Serious apprehensions were expressed that the Manantali Dam, with its storage capacity of 11.3 billion cubic meters, would devastate traditional livelihoods like flood-recession farming. One estimate suggested that around 67,000 ha of the flood recession agriculture and 179,000 ha of floodplain grazing would be lost, and access to remaining grazing restricted[38].

It was this likely loss of livelihoods that made the Manantali Dam project incorporate a "managed flood", that is, a release of water during the flooding period to simulate the natural floods, and make possible flood recession agriculture and grazing. But this was to be only for 20 years, and the level of floods would decrease every year[39]. This can be considered as a limited implementation of environmental flows in the basin.

The actual experience has been that the flows have not managed to sustain livelihoods and protect the ecology, partly because they were designed to address only a limited part of the problem[40], and partly because of the lack of proper implementation. The OVMS was not willing to release adequate floods due to the priority it gave its own considerations like technical reasons, need to maintain a certain reservoir level and so on.

A submission to the World Commission on Dams[41] documents that after the dam was completed, the flood releases were sometimes wholly inadequate, sometimes missing, and in other cases, multiple flood releases led to severe damage of sown crops. The paper calls it "OMVS's lack of respect for its promise to maintain an artificial flood." Thus, even in situations where legal agreements or project designs mandate environmental flows, the political will and readiness to implement these remains crucial.

In an assessment of the environmental flows allocation and implementation in the Senegal basin, Hirji and Davis[42] highlight that when the flows have been maintained, significant benefits have been gained – though much lesser than the original livelihoods supported – but that sustaining the flows is likely to be threatened with other uses of water like hydropower.

They note:

> "The construction of the Manantali and Diama dams created significant environmental and social impacts. A primary impact was the loss of flood-recession agriculture, fuelwood, and grazing on the floodplain. There was a 90 percent drop in the productivity of the fisheries of the Senegal Delta, which relied on inputs of freshwater from upstream.… Although the environmental flows included in the plan were small and inundated only around 50,000 hectares (20 percent of the original area), they had impressive benefits. Fishermen in the Senegal River at Mauritania saw their annual catch rise from 10 tons to 110 tons once the annual floods were re-established."

They also point out that the installation of the hydropower turbines has changed the economics of environmental flows, with hydropower being "valued" very highly in financial terms.

They also highlight another important factor that enabled at least the partial realisation of the benefits of environmental flows. They note:

> "The Permanent Water Commission of OMVS, which makes water allocation decisions, was originally made up of water engineers, but now includes representatives from local coordinating committees that provide stakeholder input and embraces the environmental flow concept. NGO input is now coordinated under an umbrella organisation (CODESEN), which was expanded from its initial membership of Senegalese NGOs to include those from Mali and Mauritania." (Page 148)

Another issue is that here environmental flows were seen as a way to address the adverse impacts of a dam project. They were to be sustained only for a limited period of time, by which time the project's other benefits were supposed to absorb the people affected by the destruction of flood-recession agriculture, fisheries and grazing. In such a situation, environmental flows may possibly alleviate some of the impacts, but cannot be expected to, by themselves, help make the project economically, socially or ecologically viable. Indeed, as several other reports[43] show, even as the environmental flows in the Senegal River have offered some relief, the Manantali Dam overall has had huge adverse impacts.

In both the Senegal and Mekong basins, there has been considerable involvement of international financial agencies, as well as other international agencies. They have played important roles in pushing the boundaries of setting and implementing environmental flows. At the same time, this can imply lower ownership of the environmental flows program and its objectives by basin countries[44] or even lead to a feeling of imposition.

Colorado River

"The Commissioners also made note of the Environmental Work Group's efforts to identify water needs for the Colorado River limitrophe and delta. This pilot program will arrange for the means to create 158,088 acre-feet (195 mcm) of water for base flow and pulse flow for the Colorado River.

The Colorado River is one of the most spectacular rivers in the world. It has carved out an immense system of canyons, including the iconic Grand Canyon. The basin, with a drainage area of 622,000 square kilometres, lies largely in the USA, with just 2% of the basin area in Mexico. The river flows through southwestern United States and enters Mexico at the Colorado Delta, where it meets the Gulf of California. With massive storage capacity that equals almost four times the average annual flow, and heavy extractions and allocations, the river is heavily over-used, and the Colorado Delta has become mostly dry, with the river rarely reaching the Gulf[45].

There has been increasing awareness that the construction of these dams and increasing extractions have had serious impacts downstream. To address these impacts, the US Department of Interior has been engaged in conducting a series of High Flow Experiments (HFE) where "artificial or controlled floods" were released from the Glen Canyon Dam

> "…designed to mimic pre-dam seasonal flooding on the Colorado River. The goal of the HFEs was to determine whether high flows could be used to benefit important downstream resources…
>
> "Dam-induced changes in the Colorado River's temperature, flow, and sediment-carrying capacity have been implicated in losses of native fish, invasion of non-native species, sandbar erosion, and the narrowing of rapids. Through the periodic use of high-flow exper iments (HFEs) … managers have attempted to benefit key resources by simulating one aspect of the pre-dam river - floods."[46]

In environmental flows science, this is called adaptive management, where certain flows are released and the impacts of these flows are studied to arrive at the appropriate environmental flows regime. Three such HFEs were carried out in March 1996, November 2004 and March 2008. However, these experiments were restricted to the basin area in the US.

In 2014, another HFE was carried out, which was different as Mexico was also involved in the experiment.

The regulation and management of the Colorado river between Mexico and the USA is governed by the "United States-Mexico Treaty on Utilisation of Waters of the Colorado and Tijuana Rivers and of the Rio Grande" signed on February 3, 1944. The agreements for the 2014 HFE were reached during the meeting of the International Bound

View from top of dam of all four jet tubes open releasing water for high-flow experiment - March 5, 2008

ary and Water Commission, United States and Mexico, held on 20 November 2012. The discussion documented in the "Minute No. 319" notes[47], among other things (Item 6):

> "The Commissioners also made note of the Environmental Work Group's efforts to identify water needs for the Colorado River limitrophe and delta. This pilot program will arrange for the means to create 158,088 acre-feet (195 mcm) of water for base flow and pulse flow for the Colorado River…
>
> "Implementation of this Minute will provide a mechanism to deliver both base flow and pulse flow during the period this Minute is in force. For the purposes of the pilot program… a volume of water will be delivered to the Riparian Corridor in a joint effort between the Government of the United States and the Government of Mexico, with the anticipated participation of a binational coalition of non-governmental organisations. Furthermore, the information developed through the implementation…will be used to inform future decisions…to address proactive actions in the Colorado River Delta."

The Minutes also required that

> "The binational project will generate environmental flows… and as a part of that effort a pulse flow will be implemented to the Colorado Delta… the United States and Mexico shall take all such appropriate actions in their respective territories to ensure that the pulse flow reaches the intended areas of the Colorado River Delta". (Item 6 (e) (i))

This pulse flow was released[48] on 23 March 2014.

Some of the important aspects of this initiative, which also offer important lessons for other transboundary environmental flows efforts, include:

1. A formal agreement under the Treaty to address environmental issues, including by using environmental flows.
2. The effort is not a one-time effort but is a part of an ongoing larger effort.
3. The formal involvement of non-governmental organisations from both countries.
4. The condition that both countries, but particularly the downstream receiving country, Mexico, will ensure that the flows are used only for purpose of maintaining environmental flows.

Last, but not the least, this initiative also underscores the critical role played by the political will of the upstream state and its willingness to put in place environmental flows, particularly when the upper riparian state is politically and economically powerful.

The European Water Framework Directive

A “directive” is a legislative act that sets out a goal that all European Union countries must achieve. However, it is up to the individual countries to devise their own laws on how to reach these goals[49].

The “Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy” or, in short, the EU Water Framework Directive (WFD), was adopted in October 2000 and entered into force in December 2000[50]. The purpose of the Directive is “to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater.”[51]

The WFD does not explicitly call for assessing and maintaining environmental flows in the EU rivers[52]. However, the WFD does require all surface water bodies, with some exceptions, to achieve “good surface water status” in a time-bound manner. Good surface water status is defined in an Annexure (Annex V) of the Directive and consists of a set of biological, hydrological and morphological criteria. It is clear from the criteria that maintaining environmental flows is implicit in achieving “good” status for rivers and thus, indirectly mandated by the WFD.

Another very important aspect of the WFD is that it asserts that the “best model for a single system of water management is management by river basin - the natural geographical and hydrological unit - instead of according to administrative or politial boundaries” and requires that “for each river basin district – some of which will traverse na tional frontiers – a river basin management plan will need to be established and updated every six years.”[53] Thus, the essential framework for man- aging rivers – even those flowing across boundaries – is that of a unified basin management, that will need to transcend the boundaries.

Another important mechanism is the agreement on the Common Implementation Strategy, required because “many of the European river basins are international, crossing administrative and territorial borders and therefore a common understanding and approach is crucial to the successful and effective implementation of the Directive.”[54] As a part of this common strategy, and to address common technical and other challenges, the EU has also created a series of technical guidance documents[55] and resource documents[56].

Thus, the WFD and its associated implementation structure provide an excellent framework to assess, allocate and implement environmental flows in transboundary rivers. However, it must be noted that several observers had raised some issues, for example with the narrow interpretation of the requirement of stakeholder involvement[57] or with the difficulties in resolving practical meanings of general concepts that were hampering proper implementation[58]. Some of the important elements of the WFD framework are:

"A river basin management plan will need to be established and updated every six years."[53] Thus, the essential framework for managing rivers – even those flowing across boundaries – is that of a unified basin management, that will need to transcend the boundaries.

1. It shows that even without an explicit requirement for environmental flows, the same can be mandated if the overall requirements of the health of rivers and water bodies are appropriately defined.
2. It sets clear objectives for restoring and maintaining the health of rivers and hence for environmental flows.
3. It insists on a unified river basin management approach that takes the basin as a unit transcending political boundaries.
4. As it incorporates different parts of the water sector in a holistic framework (e.g., ground water, water quality etc.), the WFD provides a comprehensive and overarching framework within which to locate environmental flows implementation.
5. The WFD provides a legally binding framework.
6. It provides for clear timelines within which the goals are to be achieved.
7. Through its technical guidelines and other initiatives that are being undertaken by different member states and other regional groupings (for example the International Commission for the Protection of the Danube River), it provides a strong scientific backing to river basin management decisions, including to environmental flows implementation.

There are other experiences of the implementation of environmental flows in the transboundary context that are not dealt with here, partly for the want of space and partly because the cases covered here offer a fairly comprehensive picture of the key issues and lessons, and cover a variety of geographical and political contexts.

The South Asian Context

Shared Rivers

South Asian countries (excepting the island nations, if the sea and ocean are discounted) are intimately and inextricably linked to each other through water, sharing numerous large rivers and a countless number of smaller streams. Bangladesh shares 54 rivers with India[59], including the mighty Ganga and Brahmaputra. India and Pakistan share the Indus Basin rivers like Indus, Jhelum, Chenab, Ravi, Sutluj. Afghanistan is also a part of the Kabul River basin. India shares many important rivers with Nepal, including the Mahakali, Gandak, Ghaghra and Kosi. Bhutan and India similarly share a number of rivers. South Asian countries also share these and other rivers with other neighbouring countries, not formally considered.

Legal, Policy and Institutional Regime

None of the South Asian countries or other countries with shared basins like China or Myanmar have signed or otherwise agreed to the UN Convention on the Law of the Non-Navigational Uses of International Watercourses. However, as described above, customary international laws, including the UN Watercourses Convention, will apply in the case of all bilateral and multilateral negotiations around shared rivers.

There are a number of bilateral treaties or agreements around transboundary rivers in the region that do provide binding legal frameworks, albeit restricted to those countries and those specific rivers. Some such treaties include the Indus Waters Treaty 1960 (India-Pakistan), the Ganga water sharing treaty 1996 (India-Bangladesh), the Mahakali Treaty 1996 (Nepal-India) and some important agreements include the India-Bangladesh ad hoc agreement[60] on the Teesta of 1983 and the Memorandum of Understanding between China and India for providing of hydrological information of the Brahmaputra[61].

There are several limitations to these treaties and agreements. First of all, not all of the shared rivers are covered in these. Second, these agreements are bilateral, and often leave out a third country that is also part of the basin. For example, India has separate agreements/treaties on the Ganga Basin rivers with Nepal and Bangladesh, even though these rivers are a part of the larger shared Ganga Basin.

Further, these agreements are often very limited in their scope, focusing on either just sharing water or even on specific projects. Protection of the ecology and integrity of the river basin is not there in most of these agreements. The Mahakali Treaty is titled[62] "*Treaty Between His Majesty's Government of Nepal And The Government of India Concerning the Integrated Development Of the Mahakali River Including Sarada Barrage, Tanakpur Barrage And Pancheshwar Project*", exhibiting a "project focus"; the word environment or ecology does not even figure in the text. India's agreement with China is a very basic one, restricted to the sharing of some data, and that too with a limited validity of five years. The Indus Waters Treaty is an extreme antithesis of river basin-based planning with the three eastern rivers being allocated in their entirety to India, allowing

it to stop their flow completely downstream of its boundaries. Often, even when these agreements talk of protecting the environment and river ecology, they miss the all-important link between river ecology, river flows and livelihoods.

However, there are other signs of sensitivities to the issues of protecting river ecology and maintaining environmental flows.

A draft of the Teesta Agreement between Bangladesh and India prepared in 2010 talks about giving each country a 40% share in the river's water, leaving 20% for the river[63].

The Mahakali Treaty calls for India to "maintain a flow of not less than 10 m^3/s (350 cusecs) downstream of the Sarada Barrage in the Mahakali River to maintain and preserve the river eco-system."[64]

While these are mainly ad hoc concessions in the name of environmental flows, one can look upon these as signs of openings to bring in more comprehensive and more scientific and participatory implementation of environmental flows.

Given the limitations of treaties and agreements, it is not surprising that the institutional framework to look at rivers in a holistic manner, and in particular, implement environmental flows, is weak or absent. There are no multilateral, basin-wide organisations devoted to river basin management in the region. Most countries have some system of joint river commissions working with the existing treaties. These commissions can be for specific river basins or for all or several of the shared rivers.

The most important multilateral forum in the region is the South Asian Association for Regional Cooperation, or SAARC, consisting of the eight South Asian countries. SAARC has not focussed on shared rivers specifically. An important part of SAARC relating to rivers is its "*SAARC Convention on Cooperation on Environment*", signed during the Sixteenth Summit in Thimpu in April 2010. The Convention has been ratified by all member states and entered into force with effect from 23 October 2013. The objectives of the Convention[65] are

> "to promote cooperation among the Parties in the field of environment and sustainable development, on the basis of equity; reciprocity and mutual benefit, taking into account the applicable policies and legislation in each Member State."

Among the areas which the Convention will cover is "river ecosystem including river cleaning".

There are other multilateral or bilateral initiatives in the region, most of which are focussed on trade, commerce and economy, but can impact rivers directly and indirectly and can also offer platforms to discuss the conservation of rivers, their ecology and the livelihoods of riparian communities. One is the BIMSTEC or the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation, a regional organization comprising seven member states lying in the littoral and adjacent areas of the Bay of Bengal including Bangladesh, Bhutan, India, Nepal, Sri Lanka, and two from Southeast Asia, including Myanmar and Thailand.

The BBIN or the Bangladesh-Bhutan-India-Nepal (BBIN) Initiative is another such effort. The Bangladesh, China, India and Myanmar Economic Corridor (BCIM Forum), among other things, hopes to create a corridor that would effectively combine road, rail, water and air linkages in the region.

The India Bangladesh Protocol on Inland Water Transit and Trade heavily depends on rivers and river flows, but does not talk about the health of the rivers at all.

Given their limited mandates in terms of issues of focus, or the omission of key basin states (e.g. China from SAARC), or even sheer difficulties in working due to problems like conflicts among members, it is unlikely that any of these forums will provide the right institutional structure for operationalising effective environmental flows allocation and implementation programs. For this, multilateral organisations structured along major rivers basin would be the preferred institutions, and there is an urgent need to create such institutions in South Asia, at least for major river basins or large sub-basins.

Domestic Policies Support Environmental Flows

Domestic policies of all the South Asian states also indicate a rising concern for the state of its rivers, and expressions of intent to restore and maintain the ecological integrity of rivers, including implementation of environmental flows. These can create facilitating conditions and receptive mindsets for implementation of environmental flows in transboundary basins also.

However, the policies have varying degrees of policy articulation for environmental flows and their objectives themselves can vary; e.g. in Bangladesh, water for navigation is a priority[66]. Further, different countries show diverse understanding of environmental flows. The Bangladesh Water Policy of 1999 calls for developing rules for water allocation for "in-stream needs (ecological, water quality, salinity control, fisheries and navigation) during low-flow periods…" but also appear to confuse environmental with minimum flows, by stating that "Allocation for non-consumptive use (e.g. navigation) would imply ensuring minimum levels in water bodies used for that purpose."[67]

India's Water Policy of 2012 on the other hand, states that[68]:

"3.3 Ecological needs of the river should be determined, through scientific study, recognizing that the natural river flows are characterized by low or no flows, small floods (freshets), large floods, etc., and should accommodate developmental needs. A portion of river flows should be kept aside to meet ecological needs ensuring that the low and high flow releases are proportional to the natural flow regime, including base flow contribution in the low flow season through regulated ground water use."

The Indian water policy document, while discussing transboundary rivers, talks about negotiations mainly on a bilateral basis. The Bangladesh policy on the other hand talks about co-riparian states.

Bhutan requires[69] environmental flows to be set at 30% of lean season flows, unless otherwise determined in the Environmental Impact Assessment. It is also working on refining and detailing the assessments of environmental flows through a project expected to be completed in 2017.

Nepal recognizes compulsory downstream water requirements as a water right and requires that 10% of the lean season flow should be released or compensation be paid in lieu of it[70].

The Water Policy of Pakistan also talks about ensuring that sufficient water is flowing through the rivers to the sea to maintain a sound environment for the conservation of the coastal ecosystem and that "environmental needs must be addressed while framing release rules from the major storage dams…to ensure sustainability of such areas as the Indus delta."[71]

As we can see, there is a wide diversity in the way different South Asian countries address the issue of environmental flows in their domestic policies. Yet, the common theme is that there is increasing recognition of the need and importance of environmental flows in managing domestic rivers.

The principle of customary international law for transboundary rivers of "no significant harm" also implies that principles for managing transboundary rivers must not be "narrower" than those for managing national rivers. Thus, the existence of domestic policies and laws for environmental flows will set the minimum benchmark for transboundary rivers too. It is in this context that the objectives of the SAARC Convention on Cooperation on Environment, which are "to promote cooperation among the Parties in the field of environment and sustainable development … taking into account the applicable policies and legislation in each Member State become very relevant. Taking into account the existing policies and legislations of member states creates an important and compelling mandate for incorporating environmental flows in shared or transboundary rivers.

Recommendations

Free-flowing Karnali River in Nepal (just downstream of the proposed upper Karnali Hydropower Project)

This understanding of the international legal regime, international practices and the South Asian situation suggests the following important ways in which the assessment, allocation and implementation of environmental flows in shared rivers can be made more effective in South Asia.

1. States should initiate processes with the ultimate objective of creating dedicated river basin-based international agencies with membership of all basin states, to manage rivers on a river basin basis, with environmental flows as a key element. Such agencies must also have the involvement of community representatives and non-governmental organisations in capacities that will allow meaningful inputs. These river basin organisations must develop the right institutional structure for operationalising effective environmental flows allocation and implementation programs.
2. Alternatively, some of South Asian and related multilateral organisations like SAARC, BBIN or BCIM Forum can initiate the processes of setting up these river basin organisations as they have the membership of the basin countries.
3. The processes to create and operate such international river basin organisations should include extensive dialogue and-discussions across boundaries. The aims of this dialogue should include:
   a. Arriving at common principles, approaches and methods of managing rivers. These should be based on international customary and formal laws.
   b. Developing a common construction of the practice of unified river basin management. In particular, arriving at a common understanding of what is meant by environmental flows, and their assessment methods.
   c. Reconciliation and convergence of the objectives for environmental flows of various basin states and communities. This should lead to clear and unambiguous objectives for the environmental flows. The principles, understanding and methods developed from this should be translated into technical guidance documents.
4. The domestic water policies of South Asian states, which already articulate diverse notions and significant support for environmental flows, can form the starting points to develop such an understanding.
5. Discussions and negotiations around managing transboundary rivers should move away from being only a government-to-government process and should

Even in a case where legally binding agreements exist, and particularly in cases where they don't, it is the political will that will determine how much along this road basin states can go

be broadened to include the participation of riparian and basin communities and non-governmental organisations, talking across political boundaries. This includes the processes to create dedicated river basin organisations, their actual working, and the specific processes to carry out environmental flows assessments and implementation. Such involvement will help in overcoming the differences caused by language, culture and diverse governance systems, and will also help give the due value and place to traditional livelihoods and uses of rivers.

6. Environmental flows assessments must include detailed and comprehensive studies of the role and importance of traditional livelihoods and occupations, and the value created by maintaining flows and the ecology of the river. There is a need to bring out benefits - including the substantial economic benefits - of maintaining environmental flows, to highlight that environmental flows can be maintained along with "development" of the basin. Indeed, environmental flows themselves can constitute or support development. There is a need to demonstrate that often, environmental flows will also address important social objectives and hence "environmental" flows are in reality also "environmental and social, livelihood" flows.
7. In preparing development plans for rivers, along with the conventional objectives of hydropower, irrigation and water supply, options should also be developed that look at non-consumptive and instream benefits of water, options that provide developmental benefits through maintaining environmental flows. These latter options exist but are often not brought out or are ignored as the people who benefit the most from them are not involved in the process of options assessment (and in the process of environmental flows assessment). This is one more crucial reason to ensure the involvement of local riparian communities and non-governmental organisations in the process.
8. Often, instead of focusing on the allocation of a certain quantum of water, a distribution of the benefits generated from basin development can offer a better road to reaching agreements.
9. Studies of benefits of environmental flows and various options for the development of river basins also need to highlight the equity aspect, particularly focusing on which sections of the communities benefit from which developmental options, and who is put at risk. This is often critical in bringing out the value of maintaining environmental flows.

10. Environmental flows assessments should be seen as a part and parcel of the comprehensive planning of a river basin and not as an afterthought, or as an ad hoc means to address in a limited way some adverse impacts of a hydropower or irrigation project.
11. All these studies, as also the entire process of environmental flows assessments, should be carried out in a rigourous and scientific manner, but also bringing in the knowledge and understanding of local communities.
12. The involvement of international agencies, including international financial agencies, can often help transboundary negotiations of environmental flows programs by providing independent third-party inputs, or even mediation, and technical help. However, such involvement should be in a manner that is sensitive to local sentiments. It should bring in important technical inputs but should not push for specific options in a way that will create a sense of imposition or will diminish ownership of the process by basin states and local communities.
13. There should be clear-cut timelines for the creation of the transboundary river basin organizations, who in turn must also draw out plans with proper time frames.
14. While these are being put in place, basin states should arrive at agreements to ensure that further deterioration in flows, river ecology and livelihoods does not take place.
15. Non-governmental organisations and other groups in the region should not wait for the official processes to start, but should initiate transboundary dialogues and discussions in "Track-II" style to prepare grounds for the more formal processes.
16. South Asian states should expressly articulate commitment to internationally-accepted practices and customary international law and move towards a ratification of the UN Convention on the Law of the Non-Navigational Uses of International Watercourses.
17. An effective system of monitoring and verification is critical to proper implementation of environmental flows. Local communities and non-governmental organisations must play a role in this process. This will enhance the effectiveness of the monitoring and implementation.

These measures, if undertaken in the right spirit, will help the region put in place a comprehensive river basin management framework for the transboundary rivers of South Asia with environmental flows at its centre. Yet, it must be emphasised that ultimately, it is a question of the political will of all the players involved, and in particular the intent of the stronger states and the upstream states. Even in cases where legally binding agreements exist, and particularly in cases where they don't, it is the political will that will determine how much along this road basin states can go. Political will for moving towards a regime of effective environmental flows will be created when basin states feel a convergence of their interests. The best, and possibly the only way to create such convergence of interests, is dialogue, not only between governments, but also involving citizens, non-governmental organisations, and riparian and basin communities, all interacting with each other.

Such a comprehensive dialogue across boundaries to create consensus and convergence remains the best way to reach the aim of effective implementation of environmental flows in the transboundary rivers of South Asia.

Shripad Dharmadhikary
September 2017

Top: The River Ganga - A transboundary river originating in the Gangotri glacier in India and continuing into Bangladesh and eventually into the Bay of Bengal.

Bottom: Confluence of the Teesta and Rangit rivers. The Teesta is a transboundary river originating in Sikkim, India and joins the River Jamuna in Bangladesh.

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The River Teesta

Photo credits

1. Cover The Transboundary River Teesta.
   Photo - Samir Mehta, International Rivers
2. Page 15 Map showing the Mekong River and it's tributaries.
   Photo source: https://commons.wikimedia.org/wiki/File:Mekongbasin.jpg
3. Page 17 Map of Mekong River basin
   Photo source: http://www.fao.org/nr/water/aquastat/basins/mekong/mekong-map_detailed.pdf
4. Page 18 Map of Senegal River Basin. Photo source: https://en.wikipedia.org/wiki/Manantali_Dam#/media/File:S%C3%A9n%C3%A9gal_drainage_basin_map-fr.svg
5. Page 22 View from top of dam of all four jet tubes open releasing water for high-flow experiment - March 5, 2008
   Photo source: High-flow experiment in 2008. Credit, T. Ross Reeve, US Bur. of Reclamation
6. Page 30 Free flowing Karnali river in Nepal (just downstream of the proposed upper Karnali Hydropower Project)
   Photo by Shripad Dharmadhikary
7. Page 33 The River Ganga - A transboundary river originating in the Gangotri glacier in India and continuing into Bangladesh and eventually into the Bay of Bengal
   Photo by Samir Mehta, International Rivers.
8. Page 33 Confluence of the Teesta and Rangit Rivers. The Teesta is a transboundary river originating in Sikkim, India and joins the river Jamuna in Bangladesh.
9. Photo by Samir Mehta, International Rivers
10. Page 36 The River Teesta
    Photo by Samir Mehta, International Rivers

Footnotes

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67. (Government of Bangladesh, 1999)
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