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**The Management of International Rivers as Demands Grow and Supplies Tighten: India,
China, Nepal, Pakistan, Bangladesh**

Ben Crow and Nirvikar Singh

Abstract

In this study, we describe the challenges of managing Himalayan rivers as a result of climate change and the industrialization and economic growth of India and China. We discuss a range of conceptual issues relevant for negotiations over the management of Himalayan rivers. We introduce the concept of multi-track diplomacy, and apply it to the case of international river management, in the context of innovations incorporated in five international treaties signed in 1996 and 1997. We examine past problems with bilateralism in international river diplomacy, in particular as an obstacle to successful agreement and the potential of more multilateral approaches. We describe the wave of Himalayan water projects being designed and constructed at the beginning of the twenty-first century, based on earlier agreements as well as new initiatives. We note the subsequent implementation problems that have arisen, and the substantial issues that need to be addressed by an expanded group of countries depending on Himalayan rivers. Finally, we consider directions in which current innovations might be extended as bases of regional cooperation, using the multi-track diplomacy framework. We suggest that an independent regulatory agency could facilitate rational development, assist in the management of substantial uncertainties about future flows, and reduce the potential for conflict. We describe the possible structure and functioning of such a new institution.

I Introduction

The great Himalayan rivers of South Asia, particularly the Ganges and Brahmaputra, have been the subject of five decades of discussion between governments of the region. While those discussions have continued, these rivers have contributed, through flood and drought, to the uncertainty and impoverishment of the lives of the largest concentration of poor people anywhere in the world.¹ Prosperity will come from harnessing the potential of these rivers for irrigation and power, by controlling their perils (such as floods), and managing them in the face of increasing demands and threats to supplies from climate change. This study explores some of the possibilities opened up by recent innovations in international cooperation, as well as the new challenges. In particular, we highlight the challenges of climate change, as it impacts the water resources of the Himalayan region, and the possibilities for cooperation through new institutional channels. In particular, we offer an initial proposal for a multilateral, multi-track approach to be embodied in a new institution dedicated to Himalayan river management.

In the next section, we describe the challenges of managing Himalayan rivers as a result of climate change and the industrialization and economic growth of India and China. Section III discusses a range of conceptual issues relevant for negotiations over the management of Himalayan rivers. Section IV introduces the concept of multi-track diplomacy, and applies it to the case of international river management, discussing how the conceptual issues raised in Section III have been handled, in the context of innovations incorporated in the five treaties signed in 1996 and 1997.

Sections V examines past problems with bilateralism in international river diplomacy, in particular as an obstacle to successful agreement and the potential of more multilateral approaches. In Section VI, we describe in more detail the wave of Himalayan water projects being designed and constructed at the beginning of the twenty-first century, based on the agreements outlined in Section IV. We note the subsequent implementation problems that have arisen, and the substantial issues that need to be addressed by an expanded group of countries depending on Himalayan rivers. Section VII considers directions in which current innovations might be extended as bases of regional cooperation, using the multi-track diplomacy framework. We suggest that an independent regulatory agency could facilitate rational development, assist in

the management of substantial uncertainties about future flows, and reduce the potential for conflict. Section VIII offers a summary and prospective conclusion to our study.

II New Challenges of the Himalayan Rivers

A set of climatic and social changes has transformed the context for cooperation over the Himalayan rivers. Previous negotiations over the last five decades engaged rivers on the assumptions that they had stable futures, that social interaction with the rivers was guided by the demands of agrarian economies, and that transboundary negotiations could be approached through traditional diplomacy. At the beginning of the twenty-first century, these three assumptions have changed. Glacial melting and climate change are expected to undermine the assumption of stable river futures. The rapid growth of industrial economies in India and China has changed predominant social demands on the rivers from those of agrarian to those of industrial societies, and inserted China as a possibly major player in these and other Himalayan rivers. Government diplomacy is expanding to include commercial actors and being deepened by the rise of civil society interactions. In this section we outline some of the implications of these changes.

Glacial melting and climate change

The rise in global temperatures is already bringing change in Himalayan glaciers and changes in precipitation patterns may follow. These changes will continue but there are considerable uncertainties about the speed and pattern of change. In at least one respect, these changes may be uncomfortably non-linear.

The broad outlines of Himalayan change include changes in the seasonal pattern of river flows, an increase in dry season river flows for several decades as glacial melting responds to rising temperatures, and then a decline in flows as glacial melting reaches a new plateau (Dharmadhikary 2008b: 32-33). With glacial melting, flows may increase substantially (Milly, Dunne & Vecchia 2005: Figure 4) and flood peaks may shift to earlier in the year. The World Bank issued a statement in 2009 on water and climate change in South Asia: 'Climate change in South Asia is predicted to amplify current levels of variability and may fundamentally change most hydrological systems.' (World Bank 2009) So, climate induced changes in flows and their

seasonal pattern could have significant impact on lives and livelihoods in large parts of Northern South Asia.

These broad outlines, however, mask a more complex pattern of changes which will be difficult to predict. The influence of climate change and glacial melting on flows at any point in a river's length will vary. The proportion of the flow originating from snowmelt, glacial melting, rainfall and groundwater infusion varies throughout a river's length and over time. The pattern and timing of rainfall contributions may be particularly hard to foresee. Rainfall patterns are unstable and variable over space and time even without the great uncertainties introduced by global climate change. Thus, a study published by the World Wildlife Fund, based on country studies in Nepal, India and China, describes changes on the Ganges and Brahmaputra

For the Ganga, the response of the river, near the headwaters in Uttarkashi is significantly different from what is seen downstream at Allahabad. At Uttarkashi, flows peak at between +20 percent and +33 percent of baseline within the first two decades and then recede to around -50 percent of baseline by decade 6; further downstream the deglaciation impacts are barely noticeable. In the headwaters of the Brahmaputra, there is a general decrease in decadal mean flows for all temperature scenarios; glaciers are few in this area and flows recede as the permanent snow cover reduces with increasing temperatures.

(Joe and Rai, 2005)

Recent research (Bhutiyan, et al 2008) shows a complex pattern of change in four rivers of western Himalayas. Flood peaks have increased in the last 40 years on the Sutlej and Chenab rivers, decreased on the Beas and changed little on the Ravi.

The relative proportions of flow coming from different sources is a sensitive issue in the Himalayan rivers because it has influence on the power relationship between upstream and downstream states. In the case of China, the importance of glacial and snow melting from the Tibetan plateau in the flow of the Brahmaputra reaching India and Bangladesh may influence China's role in these two downstream states. If the contribution of glacial melting is high, for example, the threat of China's diversion is more compelling for India and Bangladesh.

Vaidya and Karki (2008: 2) stress the importance of holistic approaches, such as Integrated Water Resource Management (IWRM), to water management in the face of the challenges of climate change, current treaties in the Himalayan region are more narrowly defined to cover bilateral negotiation over single issues.

We take from this discussion two points. First, climate change unsettles the basis of past planning for the development of Himalayan rivers. The plans, for example, of the Indian government for inter-basin transfer from the Brahmaputra to the Ganges, may be upset by change. Water management designs and international treaties based on a stable and predictable future have at least to be re-examined in the light of the considerable uncertainty introduced by climate change.

Second, the already uncertain consequences of large scale human intervention in river flows and riverine ecologies are now made doubly unpredictable by uncertainties about glacial melting, precipitation patterns and seasonal variation in river flows.

Industrialization and the new influence of China

The most visible indications of change in human demands on the Himalayan rivers come from the unprecedented wave of announcements about the construction of large dams and the stated purpose of the dams. Table 1 catalogs the larger (mostly greater than 400 MW) projects that have been announced.

Since at least the 1960s, there have been multiple plans for big dams in the central Himalayas (Nepal). But geographic expansions of this contemporary wave, and the principal focus of the dams, are new. The multiple dam proposals in the East and West Himalayas, notably Anunachal Pradesh, and on the Tsangpo-Brahmaputra in Tibet, are either new or have advanced much closer to construction. Concerns for irrigation provision and flood mitigation appear to have been overshadowed, if not completely replaced, by a single-minded focus on the generation of electricity. This reflects the rise of industrial, residential and to a lesser extent agricultural demand for electricity. The extent to which efforts to restrict new greenhouse gas emissions from power generation may have played a role in the promotion of hydroelectric power is not known.

Both India, and its large neighbor to the North, China, have been rapidly industrializing in recent years with sustained rates of economic growth in double figures. Industrial demand for water is a

small proportion of water demand in South Asia at present. The large majority of water consumption is for use in agriculture and that consumption may continue to rise for several decades. In addition, the experience of industrialized countries suggests that industrial demand may gradually rise to equal or exceed agricultural use. As industrial demand for water rises in India, tensions over water with Pakistan and Bangladesh may increase.

Three great South Asian river systems, the Indus, Ganges, Brahmaputra, have their origins in what is coming to be called the Himalayan water tower (Vaidya and Karki, 2008). Multiple smaller rivers of importance for South Asia, including the Kosi and Teesta, also originate in the Himalayas. China is an upper riparian with some influence on many these rivers. This status gives China the ability to act unconstrained by the river development actions of its downstream neighbors, and its actions influence conditions for those downstream. Heretofore, China's influence on most of these rivers has been slight for two reasons. First, the contribution to flows from Tibet may be relatively small compared to the flows coming from downstream territories. Second, water management schemes have not till now been proposed for China's section of rivers of importance to South Asia.

Chinese policymakers have been considering damming the Tsangpo, among other large domestic and overseas water projects (Dharmadhikary, 2008b: 20, suggests that China's dam building industry is the most prolific in the world with high technical skills and government support to expand overseas). At least two potential projects on the Tsangpo have consequences for South Asia. One is on the great bend of the Tsangpo in eastern Tibet as it turns south to enter India. The second is to the east of Lhasa at a place called Shoumatan. The status of these projects is hard to determine with any certainty. According to some reports (Tsering 2002), construction on the former project is due to start in 2009. It may be that Chinese policy announcements in this matter are implicitly linked to other strategic issues such as trade and the boundary dispute with India. China's size and power make it impossible to ignore, even when its plans are at the level of speculative ideas. Till now, there have been no reports of negotiations between India and China over water.

Although China is the upper riparian power on the Tsangpo-Brahmaputra, and a major project diverting water has been announced (more on this in section V), the consequence for downstream nations may be less serious than has been suggested (in for example Ramachandran, 2008). One estimate (Bandyopadhyay 1992: 108) suggests that 25 percent of the annual

Brahmaputra flow in Bangladesh comes from Tibet. The contribution of rainfall and groundwater from the heavily forested slopes of Northern Arunachal Pradesh may be sufficient to reduce the influence of Chinese diversions. If China's diversion of water from the Tsangpo occurs during the dry season then it might mitigate floods in Assam and Bangladesh. In addition, if an upstream Chinese project was primarily focused on hydroelectric power coming from the momentum of the flow, that is, a run-of-the-river plant, then that flow would have to be maintained, and the influence of China's proposed project on downstream nations would be smaller.

Such appraisals presume, however, a steady state analysis. Climate change might alter the relative importance of flow from Tibet. The consequence of even a 10 percent reduction in flow of the Brahmaputra could be significant. The political effect of China's upstream role may, in addition, also magnify the perception of influence. Ultimately, India, China and all the other nations that rely on the Himalayan rivers must develop a framework for cooperation to avoid irreversible damage to their ecosystems and economies.

III Facilitating Cooperation

We have argued elsewhere (Crow and Singh, 2000) that a set of changes could facilitate cooperation. The existence of potential mutual benefits from cooperation is not sufficient, in itself, for cooperation to occur. As is well known from the study of "prisoner's dilemma" situations, mechanisms for reaching and enforcing binding agreements may be additionally necessary: essentially, this means "changing the game."

In our earlier analysis, we suggest that:

1. Clear property rights in water can facilitate investment to meet human needs. Thus, the Indus Rivers Treaty enabled a division of shared rivers so that both India and Pakistan could use the water, within certain limits (described in Crow and Singh, 2000). Reducing the uncertainty with respect to property rights makes the gains from investment more certain, and therefore more valuable, as well as creating possible preconditions for mutually beneficial exchanges.

2. Defining property rights may not be enough by itself, since the situation may still involve conflict. For example, one side's investment may harm the other side. This is clearly a potential problem with upstream versus downstream nations, where water is diverted or consumed before flowing on. Nevertheless, uncertain property rights inherently involve a conflict situation, and therefore resolving this uncertainty can remove this source of conflict. Doing so, however, may require third-party help to "change the game."
3. Negotiations amongst the several nations of an international river basin, that is, multi-lateral negotiation, may be preferable to bilateral negotiation, because the former can accommodate basin-wide externalities, such as environmental impacts and regional benefits. In other words, the total net gains from agreements with respect to water use may be identified more clearly in a multi-lateral setting, although there may be additional costs and complexity of negotiation as a result.
4. Private exchange may have advantages over diplomatic exchanges because private companies and civil society organizations may have simpler, clearer objectives, unencumbered by the multiple political obligations of government. The virtues of competition and commitment to contracts may also be easier to realize with non-sovereign entities. Commercial and non-government organizations may therefore be more effective in negotiating water service agreements. The caveat to this point, of course, is that a rational delegation of authority is required from sovereign governments: they have to agree and commit to not undermining the private actors. Reputational effects may be important here, since dealings with private firms send different signals than interactions with other nations.

In an extension of our first study (Crow and Singh, 2009) to examine the problem of international flood management through non-traditional negotiation processes, we developed the following additional point.

5. Multi-track diplomacy, involving commercial, academic and civil society organizations could generate technically better schemes, and make space for small scale alternatives to large scale river development. The premise for this possibility is the greater flexibility of many of the nongovernmental organizations that could be involved, and their ability to

negotiate over more specific issues in self-contained settings, unaffected by wider issues of sovereignty and national stature.

There is a growing experience with multi-track diplomacy in South Asia, as described in Crow and Singh (2009). In addition, there are promising signs of flexibility (cost and benefit-sharing, for example) in recent inter-governmental treaties in South Asia. We will reprise some of these points in the next section, because of their centrality for our policy proposals.

In sum, these arguments suggest that regional cooperation focused on the exchange of water services could facilitate a range of water management options which are unlikely to emerge from current forms of inter-governmental diplomacy.

IV Multi-Track Diplomacy

Multi-track diplomacy is the discussion of international conflict involving not just government representatives but a wider range of professional, business and civil society actors. Multi-track diplomacy constitutes one step toward democratic, or representational, forms which extend beyond national boundaries. Although several ways of thinking about multi-track diplomacy have been suggested (McDonald and Diamond, 1996; Bavly, 1999), we find the most useful a three track formulation: Track I, traditional inter-governmental diplomacy; Track II, interactions involving non-governmental elites; Track III, grass roots actions of those involved in, or affected by, conflict or disagreement.

Multi-track diplomacy has the potential to generate more creative options than those arising from within external affairs ministries of government, and to mobilize wider support for new initiatives. In addition, participants in multi-track diplomacy, including non-government organizations and private enterprises, may bring more flexible sets of interests to negotiations than the political or strategic positions to which governments and politicians may be committed. . . “Since the participants in the discussions are not ultimate decision makers, there are no high-level (Track I) public commitments and policy-making.”²

From the perspective of water management, two important possibilities may be opened by a wider diplomacy. The first concerns the planning, negotiation and financing of large-scale schemes. A wider diplomacy, including new actors with different mandates and incentives, could

potentially design technically better schemes and, through wider representation, generate greater support for them. So, there is the possibility that multi-track diplomacy could make large-scale flood mitigation, water storage, irrigation and hydroelectric power generation schemes better and more acceptable.

The second way in which wider diplomacy might open new options concerns the possibilities for small contributions to large-scale water projects. In some cases, large scale is beneficial. For example, there are advantages to large-scale flood mitigation: large dams may store more water than small dams, per unit of land lost under water. Large polders may also be more efficient than small embankments. However, there are also advantages to small-scale water development. These may include decentralized control, environmental conservation, rural employment generation, and more effective representation of diverse needs for water. Small-scale, decentralized development of water resources is more likely to be driven by demand than is large-scale development. There is a rich, and only partially documented, history of small and large-scale water development in India, including examples of small-scale initiatives that could assist flood mitigation as well as drought mitigation (Rosin, 1993; Agarwal and Narain, eds., 1997).

Thus, it is possible that multi-track diplomacy, by involving more actors, could open new possibilities for small-scale water development, including flood mitigation. For example, the visionary suggestion of the ‘Ganges Water Machine’ (Revelle and Lakshminarayana, 1975) was that decentralized groundwater recharge and pumping, using hydroelectric power generated in the upper reaches of the big rivers, could mitigate floods, through a large expansion of groundwater recharge, and enable expansion of water supply, particularly irrigation, throughout the river basin. Decentralized water development of this kind could be socially and environmentally preferable to large interventions (See also Iyer, 2008: 20, on new goals and forms of cooperation among South Asian nations).

How might multi-track diplomacy make such a vision possible? Cross-border trading in water services could enable the governments of India and Bangladesh, or intermediary agencies, possibly including public-private partnerships, to purchase flood mitigation and drought services from a range of agencies in Nepal and India. Rather than elephantine governments plodding toward large scale water storage many decades hence, cross-border trading might enable fleet-footed institutions, be they nongovernmental organizations, private companies or public-private

partnerships, to provide services over a much shorter time span. This is not different in essence from what was envisaged for the sale of power in the India Nepal Power Trade Agreement of 1996. There is also a history of cross-border trade in electric power. Trade in water services would require research and innovation, not least to develop appropriate units, prices and sources of revenue. It would also require oversight by one or a group of regulatory agencies. But it is not unthinkable and it could generate labor-intensive employment at the same time as providing flood mitigation and expansion of dry season water supply.

The evolution of multi-track river diplomacy

Conventional diplomatic negotiations, that is, Track I diplomacy, have had limited success in the arena of South Asia's great rivers. There has been little regional cooperation in South Asia, least of all about the contentious topic of water. The South Asian Association for Regional Cooperation (SAARC), established in the 1980s, provides a forum for discussion of the least controversial topics. However, the most heated ones, particularly water resource negotiations, were excluded from its brief at the start. With the exception of one meeting in 1986, negotiations over water have been exclusively bilateral, that is, involving only two states. India, in fact, has repeatedly insisted on this bilateralism.

The most heated and long running, South Asian river disagreement has been between Bangladesh (and its predecessor, East Pakistan) and India over the sharing of the flow of the Ganges. This question has sometimes been temporarily settled by interim agreements, and has occasionally erupted into internationally publicized disagreement. More typically, as for the decade up to 1996, it has been marked by chronic lack of agreement: intergovernmental negotiations of varying frequency that repeatedly fail to make substantive progress.

The governments of India and Nepal have had many rounds of sometimes tense negotiations relating to hydroelectricity generation, irrigation water, and flood mitigation, and early agreements about shared projects have been controversial in Nepal. Water has the potential to be Nepal's major economic resource, and successive governments have expected that the sale of hydroelectric power to India would generate significant revenues for economic development. Until 1996, little progress had been made toward this goal: progress from that point on is considered in detail in section VI. Here, we briefly note that four 1996 agreements³ established innovations for South Asia, with only limited precedent elsewhere, which started to address the

uncertainties of Himalayan development, and bring new resources and initiative to the process of harnessing the geographical assets of South Asia. They enabled creation of a regional trade in hydroelectric power development, with sharing of the costs, risks and benefits of joint river development. The fifth agreement, in 1997, tentatively established arrangements for multilateral discussion.

In section V, two of the most prominent elements obstructing international cooperation will be identified and described: the Indian government's insistence on bilateral rather than multilateral negotiations (termed *bilateralism*) and competing national visions for water development.

Though these obstructions persist, the agreements in 1996 and 1997 opened new directions in regional cooperation, including:

- i) shifting some negotiations from the *diplomatic* or *governmental* sphere at least partly into the sphere of the *private economy*
- ii) bringing *third parties*, other than governments, into negotiation, design and implementation of cooperative projects
- iii) moving toward the *sharing* of eventual benefits and costs, rather than establishing *fixed* payments based on anticipated outcomes
- iv) taking steps toward limited multilateral discussion.

It will be seen that these new directions are all aspects of the conceptual issues treated in section III. We discuss them further in the context of the multi-track diplomacy framework.

Multi-track diplomacy and water management

How might multi-track diplomacy, and specifically the four new directions identified above, influence water management possibilities?

i) Shifting some negotiations from the diplomatic or governmental sphere at least partly into the sphere of the private economy

As noted in section III, in the private economic sphere, enterprises enter negotiations with clear private incentives, that is, to generate a return for owners or shareholders. By contrast, diplomacy involves negotiation between governments having multiple objectives and less direct incentives, including the approval of bureaucratic superiors and the various processes of collective

representation or protest. This suggests that negotiations within the private economic sphere can have the advantages of simple goals, clear rules and pressures for quick completion. The shift from diplomatic to private economic negotiation parallels the widely debated processes of privatization and liberalization, but it raises a distinct set of questions and possibilities in the sphere of international negotiation. In particular, an arena for such negotiation must be created, in the form of an organization or forum for making proposals and reaching agreement: in essence, one needs an institutional framework for multi-track diplomacy.

In some cases, the diffuse benefits of water management projects may limit private incentives. In particular, flood mitigation is a public good, and may not easily be turned into a tradable private good. However, it may be possible to develop trade in water storage benefits. The governments of Nepal or China, or a public private partnership, for example, might agree to store a quantity of water for their downstream neighbors. The payment for this storage might reflect both the benefits of flood mitigation as well as the supply of dry season water. Once a market is created for a private good, subsidies can conceivably be used to bring marginal private and social benefits more in line with each other.

ii) Bringing third parties, other than governments, into negotiation, design and implementation of cooperative projects.

The second new direction suggested by the 1996-97 agreements relates to the inclusion of third parties such as corporations, local governments and non-governmental organizations (NGOs) in international negotiations: this is, of course, the essence of multi-track diplomacy. This may be advantageous if new social, economic and intellectual resources are to be brought to bear upon concerns shared across national boundaries. When negotiations are shifted from diplomacy to commerce third parties are necessarily involved. A further widening can be seen, however, in the growth of nongovernmental networks involved in international negotiation about environmental risks and possibilities. In particular, the large-scale nature of many water projects, and their influence on large populations cutting across existing political boundaries or constituencies, can be more effectively addressed by the inclusion of NGOs in multi-track diplomacy. Given the heterogeneity of NGOs in terms of size and organizational character, this can be thought of as a hybrid of Track II and Track III diplomacy.

iii) Moving toward the sharing of eventual benefits and costs, rather than establishing fixed payments based on anticipated outcomes.

The third new direction relates to the sharing of costs and benefits of international environmental change. Situations of uncertainty present a challenge to intergovernmental cooperation. The costs and benefits of large infrastructure projects are frequently hard to predict. Costs are routinely under-estimated and the benefits over-estimated. For these reasons alone, the sharing of costs and benefits makes sense, and developing these sharing mechanisms may be easier within a setting of multi-track diplomacy. In addition, in the case of South Asia, climatic and tectonic variations combined with the unpredictable consequences of agriculture, land clearance, other human interventions, and climate change constitute significant sources of uncertainty influencing international environmental negotiations. River flows, sediment loads and groundwater levels are only partially predictable.

In these conditions, the sharing of benefits and costs constitutes a promising direction for international cooperation. This does not, of course, exclude governments from this risk sharing: large-scale projects, in particular, will require their participation, even if only as guarantors or underwriters. For example, flood mitigation is an area where active government participation is essential. In this context, the role of multilateral institutions can be seen as providing some risk sharing where individual governments may not be able to accomplish it sufficiently on their own.

iv) Taking steps toward limited multilateral discussion.

The fourth new direction, of multilateralism, has parallels with the second: new resources are brought to bear on problems, and unintended negative impacts on those otherwise excluded are avoided. Agreements based on multilateral consultation and discussion are more likely to be stable in the long run. In addition, there is the possibility of expanding the “gains to trade” by expanding the set of bargainers, as discussed in section II. These issues are taken up further in Sections IV and V. Multilateralism represents an innovation that is in some ways orthogonal to multi-track diplomacy. Interestingly, however, NGOs can informally cut across national boundaries (at least through information sharing, and possibly through coordinated action) and that aspect of Track II diplomacy may provide an avenue for developing multilateralism without formally bringing multiple governments to the bargaining table. Thus, multi-track diplomacy can facilitate multilateralism.

Our earlier point, about the need for an institutional framework for multi-track diplomacy, can be interpreted as arguing also that multilateralism can support or facilitate such broader-based diplomacy. The implicit assumption is that the requisite institutional framework would be multilateral in some form. As a prelude to our proposal for multilateralism, the experience with bilateralism is discussed in the next section.

V Bilateralism as an Impediment

Traditionally, international river negotiations have taken many decades before agreement can be achieved, if at all. Water resource cooperation in the basins of the rivers Ganges and Brahmaputra may constitute the most complex of all international water negotiations. The combined scale of the environmental, social and technical issues raised by the Himalayan rivers has no equivalent anywhere else in the world. Given the scale of these problems, and the paucity of regional resources that can be garnered to address them,⁴ it is not surprising that the negotiation of international cooperation should be protracted and uncertain. Nevertheless, it is arguable that the past focus on bilateral negotiations, and on national, rather than regional, multi-country perspectives, has slowed the achievement of cooperation and river development.⁵

To illustrate this point, here we focus on India's policy of bilateralism, and its consequences for India, Bangladesh and Nepal in past river negotiations. Bilateralism has been a consistent Indian government prerequisite for negotiations with its South Asian neighbors ever since independence in 1947. Almost all negotiations about a range of key issues, from river development to trade and transit, have been negotiated on that basis.

Rose (1987) identifies bilateralism as one of two main principles of Indian government policy towards its South Asian neighbors, acceptance of India as the major regional power being the other. He describes bilateralism:

As defined by India, the South Asian system would function through the greater coordination of India's bilateral economic relations with the other regional states; any substantial integration of the economies of the other states (e.g., Pakistan and Sri Lanka or Nepal and Bangladesh) or any use of a multilateral approach to regional economic issues (e.g., the river systems of Nepal, Bhutan, Bangladesh and India) should be discouraged.

Two typical alternative perspectives on bilateralism can be identified. In support of this approach, spokespersons for the Indian Ministry of External Affairs have argued that bilateral negotiations on specific bilateral questions or projects are more expeditious than multilateral negotiations. This argument is plausible, but has to be tempered by the experience of delays in bilateral negotiations between the Indian government and its neighbors, and by the mutual benefits that arise from multilateral diplomacy. In particular, if river basins span more than two nations, or if their resources can be utilized to benefit more than two countries, bilateral approaches may shrink the potential gains from bargaining, as well as the costs of negotiation.

A different perspective on bilateralism, sometimes found in political and academic discussion in Nepal and Bangladesh, is that this approach allows India to dominate the subcontinent, presumably by hindering the formation of a “bargaining coalition” by India's neighbors. This perspective may have historical validity but gives little immediate purchase on current questions of cooperation. It is also unclear to what extent, and in what ways, it actually impinges upon Indian governmental discussions and decisions. In any case, the inclusion of China in any regional discussion of water management will have a profound impact on the bargaining situation, and will have to be structured carefully to overcome potential Indian concerns.

The emphasis on bilateral relations also leads to a particular focus on the sequence of issues that have dominated the relations between two governments. It has been argued that this focus encourages the perception that river development is a “zero sum game,” a common obstacle in international river discussions.⁶ This perception, that the gain of one country is necessarily the loss of the other, gives the negotiations a particular charge: any compromise of prior national objectives can be portrayed as a victory for the other side. Whether this perception is rational is another matter, however: even bilateral situations may involve mutual gains. As noted earlier, the real question is whether multilateralism might substantially expand the gains – enough to overcome additional complexity or bargaining costs.

The focus on histories of bilateral relations may also create fertile ground for the growth of myths about the nature and possibilities of those relations. In the case of India and Bangladesh, perceptions of river negotiations are deeply influenced by the history and myths of past negotiation over one project, India's Farakka Barrage across the Ganges. All subsequent discussion about water between these two governments, and in their national media, tends to be mired in the myths and colored by the particular paths of past bilateral relations.⁷ These myths,

with complex foundations in the colonial division of the subcontinent, as well as in the technical uncertainties and ambiguities of water development, also posit negotiations over water as a 'zero-sum game'. This structuring of the discussion leaves little space for the possibility that water development could be an enterprise from which all sides gain much more than they lose. The boundaries of discussion could be relaxed in the context of regional, in place of bilateral, discussion.

Finally, recent visions of water development within India express national visions that make little accommodation to the concerns of other countries in the region. . To some extent, these visions were shaped by the failure of conventional bilateral diplomacy. There has been no recognition that compromise might achieve greater benefits for the region

Why has India been reluctant to move beyond bilateralism? We suggest two possibilities. The existing distribution of bureaucratic power associated with Track 1 (traditional) diplomacy could be undermined by a move to multilateral negotiations. If so, it could be resisted by mid-level officials whose power would be reduced. Alternatively, the fixed focus of Ministry of External Affairs routines may not easily allow consideration of the broader issues entailed by multilateral negotiations. Either or both of these considerations could impede discussion of the larger vision of a multilateral and multi-track compromise.

In section VI, we examine in detail the recent innovations and future directions that may overcome this failure.

VI Innovations at the International Level

By examining innovations at the international level, we aim to bring out the general principles that can transform international negotiations over water rights and usage. These general principles include rights allocation mechanisms, governing institutions, and rules for exchange. The beginning of a more flexible and inclusive framework for achieving regional benefits was set by the agreements of 1996-97, first discussed in Section IV. Here we further describe those agreements and progress in their implementation.

Later in this section, we also describe the design and construction of large hydroelectric projects on the rivers draining from the Tibetan Plateau into South Asia. This phase, involving many

projects started or under active consideration, at least one, the Tsangpo, expected to be twice as large as the world's largest hydroelectric scheme (the Three Gorges), raises questions of conflict (over China's diversion of water, over unresolved territorial claims between India and China), and overlooks a range of potential mutual benefits. Table 2 lists some of the wide range of water services that South Asian governments have sought from each other in relation to regional water resources. Potentially there are a set of regional benefits beyond the immediate concern of hydroelectric power.

Five international agreements

The three 1996 agreements involving India and Nepal established innovations for South Asia to address the uncertainties of Himalayan water development. In broad terms, the India-Nepal Power Trade agreement transferred negotiations for the sale of hydroelectric power from the purely diplomatic to the economic sphere, and in doing so brought agencies other than national government into the process. The Mahakali Treaty established a process of sharing future benefits of water resource development on the Mahakali River (the border river between Western Nepal and India). The Tala Hydel Project negotiations illustrate a process similar to that envisaged in the Mahakali Treaty, at a later stage of negotiation. The Ganges Treaty of 1996, signed by India and Bangladesh, was formulated to resolve 40 years of dispute about dividing the low flow of that river.

In principle, the 1996-97 treaties established a basis for the steps discussed in Sections III and IV, with respect to cooperation and multi-track diplomacy. The India-Nepal Power Trade agreement has potential to assist in the establishment of property rights, and to shift some negotiations from diplomatic to private transactions (track II diplomacy). The Mahakali Treaty provided an important precedent for dealing with uncertainty in river development, one which could be extended to encompass uncertainties resulting from glacial melting. Following on these, the 1997 agreement made tentative steps toward multilateral discussion.

Difficulties in progress: The complexity of the Mahakali agreement, its vagueness with respect to details, political changes and uncertainty in India and Nepal, and even external events such as the collapse of Enron have all hampered progress between those two nations. In the Enron case, however, the difficulty of identifying and incorporating the benefits of flood mitigation played a role in delaying implementation. While internal Nepali politics and Enron's own maneuvering

were more public problems, it has also been recognized that India was reluctant to admit that it would receive benefits from irrigation, and especially flood mitigation, in addition to the ability to purchase power. Enron itself also downplayed the importance of the latter, since it could not contract for those benefits, illustrating one of the limitations of private contracting.

India's somewhat unilateral approach also continues in the case of older agreements with Nepal. Under the Kosi agreement, India built a dam across the Kosi River in Nepal to control floods in its own state of Bihar during the monsoon season, as well as supply extra water to the state in the dry season. However, the diversion of the Kosi for flood prevention in Bihar submerges arable land in Bihar, destroying standing crops and temporarily dislocating residents of the area in Nepal. The problem is four decades old, but remains unresolved.⁸

Consolidating diplomatic innovations: While these five agreements established important precedents, the potential for reduced conflict and greatly improved regional development has only partly been realized in agreements enacted by 2008. One aspect of this slow progress was the lack of an institutional framework for overall evaluation and facilitating implementation. It is for this reason that we propose, in Section VII, that a new independent regulatory body could be established to facilitate the potential for regional benefits, and more effective representation. This need is made more pressing by the current proliferation of Himalayan hydroelectric projects, summarized next in this section, and the potential impacts of climate change, which motivate this article.

The new phase of Himalayan hydroelectrics

A wave of hydroelectric dam construction is starting in the Himalayan valleys of Nepal, Pakistan and India (Dharmidakary, 2008; Butt, 2008; Bhattacharya, 2004; Chowdhury, 2004; Kathmandu Post, 2005, 2008; Sangraula, 2006; Kuai, 2007). One major project, the 750 MW West Seti scheme in Nepal, appears to be in the early stages of construction. In the Western Himalayas both India and Pakistan are planning hydroelectric projects and in the Eastern Himalayas India is planning a number of large projects and possibly many smaller ones. Several of these projects involve complex combinations of diplomacy, multi-year power purchase agreements, and substantial financing and construction arrangements. A range of development banks and national banks (notably China's Exim Bank), foreign construction companies from Australia, Sweden and Germany, and financing consortia are involved in the hydroelectric projects getting underway.

Table 1 shows the larger (generally over 400 MW) Himalayan water projects currently scheduled, under construction or in detailed design. One source (Dharmadhikary, 2008) suggests that by September 2007, 39 Memoranda of Understanding had been signed by the Indian government, with both private and public developers, in Arunachal Pradesh alone. This would generate 24,000 MW, roughly equivalent to the total amount of power generating capacity installed in India since Independence. A large part of Arunachal Pradesh is still claimed by China. The Chinese Ambassador to New Delhi re-stated in 2005 (IRNA, 2005) that the land was disputed. The site of one project, the 11,000 MW Upper Siang Project has already been relocated because of China's concerns (Sasi, 2006). Nonetheless, the Indian Prime Minister laid a foundation stone for one of the larger projects, the 3,000 MW Dibang multi-purpose project on January 31 2008 (Dharmadhikary, 2008).

Dharmadhikary (2008b: Table 3) identifies a total of 46 dam projects under construction in the Himalayas (37 of them in India) and 396 planned (318 of them in India). With the construction of these projects, India's Himalayan hydroelectric generating capacity will go from 15,000 MW to 126,000 MW; Nepal's from 500 MW to 27,000 MW; Bhutan's from 1,500 MW to 17,000 MW; and Pakistan's from 6,400 MW to 42,000 MW.

China's proposed Yarlung-Tsangpo hydroelectric scheme is intended to generate 40,000 MW, even more electricity than the 39 dams proposed in Arunachal Pradesh. It is to be sited in what's known as the 'great bend' of the river at Namcha Barwa in Eastern Tibet, a point where the river drops 3,000m in 200 km. This is a location long known by engineers as a site with unrivaled potential for hydro-electricity. China also proposes to divert large, but so far not publicly divulged, quantities of water from the Tsangpo several hundred kilometers to Xinjiang and Gansu. One source (Tsering, 2002) describes the potential for conflict between China and its downstream neighbors:

This project represents a direct threat to the water security of people living downstream in India and Bangladesh... Precipitation in the region is "too much" (80 percent) during the four monsoon months (between June to September), and "too little" (20 percent) for the remaining eight months. China will withhold water for power generation and irrigation during the dry season, but would be compelled to release water during the flood season. Diversion of large quantities of water to China's northwest would be even more devastating for farmers and fishermen

downstream.

Despite the ongoing reformation of the Nepalese government (Vanaik, 2008), Nepal signed a Memorandum of Understanding with India on March 2, 2008 to construct the 400 MW Arun III hydroelectric project. This is a project from which the World Bank withdrew funding after opposition from environmentalists. It is to be constructed over the next five years, once financing has been arranged, under a build-operate-own-and-transfer (BOOT) agreement with Sutlej Jal Vidayut, a joint venture of the Indian and Himachal Pradesh governments. Under this arrangement, SJV constructs and operates the project for 30 years, then hands it to the Nepal government. In addition to royalties (7.5 percent of income) and taxes (0.5 percent of exports), the Nepal government has arranged to receive 22 percent of the power from the project without payment.

In some cases these projects are associated with reduced tensions between the two countries most immediately involved. This seems to be the case for those projects involving India and Nepal. Elsewhere, there are signs that the projects are exacerbating tensions. Pakistan appears to be in a race to get the 963 MW Neelum Jheelum project started before India's 330 MW Kishanganga project, located upstream on the same river, can be completed. Both these rivers fall under the Indus Treaty. In the East, India's rejuvenated dam proposals on the Tipaimukh, Dihang and Subansiri rivers are causing unease in Bangladesh.

This wave of dam construction is proceeding in the absence of a plan to optimize the regional benefits (and minimize the environmental costs) of water management, and with little concern for alternative proposals. The outcomes of these schemes may have repercussions, and potential benefits, for countries not currently involved in negotiations. The significant involvement of the Chinese government, and its Exim Bank, in financing the Pakistan and Nepal projects suggests there could be value in bringing China into regional negotiations.

Indian foreign policy needs to look ahead to the difficulties of negotiating with China over projects in the Eastern Himalayas, such as the Dihang, Dibang and Subansiri Dams, located on land claimed by both India and China since the 1962 war. In addition, the need for regional analysis of the consequences of global warming, the involvement of China in financing several projects on the South Asian side of the Himalayas, and the need to discuss projects in Tibet

which could have consequences for South Asia, all provide justification for the establishment of a multilateral regulatory institution.

When Chinese President Hu Jintao and Indian Prime Minister Manmohan Singh met in New Delhi in November 2006, they issued a joint declaration which included the following paragraph:

‘The two sides will set up an expert level mechanism to discuss interaction and cooperation on the provision of flood season hydrologic data, emergency management and other issues regarding trans-border rivers as agreed between them. The on-going provision of hydrological data for the Brahmaputra/Yarlung-Zangbo and the Sutlej/Langqen Zangbo Rivers by the Chinese side to the Indian side has proved valuable in flood forecasting and mitigation. The two sides agree to continue bilateral discussions to finalise at an early date similar arrangements for the Parlung Zangbo and Lohit/Zayu Qu Rivers.

‘Both sides shall intensify their consultations, bilaterally and in multilateral for a, on sustainable development, bio-diversity, climate change and other related issues of common concern.’ (China Report 2007: 118)

This declaration suggests two points. First, there is an intention to establish ongoing talks between India and China on major rivers – although no word of the establishment of the expert level mechanism has emerged in the 18 months since this declaration. Second, the two leaders were open to bilateral and multilateral talks on a range of issues. But the focus of existing river talks is floods, not climate change or dry season flows. The one mention in the joint declaration of specific multilateral cooperation is this: ‘The two sides welcome the organization of a car rally, recommended by the BCIM (Bangladesh China India Myanmar?) Forum, between Kolkata and Kunming, via Bangladesh and Myanmar’. (China Report 2007: 119).

VII Steps toward a Himalayan Authority for Water Services and Environmental Cooperation

Our discussion of the new challenges of managing Himalayan rivers, and a conceptual framework for thinking about the possibilities of multi-track diplomacy, enables us to outline **why** a new institution is needed, **what** it would do, **who** it should represent and **how** it might be

constituted and sustained. We propose a regulatory body that encompasses all the nations with stakes in the Himalayan rivers, and a mix of expertise and interests, including a panel of technical experts, experienced diplomats from each country, and representatives of key interest groups.

Why is a new multilateral institution needed?

As we have discussed earlier, the potential benefits of multilateral, multi-track cooperation are considerable. International exchanges which cannot be generated in bilateral discussions become feasible, conflicts which easily descend into zero-sum discussions can be avoided, reliable information can be generated, integrated river basin management becomes possible, small scale environmental management can be remunerated, and prompt responses to climatic uncertainty can be produced.

To elucidate further, we have argued that three kinds of obstacle have constrained intergovernmental negotiations over water in the past, and contributed to the rise of significant tensions between states. First, the strict practice of bilateral negotiation has put blinkers on the discussants, exaggerating the importance of past disagreements, limiting discussants' ability to evaluate the regional potential for cooperation, and encouraging the rise of myths about the malevolent roles and limited needs of neighboring states. Second, the construction of grand national plans for river development has tended to crowd out plans with benefits for other nations or for the whole region. Third, the limits of bilateral diplomacy have been confined further by the restrictions of barter exchange. Transactions are only possible, in this type of exchange, when each government has what the other government wants.

The expansion of diplomacy in ways prefigured by the agreements of 1996 and 1997 could overcome these obstacles of bilateralism, grand nationalism and barter diplomacy. Could negotiations about international river water management be taken out of diplomatic barter and transferred to negotiations among private and public-private agencies? This transfer would require the design and unfolding of a suitable regulatory framework. That framework could address the concerns of sovereignty which currently limit the topic to interactions among states. It could also clarify property rights in water, and incorporate the latest thinking on unresolved environmental questions, such as those relating to falling groundwater aquifers and the looming impacts of climate change, which threatens water sources in a manner hitherto unimaginable.

With an appropriate regulatory structure, cross-border transactions involving water services could be a significant source of employment, economic growth and livelihood security.

What would it do?

Building on Crow and Singh (2000) (see our Table 2), Vaidya and Karki (2008) suggest that regional cooperation could include at least six areas of water resource cooperation:

- (i) Sharing information for flood forecasting and early warning
- (ii) Storing water in upstream river basins for flood moderation
- (iii) Storing water resources for increasing dry season flows
- (iv) Storing water for inland water transit
- (v) Harnessing water resources to generate hydroelectricity
- (vi) Managing watersheds to help increase the quality and quantity of water available for irrigation and drinking water by downstream users

To this list we can add:

- (vii) Construction services
- (viii) Reforestation to mitigate flows and recharge groundwater
- (ix) Groundwater recharge schemes (for flood mitigation, and dry season flow guarantees)
- (x) Sediment control
- (xi) Regulation of flows for environmental maintenance

These eleven areas of cooperation could be organized through non-government organizations and could operate at small as well as large scale. Note that while most of the eleven areas involve river waters, our list also includes issues of groundwater and forests, which cannot be properly separated in considering the health and productivity of river basins. A new water regulatory institution could serve as a knowledge clearing house and source of technical information for all these water issues. It could also monitor the health of river basins, the progress of various projects, and adherence to international agreements. Potentially, some level of enforcement authority could be assigned to this body by member nations, though issues of sovereignty will always be delicate. At the least, violators or non-performers can be named and shamed if such an institution increases disclosure and transparency, and provides a centralized source of the resulting information.

We do not see the proposed institution as a funding agency, but it could play an important role in overcoming funding constraints. Investments in water and related projects that generate tradable benefits are typically funded by governments, multilateral agencies, and, in some cases, private

corporations. NGOs may also be involved in smaller projects such as small scale groundwater recharge. Where benefits are diffuse, or in the nature of a public good, the private profit motive is clearly insufficient, and institutions with non-profit motives (government, multilaterals and NGOs) all have an important role to play. Taxes and multilateral loans (ultimately recovered through taxes or user charges) provide a traditional source of funding in such cases.

With large-scale efforts that cross boundaries of sovereignty, the institution we propose would have a role that is based on overcoming the traditional obstacles we have already described. There are subtler issues involved with smaller scale projects that cut across boundaries, and which may be part of an overall package of benefits. For example, micro-hydroelectricity generation may be an important component of power generation schemes for Himalayan rivers. Project locations and benefits could span more than one sovereign jurisdiction, but the other problem is of identifying small-scale opportunities and aggregating them. Ideally, existing institutions (governments and multilaterals) could do this, but historically they have been less effective in dealing with the local.

Essentially, a new, specialized institution could augment local capacity in the realm of water management and productivity,⁹ by providing specialized expertise drawn from experience throughout the region. Definition and articulation of local benefits in this manner can reveal the possibility of mutually beneficial exchanges that might not otherwise be realized. A dedicated institution could also provide mechanisms to facilitate payments, as a trusted intermediary, almost to the extent of serving as a market-maker.¹⁰ At the same time, a regional approach provides a check against neglect of any cross-border externalities that would need to be priced in the transaction.

To address externalities or public good-type benefits, the involvement of governments in the regulatory institution can enable a hybrid funding mechanism, where earmarked tax revenues can be paid into dedicated funds for investment or loan paybacks, in a form of escrow arrangement. Two examples of partial tax finance can be offered here as illustrations. South Asian irrigated agriculture is now dominated by electrically powered tube wells (Shah, et al 2004). A tax on rural electricity could be used to finance dry season flows and groundwater recharge initiatives. Climate change justifies the raising of taxes on emissions of greenhouse warming gases. Such finance could rationally be used to advance both large and small scale hydroelectricity generation.

Who would participate?

There is already a regional body tasked with Himalayan issues. The International Center for Integrated Mountain Development (ICIMOD), which began to evolve as long ago as 1983, is an eight country (Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan) regional institution dealing with Himalayan mountain development questions. The existence of this relatively low-key body suggests that it is possible to build a center for regional discussion of shared interests in Himalayan environment and water management.¹¹ In particular, the participation of both Chinese and Indians in ICIMOD, including senior politicians and technical experts, indicates that cooperation between the two giants in this sphere is feasible.

Our proposal is for an institution that would encompass – perhaps delegate to – a body such as ICIMOD, but would be considerably more ambitious in eventual scope. From India's perspective, China's presence would unavoidably change the strategic balance of South Asian river discussions, especially in the direction of reducing India's bargaining power, or ability to act relatively unilaterally as a result of its dominant position in South Asia. Yet the ability of China to drastically affect water supplies throughout South Asia, particularly as the impacts of climate change become more severe, means that its inclusion is necessary and potentially valuable to all parties. Through the presence of official government representatives in a regulatory body, there will inevitably be an implicit linkage between river water issues and other strategic interests such as trade and national boundaries. However, the presumed virtue of the multi-track approach is precisely to temper or ameliorate such conflicts, by keeping them contained, and by focusing on achieving agreement where mutually beneficial gains to cooperation are available, through investment, contractual relationships or integrated technical analysis.

Our earlier discussion of multi-track diplomacy gives us a conceptual framework for postulating some specific features of the types of members in a potential regulatory institution.¹² First, the technical issues involved in planning for the future with respect to water management in the region are highly complex. An international panel of experts focused on the specific characteristics and challenges of the regions river basins would be an essential part of a future solution. Second, due to issues of sovereignty, participation by the governments concerned is also necessary, of course: one would expect it to be through the appointment of seasoned foreign policy experts. Third, to represent key interest groups such as global capital, technical inputs, and

people affected – conventional Track 1 does not aggregate interests of constituencies – participation by national and international NGOs and even private sector bodies such as industry associations (rather than individual firms) would round out the membership of a new regulatory body. In terms of our multi-track classification, this would represent a hybrid of Tracks I and II, with the weight toward the latter. Track III would be implicitly present through grassroots linkages of NGOs – grassroots activism would be difficult to incorporate directly into the envisaged framework.

There is a clear distinction between our proposal and an institution such as the South Asian Association for Regional Cooperation (SAARC), which is currently the most prominent South Asian regional institution. Unlike the case of SAARC, or even bodies that are designed to address international or cross-border environmental issues, the focus of the proposed body would be specifically on water management, with environmental issues such as climate change, pollution, groundwater depletion and soil degradation being a natural component of a focus on quality as well as quantity of water. This focus would distinguish such an institution from SAARC, or other kinds of regional organizations. In any case, the need to include China implies that a delinking from SAARC would be essential. Even then, the fact that some basin issues are strictly bilateral (though less so when climate change is factored in) would require something of a hybrid structure, so that different river basins might be addressed only by subsets of the membership. The opportunity to link and compare bilateral issues would still be valuable of course, as information-sharing about technical matters could enhance the quality of specific basin solutions.

How would it be constituted and sustained?

The institution we propose might be built on the existing structures of ICIMOD, or be developed de novo, with well-defined ties to that body. There are always a host of issues with respect to detailed implementation of a proposal such as ours, and it is beyond our scope to go into these in details. A critical question, however, is, what interests would sustain such a regulatory authority? There are two. First, a new basis for Himalayan cooperation makes possible new water and environmental management initiatives at small and large scale. In other words, there are benefits to be gained from establishing an institutional basis for cooperation in this arena. Second, the challenges of climate change and glacial melting generate uncertainties which will be hard to

respond to without such an institution. That is, the costs of not cooperating are likely to be substantial, and this will rapidly and increasingly become apparent.

There is now a significant body of experience with multilateral water institutions. The design of such an institution can draw upon the experience of the Mekong and Indus commissions, and of similar bodies in Europe and the Americas. These institutions provide evidence on the limits and possibilities of a range of different ways of approaching international water management cooperation. Some, like the Indus, build on a division of rivers between nations to provide an institution primarily focused on engineering questions and monitoring the two parties involved. We suggest that this type of design limits the possibilities for innovative cross-border cooperation and investment. Others, such as the Mekong, exclude major governments (China and Burma) and limit possibilities for cooperation in that way. The design of this regulatory body should transcend such limits in order to make the full range of cooperative advances possible.

At one level, the proposed institution may be seen as an international multi-basin version of bodies that attempt to regulate single river basins within national boundaries. In such cases, there are also sub national entities, such as states or provinces, with differing interests. One obvious difference is that a national government can exercise overriding sovereignty in such cases. With federal structures or relatively powerful or influential sub national governments, this exercise of sovereignty may be available only through carrots rather than sticks. In the absence of a world government, coalitions of national interests as represented through multilateral agencies may play a role, just as the World Bank did in the case of the Indus Waters Treaty.

To the extent that multilateral agencies are dominated by specific national interests (the US for the World Bank, or Japan for the Asian Development Bank), this may not be too different from the perspective articulated in Sahni (2006), where a case is made for the US to further its strategic foreign policy interests by improving cooperation between India and Pakistan with respect to the Indus. The problem with such overt attention, of course, is that it brings traditional Track I approaches more to the forefront, perhaps diverting focus from the kinds of cooperation envisaged in this study.

The history of management of the Mekong basin, from the control of colonial powers to a Mekong River Commission that does not include major upstream nations (China and Burma), indicates some of the problems with traditional nationalist approaches to multilateral

cooperation, as well as the limitations of investment-oriented multilateral institutions. Of course there is no ideal or easy solution to these tradeoffs and the success of any such institution such as the one proposed here depends on the specifics of design and implementation. Therefore, in addition to ICIMOD, the Mekong River Commission can also provide a starting point for thinking about the appropriate institutional design. The importance and urgency of the problem, to our minds, requires some institutional innovation, and design and implementation can only follow putting the idea on the agenda of policymakers in the countries at risk from future water shortages and crises.

VIII Conclusion

Climate change, particularly glacial melting, is shifting the pattern and predictability of flows in the major rivers of South Asia. Industrial growth in India is generating substantial demand for energy that is being met by an unprecedented phase of dam construction on major rivers of the Himalayas. Somewhat comparably, industrial growth in China has led to proposals for hydroelectric power and water diversion projects on the Yarlung-Tsangpo in Tibet, which becomes the Brahmaputra. These three factors transform the goals, circumstances and potential for negotiation over the major Himalayan rivers supplying South Asia. We are not aware of negotiations that recognize this transformed situation.

China may have the most to gain, and India and Bangladesh the most to lose, from the present state of diplomatic silence about Himalayan Rivers. If China establishes hydropower or diversion capacities on the Yarlung-Trangpo-Brahmaputra, this will place it in a commanding position on that river. South Asian governments have only to look to the Mekong to see the difficulties and uncertainties which follow when this large upstream power makes plans ignoring the concerns of downstream nations. India now faces the possibility of a powerful upstream neighbor dominating one of the rivers on which it depends.

The government of India has chosen not to open explicit discussions with China about projects on the Yarlung Tsangpo/Brahmaputra. It has told China that India would be interested in buying power from the proposed Namche Bazaar hydroelectric project in Eastern Tibet, and there is a continuing exchange of flood flow data about several rivers. It is possible that the Congress government perceives such negotiations as a sign of weakness that would have domestic repercussions. Both in relation to China, and to the larger questions of environmental

uncertainty, such a perception appears short sighted. The Indian negotiating position will weaken as construction in Tibet gets underway. South Asia's ability to understand and respond to climate change will, also, not be improved if environmental challenges are allowed to become imminent disasters in the form of flood, drought and white elephant projects.

The way forward we suggest is a multi-nation regulatory authority for the Himalayan rivers and their supporting environments. This institution could build upon the innovations made in recent South Asian treaties to establish the parameters for multi-track diplomacy around water and environmental services. A regulatory authority could aggregate information, identify mutually beneficial exchanges, manage uncertainty and encourage innovation and investment in the context of more comprehensive environmental knowledge. While this institution would establish negotiations between the two great Asian powers, it would do so in the context of common benefit and multi-track diplomacy, rather than the potentially zero-sum confrontations of conventional river diplomacy. We suggest there are cross-border investments, in small scale and conservation projects as much as large hydropower dams, which create gains in both nations even when there are conflicts between them.

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TABLE 1: LARGER HYDROELECTRIC AND DIVERSION PROJECTS IN THE HIMALAYAS CURRENTLY IN PLANNING OR CONSTRUCTION

Project and size	Location	Current position and parties
China		
Yarlung-Tsangpo Dam 40,000 MW and diversion	Namcha Barwa E Tibet, great bend of the Tsangpo/Brahmaputra	Construction to start 2009. Unknown share of waters of the Tsangpo to be diverted to provinces of Xinjiang and Gansu. Indian Power Ministry said they could buy power
India		
Baglihar	Kashmir, Chenab River -> Indus (2005 complaint to Bank?)	
Dibang 3000MW multipurpose	Dibang river, E AP, Arunachal Pradesh	Fndn stone laid in Itanagar by PM Jan '08
Kishanganga hydel and storage 330 MW	Kishenganga river, Gurez valley India Indus	Swiss arbitrator to settle dispute. Construction by Kishenganga Contractors (Swedish consortium)
Ranganido 405 MW	Dikrong River, Arunachal	Commissioned 2002 NEEPCO
Siang (Dihang) Three projects: Upper (11000 MW) middle (1000 MW) and lower (1600 MW)	Siang River	Upper Siang site moved downstream to prevent flooding in Tibet. Awaiting data from China
Subansiri (Lower) 2000 MW	West Siang Dist, Arunachal	NHPC. Alstom beats Bhel?
Tipaimukh 1500 MW	Barak, Kushiara, -> Meghna, Assam, Manipur, Mizoram	Protests India and Bd. Flood other goals wd make unfeasible. NEEPCO implementing
Nepal		
Arun III 402MW hydel	Arun river E Nepal. River origins in Tibet.	MOU signed 3/2/08. Construction to be completed 5 yrs after finance arranged Sutlej Jal Vidyut. BOOT for 30 yrs. 22% of power free to Nepal. + royalties (7.5% income) and export taxes (0.5%)
Pancheshwar 6000 MW	Mahakali river Nepal/India border	Nepal-India Treaty signed 1996 but disagreement over resettlement and electricity price
Burhi Gandaki 600 MW		Enron sought contract
Karnali-Chisapani 10,800 MW		China Exim Bank SMEC. SMEC to do with BOOT?
West Seti 750 MW	Nepal Completion 2013. Const start nov 07	West Seti Holdings owned by SMEC. PTC 4.9 c per

TABLE 2 POTENTIAL INTERNATIONAL TRANSACTIONS IN SOUTH ASIA¹³

Potential parties	Good or service (Exchange: † occurring to some extent, * discussed, Ω suggested)	Type of exchange anticipated
Nepal to India	Supply of hydro-electric power *	Monetized
	Supply of water storage benefits ¹⁴ *	Barter exchange
India to Nepal	Navigation and transit †*	Barter exchange
	Provision of finance for construction *	Monetized
	Provision of engineering expertise *	Probably monetized
India to Bangladesh	Supply of water storage benefits *	Barter exchange
	Granting secure expectations of minimum flow *	Barter exchange
Bangladesh to India	Navigation and transit rights *	Barter exchange
	Transfer of water from Brahmaputra to Ganges Ω	Barter exchange
Bangladesh to Nepal	Navigation and transit rights Ω	Barter exchange
Nepal to Bangladesh	Supply of hydro-electric power Ω	Monetized
	Supply of water storage benefits Ω	Barter exchange
Bhutan to India	Supply of hydro-electric power †	Monetized
	Supply of water storage benefits Ω	Barter exchange
India to Bhutan	Navigation and transit †	Barter exchange
	Provision of finance and engineering for construction †	Partly monetized

Endnotes

¹ By one estimate there are more poor people in the Ganges-Brahmaputra basin than in all sub-Saharan Africa: Rogers et al (1994).

² See Haddad (1996).

³ Formally, the four agreements are these:

i) **The India-Nepal power trade agreement** (Agreement between His Majesty's Government of Nepal and the Government of India concerning the Electric Power Trade, February 17, 1996)

ii) **The Mahakali Treaty** (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, January 29, 1996).

iii) **The India-Bangladesh Treaty on Sharing the Ganges:** The Treaty Between the Government of the Republic of India and The Government of the People's Republic of Bangladesh on Sharing of the Ganga/Ganges Waters at Farakka, December 12, 1996. The text of this Treaty is published in *The Independent*, Dhaka, December 14, 1996.

iv) **Agreement for the Tala Hydel Project** signed by representatives of India and Bhutan in March 1996 ('Bhutan and India sign Tala Hydel Project' *Kuensel* 3/9/96 p1, 12).

Crow (1998) also considers these agreements. Iyer (1999) discusses the Mahakali and Ganges Treaties, along with the older Indus Treaty.

⁴ The existence of conflict over the rivers, and the absence of coordination of development has made international agencies, such as the World Bank, unwilling to fund river development projects on these rivers.

⁵ One successful, if limited, bilateral negotiation culminated in the Indus Waters Treaty of 1960 between India and Pakistan. See Crow and Singh (2000), as well as Sahni (2006).

⁶ See the discussion in section III, of conflict situations. See also Ohlsson (1995).

⁷ A more detailed description of these histories can be found in Crow and Singh (2000).

⁸ Problems with the Kosi extend to the nature of downstream solutions also. Flood mitigation embankments built in northern Bihar state have contributed to permanent waterlogging. Natural flooding has perhaps been replaced with a worse outcome (Sharma, 1999). The problem here is not transboundary spillovers, but simply one of neglecting the knowledge and interests of local experts and residents. In this sense, one can argue that a multi-track approach is warranted as well for purely internal flood mitigation issues.

⁹ As noted before, we do not exclude related environmental improvements such as reforestation and soil stabilization.

¹⁰ A loose analogy may be made with eBay, which provides a range of services that facilitate transactions, including information, tools for sellers and buyers, disclosure requirements, and other regulatory restraints.

¹¹ A parallel suggestion for an independent body to deal with South Asian environmental issues was made by a report to the UNDP (Romm, Rose and Crow 1997). The case for a regulatory body is made more pressing than it was in that report by the issues of China's development of the Tsangpo and the uncertainties raised by climate change and glacial melting.

¹² Several of these features may be found in the structure of ICIMOD as well.

¹³ This is based on Crow, et al, 1995, Table 18, Ch 8.

¹⁴ This includes water storage for dry season irrigation and monsoon flood mitigation.