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demands grow and supplies tighten:  
India, China, Nepal, Pakistan,  
Bangladesh**

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# The Management of Inter-State Rivers as Demands Grow and Supplies Tighten: India, China, Nepal, Pakistan, Bangladesh

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## **Abstract**

International cooperation over the major rivers in South Asia took a new turn with the signing in 1996 and 1997 of five innovative water, power and economic cooperation agreements. The innovations include four elements: (i) the transfer of some previously diplomatic questions into the sphere of the private economy, (ii) bringing third parties, other than governments, into the design and negotiation of cooperative projects, (iii) the principle of sharing costs and benefits, and (iv) taking steps toward multilateral discussion. However, political and implementation challenges have remained, and have been exacerbated by looming water shortages as economies grow and climate change occurs. This paper examines how recent innovations in diplomacy may be extended to address these challenges.

## **I Introduction**

The great 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.<sup>1</sup> 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 paper explores some of the possibilities opened up by recent innovations in international cooperation, as well as the new challenges.

We seek to address two challenges in particular. The first is that water flows are being changed by global warming. Glaciers and accumulated snow bodies are beginning to melt as global temperatures rise, and the pattern of monsoon and other precipitation may be changing. These changes will affect both the quantity of water supplied by South Asian rivers and the seasonal pattern of flows; river flows vary significantly between dry and monsoon seasons. Patterns of agriculture, residence, water supply, industry and riverine adaptation have been deeply influenced by this seasonal pattern. With glacial melting, flows may increase substantially (Milly, Dunne & Vecchia 2005: Figure 4) and flood peaks may shift to earlier in the year. 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.

The second challenge we seek to address concerns industrialization. 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.

A major new variable in the international management of South Asia's rivers comes from outside the region. The Brahmaputra-Tsangpo, which flows through India and Bangladesh, has its origin and main length in the Tibetan plateau. The total flow of the Brahmaputra exceeds that of the Ganges. China is therefore a significant potential player in the strategic game of managing South Asia's rivers. After the massive Three Gorges dam project, Chinese policymakers have been

considering damming the Tsangpo, among other large domestic water projects. But only this project has direct consequences for other nations. It is easy to recognize also 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.

In this first section, we describe the challenges of managing South Asian rivers, including a discussion of the relationship and differences between flood problems and potential benefits of irrigation and power generation, and . We also provide an overview of the region's international relations over water, and outline new directions enabled through multi-track diplomacy.

Section II introduces a range of conceptual issues relevant for negotiations over flood mitigation and water development: conflict over the allocation of property rights, who is included in the bargaining process, the scope of their negotiations, and the rules that govern the process. Section III introduces the concept of multi-track diplomacy, and applies it to the case of international river management.

Sections IV and V examine past problems with bilateralism, and the innovations incorporated in the five treaties signed in 1996 and 1997, how they relate to multi-track diplomacy, and how they address some of the past obstacles to successful agreement as discussed in Sections II and IV, and the subsequent implementation problems that have arisen. Section VI concludes by considering directions in which current innovations might be extended as bases of regional cooperation, using the multi-track diplomacy framework.

At the end of section V, we describe the wave of Himalayan water projects being designed and constructed at the beginning of the C21st. There are substantial issues to be addressed by an expanded group of countries depending on Himalayan rivers. 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.

### **The problems and the promise of South Asian rivers**

South Asian governments seek to control the great rivers of their region<sup>2</sup> because river control offers partial, but tangible, solutions to the most fundamental problems of rural poverty, industrial constraints, and urban stress that those governments seek to address. Often, the ways in which control has been sought -- through national visions, covert appropriation and bilateral bargaining -- constrain

what can be achieved. Climate change will complicate an already difficult situation, by increasing uncertainty and reducing supplies of water.

A significant community of scholars, officials and politicians<sup>3</sup> in South Asia argues that the region's rivers can be better harnessed in support of economic development. For example, George Verghese, a prominent former Indian-newspaper-editor and long-time proponent of river development, has written:

There is no reason why the immiserised population of this resource-rich [Ganges] Basin should remain poor and hostage to a recurring cycle of devastating flood and drought. There is sufficient indication that international funding and technical assistance will be forthcoming in ample measure if the Basin-states decide cooperatively to harness the waters of these mighty rivers, green the mountains and conserve 'losing ground'.<sup>4</sup>

A complementary view (Boyce, 1987), agrees about the promise of water development, and argues that conflict between rich and poor hinders the emergence of local cooperative institutions which could employ water resources effectively. Together these arguments make a powerful case for those types of river development which recognize the political and economic forces shaping current conflict at international and local levels.

To make more precise the different issues involved, we can identify three areas where there are potential benefits to be gained from improved water management and development. These are flood mitigation, water consumption (for agriculture and industry, as well as for drinking and other human uses), and power generation. In different circumstances one or two of these areas may be more salient, but they are typically interconnected. In some cases, this linkage is positive: for example, a single dam may assist in flood mitigation, water consumption and power generation. In other cases, however, there can be negative relationships, where pursuing water development for one goal, such as flood mitigation, may limit water consumption for a set of users. The specificity of these relationships with respect to topography, hydrology, social institutions and other factors complicates analysis and implementation of policies to actualize any potential benefits. Further complications come about from uncertainty, lack of technical expertise, lack of understanding of interrelationships among technical, social and environmental factors, and diversity in the locus of beneficiaries and those who bear the (often substantial) costs involved in realizing benefits. Many of these issues underlie our subsequent discussion.

In 2008, a substantial phase of hydroelectric power development is underway in India, Nepal, Pakistan, and not least China. Concerns to expand, and ensure reliability of, electricity supply for industrial and urban uses in India and China, and to avoid the greenhouse gases of coal-fired power generation, lie behind this phase of water development.

Wood (1999: 731) reminds us that ‘water management is a democratic not a technocratic issue.’ And, in several parts of South Asia, water development has become the focus of social organization (Phadke 2002; Agarwal and Narain 1997; Adnan 1993). Flood mitigation, in particular, is centrally about democratic representation as well as technical possibility. The demise of the G8-backed Bangladesh Flood Action Plan underlines that conclusion. This well-intentioned and potentially well-financed initiative foundered when groups of donors disagreed over the best approach to take to flood mitigation, and most centrally, when it became apparent that local and international nongovernmental agencies opposed the plan. Much good research and investigation was funded in the aftermath of the plan, but the initiative to finance flood mitigation schemes was lost (Wood 1999; Adnan 1993; Paul 1995; World Bank 1997).

Flood mitigation has diffuse consequences for livelihoods, and requires popular support for its implementation. Therefore, where international negotiations are involved, the democratic space for negotiation opened by multi-track diplomacy may be preferable to the confines of intergovernmental negotiation. These benefits may also be realized with respect to international management of water availability, which promises to be an increasing problem as demands grow along with the region’s economies, and as climate change starts to affect sources of supply. Through improved representation of multiple stakeholders, multi-track diplomacy could generate better plans and wider political support for those plans.

## **II Facilitating Cooperation: Conceptual Issues<sup>5</sup>**

In this section, we describe in abstract the problems in achieving cooperation, and how these arise in the case of managing international. Cooperation can occur when mutual benefits are possible. However, the existence of mutual gains is not sufficient for cooperation: the prisoner's dilemma is the most famous example of failure to achieve mutual gains. In the prisoner's dilemma game – given the relative payoffs of different courses of action – the inability to communicate and, especially, to commit to a binding agreement, are the sources of this failure. In the case of international diplomacy, constraints on communication may matter, but the inability to enforce agreements is more likely to be a problem.

Cooperation can be achieved in a prisoner's-dilemma-type situation by changing the structure of payoffs. This may be done, for example, through allowing for repeated interactions, the existence of certain kinds of asymmetric information about the preferences of players,<sup>6</sup> the ability to punish violation of agreements, or tying the game to other games that are also taking place between the players. The game remains one of noncooperative behavior, but such behavior can support a cooperative outcome in the expanded game. While some types of asymmetric information help resolve the prisoner's dilemma, in other cases, incomplete information makes achievement of mutual benefits limited or even impossible, this being a version of the “lemons problem.”<sup>7</sup>

This abstract discussion helps to focus on the following questions in discussing how cooperation in the management of water resources may be facilitated. First, are there truly potential mutual benefits, or is the situation one of conflict (one party can only gain at another's expense)? Second, if the answer to the first question is negative, can the situation be redefined (e.g. broadened in scope by considering other dimensions, or repeated interaction) to transform it to one of potential mutual benefit? Third, what are the impediments to actually achieving mutual benefits: uncertainty, asymmetries of information, exclusion of key parties affected by the transaction, or inefficient bargaining protocols? Obviously, the answers to all three questions will overlap. We will explore the experience of international negotiations over the use of South Asia's water resources in this framework. To illustrate, we briefly consider the Indus waters case.

Which governments ‘owned’ the five rivers making up the Indus system was the basis of dispute between India and Pakistan after independence and partition in 1947. There was uncertainty about property rights, which made any *de facto* property rights of limited value. However, any division of the flows was viewed as potentially providing a gain to one side at the expense of the other. This is the common problem in the allocation of property rights: mutual benefits from agreement are unclear or nonexistent. The Indus Waters Treaty of 1960 established that the rivers would be divided between India and Pakistan. This division resolved the property rights, but to either Pakistan or India’s disadvantage, depending on who bore the cost of investments required to make the proposed division workable. Intervention that changed the nature of the game came in the form of external funding via the World Bank. Secure property rights and financing from the World Bank allowed each country's share of the system to provide much more than could have been achieved while property rights were uncertain.

The example illustrates answers to the first two questions above: a situation of conflict was transformed in a simple way to one of mutual benefit, by a third party



“sweetening the deal.” The answers, and the solution to the problem, however, are both limited. The theoretical issue of why the World Bank intervened can be answered briefly: the geopolitical incentives underlying that institution and its backers determined this role. The practical solution to the Indus waters problem was limited, however, because the waters that “belong” to Pakistan partly flow through Indian territory. If optimal usage of these waters requires large fixed investments, a different set of issues, well beyond the allocation of property rights to water, arise. In fact, these issues have prevented such investment occurring. To the extent that flood mitigation requires such investments, the difficulties are greater than those inherent in the case of agreeing on the sharing the Indus waters. We turn to these issues after discussing the problem of allocation of property rights.

### **Conflict and cooperation**

A situation of pure conflict is one where no mutual benefits are possible: in a bilateral negotiation, a gain for one party must result in a loss for the other. A simple reallocation of property of rights is therefore a situation of pure conflict. Therefore, to the extent that international river disputes are disputes over property rights, one would be pessimistic about resolving conflict. Only when property rights are sorted out can mutually beneficial agreements contingent on those rights be contemplated. This suggests that mutually beneficial international flood mitigation agreements may require more basic conflicts over rights to be sorted out first.

Several factors soften this pessimism, and provide the basis for our subsequent analysis. While the geography of rivers and underground aquifers creates *de facto* property rights, even when there is no explicit agreement on rights, these property rights may be uncertain enough that a certain right to less may be more valuable than an uncertain claim to more. Thus the removal of uncertainty on one or both sides in a bilateral negotiation may create the scope for mutually beneficial agreement. One example of the benefits of the removal of uncertainty would be in the perceived returns to investments that support the effective management of water resources.

Another way of going beyond a situation of pure conflict is to expand the dimension of the bargaining space. The relinquishing of a property right, or a claim to a right, can be compensated by a transfer in the opposite direction, just as in any mutually beneficial trade. The transfer in this case may be of money, material goods or intangibles such as security. This need not involve going outside the sphere of conventional diplomacy (including commercial diplomacy), but private exchanges may be helpful, for reasons we discuss below. On the other

hand, if negotiations over water rights are tied to other relatively intractable conflict situations, expanding the space of bargaining may make agreement more difficult. Thus, linking the issue of how China controls the water of the Tsangpo within its own territory is likely to be complicated by connecting it to the long-frozen dispute over India's northeastern boundary.

While multilateral negotiations do not provide any direct advantage with respect to the resolution of property rights conflicts, the different aspects of ameliorating conflict that we have outlined apply to multilateral as well as bilateral bargaining situations.

### **Property rights and investment**

While we have noted above the benefits for water-related investment of a transformation of uncertain claims into certain property rights, we earlier pointed out the limits of this transformation in the Indus case. Here we explain these limits. As we remarked earlier, the river waters allocated to Pakistan through the Indus treaty partly flow through Indian territory. The treaty rules out consumptive uses of this water –such as irrigation – by India. What about nonconsumptive uses such as hydroelectric power? In principle, India should be able to negotiate such uses and undertake the investments required. However, Pakistan might desire to monitor the investment to make sure that no water is being diverted. Such monitoring would raise currently insurmountable issues of security and sovereignty. Even greater problems would arise with respect to Pakistani investment within Indian territory. As a result of these issues, the full hydroelectric potential of the Chenab and Jhelum remains untapped.<sup>8</sup> Both Pakistan and India, as we note in Section V, are currently in a race to develop hydroelectric projects on the Jhelum. Flood mitigation investments that are made in one country to benefit another country are subject to similar potential monitoring problems.

### **Bilateralism vs. multilateralism**

Bilateralism has been an important aspect of India's policy with respect to its South Asian neighbors. Bilateralism may be justified for all parties in terms of simplicity of negotiations or, for some participants in the negotiations, as a way of avoiding opposing coalitions and preserving bargaining power. However, in the case of rivers flowing through more than two nations, or where an entire river basin spans more than two territories, bilateral bargaining may neglect positive and negative externalities, and limit the mutual benefits of possible agreements on water development and usage. Bilateralism combined with conventional barter diplomacy may also limit the gains from trade, though in this case it is the lack of

fully transferable value that is the culprit, rather than bilateralism. Hence it is the existence of externalities that provides a case for multilateralism over bilateralism in negotiations over the management of international river waters.

### **Private exchange vs. diplomacy**

Conventional diplomacy is characterized by barter, either involving specific items, or of broader scope (general reciprocity). More and more, over time, diplomacy has extended to the commercial sphere, covering international trade and investment in particular. Again, this can involve specific exchanges between governments or, instead, the setting of rules under which private parties operate. Whether the actual exchange takes place between governments or private parties depends on who owns the potential objects of trade.

Natural resources such as river waters have conventionally been treated as government-owned, and therefore international negotiations over their shared development and use have been firmly in the sphere of diplomacy, albeit with economic components and economic implications. Where private parties, such as farmers and industrialists, have been the ultimate users of water (for irrigation, power and navigation), they have had only an indirect say in such negotiations, through political influence or political pressure. This political model has also governed the domestic allocation of water at subnational levels, through politically determined pricing and investment subsidies.

What changes with private involvement in water development decisions, whether at the subnational or the international level? To the extent that ownership is transferred to private entities, decision-making will be determined by different objective functions. Private entities may range from corporations that maximize profits to nongovernmental organizations (NGOs) that maximize some aggregate measure of their members' welfare. Though governments may also theoretically maximize aggregate welfare, in practice, the incentive mechanisms to enforce this may be too weak, particularly at the national level. Thus, even for public goods such as flood mitigation, the greater involvement of different stakeholder groups may be beneficial: this is the point taken up more explicitly in considering multi-track diplomacy in the next section.

Even if ownership is not privatized, when private parties are involved in sharing the costs and benefits of water development, their objectives will have a more direct impact on decision-making than in the conventional model of political influence. We can think of their participation in contracting and bargaining as similar to multilateralism in extending the set of those who bargain. If this helps to internalize externalities, then greater efficiency in bargaining may be realized. A

further benefit goes beyond overcoming externalities. While the nations in a multilateral negotiation are determined by geography, private entities such as multinational firms can be asked to compete for seats at the bargaining table, enhancing the potential gains to others involved in the negotiation. Competition is an important idea here – if the selection of private parties is determined through private influence activities, efficiency may be lost. Hence transparency and accountability in determining who comes to the table is a first requirement.

The inclusion of private parties in negotiation over water development and use not only changes objectives, but can also make them more transparent. National governments may not have easily identifiable objectives, since they are a complex mix of the preferences of constituents, politicians (the agents of constituents) and bureaucrats (the agents of politicians). Lower level governments provide some degree of disaggregation, but subnational private entities are required to be more open about their goals and performance than is traditional for governments in South Asia. This comes about through home country corporate disclosure requirements, assuming that these are strong enough. In this context, the country of origin can matter greatly – a Chinese state-owned enterprise will likely be less transparent than a private firm from a Western industrialized country. One can conjecture that greater transparency will, on the whole, aid agreement in water negotiations.

There are two final implications of the inclusion of private parties. First, there is, perhaps, greater flexibility in the kinds of contracts that can be signed. In principle, there is nothing to stop governments from signing commercial contracts (including those specifying sharing of costs and benefits), but there may be problems due to incomplete information: in particular, the appearance of possible impropriety may prevent even the signing of honest contracts. This again assumes that profit-making entities have better internal monitoring and mitigation mechanisms, and accountability to external stakeholders. A stronger argument is based on commitment. Sovereign governments may not be able to credibly commit to certain kinds of agreements, while private parties can. This simply reflects the nature of sovereignty. Governments can expropriate and renege on contracts involving private parties, but this may involve greater reputation loss than breaking or bending vaguely worded treaties.

Overall, therefore, it may be that the inclusion of private or nongovernmental entities in negotiations over water development and use implies changes more profound than those involved in shifting to multilateralism. At the same time, the role of private parties would be impossible or severely limited without both those

changes. We turn now to the recent experience in South Asia, with a focus on multi-track diplomacy, as well as multilateralism.

### **III Multi-Track Diplomacy**

The inclusion of private parties in international negotiations, which we have discussed in the previous section, can be subsumed in the general concept of multi-track diplomacy. Originally, ‘Track II diplomacy’ was distinguished from traditional (hence Track I) diplomacy,<sup>9</sup> and characterized by third party interventions, including the participation of non-policymaking officials and non-governmental leaders in negotiations. The advantages of this two-track approach are thought to include a shift in focus from ‘positions’ to ‘interests’, and an avoidance of government officials and policymakers risking their public positions. “Since the participants in the discussions are not ultimate decision makers, there are no high-level (Track I) public commitments and policy-making.”<sup>10</sup> Beyond such benefits, there is also the possibility of incorporating economic matters more explicitly, as we discussed in the previous section.

After the original formalization of ‘two-track’ diplomacy, there have been various attempts to refine the concept. McDonald and Diamond (1996) elaborated McDonald’s initial five-track classification to come up with a nine track ‘system’. The nine tracks in this system are government, nongovernmental professionals, business, private citizens, researchers and educators, activists, religious organizations, funding agencies, and the media. We would tend to agree with critics<sup>11</sup> that this classification loses analytical crispness. Nevertheless, it highlights the different actors and channels of interaction that are possible once official avenues of diplomacy are supplemented. Perhaps the most useful distinction is one which allows for three tracks, with Track II including all interactions involving nongovernmental elites, whereas Track III encompasses grassroots actions by those directly involved in, or affected by, the conflict. This classification is what we adopt in this paper.

There are at least two ways in which a wider diplomacy might open new options. The first relates to the planning, negotiation and financing of large-scale schemes. A wider diplomacy, including new actors with different mandates and incentives, could make 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. For example, there are some advantages to large-scale flood mitigation. For example, 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. 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, of course, a rich, and only partially documented, history of small and large-scale water development in India. That history offers examples of small-scale initiatives that could assist flood mitigation as well as drought mitigation (Rosin 1993; Agarwal and Narain (eds.) 1997)

It is possible that multi-track diplomacy 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.

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. Is this so different from what is envisaged for the sale of power in the India Nepal Power Trade Agreement of 1996? There is a history of cross-border trade in electric power. Trade in water services would require research and innovation, not least to develop appropriate units and prices. 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, i.e., 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, 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 section V.

In section IV, 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, 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) making steps toward limited multilateral discussion.

It will be seen that these new directions are all aspects of the conceptual issues treated in section II. 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*

Social practices with distant origins dictate that certain issues are economic and others diplomatic. In the diplomatic sphere, a range of issues of national interest, possibly including economic matters, are negotiated by governments. In the private economic sphere various exchanges of trade, investment, lending and labor are negotiated between private parties, and government regulates only the broad framework.

There are contrasts between diplomatic and private economic practices which suggest that there are advantages to the transfer of some international river negotiations from diplomacy to commerce. As noted in section II, 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.

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 1996-7 agreements relates to the inclusion of third parties such as corporations, local governments and nongovernmental organizations (NGOs) in international negotiations. 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. 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 addition, projects to harness natural resources have uncertain benefits and costs.

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) Making 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 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.

#### **IV Impediments to Agreement: Is there need for a multilateral institution?**

International river negotiations frequently take many decades before agreement can be achieved. 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,<sup>12</sup> 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, perspectives, has slowed the achievement of cooperation and river development.<sup>13</sup>

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 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.

This policy of bilateralism is a complex aspect of Indian foreign policy. We argue here that it constitutes a serious obstacle to achieving the potential of South Asian water resource development. Two alternative perspectives on bilateralism can be identified.

Firstly, spokespersons for the Indian Ministry of External Affairs have emphasized the additional complexity and duration implied by multilateral negotiations<sup>14</sup>. In this perspective, 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.

A second perspective on bilateralism, sometimes found in political and academic discussion in Nepal and Bangladesh, is that bilateralism 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. One important point to note is that the inclusion of China in any regional discussion of water management will have a profound impact on the bargaining occasion, and will have to be structured carefully to overcome potential Indian concerns.

The emphasis on bilateral relations 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.<sup>15</sup> 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. 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.<sup>16</sup>

These myths, with complex foundations in the colonial division of the subcontinent, as well as in the technical uncertainties and ambiguities of water development, 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.

Examination of the historical record and of national water proposals (Crow and Singh 2000: 1911-1913) illustrates how nationally constituted visions of water resource development frequently overlook the concerns of neighbors. Thus, when India and Bangladesh approached Nepal, the concerns of Nepal were overlooked. And, when India decided to build the Farakka Barrage in the early 1960s, Nehru was convinced (presumably by his engineers) that it would cause 'no real injury' downstream.

Recent visions of national water development express national visions making little accommodation to the concerns of other states. There has been no recognition that compromise might achieve greater benefits for the region. To some extent, these visions were shaped by the failure of conventional bilateral diplomacy. In section V, we examine recent innovations and future directions that may overcome this failure.

## **V Innovations at the international level**

At the end of this section we 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 1 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. The beginning of a more flexible and inclusive framework for achieving such benefits was set by the agreements of 1996-7.

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.

### **Five International Agreements**

The four 1996 agreements<sup>17</sup> establish innovations for South Asia, with only limited precedent elsewhere, which start 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 begin creating 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 broad terms, the India-Nepal Power Trade agreement transfers negotiations for the sale of hydroelectric power from the purely diplomatic to the economic sphere, and in doing so brings agencies other than national government into the process. The Mahakali Treaty establishes a process of sharing future benefits of water resource development on the Mahakali River (the border river between Western Nepal and India). The Tala Hydrel Project negotiations illustrate a process similar to that envisaged in the Mahakali Treaty, at a later stage of negotiation. The Ganges Treaty resolves 40 years of dispute about dividing the low flow of that river.

In principle, the 1996-7 treaties established a basis for the steps discussed in Sections II Facilitating Cooperation and III 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 provides an important precedent for dealing with uncertainty in river development, one which could be extended to encompass uncertainties resulting from glacial melting. Then, 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.

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.<sup>18</sup>

**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. It is for this reason that we propose, in Section VI, that a new independent regulatory body could be established to facilitate the potential for regional benefits, and more effective representation.

### **The new phase of Himalayan hydroelectrics**

A wave of hydroelectric dam construction is starting in the Himalayan valleys of Nepal, Pakistan and India (refs). 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 multilateral diplomacy, multi-year power purchase agreements, and multilateral 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 2 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 3000 MW Dibang multi-purpose project on January 31 2008. Oddly, the stone was laid in Itanagar, the capital of Arunachal, 600 km from the dam site (Dharmadhikary 2008).

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 3000 m in 200 km. This is a location long known by engineers as a site with unrivaled potential for hydroelectricity. China also proposes to divert large, but so far not publicly divulged, quantities of water from the Tsangpo several hundred kilometers to Xinjiang and Giansu. 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%) during the four monsoon months (between June to September), and "too little" (20%) for the remaining eight months.<sup>84</sup> 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<sup>nd</sup> 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% of income) and taxes (0.5% of exports), the Nepal government has arranged to receive 22% 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 to 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, located on land claimed by both India and China since the 1961 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.

## **VI Conclusion: A Way Forward**

Three kinds of obstacle have constrained intergovernmental negotiations over water in the past, and contributed to the rise of significant tensions between states. Firstly, 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. Secondly, 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. Thirdly, 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 embody 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.

Our discussion of multi-track diplomacy gives us a conceptual framework for postulating some specific features of a potential regulatory institution. 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. Participation by the governments concerned is also necessary, of course, and one would expect it to be through the appointment of seasoned foreign policy experts. 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. 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.

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.

China's presence in such a body 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.

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 subnational 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 subnational 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 paper. 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. The Mekong River Commission can 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.

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TABLE 1 POTENTIAL INTERNATIONAL TRANSACTIONS IN SOUTH ASIA<sup>19</sup>

<b>Potential parties</b>	<b>Good or service</b> (Exchange: † occurring to some extent, * discussed, Ω suggested)	<b>Type of exchange anticipated</b>
Nepal to India	Supply of hydro-electric power *	Monetized
	Supply of water storage benefits <sup>20</sup> *	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



TABLE 2: LARGER HYDROELECTRIC AND DIVERSION PROJECTS IN THE HIMALAYAS CURRENTLY IN PLANNING OR CONSTRUCTION

Project and size	Location	Current position and parties
<b>China</b>		
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
<b>India</b>		
Baglihar	Kashmir, Chenab River -> Indus (2005 complaint to Bank?)	
Dibang 3000MW multipurpose	Dibang river, E AP, Arunachal Pradesh	Fndn stone laid in Ita nagar by PM Jan 08
Kishenganga 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 Pradesh	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 Pradesh	NHPC. Alstom beats Bhel?
Tipaimukh 1500 MW	Barak, Kushia ra, -> Meghna, Assam, Manipur, Mizoram	Protests India and Bd. Flood other goals wd make unfeasible. NEEPCO implementing
<b>Nepal</b>		
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 1 0,800 MW		China Exim Bank SMEC. SMEC to do with BOOT? West Seti Holdings owned by SMEC. PTC 4.9 c per kw
West Seti 750 MW	Nepal Completion 2013. Const start nov 07	
<b>Pakistan</b>		
Neelum Jhelum Hydel 963MW		Pak seeks \$800 m from WB, ADB, IDB 3 Chinese companies? MOU 2006?
Diamer Bhasha \$4 bn		Announced 2006 Lahmeyer const blacklisted

## Endnotes

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

<sup>2</sup> The topography of these rivers is, briefly, as follows. The Indus and its tributaries begin in the Himalayas and their foothills, then flow west and southwest through Kashmir and (Indian and Pakistani) Punjab, and finally southwest to the Arabian Sea through Sindh in Pakistan. The Ganges has its headwaters in the Himalayas of Nepal, China and India. It flows south from the Himalayas, before turning east to dominate the geography of North India as it flows through the states of the Ganges plain (Uttar Pradesh, Bihar, West Bengal) and into Bangladesh, where it turns south as it joins the Brahmaputra before emptying into the Bay of Bengal. The Brahmaputra flows west to east through much of the length of the Tibet region of China (where it is called the Tsangpo), before falling 7,500 ft from the Himalayas to the plains of Assam, and turning through almost 180 degrees to flow east to west, then it turns south into Bangladesh, where it joins the Ganges.

<sup>3</sup> For example: Verghese (1990), Gyawali and Dixit (eds) (1994), Ahmad, et al (1994), Verghese and Iyer (eds.) (1993), Ahmad et al (1993), Thapa, et al (eds.) (1995).

<sup>4</sup> See Verghese (1990).

<sup>5</sup> This section is based heavily on Crow and Singh (2000).

<sup>6</sup> For example, one player in the prisoner's dilemma may assign a small probability to the possibility that the opponent simply plays "tit-for-tat".

<sup>7</sup> The "lemons problem" arises when one party in a transaction does not have complete information about the value of the trade. For example, a potential buyer may be uncertain about the quality of a good being sold. If the buyer uses average quality as a basis for making offers, high quality goods are withdrawn from the market, leaving only "lemons". Mutually beneficial trades then fail to be consummated.

<sup>8</sup> This discussion is based on conversations of the second author with Indian officials of the Indus Waters Commission.

<sup>9</sup> Joseph V. Montville, a former U.S Foreign Service officer, apparently introduced the term Track Two Diplomacy in 1982 (Montville, 1982). In his words, Track II Diplomacy signifies "unofficial, nonstructured interaction between members of adversarial groups or nations that is directed toward conflict resolution through addressing psychological factors." (Montville, 1987).

<sup>10</sup> See Haddad (1996).

<sup>11</sup> See, for example, Bavly (1999).

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<sup>12</sup> 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.

<sup>13</sup> One successful, if limited, bilateral negotiation, culminated in the Indus Waters Treaty of 1960 between India and Pakistan. See Crow and Singh (2000).

<sup>14</sup> Interviews with the first author.

<sup>15</sup> See the discussion in section II, of conflict situations. See also Ohlsson (1995).

<sup>16</sup> A more detailed description of these histories can be found in Crow and Singh (2000).

<sup>17</sup> 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 17th 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 29th 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, 12th December 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.

<sup>18</sup> 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.

<sup>19</sup> Based on Crow, et al, 1995, Table 18, Ch 8.

<sup>20</sup> Including water storage for dry season irrigation and monsoon flood mitigation.