

Impediments and Innovation in International Rivers: The Waters of South Asia

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Abstract

International cooperation over the major rivers in South Asia has become much closer in the last several years, despite nuclear tests in India and Pakistan, and rising tension between those states. Five important treaties or agreements, signed in 1996 and 1997, against a background of greater regional economic and nongovernmental contact, could facilitate significant progress to mitigate flooding and drought, to provide a basis for greater regional cooperation, and to sustain irrigation expansion and industrial development. This paper identifies past impediments to cooperation, then examines how new agreements seem to offer negotiation on a wider range of issues than has previously been considered, and to expand the range of institutions involved in negotiations. Most notably, the new agreements expand the range of potential negotiating bodies beyond national governments to include cities, corporations, local governments and nongovernmental organizations. This integration of diplomacy and economics could have far-reaching implications elsewhere, as well as in South Asia.

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I The Conflicts and the Possibilities of South Asian Rivers

The great rivers of South Asia, particularly the Ganges and Brahmaputra, have been the subject of at least four decades of discussion between governments of the region. While those discussions have continued, until 1996 with little productive outcome, the 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 There is nevertheless a growing consensus that the perils of the rivers can be turned into prosperity. This paper explores some of the possibilities opened up by recent innovations in international cooperation.

In this first section, we describe the promise of South Asian rivers, provide an overview of the region's international relations over water, and outline the new directions opened by the agreements of 1996 and 1997. Section II explores the course of past diplomacy with case studies of the limited success of the 1960 Indus Waters Treaty between India and Pakistan, and of the Ganges river dispute between India and Bangladesh, including how this dispute colored a subsequent unsuccessful attempt at regional cooperation. Section II concludes with a description of grand visions of regional water and power development which have been expressed by the governments of India and Bangladesh. Section III introduces a range of conceptual issues relevant for negotiations over water development, such as 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. These issues are related to the historical problems in South Asian river development discussed in Section II. Section IV examines the innovations incorporated in the five treaties signed in 1996 and 1997, and how they address some of the past obstacles to successful agreement as discussed in Sections II and III. This section also considers parallel innovations at the local level, as well as suggesting directions in which current innovations might be extended as bases of regional cooperation. Section V provides a summary conclusion.

The problems and the promise of South Asian rivers

South Asian governments seek to control the great rivers of their region² because they offer partial, but tangible, solutions to the most fundamental problems of rural poverty, industrial constraints, and urban stress that those governments seek to address. At present, the ways in which control has been sought -- through national visions, covert appropriation and bilateral bargaining -- constrain what can be achieved.

There is a growing community of scholars, officials and politicians³ in South Asia that believes 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 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'.⁴

An American economist, James Boyce, reinforces this argument from a different point of view (which will be described below):

Nowhere on earth is the contrast between the lushness of the landscape and the poverty of the vast majority of the people more striking. Nowhere is the gap between what is possible and what exists more poignant.⁵

These two writers agree about the promise that water development holds. They have contrasting, but not inconsistent, views about why poverty persists. Verghese argues that international conflict over the rivers is an important obstacle to utilizing their potential. Boyce presents a widely-debated case 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.

This argument was echoed in the US Congress in 1996 with a concurrent resolution urging South Asian governments to 'redouble their efforts to devise development projects that could relieve the poverty of those people living in the Ganges and Brahmaputra River Basin and address the critical problems of flooding and drought...'⁶

Failure of past negotiations

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, discussed in Section II, negotiations over water have been exclusively bilateral, that is, involving only two states. India, in fact, has repeatedly insisted on this bilateralism, a point we will take up again in Section II.

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 (see Section II).

The governments of India and Nepal have had many rounds of sometimes tense negotiations relating to hydroelectricity generation, irrigation water, and flood control, 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.⁷

In section II, 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 (this approach to diplomacy is termed *bilateralism*) and competing national visions for water development.

New directions

Though these obstructions persist, recent agreements open 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 tentative steps toward limited multilateral discussion.

These innovations bring new ideas, processes and parties to the negotiations and help to address uncertainties about the natural world, and about the outcome of human intervention in the natural world. The directions that these innovations suggest will be examined briefly before we turn to more detailed examination of the particulars of past negotiations and recent agreements.

The first new direction concerns the borders of diplomacy. 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 only the broad framework is regulated by government. The distinction between the two spheres, and international practices to be followed within them, are periodically a matter of public debate, as in the free trade debates of 18th and 19th century England, and the late 20th century return to those debates, around various GATT negotiations, NAFTA and so on. These recent trade negotiations are a significant example of "economic diplomacy". It is also true that the boundary between public and private shifts over time. Developing country governments such as India's intervened heavily in the domestic economic sphere, and this carried over to negotiations with other countries. For example, India's ties with the Soviet Union were represented by a complex mix of political and economic agreements. However, this approach did not extend to diplomacy within South Asia.

There are contrasts between diplomatic and private economic practices that suggest that there are advantages to the transfer of some international river negotiations from diplomacy to commerce. 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 set of contrasts suggests that negotiations within the private economic sphere 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, and is discussed in Sections III and IV.

The second new direction suggested by the 1996 agreements relates to the inclusion of third parties such as corporations, local governments and nongovernmental organizations 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.

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 and other human interventions, constitute a significant source 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.

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 that 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. These issues are taken up in Sections III and IV.

II Impediments to Agreement: Bilateralism and National Visions

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 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,⁸ 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 and planning, have slowed the achievement of cooperation and river development. We briefly discuss one successful, if limited, bilateral negotiation, which culminated in the Indus Waters Treaty of 1960 between India and Pakistan. We then examine India's policy of bilateralism more broadly, and its consequences for India, Bangladesh and Nepal in past river negotiations.

The Indus waters dispute

Disputes over the use of the waters of the Indus and its tributaries date back to the 19th century.⁹ However, until the independence and partition of India and Pakistan in 1947, these disputes were inter-provincial. They could be and were resolved by the central government, typically with the aid of appointed commissions. This kind of dispute resolution mechanism, still used for inter-state disputes in India, is no panacea, but the aftermath of partition raised a much more serious conflict.

The rivers supplying Pakistan's irrigation system first flowed through Indian territory, and India temporarily attempted to divert some of these flows for its own use, a year after partition, in 1948. In an early example of Indian bilateralism, India at first declined Pakistan's proposal for arbitration. However, India subsequently accepted an offer from the World Bank to mediate, and three-way negotiations began in 1952. Initially, the Bank attempted to frame proposals for joint development and use of the entire Indus basin, but this foundered on the rocks of hostile relations and sovereignty concerns.

In 1954, the World Bank offered a simple alternative: a division of the Indus and its tributaries, with India to receive the waters three southern and eastern rivers (Ravi, Beas and Sutlej) and Pakistan the other three (Indus, Jhelum and Chenab). Since Pakistan relied on irrigation from the eastern rivers, it would require storage dams and link canals for the western rivers to replace its historical use of the eastern rivers.

The proposal had the virtue of simplicity and practicality, but was threatened by the issue of cost, and who would pay. It was originally proposed that India pay only for link canals, but, after study, the storage dams were added to this requirement. India balked at the high cost. The agreement was rescued by external funding from several countries for the required investment, through the auspices of the World Bank, and the Indus Waters Treaty was signed in 1960. The canals and dams were constructed as scheduled, and a permanent bilateral Indus Commission was set up for general management and conflict resolution with respect to engineering works or other matters.

The Indus Treaty can therefore be considered a success, albeit a limited one. It involved going beyond bilateral talks, though only two nations were involved in the dispute and negotiation. Some disputes that have arisen over the design and construction of engineering works on both sides have not been easy to resolve, and no joint project has been proposed, let alone undertaken. Repeated hostilities and generally suspicious and non-cordial relations between India and Pakistan have determined this state of affairs. Even in the absence of such problems, however, joint development poses general difficulties that we discuss in Section III.

Bilateralism

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. The first, he argues, is acceptance of India as the major regional power. Then, he describes bilateralism as follows:

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.¹⁰

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

Firstly, spokespersons for the Indian Ministry of External Affairs have emphasized the additional complexity and duration implied by multilateral negotiations¹¹. 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 is sometimes to be found in political and academic discussion in Nepal and Bangladesh. This is the suggestion 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.

This 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.¹² 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.

The case that follows illustrates how bilateral negotiations create obstacles to regional cooperation. It begins with negotiations between India and Bangladesh, primarily about the sharing and development of the Ganges, and continues with how this history affected the first multilateral discussion, among India, Bangladesh and Nepal, about regional water development.

From conflict over the Ganges to claims on Nepal's rivers

In South Asia, the conflict between India and Bangladesh over the waters of the Ganges is generally known as the Farakka dispute. This name comes from the government of India's construction, in the 1960s, of a large barrage¹³ across the Ganges at the small town of Farakka, 11 miles upstream from the Indian border with Bangladesh. The barrage was constructed to divert water down the river Hooghly (a distributary of the Ganges) to improve the access of ships to Calcutta Port, which is connected by the Hooghly to the sea. The government of Pakistan and, after 1971, the government of Bangladesh opposed the construction and operation of the barrage because they perceived (rightly) that the reduction in the dry season flow of the Ganges would have serious implications for East Pakistan/Bangladesh.

The dispute has long since ceased to be primarily about the water diverted by the Farakka Barrage. These waters have been overshadowed by larger (but never publicly calculated) diversions further upstream for the development of irrigated agriculture in India. The conflict over the sharing of the Ganges arises primarily because the dry season flow of that river cannot sustain the irrigation needs, as currently estimated (possibly with exaggeration) of both countries.

The conflict over the Ganges can best be understood, at least initially, by examining the different chronological phases through which it has developed.¹⁴ Table 1 summarizes those phases.

In the 1950s, shipping companies using the state of West Bengal's Calcutta Port, and the industrialists and politicians of the state, thought that the port's decline could be reversed if water from the river Ganges could be diverted to 'flush' the channel of the river Hooghly. The 'flushing' thesis was, and remains, controversial.¹⁵ Nevertheless, the government of India decided in the early 1960s that the barrage should be constructed. Indian Prime Minister Jawarhalal Nehru pronounced himself satisfied that there would be no significant consequences for East Pakistan.¹⁶ The government of Pakistan occasionally objected to the Barrage throughout its construction during the 1960s.

When East Pakistan gained independence as Bangladesh in 1971, the Farakka Barrage was still under construction. Independence brought to power a party, the Awami (People's) League, which had recently made a pledge that '[e]very instrument of foreign policy must be immediately utilized to secure a just solution of this [the Farakka] problem'.¹⁷ Relations between Bangladesh and India were, nonetheless, much more cordial than they had been between Pakistan and India. A 25-year 'Treaty of Friendship' was signed, and, the new Bangladesh government began to shift from the complete opposition of its predecessor to negotiations about the operation of the Barrage, and an interim agreement for trial operations was signed in 1974.

This phase of the conflict was brought to an end with the electoral defeat of the Congress Party government in India in 1977, and the signing, six months later, of the 1977 Ganges Waters Agreement.¹⁸ The Agreement laid down the division of the dry season flow in the Ganges, and began a phase of discussions about how best to increase that flow in the lower reaches of the Ganges. The incompatibility of national visions of water development emerging in these discussions meant that no agreement could be reached on how to increase the dry season flows. After brief extensions to the sharing agreement, minus the written guarantee of minimum dry season flows, discussions about flow augmentation ended and the agreement lapsed.

The Farakka Barrage created a dispute about the waters of the Ganges that has influenced, and continues to influence, subsequent discussion of water policy. The focus on India's Farakka Barrage, encouraged by the bilateral boundaries of the discussion, seems to generate a narrow, nationalistic discussion that ignores wider possibilities and sustains debilitating myths.

Two of these myths are as follows. In Bangladesh, the Farakka Barrage has been widely portrayed in political and media discussions as a symbol of India's evil intent toward Bangladesh. Technical controversy about the 'flushing' process through which the barrage was expected to save the port of Calcutta and its industrial hinterland, as well as India's failure to recognize the downstream consequences of the project, left space for the assertion that the barrage was built *because of* its deleterious effects on Bangladesh (then Pakistan).¹⁹ A second myth of Indian malice has also been widely repeated. This is the assertion that India can cause flooding in Bangladesh through the release of water stored behind the Farakka Barrage. Brief description of the barrage (see footnote 13) indicates that it is unable to store more than trivial quantities of water, far too little to have a significant effect on floods in Bangladesh.

These myths (which have 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' in which the gains of one party are the losses of another. 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.

The next part of this case is the story of how the governments of India and Bangladesh arranged a meeting with the government of Nepal to discuss river waters. The agenda of the meeting was almost entirely determined by the concerns of the two larger states, and the bilateral discussions they had previously generated. Their history of bilateral relations ensured that the concerns of Nepal were omitted from the agenda.

In the aftermath of a 1985 cyclone devastating some of the southern islands of Bangladesh, Indian Prime Minister Rajiv Gandhi flew to Bangladesh to offer Indian assistance. He met Bangladesh President Ershad and, amongst other topics, they discussed the question of sharing the Ganges. This meeting began a new series of discussions and initiatives and an interim ‘memorandum of understanding’ was signed in November 1985. They met again the next year, and agreed that the two governments should make a joint approach to the government of Nepal. Despite considerable ambiguities about the terms of reference of the meeting, and what was not to be discussed, the meeting took place in Kathmandu in October of 1986.

The most evocative description of what transpired in this three-day meeting comes from an Indian participant, who describes the representatives of Nepal “repeating ‘mutual benefit’ like a mantra” in response to all requests and discussions.²⁰ Whatever the two leaders may have intended, the meeting was preceded by limitations agreed between the relevant ministers of Bangladesh and India. Indian ministers requested and received assurances from Bangladesh that this meeting would not constitute a precedent for trilateral negotiations, and letters sent by Bangladesh and India to Nepal further limited the meeting to seeking information and data.

Although this was probably not apparent at the time to the representatives who negotiated the limits, the outcome was a strangely restricted meeting. Here were two governments making a formal approach to discuss the development of the rivers of a third nation, having agreed in advance that they would not allow the third government any standing in their deliberations. They were only going to ask the third government to supply them with the information needed to plan development of rivers in the third government’s territory.

The understandable response from Nepal to a request from its neighbors for its cooperation without having any role in the development of its rivers was to ask ‘why?’ What is the *mutual* benefit of this cooperation, and what is the standing of Nepal in this development of its own resources? The representatives of the governments of India and Bangladesh were unable to answer this question. Any answer they could give would prejudice their prior agreement that the meeting should not be a precedent for trilateral negotiations. The two visiting government delegations came away empty handed: Nepal gave none of the requested information about water resources.

What this history illustrates is that 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. This also

is the case when governments are planning new water development, as the next section illustrates.

Three grand visions

This section focuses on three relatively recent visions of water development, one from each of the three largest South Asian countries within the basins of the Rivers Ganges and Brahmaputra: India, Bangladesh and Nepal. These three visions illustrate particular national perspectives and the process by which claims are made over water.

For many years, engineering advisors to the governments of East Pakistan and Bangladesh argued that the shortage of dry-season water in East Bengal could best be tackled by the construction of water storage reservoirs in the Himalayan headwater rivers of the Ganges, in India and Nepal. The 1977 Ganges Waters Agreement gave both governments a mandate to produce a vision of how to augment the dry season flow in the lower Ganges. In a 1978 report (updated in 1983), the government of Bangladesh presented its proposal for how this might be done: more than 80 large water storage reservoirs could be constructed in India and Nepal to increase the dry season flow in the Ganges. This report estimated that the release of stored water could increase the dry season flow in the Ganges by 6 times its mean level, and that this would meet the irrigation needs of all three countries. If constructed, the storage of melting snows from the Himalayas and of monsoon precipitation would contribute to the mitigation of floods. The release of stored water could also generate urgently needed electricity for the subcontinent.

This vision has faded. The government of Nepal was sometimes willing to consider the idea, in part because it wanted to see at least some of the dams constructed so that revenue could be generated for Nepal. The government of India has so far been intransigently opposed to this proposal from the government of Bangladesh, on grounds of multilateral inefficiency and engineering implausibility.

While the Indian government opposed any Bangladesh claim to water stored on the Ganges, the Indian government suggested that the Ganges flow could be increased by transferring water from the Brahmaputra. They proposed (again in a limited circulation report published in 1978 and updated in 1983) (i) a 200-mile long and 900 ft wide canal passing through northwest Bangladesh, linking the Brahmaputra to the Ganges, (ii) a barrage across the Brahmaputra, upstream of Bangladesh, to divert water into the canal, and (iii) (at some later date) three large dams on the Brahmaputra and Meghna rivers.

This vision has also faded. The unhappy experience of having India control the Ganges at Farakka provides reason for Bangladesh to avoid an Indian-controlled barrage across the Brahmaputra. Quietly, Bangladesh has investigated the possibility of internal transfers, controlled by Bangladesh, and using less land-consuming, existing river channels rather than a huge canal. But this internal option would be under the control, and for the benefit, of Bangladesh.

The third vision would give land-locked Nepal access to the sea. Included in the 1978 proposal from Bangladesh was the idea that a canal could be built from Nepal, across a

narrow part of India separating Nepal from Bangladesh, to join up with a large river in Northern Bangladesh. This idea had been presented by the government of Bangladesh on Nepal's behalf. It expressed Nepal's frustration at having its connections to the global economy controlled by India, and subjected to imposition of 'trade and transit' treaties (and, at one time, a trade embargo). The canal dangled the promise of direct sea access for Nepal (and direct access for Bangladesh to the waters of at least two Nepalese rivers). It also represented an attempt by two smaller nations to formulate common interests against a shared experience of dominance by the much larger, and economically more powerful, Indian neighbor. The vision of this canal was dismissed by the Indian government.

So, what do we conclude from these three visions of water development in South Asia? Each expresses a national vision 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. We next explore conceptual issues with respect to cooperation over international river waters in South Asia, and in section IV, we examine recent innovations and future directions.

III Facilitating Cooperation: Conceptual Issues

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, the inability to communicate and to commit to a binding agreement is the source of the problem, given the structure of the payoffs. Ways around the prisoner's dilemma involve changing the structure of payoffs, through repeated play, introduction of certain kinds of incomplete information about the payoffs or player types²¹, or the introduction of other features that broaden the game. Technically, the game remains one of noncooperative behavior, but such behavior can support a cooperative outcome in the expanded game. While some types of incomplete information help resolve the prisoner's dilemma, in other types of games, incomplete information makes achievement of mutual benefits limited or even impossible, this being a version of Akerlof's "lemons problem"²².

In game theory, the cooperative approach to negotiating for mutual benefit assumes that binding agreements can be signed, but typically relies on normative axioms to identify a cooperative solution, such as the Nash bargaining solution, without examining the details of the bargaining: protocols, rules and so on. Noncooperative game theoretic approaches try to model these details. Recent theoretical advances have begun to connect the noncooperative and cooperative approaches to negotiation or bargaining, by identifying which noncooperative bargaining protocols will lead to standard axiomatic cooperative outcomes such as the Nash bargaining solution. These theories have been extended from the original two-player analysis to cover multiple bargaining parties.

The abstract discussion above helps to focus on the following questions in discussing how cooperation in the use 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 return to the Indus waters case, detailed in Section II.

Who '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: analysis of the problems will bring one back to the recent examples discussed in the previous section. We turn to these issues after discussing the problem of allocation of property rights and other conceptual issues.

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 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.

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 use of water, or that require reasonably certain water supplies.

A slightly different way of looking at the possibility of mutual benefit in a conflict over property rights is as follows. *De facto* rights may be subject to overt conflict or threats, which may be resolved through agreement. To put it in technical terms, the disagreement point in the bargaining game may itself be endogenous, and this endogenous location of the disagreement point creates the possibility of mutual benefits from agreement. For example, one may identify this as a possible factor in the Indus waters dispute, where both sides wished to avoid a broader conflict that would have altered the disagreement point.

A third 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, 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.

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. We examine the issue of multilateral vs. bilateral bargaining below.

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. Clearly, consumptive uses of this water -- such as irrigation -- by India are ruled out by the treaty. However, 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 clearly 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.²³

Monetization vs. barter

Bilateral barter in international diplomacy, as elsewhere, is subject to the need to find a 'double coincidence of wants'. Monetization, in this context, is the establishment of mutually agreed-upon values (priorities, rates of exchange) to services, enabling more general exchange to proceed within the complex fabric of diplomatic relations. Besides the extreme case of overcoming the lack of a double coincidence of wants, monetization more generally expands the set of gains from trade, since transfers of money more fully transfer value than does barter.

Bilateralism vs. multilateralism

As we have detailed, 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, only for some, 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 really the lack of fully transferable value that is the culprit, rather than bilateralism. Hence it is really the existence of externalities that provides a case for multilateralism over bilateralism in river negotiations.

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 extends 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 crucially 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.

Of course governments may also theoretically maximize aggregate welfare: in practice, the incentive mechanisms to enforce this may be too weak, particularly at the national level.

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.

The inclusion of private parties in negotiation over water development and use not only changes objectives, but makes them generally 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 much more open about their goals and performance than is traditional for governments in South Asia. 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 some 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 assumes that profit-making entities have better internal monitoring and control mechanisms. 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. Of course 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 seen 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 or to monetization. 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, to explore how the above factors may play out in the future.

IV Innovations at international and local levels

When representatives of the government of Nepal, in the trilateral meeting of October 1986, asked the governments of India and Bangladesh to spell out the 'mutual benefits' of joint river development, they were asking two fundamental and related questions. How

will Nepal benefit from the water development proposed by India and Bangladesh? What can be achieved through regional cooperation that could not be achieved bilaterally? There is at least one ready (but partial) answer to the latter question. Table 2 lists what governments have sought from each other in relation to regional water resources.

The realization of a significant proportion of these, or similar, proposals could constitute an important advance, mitigating power and irrigation-water shortages, flood and drought, and contributing to the potential for regional stability and economic development.

The realization of these transactions will, however, be limited under a strictly bilateral regime because the possible multiple uses of river water and the basin-wide consequences of many development proposals do not respect territorial boundaries. Thus, for example, the development of hydroelectric power bilaterally by Nepal and India may preclude consideration of other potential water storage services. Flood mitigation and irrigation expansion, for Bangladesh and the eastern Indian plains states, could be achieved through the construction of water storage in Nepal. If that construction is undertaken bilaterally by Nepal and India, it is less likely that services other than hydroelectric power generation will be given serious consideration. However, innovations in water use and negotiations over water development are beginning to relax past limitations.

By examining innovations at both the international and local levels, 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. Furthermore, one of the innovations we explore at the international level is the potential for local governments, NGOs and corporations to be involved in the international allocation of water. The gains from international negotiations, whether by governments or private parties, are affected by, and therefore must be informed by how allocation mechanisms function at the subnational level.

Five International Agreements

1996 was a great year for river treaties in South Asia. In its first month, Nepal and India signed the Mahakali Treaty, advancing a decades-old river development proposal, and in its last month India and Bangladesh signed a 30-year treaty seeking to resolve the dispute between the two nations over the sharing of the Ganges waters. In between, two other agreements were signed, establishing procedures for power supply from Nepal and Bhutan to India. A fifth, more tentative agreement came in April 1997, when representatives of India, Bhutan, Nepal and Bangladesh considered forming a sub-regional economic group within the SAARC framework that would include the shared rivers of the four nations.

The four 1996 agreements²⁴ establish innovations, novel in South Asia and with only limited precedent elsewhere, which begin to address the environmental uncertainties and unpredictable outcomes of Himalayan development, and bring new resources and initiative to the process of harnessing the geographical assets of South Asia. In effect, the

four agreements begin creating a regional trade in hydroelectric power development, and begin sharing the costs, risks and benefits of joint river development.

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 Hydel 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. We next consider each of these four treaties in more detail, and then describe the fifth development, involving all the four nations.

The India-Nepal power trade agreement

The Nepal-India Power Trade Agreement represents an important innovation partly because it transfers some questions of international development negotiation from the traditional diplomatic to the economic sphere. More precisely, the Power Trade Agreement effectively privatizes the negotiations between India and Nepal over hydroelectric power. That term does not, however, do justice to the change that the agreement makes possible, nor to the potential it proffers.

Till this agreement, the price of hydroelectricity had been a source of conflict and delay in quiet negotiations between the governments of India and Nepal around the development of Nepal's hydroelectric power potential. Instead of treating these as questions of bilateral diplomacy, the Power Trade Agreement has shifted the whole process of negotiation, construction, and operation, even the price of electricity, into the sphere of economic exchange. The principal parties to the exchange are no longer governments, but various private, semi-government and government agencies. The terms and conditions of the exchange are set by those parties, subject to the laws of both nations, and by more direct economic incentives. The raising of finance, organizing of construction, and day-to-day operation of any hydroelectric facilities agreed may be in the hands of a private corporation or in those of a government agency.

In the wake of this agreement, the government of Nepal has issued what amounts to a 'hunting license' for at least one private corporation (the Snowy Mountains Corporation of Australia) to seek the international purchase agreements and finance enabling a 350 MW hydroelectric power plant to be constructed on the West Seti River.

Under the Nepal-India Power Trade Agreement, arrangements for the supply of hydroelectric power from Nepal to India can now be made by nongovernment agencies, including private enterprises, municipal governments, and state governments. The agreement says:

Any governmental, semi-governmental and private enterprise in Nepal or India can enter into an agreement for power trade between the two countries. Parties entering into such power trade arrangements may determine the terms

and conditions, including the quantum and parameters of supply, points of delivery, and the price of electricity.²⁵

In principle, a Nepalese district government can make an arrangement with an Indian city government or a particular industrial user of electricity for the sale of electric power. Instead of negotiations between two sovereign governments, this agreement opens up the possibility of discussion among many pairs of agencies from a pool of hundreds of institutions.

The agreement may therefore bring new financial resources and greater flexibility in contracting to the development of hydroelectricity in South Asia. To the extent that property rights are clearly allocated (whether to water or the hydroelectric power generated by the water), there may be greater opportunities for mutual gains from trade through greater transparency and competition.

One can conjecture that there will still be limits placed by sovereign governments. The Agreement itself does not say this, but the wording of the Treaty on the Mahakali suggests that the power trade agreement will not apply to the largest hydroelectricity projects, which will remain in the sphere of bilateral diplomacy.

The Mahakali Treaty

The Mahakali Treaty is a complex set of agreements which seeks to correct perceived inequities in past agreements and to establish procedures for the construction and use of a large, multi-purpose project on the Mahakali river, called the Pancheshwar Project. When the treaty was ratified, in September 1996, the Minister of Water Resources for Nepal told a joint session of the two houses of Nepal's parliament:

The Mahakali Treaty will open up the door for the speedy development of Nepal. Thanks to our successful diplomatic efforts, Nepal-India relations in the field of water resources have been strengthened without any harm to our non-aligned foreign policy. Our excessive dependence on India will be reduced if we are able to mobilize our natural resources. Indeed, the Mahakali Treaty has resolved the tangle that Nepal has been facing in this field for the past 50 years.²⁶

These are high expectations, arising from the treaty itself, concessions in other areas made by India,²⁷ and from the promise that the principles of the Mahakali treaty might suggest for other river projects. At the same time, there is also suspicion among some Nepalese of possible deleterious effects, such as displacement of population, arising from the envisaged development.

As it relates to the harnessing of the Mahakali river, the Treaty agrees (in Article 3) four principles:

- 1 To maximize the total net benefit from the project, including power, irrigation, and flood control.

- 2 The project will be an integrated project with two power stations of equal size on each side of the river [that is, one in Nepal and one in India], operated jointly, and the energy they generate will be shared.
- 3 The costs of the project are to be shared in proportion to the benefits. Both countries are to mobilize finance: 'The cost of the [Pancheshwar Multipurpose] Project shall be borne by the Parties in proportion to the benefits accruing to them. Both the Parties shall jointly endeavor to mobilize the finance required for the implementation of the project'.²⁸
- 4 Some of Nepal's share of energy can be sold to India, with the price and quantity to be mutually agreed.

This Treaty concerns a boundary river. Some of its articles, notably the strange idea of a matched set of power stations on either side of the river, clearly reflect the particularities of that situation. Nonetheless, the statement of Nepal's Water Resources Minister reflects the hope that the treaty may prefigure a new phase of relations with India.

Much remains to be established: a Mahakali River Commission, detailed project design, and elaboration of the sometimes enigmatic procedures sketched by the Treaty. It is, nevertheless, a departure from previous tangled negotiations over electricity prices because it establishes a hedge against uncertainties, the principle of sharing benefits and costs. In other words, this principle provides a framework within which the price and quantity of Nepal's electricity sales to India can be "mutually agreed".

India-Bhutan agreement for the Tala Hydroelectric Project

The third agreement concerns India and Bhutan. The 1000 MW Tala hydroelectric plant has been made possible by an agreement which rests upon market pricing of electricity and Indian financing (60% grant; 40% loan) of construction. One participant in the negotiations leading to this agreement argues that flexibility, a non-political approach, and willingness to allow prices for energy to be established by market levels, enabled agreement to be reached. Indo-Bhutanese relations are less contested than those with India's other neighbors, and Indian influence over Bhutanese government policy is much greater than for its larger neighbors. Nonetheless, this treaty shares important characteristics with the India-Nepal Power Trade Agreement. It establishes a process for sharing the benefits of development, this time through market prices, rather than a fixed rate of payment. One central part of the deal, the price Bhutan receives for electricity generated, was not pre-determined, but left out. The Bhutan government's assessment that Indian subcontinent electricity rates will rise in the future, as subsidies are removed and energy shortages are reflected in prevailing prices, appears sensible.

The India-Bangladesh Treaty on Sharing the Ganges

In December 1996, the prime ministers of India and Bangladesh signed a 30-year Treaty which sought to resolve their long-running dispute over the sharing of the dry-season flow of the Ganges. One member of an unofficial delegation that helped pave the path for

the treaty has written that the agreement was achieved through a combination of circumstances:

new governments in both countries, a changed political climate, a determination on the part of the Indian Foreign Minister and Foreign Secretary to settle this issue, the statesmanship of the West Bengal Chief Minister and the negotiating skills of his Finance Minister Ashim Dasgupta, the flexibility and political courage of Sheikh Hasina [Prime Minister of Bangladesh], and so on²⁹

The Treaty for sharing the Ganges is more complex but more limited than the other three, making less progress toward regional cooperation. It specifically eschews discussion of augmenting the flow (Phase III of previous negotiations -- see Table I) to focus on the division of the dry season flow (Phase II), whilst recognizing the need for future cooperation on augmentation.³⁰

The Treaty declares the ambitious principle of ‘fairness, equity, and no harm to either side.’ The latter principle echoes Nehru’s 1961 declaration that river development in India should cause ‘no real injury’ to its neighbor,³¹ while moving it from the ethereal realm of parliamentary rhetoric to the more negotiable language of intergovernmental treaty.

The Indian Government has, for the first time, promised ‘every effort...to protect the flows of water at Farakka as in the 40-years average availability...’³² This is a commitment either to limit additional irrigation development in the populous, Ganges Basin states of India, including Uttar Pradesh and Bihar, or to ensure that additional flow reduction is matched by augmentation from storage.

These two principles of ‘no harm to either side’ and of protecting ‘average availability’ of water, represent a significant advance on prior agreements, even though the details of their implementation are not specified. The Treaty has, however, run into significant criticism in the newspapers of Bangladesh and West Bengal, with commentators in both regions arguing that the agreement provides less water than is required.

The division of river flows in the Treaty bears superficial resemblance, in the key figure of 35,000 cusecs,³³ to the division established in the five-year 1977 accord, but appears to give more water to India than that earlier agreement. Table 3 describes the sharing arrangements in the Treaty. The outcome of these arrangements depends on the actual flows reaching Farakka.

Unfortunately for popular acceptance of the Treaty in Bangladesh, the emergency arrangements requiring immediate government consultations when the flow at Farakka falls below 50,000 cusecs had to be invoked in early April 1997. The character and institutional arrangements for these consultations is not specified in the Treaty.

The Treaty also brought other parties than national government to the negotiating table. For the first time, the government of the Indian state of West Bengal, Bangladesh’s immediate neighbor to the West, played a key explicit role in the discussions. The

concerns of industrial, commercial and agricultural interests in West Bengal have been at the heart of dispute over the Ganges. The project that triggered dispute, the Farakka Barrage, was built to address their needs for water. The government of West Bengal has, nevertheless, had a more indirect role, represented by the federal government, prior to this agreement.

Tentative four nation agreement on economic cooperation

In April 1997, at a meeting in Kathmandu, the Foreign Secretaries of India, Bhutan, Nepal and Bangladesh 'discussed the question of forming a sub-regional group within the SAARC framework...to identify an economic programme which could be taken up jointly by the four.' In response to journalists' questions about the purpose of this new group, the Bangladesh Foreign Secretary connected the group to the shared rivers of the four nations, 'If there are floods in this region, this will affect only our four nations. It is on the basis of this reality that the present initiative is being taken.'³⁴

This is a small step that may not reach fruition. It is, nonetheless, in marked contrast to the Indian tradition of bilateralism, and is a more promising approach to multilateral negotiations than the meeting in Kathmandu in 1986, discussed in section II. Furthermore, this step must be seen in the context of the potential changes wrought by the other four, bilateral agreements. The first three of those agreements, involving India, Nepal and Bhutan, made tentative moves in the direction of a regional market for hydroelectric power. Furthermore, they introduced actors other than national governments into negotiations over international river water development. The India-Bangladesh treaty, was more basic in scope, still seeking to allocate rights to water, rather than to establish a market for its uses that might cross national boundaries. However, it also broke new ground through the explicit involvement of a subnational government. Expansion of the set of negotiators to include non-geographically defined entities such as corporations must perforce create a multilateral or regional approach to water development. Regionally determined values for the uses of water further this pull. Explicit multilateralism, as outlined in the 1997 four nation agreement on economic cooperation, may only ratify those emerging trends.

Therefore, in our view, the most significant trend incorporated in the five international agreements discussed above is the introduction of private actors and explicit economic valuations into the process of the development and use of water. Before considering ways of building upon the diplomatic innovations incorporated in these international agreements, we describe briefly some parallel innovations in local water use institutions, particularly with respect to the introduction of explicit economic valuations, and the involvement of nongovernmental organizations.

The privatization and sale of underground water

Innovations in local use of underground water in South Asia have occurred over a longer period than those in diplomacy. Water filtering into underground aquifers from the snows of the Himalayas and the floods of the monsoon has been transformed, over the last three

decades, from common property (or, more accurately, "non-owned" property) into private property, then utilized for irrigation and sale.

The private appropriation and use of underground water for irrigation was the 'leading technology' which allowed the 'green revolution' to occur in South Asia from the late 1960s onwards. South Asia has moved from chronic food shortage in the early 1960s to adequate food production (albeit with continuing chronic malnutrition). This progress resulted from social and technical changes in agriculture, known collectively as the Green Revolution, resting upon groundwater irrigation. The Green Revolution brought uneven change but, nevertheless, was the major source of economic growth in the South Asian countryside over the last three decades.

In contrast to the grand visions of large-scale government engineering, described in Section II, the widespread use of underground water has been led by private action. Until the mid 1960s, the underground water of South Asia constituted an abundant resource, with ownership often ill-defined. In the subsequent three decades, underground water was quietly appropriated as the private property of those farmers with land, and the capacity to buy pumps and sink tubewells. In law, groundwater is the property of the landowner beneath whose land it sits or flows. In practice, it has become the property of the pump owner who can capture it first.

This private appropriation of water led some observers to suggest that the owners of irrigation pumps would use the water preferentially on their own land.³⁵ Water, pumps, and labor would then be underutilized. Rich peasant pump-owners would have too much water for their own use. Poor peasants with a little land would be unable to afford pumps. Then pumps would be underutilized, irrigation coverage would be uneven, and laborers would be unemployed. This element of inefficiency has been at least partially overcome by the emergence of markets for water.

Complex and locally-varied arrangements have sprung up, in many parts of South Asia, for the sale of irrigation water. These new 'markets' are not yet completely understood, but they are using groundwater more widely and efficiently than owner-use would allow. In many cases, groundwater is paid for with a share of the crop produced. Elsewhere, fixed and variable monetary prices have emerged.³⁶

The privatization and sale of underground water is no panacea. It has supported increased agricultural output, and allowed a minority to accumulate some assets. But, in the absence of government regulation and larger visions of social development and water management, it raises many contradictions. Besides the polarization of rich and poor, a glaring conflict in Bangladesh highlights one problem of unregulated water development.

In recent decades, the proportion of the rural households in Bangladesh with access to clean drinking water, a key determinant of mortality and morbidity, has risen from a minority to over 75%. This great social advance has been achieved through the dissemination of handpumps. In the mid 1990s, the advance was reversed. For 3-4 months of the year, half those handpumps may be going dry. Powered irrigation pumps are lowering the water table below the level that handpumps can reach.³⁷

To some extent, these problems can be viewed as resulting from imperfections in the markets that have been created. There are markets for handpumps, but not for the underground water. The rights to that water are still not properly assigned, and are instead appropriated by those with the resources to use the new technology. This issue of assigning rights was discussed in Section III, where we outlined possible ways around the problem. At the local level, or subnational level more generally, there is the additional possibility that transfers of rights can be enforced through legal and political mechanisms: the problem of sovereignty is less severe. Even at the subnational level, however, the national government may feel constrained by competing political pressures, particularly when, in the case of India, two large states are in dispute. Net transfers from the national government to both subnational parties in a rights dispute may appear to be the only way out in some cases. At the more local level, explicit ownership rights vested in local water users' associations (rather than with individuals) may be the answer, provided that the practical difficulties of equity and protecting basic access -- particularly for life-sustaining uses such as drinking -- can be adequately addressed at the local level.³⁸

One can even envisage a hierarchy of water management institutions, from international and national river basin authorities down to local water user associations, and federations of such associations. Several different models of such federations exist.³⁹ We can think of state and national level institutions as linking up and continuing this kind of hierarchical, federated structure. Ultimately, water allocation will be efficient only if decision-making is responsive to the end users, and it is the local institutions that may be more feasible. International river basin authorities may be politically more difficult, though they may play limited roles, as in the case of the Indus waters joint commission.

Future directions

The trends we have identified are only a beginning. Innovations can continue in several directions. Here we highlight two sets of possibilities:

- i) extending bilateral barter to multilateral exchange
- ii) expanding negotiations from conventional diplomacy to incorporate private economic actors.

Bilateral barter or multilateral exchange

Bilateral barter in international diplomacy is subject to the need to find a 'double coincidence of wants'. In the history of South Asian river development, the wants of several governments have not been met partly because there is no 'double coincidence of wants'. Nepal's offer, for example, to assist in the mitigation of flood and drought in Bangladesh could not be easily reciprocated by Bangladesh, because a third party, India, had to be involved, and bilateral barter precludes third party involvement. Even where bilateral agreements and exchanges occur, they can have externalities for third parties: this is still potentially the case with the bilateral agreements discussed earlier in this section. For example, water storage facilities, on tributaries of the Ganges in Nepal, that

enable the use of hydroelectric power in India can have externalities for Bangladesh by affecting the flow of the Ganges downstream at different times of the year.

By contrast to bilateral barter, multilateral exchanges could enable parties from more than two national economies to be involved. Thus, the establishment of "rates of exchange" for water development services could enable exchanges amongst three or more countries and transcend the limits of bilateral barter. The goods and services that could be valued and exchanged are unlikely to be globally traded commodities. Flood mitigation services, transit rights, minimum flow guarantees, equalizing of seasonal flow disparities, and sediment transport reductions are not currently traded services, and there is little reason to suppose that they will be in the future. If the proposed exchange is established, it will constitute a segmented market, confined to the region of those countries wishing to participate.

It is possible that some water services could be appropriately transferred to the economic sphere, to be negotiated by nongovernment agencies, as the Nepal India Power Trade Agreement has done with electric power. Other services could be monetized within diplomacy. In all these cases, the existence of publicly verifiable contracts involving private parties, and competition among those private entities will be important in determining the "rates of exchange" for various services connected to water use and control.

In the light of the Indian government's past adherence to bilateral diplomacy, and notwithstanding recent tentative steps toward multilateral negotiation, it may be sensible to explore how multilateral exchange might be established *within* a pattern of bilateral diplomacy. This option, we term a *regionally-appraised bilateralism*.⁴⁰

The need for a regionally-appraised bilateralism can be illustrated in the case of the Nepal-India Power Trade Agreement. One objection to this agreement is that it privatizes one (already monetized) service to be provided by river development, and apparently makes no mention of other services, such as flood mitigation and dry-season flow augmentation, which could be incorporated into projects. This is understandable. Indian cities, industries and irrigation pumps have pressing needs for power which are forcefully represented to the Indian government by organized lobbies. The needs for flood control and dry-season flow augmentation (within and without India) are less well represented to the Indian government. Furthermore, these services may be more desirable to a third nation, Bangladesh.

In order to achieve the full range of goods and services that can be generated by the development of South Asian rivers, there are strong reasons for related negotiations over several of these exchanges. Without relinquishing sovereign rights to the development of the shared basin, it may be feasible to establish a system which enables the concerns of more than one party to be incorporated into bilateral negotiation processes.

Expanding negotiations to include private economic actors

The right hand column of Table 2 draws attention to the different forms of negotiation which are anticipated for each transaction. Most are presumed to be negotiations between two governments, in the sphere of traditional diplomacy. Within that sphere, some forms of transaction are monetized and others are not. The transfer of hydroelectricity development from diplomacy to economics in the India-Nepal Power Trade Agreement was described earlier in this section.

The fact that one service to be offered from river development can be shifted to the economic sphere suggests that it might be possible to shift others at least part of the way. In this case, the diplomatic negotiation of the supply of hydroelectricity was already assumed to be a monetized exchange, presumably because there are many precedents for the large-scale sale of electricity between countries. Many other services are not monetized, and their negotiation is undertaken fully in the traditional, barter-driven diplomatic sphere. To understand what might be possible, it is useful to look at the border between the traditional diplomatic and private economic spheres.

Diplomacy can be conceptualized as a zone of intergovernmental exchanges founded upon a generalized reciprocity. Progress in the India-Bangladesh water negotiations during the early years after the independence of Bangladesh may be an example of diplomacy of this kind. Various debts of the new Awami League government to the Congress government in India, including India's support for the independence struggle and its military intervention, contributed to the better relations between the two governments which allowed agreement on trade and a Treaty of Friendship, as well as on the river Ganges, to be achieved.

Diplomacy may also encompass more specific barter exchange. The exchange may or may not be publicly acknowledged. The 1977 Ganges Waters Treaty and the prior agreement by India to desist support for armed incursions on Bangladesh is an example of a covert barter exchange.

Diplomacy may also include monetized exchange which is negotiated between governments by diplomats. This is a zone of diplomacy with clear monetary returns. Here lie negotiations over hydroelectricity before the India-Nepal Power Trade Agreement. This type of exchange is economic in the sense that a trade is acknowledged, of electric power for money, but it is also diplomatic in the sense that it occurs through negotiation between sovereign governments.

Finally, in the broader economic sphere monetized exchanges take place between a range of agents, including, but not restricted to, private enterprises. There is no particular reason why other services arising from the development of water resources, in addition to hydroelectric power, should not be monetized within diplomacy, that is, moved from generalized reciprocity and barter exchange into the sphere of monetized diplomacy. However, this may not be a sufficiently radical shift, and the involvement of nongovernmental actors may be important in promoting more effective use of the region's water resources.

Drought reduction and flood mitigation measures are not currently monetized in any international river sharing agreement.⁴¹ Given the scale of the benefits which could derive

from such measures in South Asia, and the possible easing of constraints to development which monetization might bring, there are strong reasons to consider monetizing them. Both services are measurable, at least in principle, as flows of water greater or smaller than those which would have flowed down the river without intervention. Values can be allocated to water flows by comparison with their values for agriculture or industry.

Transfers of water from one river basin to another have also been sought. The Indian government has made strong arguments for transfers from the Brahmaputra to the Ganges. Transfers from the River Kosi in Nepal to the Teesta in Bangladesh have also been discussed. As the objects of potential diplomatic barter, discussion of such water transfers has become highly charged. The monetizing of water transfers could help to reduce the political charge by shifting negotiations from the realm of national conflict to one of mutual economic benefit. The measurement and valuation of water transfers is, again, relatively straightforward. Water flows are measurable, and their values for irrigation or industry can be estimated.

Guarantees of minimum dry season flows are not so easily shifted from barter to monetized diplomacy. There is, however, considerable knowledge about a range of alternative pricing and rationing systems for dealing with water shortages in drought-prone areas within nations (particularly in the American West). Lessons could be drawn from the procedures which have been developed for negotiating amongst the demands of agriculture, industry, environment and city in those contexts.

The wholesale privatization of international water development is *not* what is being suggested here. Rather, the comparison of the nature of exchanges located in the sphere of diplomacy and those located in the private economy is being used to illuminate how international negotiations might be facilitated. Monetization or economic valuation enables a simpler, more open assessment of an international exchange than is possible with existing forms of diplomatic barter. Once that step has been taken, other possibilities, including the involvement of private financial institutions, are opened up.

V Conclusion

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 agreements of 1996 and 1997 suggest some ways in which these obstacles may be transcended and further suggestions based on these innovations have been developed in Section IV. The transformation of bilateral barter into a grand design for the whole river

basin(s), with the transfer of planning decisions to a new river commission which that implies, is unlikely to be politically feasible. Instead, smaller shifts, in negotiation practices on the borders of diplomacy and the economy, and between bilateral and multilateral considerations, may be possible.

The shift of hydroelectric power from monetized diplomacy to the realm of the economy, in the India-Nepal Power Trade Agreement, suggests that negotiation practices can be changed for other possible projects. Some of the limits of bilateral barter can be transcended by bringing corporate, district and municipal negotiators to the table. Negotiators are restricted, in this kind of shift, to those from two states, but there are more of them, and they bring different sets of incentives to the negotiations. This kind of transfer has the effect of changing the priorities of negotiation from those of sovereign governments to those of cities, states and private enterprises.

A second kind of transfer could be less drastic for the sovereignty of states, but at the same time more complex to execute. If regional governments would value the benefits of transactions for all states and redistribute those benefits amongst themselves, then the benefits of *multilateral* negotiation could be achieved within *bilateral* negotiations. This shift would allow the concerns of more than two governments to be considered in negotiations that are still between two governments. This change of negotiation practices is what we have termed a *regionally-appraised bilateralism*. The 1996 agreements, specifically the Mahakali Treaty, the Tala Hydel Agreement, and the Ganga/Ganges River Water Sharing Treaty, have made this second kind of transfer more possible by establishing the principle of sharing costs and benefits.

The development of the water resources of South Asia is likely to play an important, possibly pivotal, part in raising living standards and reducing intergovernmental tensions in the region. Verghese is not entirely correct when he writes that 'there is no reason why the immiserized population of this resource-rich basin should remain poor and hostage to a recurring cycle of devastating flood and drought'. There are reasons arising from the realities of patterns of intergovernmental and village relations, as well as from technical and environmental constraints. However, institutional innovations offer ways in which those obstacles can be overcome.

Tables

Table 1: The four phases of the Ganges river dispute

Phase	Period	Focus
Phase I	1951–1971	Discussion over the Farakka Barrage
Phase II	1971–1977	Division of dry season flow (leading to Ganges Waters Agreement)
Phase III	1977–1982	Augmentation of the flow
Phase IV	1983–1987	Independent national river development

Table 2 Potential International Transactions in South Asia⁴²

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 ⁴³ *	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 3 Sharing arrangements in the 1996 Ganges Treaty

Flow at Farakka	Share of India	Share of Bangladesh
> 75,000 cusecs	40,000 cusecs	Balance of flow
70,000 - 75,000 cusecs	Balance of flow	35,000 cusecs
50,000 - 70,000 cusecs	50%	50%
< 50,000 cusecs	'the two governments will enter into immediate consultations to make adjustments on an emergency basis'	

During the driest period, March 1 to May 10, 'India and Bangladesh each shall receive guaranteed 35,000 cusecs of water in alternate three 10-day periods'

Source: Treaty, Article II and Annexure I.

Endnotes

¹ By one estimate there are more poor people in the Ganges-Brahmaputra basin than in all sub-Saharan Africa, living at a somewhat lower standard of living. Rogers, P., Lydon, P., Seckler, D., & Pitman, G. T. K. (1994). *Water and Development in Bangladesh: A Retrospective on the Flood Action Plan* (Synthesis report prepared for the Bureau for Asia and the Near East of USAID. Irrigation Support Project for Asia and the Near East.

² The topography of these rivers is, briefly, as follows. The Indus and its tributaries begin in the Himalayas and their foothills, then flowing roughly 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 known as 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.

³ An accumulating series of books from India, Nepal and Bangladesh attest to this: Verghese, B. G. (1990). *Waters of hope: Himalaya-Ganga development and cooperation for a billion people*. New Delhi: Oxford and IBH Publishing. Gyawali, Dipak, and Ajaya Dixit (eds) 1994 *Himalaya-Ganga: Contending with Complexity* special issue of *Water Nepal*, 4, 1, September. Ahmad, Q. K., Verghese, B. G., Iyer, R. R., Pradhan, B. B., & Malla, S. K. (1994). *Converting Water into Wealth: Regional Cooperation in Harnessing the Eastern Himalayan Rivers*. Delhi: Centre for Policy Research; Kathmandu: Institute for Integrated Development Studies; Dhaka: Bangladesh Unnayan Parishad. Verghese and Iyer (eds.), 1993, *Harnessing the Eastern Himalayan Rivers: Regional Cooperation in South Asia*, Centre for Policy Research, Konark, New Delhi. Ahmad, Q K, et al, 1993, *Resources, Environment and National Development with Particular Reference to the Ganges-Brahmaputra-Barak Basins*, Bangladesh Unnayan Parishad, Academic Publishers, Dhaka. Bhekh Thapa, et al (eds.), 1995, *Water Resources and National Development: Nepalese Perspectives*. Kathmandu: Institute for Integrated Development Studies.

⁴ Verghese, B. G. (1990). *Waters of hope: Himalaya-Ganga development and cooperation for a billion people*. New Delhi: Oxford and IBH Publishing. Note that the relative importance of drought varies through the Ganges-Brahmaputra basin, and floods have become more of a problem as people in the region have been forced into more marginal lands. We are grateful to a referee for this point.

⁵ Boyce 1987 *Agrarian Impasse in Bengal* Oxford: Oxford University Press, p. v.

⁶ 104th Congress, 2nd Session, House Concurrent Resolution 213, 'Concerning the urgent need to improve the living standards of those South Asians living in the Ganges and Brahmaputra River Basin', September 12 1996, referred to the Committees on International Relations and on Banking and Financial Services, by Representatives Bereuter and Berman.

⁷ Three pairs of states sharing international rivers in South Asia have not been in conflict over water. China and India have had neither discussion nor conflict over the Brahmaputra/Tsangpo river, almost certainly because China has not started to harness the waters of the Tsangpo. Bhutan and India have not been in conflict over their shared rivers (flowing into the Brahmaputra), and have recently concluded a treaty which enables Bhutan to generate hydroelectric power for sale to India. The absence of tension in this case deserves further study, but may reflect the close relationship between the governments of Bhutan and India. There is the potential for conflict between China and Nepal on their shared rivers. China is the upstream state for several rivers flowing into Nepal. On the Pengqu River (called the Arun in Nepal), for example, irrigation diversions for 9000 ha of cultivation began in 1994 for the Changsuo Basin Irrigation Project

inside the Mt. Everest Nature Preserve. It is estimated that up to one third of the dry season flow of the Arun river may be consumed by planned diversions in Tibet (Pandey, B. (1995). 'Because it's there: foreign money, foreign advice and Arun III.' *Himal* (July/August), 29-35). We have not come across reports of negotiations between the governments of Nepal and China on this or any other river.

⁸ 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.

⁹ See Kirmani, S.S. 1990 'Water, Peace and Conflict Management: The Experience of the Indus and Mekong River Basins', *Water International*, 15: 200-205, and Barrett, S., 1994 'Conflict and Cooperation in Managing International Water Resources', World Bank Policy Research Working Paper 1303.

¹⁰ Rose, L. (1987). India's regional policy: nonmilitary dimensions. In S. P. Cohen (Eds.), *The Security of South Asia: American and Asian perspectives* Urbana: University of Illinois Press.

¹¹ Interviews with the first author.

¹² Ohlsson, L 1995 'The role of water and the origins of conflict' pp22-3, in Ohlsson, L (ed) *Hydropolitics*, London: Zed Press. We will return to this 'zero-sum' issue in Sections III and IV.

¹³ The difference between a barrage and a dam is of some importance for the interpretation of this conflict. A dam is built in the upper, deep-valleyed reaches of a river to *store* water, generally for hydroelectricity generation, irrigation supply or flood mitigation. A barrage is built in the plains, or lower reaches, across wide, meandering rivers, primarily to *divert* water, for irrigation or navigation. Thus, a dam is a tall structure, possibly raising water levels by hundreds of feet, whereas a barrage is a long (or wide) structure which raises water only a few feet, perhaps 20.

¹⁴ Crow, Ben with Alan Lindquist and David Wilson, 1995, *Sharing the Ganges: the politics and technology of river development*, New Delhi and Thousand Oaks, CA: Sage.

¹⁵ The government of Pakistan mustered engineers who cast doubt on the hydraulics of this process. See chapter 1 of Crow, et al, 1995, *Sharing the Ganges*.

¹⁶ He told the Lok Sabha, the people's house of the Indian parliament that, 'It is our view that there should be no real injury caused to Pakistan by this scheme.' India, Lok Sabha *Debates*, 19/8/61, 'The Farakka Barrage', S2, 56, col. 3201. (In fact, Indian engineers had not fully evaluated this question.)

¹⁷ India, Ministry of External Affairs, *Bangladesh Documents*, 'Awami League Manifesto', p. 81, undated, New Delhi.

¹⁸ The agreement was facilitated by a prior prime ministerial understanding that India would not support bandit-type attacks on Bangladesh. Indian Prime Minister Desai agreed to 'see that no shelter was given to criminal elements from across the border, whatever might have taken place under the previous regime'. *The Hindu*, 11/6/77, 'Zia happy over talks'. [Check reference 259 in book].

¹⁹ That this idea is still widely believed can be seen in the final section (pp. 445-449) of an otherwise thoughtful review of Crow, et al, *Sharing the Ganges*, in the journal of the Bangladesh Institute of International and Strategic Studies (Neila Hussein, 'Book Review: Sharing the Ganges', *BIISS Journal*, 16,3, 1995, pp437-449).

²⁰ This account rests on that in Crow, et al, 1995, *Sharing the Ganges*, which drew upon the official minutes of the meetings and interviews with participants in these and subsequent events.

²¹ 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".

²² 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.

²³ This discussion is based on conversations of the second author with Indian officials of the Indus Waters Commission.

²⁴ 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).

²⁵ The Power Trade Agreement continues:

'They will be given all necessary assistance by the respective governments according to their respective laws and regulations for studies and construction, installation, operation, maintenance of facilities required for power generation and transmission in the territories of both countries. HMG [Nepal government] and the government of India may enter into a separate agreement between themselves or with third countries, on power trading'.

Nepal-Press-Digest (1996). Agreement on Power Trade. *Nepal Press Digest* (Feb. 19).

²⁶ Nepal-Press-Digest (1996). The Mahakali Treaty: Special Report. *Nepal Press Digest*, 40 (38 (September 16)), (*Gorkhapatra*, Sep 12) 326-8.

²⁷ In discussions, between the signing and ratification of the treaty, India had made several concessions to Nepal. Notably, Indian Ambassador K V Rajan described a relaxation of transit constraints: 'India has agreed to provide a number of transit points on the open border between the two countries. India has also agreed to allow Nepal to use the ports of Kandla and Bombay as transit ports. Earlier, we had given Radhikur as a route to Bangladesh at Nepal's request, but now we have been told the route is not very useful. We have accordingly agreed to offer an alternative transit route to and through Bangladesh. We are now working out the mechanism. We would like Nepal to be totally free to trade with the outside world. We are in favor of liberalizing existing facilities to the extent that Nepal would like it to be'. (*Gorkhapatra* and *Rising Nepal* Sep 12).

²⁸ There was controversy in Nepal about this article of the treaty. At the time the Treaty was ratified, the leader of one party previously opposing the treaty conceded: '[the government of Nepal] has changed its stand on Article 3 of the Mahakali Treaty and agreed to interpret it in a manner consistent with the interests

of the nation. It has been agreed that a consensus will be reached while preparing the detailed project report and forming the Mahakali Commission. There has also been a commitment to hold discussions and reach a mutual agreement between Nepal and India on matters relating to the Mahakali Treaty, as well as other matters.' Nepal-Press-Digest (1996). The Mahakali Drama: Special Report. *Nepal Press Digest*, 40 (39), (*Gorkhapatra*, Sep 21), 335-8.

²⁹ Ramaswamy Iyer, a non-official member of the Indian delegation to the talks, in a letter to the first author.

³⁰ Article VIII of the Treaty notes that the two governments 'recognize the need to cooperate with each other in finding a solution to the long-term problem of augmenting the flows of the Ganga/Ganges during the dry season'. The Treaty, unlike the 1977 Ganges Waters Agreement, makes no provision even for the discussion of this question. Our interpretation of this Treaty rests in part on Iyer, R (forthcoming) 'The Indo-Bangladesh Ganga Waters Dispute' *Journal of South Asian Studies*, particularly the Postscript. See also John Burns, 'Sharing Ganges Waters, India and Bangladesh Test the Depth of Cooperation', *New York Times*, May 25 1997, International Section, p10.

³¹ See note 16.

³² Article II of the Treaty.

³³ Cusec = one cubic foot per second.

³⁴ *Nepal Press Digest*, April 14 1997.

³⁵ Boyce, J, 1987, *op cit*

³⁶ For example, see Rogaly B., B. Harriss-White, and S. Bose, 'Sonar Bangla - Agricultural Growth and Agrarian Change in West Bengal and Bangladesh,' *Economic and Political Weekly*, 1995 Jul 22, V30 N29:1862-1868.

³⁷ Sadeque, Z., (1995), Paper to the Conference on Common Property, Berkeley.

³⁸ See, for example, Ostrom, E., and Gardner, R., (1993) "Coping with Asymmetries in the Commons: Self-Governing Irrigation Systems Can Work", *Journal of Economic Perspectives*, 7, 4, Fall, 93-112.

³⁹ See, in particular, Meinzen-Dick, R., M. Mendoza, L. Sadoulet, G. Abiad-Shields, and A. Subramanian, (1994), "Sustainable Water User Associations: Lessons from a Literature Review", paper presented at World Bank Water Resources Seminar, Lansdowne, Virginia, December 13-15, pp. 25-27. It is interesting to note that a recent study for the United States by Foster and Rogers makes somewhat similar institutional recommendations to the ones proposed here, including national and regional councils for water resources policy: see Foster, C. H.W., and P. P. Rogers, (1988), "Federal Water Policy: Toward an Agenda for Action", Report of the Harvard Water Policy Project, Energy and Environmental Policy Center, JFK School of Government, Harvard University.

⁴⁰ A parallel suggestion to 'think basinwide and act locally' is made in Falkenmark, M and J Lundquist (1995) 'Looming water crisis: new approaches are inevitable' pp 209-210, in Ohlsson, L (ed) *Hydropolitics*, London: Zed Press.

⁴¹ These services are sometimes given values in large scale national projects, for example in the USA. However, the difficulty of allocating the benefits to particular social groups or entities means that they are generally treated as cost subsidies for a project, funded out of general government revenues.

⁴² Based on Crow, et al, 1995, *op cit*, Table 18, Ch 8.

⁴³ Including water storage for dry season irrigation and monsoon flood mitigation.