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SPECIAL REPORT

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ABOUT THE REPORT

This report, commissioned by the United States Institute of Peace, examines the Indus Waters Treaty and its role in contemporary international hydrogeopolitics in the Indus basin, paying particular attention to the most recent river development projects on the Indian side of the Indus's three western tributaries. Conflicts around contemporary large-scale water development projects in the Indian and Pakistani parts of the Indus basin are also reviewed. Arguing against assumptions about the inevitability of conflict over water because of its future absolute scarcity, this report finds that, on the international level, the lack of transparency in data sharing between India and Pakistan and the trust deficit between them have real potential for accentuating tensions in the subcontinent. It also finds that, on the subnational level, focus on the supply side of water management and pervasive inequities and inefficiencies in water distribution in both India and Pakistan have the potential to drive interprovincial conflict in Pakistan.

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Daanish Mustafa

Hydrogeopolitics in Pakistan's Indus Basin

Summary

- Water problems in Pakistan result largely from poor management, but the consequences of management failures are accentuated, both materially and politically, by international and subnational hydrogeopolitics.
- There is enough water in the Indus basin to provide for the livelihoods of its residents for a long time, provided that the water is managed efficiently and equitably and that additional water is made available not just through storage but, more importantly, through higher efficiency and intersectoral transfers.
- The Indus Waters Treaty (IWT) seems to moderate the worst impulses of India and Pakistan toward each other, and perhaps therein lies IWT's greatest strength.
- Pakistani engineers typically interpret the IWT's extensive technical annexures very literally, whereas the Indian engineers tend to emphasize the treaty's criteria for techno-economically sound project design.
- No single completed or proposed Indian project on the three western rivers of the Indus basin alone has the potential to significantly limit flows of water to Pakistan. But the long list of proposed Indian projects on those rivers will in the future give India the cumulative storage capacity to reduce substantially water flows to Pakistan during the low-flow winter months.
- The IWT, by performing an amputation surgery on the basin, made matters simple and allowed India and Pakistan to pursue their nationalist agendas without much need for more sophisticated and involved cooperation in the water field. This lack of cooperative sharing of water leaves the ecological and social consequences of the treaty to be negotiated and contested at the subnational scale.
- The interprovincial conflict over water distribution in Pakistan has potential—albeit entirely avoidable—repercussions for stability, at both the subnational and international levels.
- Instead of constructing very expensive, environmentally damaging, and economically dubious water-storage megaprojects in Pakistan, enhancement of the existing infrastructure's

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efficiency, coupled with better on-farm water management and more appropriate irrigation and farming techniques, would perhaps more than make up for any additional water that might be gained from megaprojects.

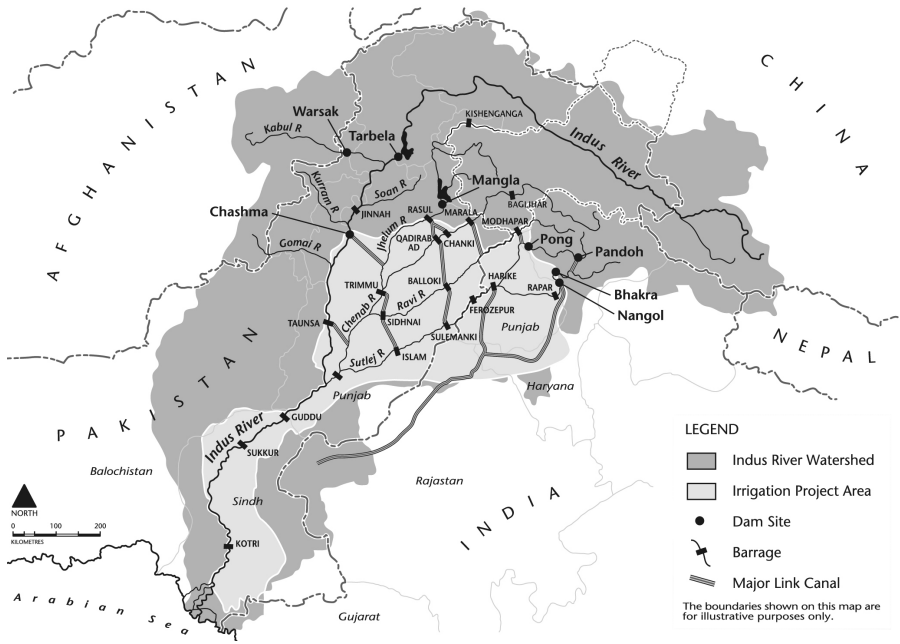
- Since the drought in southern Pakistan in the latter half of the 1990s, the single-minded focus of the Pakistani water bureaucracy on water development has made the issue of the construction of the Kalabagh Dam project a surrogate for a litany of Sindhi grievances against the Punjabi-dominated political, military, and bureaucratic system in Pakistan.
- The emphasis on maximizing water withdrawals and on greater regulation of the Indus river system contributed to accentuating the very high flood peaks in 2010. Although the floods are being used by the pro-dams lobby to call for construction of more storage on the Indus, the tragedy ought to inspire a more nuanced and comprehensive reevaluation of the water-management system in the basin.
- The IWT is a product of its time and could be fruitfully modified and renegotiated to bring it more in line with contemporary international watercourse law, the Helsinki rules, and emerging concerns with water quality, environmental sustainability, climate change, and principles of equitable sharing. But that renegotiation, if it ever happens, is going to be contingent upon significant improvement in bilateral relations between India and Pakistan.
- India could be more forthcoming with flow data and be more prompt and open in communicating its planned projects on the Indus basin to Pakistan, particularly in the western basin.
- Pakistan can engage with India within the context of the IWT more positively than defensively, and also educate its media and politicians so as not to sensationalize essentially technical arguments by presenting them as existential threats.

Introduction

The semiarid environment of the Indus basin is home to more than a quarter of a billion people, with some of the lowest human-development indicators in the world. As if the marginal environment and the pervasive poverty were not enough, deep political fissures across international, subnational, and local boundaries characterize the political geography of the basin. Just as Egypt has been described as a gift of the Nile, the bustling ancient cultures of northwestern South Asia and present-day Pakistan and northwestern India can be described as the gift of the Indus. There were, of course, bustling communities of agropastoralists and inundation-irrigation-based agriculture in the basin prior to the construction of the present-day system in the nineteenth century.¹ The present-day agricultural productivity and population densities, however, would not have been possible without the contemporary irrigation system. Given the stakes involved, in terms of the livelihoods of millions of people, the Indus River basin has been a veritable laboratory for international and national research on various problems associated with water distribution, development, and management, especially those problems that pertain to issues of water efficiency, equity, hazards, and environmental quality.² More recently, though, what had been a laboratory for devising water management solutions has become an arena of conflict over water both between India and Pakistan and between ethnic groups and provinces in Pakistan.

Nowhere is the need for a focus on the political, economic, and discursive factors driving resource use and distribution more urgent than in the field of water resources. The sterile per capita fresh-water-availability numbers may seem alarming to many observers,³ but such alarm serves only to divert attention from water's problematic social geography, its extremely skewed distribution across sectors and social groups, and its conceptualization by

Figure 1. Indus Basin and Its Major Infrastructure



the power elites as a resource to be deployed toward modernist economic development, in isolation from its ecological and social roles.⁴ Surprisingly, even though scholars continue to talk about per capita water-availability numbers, ordinary water users at the local level tend to know that water scarcity is really mediated by social power relations.⁵

The following analyses of water and security in the Indus basin reject the argument that absolute population growth is responsible for absolute resource scarcity. This report argues instead that environmental degradation, resource scarcity, and resource security are all socially constructed—normative and collective understandings that have consequences for physical and social worlds.⁶ Furthermore, the epistemic (knowledge-based experts) and political communities that are most influential in the social construction of environment and security are found at the subnational level, but they have important linkages to international epistemic communities (e.g., the engineering profession). The following survey of the Indus basin concentrates on the geopolitical context that renders Indus basin hydrogeopolitics so riven with conflict and on the perceived limited range of choices of South Asian water managers, which accentuates deeply held sensitivities about water by both the general public and the politicians. The key insight offered by this report is that water problems in Pakistan result largely from poor water management, but that the consequences of management failures are accentuated, both materially and politically, by international and subnational hydrogeopolitics. There is enough water in the basin to provide for the livelihoods of its residents for a long time, provided that the water is managed efficiently and equitably and that additional water is made available not just through storage but, more importantly, also through higher efficiency and intersectoral transfers.

The report builds a narrative of contemporary hydrogeopolitics in the basin at the international level, paying particular attention to the dispute resolution mechanism between India and Pakistan under the rubric of the Indus Water Treaty (IWT). The report then discusses subnational-scale hydrogeopolitics with reference to the Kalabagh Dam controversy in Pakistan and the water dispute between Punjab and Haryana states in India. The report concludes will identify possible avenues for the international community's intervention to facilitate cooperation rather than conflict over water in the Indus basin.

Even though scholars continue to talk about per capita water-availability numbers, ordinary water users at the local level tend to know that water scarcity is really mediated by social power relations.

There is enough water in the basin to provide for the livelihoods of its residents for a long time, provided that the water is managed efficiently and equitably.

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International Hydropolitics

In the immediate aftermath of the partition of the subcontinent between the two independent states of Pakistan and India, the issue of water distribution in the Indus basin—now divided—was to gain immediate urgency for the Pakistani government and the populace at large. As a result of the partition on August 15, 1947, the headworks of two important canal systems were left in Indian territory, and the command areas in Pakistani territory. In the absence of any arrangement for the sharing of water in those canal commands, the two countries concluded a “standstill agreement,” which provided for the maintenance of existing flows until March 31, 1948, to allow time to reach a longer-term settlement. However, the agreement lapsed without settlement, and the very next day the provincial government of Indian Punjab suspended supplies to Pakistan. This suspension of water was seized into the Pakistani consciousness as evidence of Indian desire to undermine the fragile new dominion of Pakistan.⁷ The supplies were restored eighteen days later, and soon after the two countries concluded what came to be known as the Inter-Dominion Agreement, which called for continued negotiations for a final settlement of the water issue. This brief episode of the suspension of water supplies alarmed the Pakistani water bureaucracy into initiating the Bombanwala-Ravi-Bedian-Dipalpur (BRBD) link canal project, which would allow flows from the Ravi River to be diverted to the Sutluj. Significantly, this project demonstrated to Pakistani engineers the viability of compensatory interriver water transfers—a lesson that was to be at the core of Pakistan’s position during the IWT negotiations.⁸

Indus Waters Treaty

Thanks to the active mediation and financial support of the World Bank and the Western powers, led by the United States, India and Pakistan signed the IWT in 1960, allocating the entire flow of the three eastern tributaries of the Indus River—Ravi, Sutluj, and Beas—to India and the three western tributaries—Indus, Jhelum, and Chenab—to Pakistan. The World Bank rewarded both Pakistan and India with massive aid inflows to build storage and conveyance facilities to provide remedial water supplies for the flows that were supposedly lost to the other country.⁹

The resources for water storage and diversion facilities in both countries were made available in the geopolitical context of the Cold War. Pakistan had relatively early on aligned itself with the U.S.-led Western military alliances, such as the Central Treaty Organization (CENTO) and the Southeast Asia Treaty Organization (SEATO). India, on the other hand, was one of the founding members of the Non-Aligned Movement, which sought to chart an independent course between the two superpowers. But despite the trappings of apparent nonalignment, the United States at the time looked upon the Non-Aligned Movement with considerable hostility as a front for pro-Soviet postcolonial states from the global South. Furthermore, the government of India at the time did maintain friendly relations with the Soviet Union and did draw upon the Soviets for military hardware. In that context, then, the Western allies led by the United States were willing to make much more resources available to both India and Pakistan to spread their influence in South Asia than would probably have been forthcoming otherwise.

The IWT was a trilateral treaty between, India, Pakistan, and the World Bank. It was concluded in an atmosphere of considerable mutual suspicion, particularly in the context of Pakistan’s paranoia about the upper riparian—India’s—ability and intentions to deprive Pakistan of water. Nationalist engineers negotiated the IWT, and the treaty did not concern

itself with more contemporary principles of equitable sharing of water between riparians.¹⁰ Rather, the treaty mirrored the political landscape of the time by simply dividing the basin between the two countries instead of providing for meaningful cooperative management or sharing. As mentioned, India was given rights to the three eastern rivers of the Indus basin and Pakistan was given full rights to the three western rivers. Pakistan's rights on the three western rivers, however, acknowledged customary use of water in the Indian territory and allowed for limited diversion for agricultural purposes and for run-of-the-river electricity-generation projects. It is the IWT provisions allowing India limited use of the three western rivers that has caused the most conflict. The IWT provides for specific coordination mechanisms through the Indus Commission, with dispute resolution to pass in a stepwise fashion from the Indus Commission, which is composed of Indian and Pakistani representatives and administers the IWT,¹¹ to the governments of India and Pakistan, to a neutral expert, and then to a Court of Arbitration.

The key feature of the IWT was its extensive technical annexures, which are typically interpreted very literally by Pakistani engineers, whereas Indian engineers tend to emphasize the treaty's criteria for techno-economically sound project design.¹² For example, as will be illustrated later, the IWT's technical annexures do not allow for substantial storage on projects on the three western rivers upstream of Pakistan. The treaty also puts strong limitations on structures with movable gates that could manipulate the storage upstream of Pakistan in any project on the three western rivers of the basin. But, given the high seasonal flow variability of the Indus basin rivers, which also carry some of the highest silt loads in the world, projects often simply cannot be technically or economically viable without a liberal interpretation of the limitations on those regulating structures, such as movable spillway gates. This issue is further elucidated later in this report, in the context of the first episode of resorting to the neutral expert by India and Pakistan.

The massive water development carried out in both India and Pakistan as part of the Indus Basin Water Development Project in the aftermath of the IWT provided a temporary boon to agricultural water supplies in the basin.¹³ But one of the more obvious hydropolitical implications of the IWT was the capacity of the two governments to build infrastructure with more overt security implications. The efficacy of canals as defensive infrastructure that could serve as tank ditches and hinder enemy movement was not lost on the military planners of the two countries. General J. N. Chaudhury, chief of army staff of the Indian Army from 1962 to 1966, commenting on the prospect of an Indian assault on Lahore on the eve of the 1965 India-Pakistan war, proclaimed, "All my experience teaches me never to start an operation with the crossing of an opposed water obstacle; as far as I am concerned I have ruled out Lahore or a crossing at Dera Baba Nanak."¹⁴ But he was made to go against his better judgment when he was ordered by his civilian bosses to mount precisely such an assault on Lahore. The quote, however, illustrates the recognition of the defensive importance of canals and other water bodies in Indian and Pakistani military thinking. The alignment of the BRBD canal was very much influenced by military considerations, and it served its defensive purpose quite well during the 1965 war. On the Indian side, the importance of defensive considerations cannot be discounted in the alignment and operations of canals—for example, the Indira Gandhi Canal. The 649-kilometer canal serves the dual purpose of irrigation canal and tank ditch. Some have pointed to the ecological and economic pitfalls of the canal, but measures such as encouraging settlement only on its left bank seem to indicate a strong defensive bias in its conception, alignment, and operation.¹⁵ The military functionality of canals is well known on the Pakistani side as well, where canals are often operated to simulate flooding during military exercises to the detriment of their supposed function as irrigation water suppliers.

One of the more obvious hydropolitical implications of the IWT was the capacity of the two governments to build infrastructure with more overt security implications.

Dispute Resolution under the IWT Rubric

The IWT has been relatively successful, at the very least by virtue of surviving two and a half wars and frequent military mobilizations by India and Pakistan. But some of the disputes that arose in the context of the treaty are also indicative of the nature of the treaty and the nationalist-driven hydrogeopolitics of the basin, which are further inflected by the supply-side engineering bias of the water managers of the two countries. In this case, supply side means a simplistic equation whereby growing populations must be provided additional water supplies by enhancing the supply of water through storage or more water control structures and not through gains in use efficiency or intersectoral water transfers.

Relatively early on, for example, there was disagreement over Indian plans to build the Salal hydroelectric project on the Chenab River. After negotiations at the governmental level, the Pakistanis accepted the project in the 1970s. Subsequently, the Tulbul/Wullar project on the Jhelum River from the early 1980s and the Baglihar hydroelectric project on the Chenab River from the late 1990s became prolonged sources of disagreement. Because of Pakistani objections, work on the Tulbul/Wullar project was stopped in the 1980s, and the project is still a subject of negotiations between the two governments. On the Baglihar project, however, the government of Pakistan invoked the arbitration clause for the first time in the treaty's history in 2005.¹⁶

Pakistani objections to the Baglihar regarded primarily the technical specifications of the run-of-the-river project—that is, a river project without dams or storage. Although the project was initiated in 1992, the Pakistanis did not object to it until 1999, when they complained about changes in the design of the project on which they had not been consulted. The Indians protested that the changes were necessary for the techno-economic viability of the project. The public view in Pakistan, however, was that India was somehow trying to dam the Chenab River, which was Pakistan's by virtue of the IWT, whereas Indians viewed Pakistani objections as yet another example of Pakistanis' negativism about any legitimate Indian project on the three western tributaries.¹⁷ The dispute was a manifestation of the different interpretations the two countries' engineers had of the treaty. In the words of a former Indian secretary for water resources, Ramaswamy Iyer,

Pakistan regards the western rivers as *its* rivers under the treaty, and tends to look with jaundiced eyes at any attempts by India to build structures on those rivers. Structures give control, and Pakistan is reluctant to agree to India acquiring a measure of control over those rivers, that stand allocated to Pakistan. The treaty gives Pakistan virtually a veto power over Indian projects on the Western rivers, which Pakistan tends to exercise in a stringent rather than accommodating fashion.¹⁸

Pakistani possessiveness about the western rivers notwithstanding, it is also a fact that much of Pakistan's technical objections to projects such as Baglihar are informed by security concerns, such as India's potential ability to impound water during low-flow winter months and/or to release excess water during high-flow months to cause flooding in downstream Pakistan. India of course protests (1) that it cannot flood Pakistan without flooding itself first, (2) that the water projects are necessary for the development of the disputed state of Jammu and Kashmir, and (3) that the design elements of the Baglihar are necessary for the safety and techno-economic viability of the project. The neutral expert appointed by the World Bank to resolve the dispute gave his binding decision on the Baglihar dispute in 2007, essentially accepting some of the Pakistani concerns by asking India to respond to them but rejecting other concerns. This allowed the project to go forward with some design changes.¹⁹ Both the countries claimed the neutral expert's decision as a victory, though the Indians had more of a cause for such a claim, because the neutral expert conceded the fundamental design issues of the impounding of water and the location of the movable spillway gates for the project.

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Overall, Pakistan's perceived negativism might be vexing for India but has not been unreasonable. The Salal Dam was agreed to by Pakistan once Pakistan's concerns were satisfied, and there was no official protest on Baglihar until the design changes that, in Pakistan's view, went against IWT provisions. Pakistan has never opposed an Indian project on the western tributaries in principle. Its objections have always been technical and based upon a *literal* reading of the IWT. That literal reading is intentional. Indeed, at the time of the treaty signing, extensive technical annexures were added to the treaty and agreed to precisely because such future disputes were anticipated. It should, however, be noted that the Indus Commission is a rather secretive organization and with good reason. News of any Indian projects on the western rivers, once leaked to the Pakistani press, becomes highly emotive and inflames public opinion. In that environment, it becomes virtually impossible for Pakistani engineers to evaluate a project on its technical merits alone and concede Indian projects on the three western rivers without taking public opinion into account. This problem will likely become more pronounced because Pakistan and India have highly diverse and vocal electronic media. The truth is that no single completed or proposed Indian project on the three western rivers of the Indus basin alone has the potential to significantly limit flows of water to Pakistan. But given the long list of proposed Indian projects on the three western rivers, India will in the future have the cumulative storage capacity to substantively reduce water flows to Pakistan during the low-flow winter months. It is this *potential capacity* that Pakistan is ultimately afraid of, but this is a fear that India does not recognize as legitimate.²⁰

Besides the Baglihar challenge to the IWT, there was some talk in India in 2002 of rescinding the treaty altogether because of "cross-border terrorism," particularly the attack on the Indian parliament in December 2001, and the ensuing mobilization of the two countries' armed forces. Notwithstanding this talk, the expert view held that the treaty was serving both countries' interests and that rescinding it would open a Pandora's box of bilateral water-sharing issues between India and Pakistan and other South Asian countries—a situation India could ill afford.²¹

More recently, the political temperature in Pakistan again began to rise on account of India's Kishenganga–Jhelum run-of-the-river hydroelectric project. The project, on a tributary of the Jhelum River, proposes to divert water from the Kishenganga River (also called the Neelum River in downstream Pakistan) a few kilometers upstream from where it enters Pakistan across the Line of Control in Kashmir and channel it through a tunnel to a tributary of the Jhelum River to generate electricity. The diverted water does theoretically reenter Pakistan via the Jhelum River. The Pakistani water establishment is irked, because it has a similar planned run-of-the-river project on the Kishenganga River soon after it enters Pakistani-administered Kashmir. Pakistani project's design specifications and economic viability are contingent on the specifications of the Indian project and evaluation of river-flow data supplied by India. According to Pakistani sources, the Indians, when asked for design specifications and flow data, have not been forthcoming.²² For example, when the upstream low-flow data was requested, the numbers received were much higher than what Pakistan had historically experienced downstream. Pakistanis' suspicions about Indian intentions are further accentuated by the fact that India in general holds stream-flow data as a state secret and that there is very little possibility to independently verify the data. In this context, then, data quality and accessibility are at the heart of the brewing conflict between the two countries. The Indus Commission agreed in principle in late July 2010 to install a telemetry system on the Indus River system.²³ One hopes that the installation and judicious use of the system will be an important confidence-building measure between the two countries in the water sector, though the fate of a similar system in Pakistan for interprovincial water distribution—discussed later—is not very encouraging.

To reiterate, the international hydrogeopolitics of surface water between India and Pakistan are delimited within the bounds of the IWT. The treaty is a product of its time and would probably not have been negotiated the same way today. Pakistan's perceived negativism toward Indian projects on the three western tributaries do rankle Indian nationalist elements, just the same as Indian river development arouses Pakistanis' worst fears about India's intentions. Ironically, Pakistan's negativism most rankles the Indian-administered Kashmiri population, which considers such obstructionism as evidence of Pakistan's relative indifference to its well being. The trust deficit between the two countries is played out through the technical negotiations between the two governments and rhetorical posturing in their respective media. All told, though, the IWT does seem to moderate the worst impulses of the two countries vis-à-vis each other, and perhaps therein lies IWT's greatest strength.

The IWT, by performing an amputation surgery on the basin that was much the same as the political bifurcation of the subcontinent, made matters simple and allowed the two countries to pursue their nationalist agendas without much need for more sophisticated and involved cooperation in the water field. This lack of cooperative sharing of water leaves the ecological and social consequences of the treaty to be negotiated and contested at the subnational level, which has considerable negative consequences for the ecology and societies of the Indus basin.

This lack of cooperative sharing of water leaves the ecological and social consequences of the treaty to be negotiated and contested at the subnational level. . .

Subnational Hydrogeopolitics

In both India and Pakistan, subnational hydrogeopolitics have been political lightning rods in terms of interprovincial relations. In the case of India, the issue of interstate water distribution between Punjab, Haryana, and Rajasthan became one (among many others) of the catalysts for a very destructive separatist insurgency. In the case of Pakistan, however, the conflict over water distribution between the dominant Punjab province and remaining smaller provinces in the federation, particularly Sindh province, has remained peaceful and limited to the political arena, though its wholesale appropriation by Sindhi nationalist elements in their rhetoric bodes ill for the future. The fratricidal insurgency in the Indian Punjab in the 1980s claimed thousands of lives and almost spun into an international conflict between India and Pakistan when the Indian Armed Forces were mobilized in 1987 on the pretext of stopping Pakistan's alleged support to militancy in the Indian Punjab. The insurgency had a number of causes, including water conflict between Punjab and Haryana. Similarly, the ongoing interprovincial argument over water distribution in Pakistan has potential—though entirely avoidable—repercussions for stability, both at the subnational and international levels. It is with the worst-case scenario of the Indian Punjab-style insurgency in mind that this report turns to an analysis of subnational-scale hydrogeopolitics in Pakistan.

Historical Overview of Interprovincial Water Conflict in Pakistan

In Pakistan, the interprovincial conflict over the allocation of the Indus Rivers' water dates to the beginning of the massive canal construction by the British in the Punjab from the mid-nineteenth century onward. The first substantial interprovincial water allocation treaty between the Punjab and the downstream riparian Sindh province dates to 1945. The treaty allocated 75 percent of the waters of the main-stem Indus River to Sindh province, and 25 percent going to Punjab province. The treaty further allocated 94 percent of the water from the five eastern tributaries of the Indus River to Punjab, and 6 percent to Sindh.²⁴ The partition of the Subcontinent and the subsequent signing of the IWT by India and Pakistan allocated most of what was Punjab's share of the Indus basin waters—according to the 1945 Sindh-Punjab Agreement—to India, and provided for

construction of storage and link canals from the western half of the Indus basin to the eastern half to compensate for the water lost to India. The Sindhis widely perceived the compensatory water and the storage on the Indus and Jhelum Rivers to be compensation to Punjab province at the expense of Sindh.²⁵ The Kalabagh Dam controversy—an argument between the dominant Punjab province and the remaining smaller provinces in Pakistan, especially Sindh, over a proposed storage dam on the main-stem Indus River in Punjab—is perceived by the Sindhis as yet another insult that has been directed at them by the Punjabis in the form of further appropriation of Sindh’s rightful share of water.²⁶

Although the focus of subnational hydropolitics in Pakistan has been surface water, it would be useful here to point to the significance of groundwater in the basin and related problems of water logging and salinity, which are likely to have much greater impact on water use, agricultural productivity, and hence hydropolitics in the long run. The estimated 0.8 million water pumps in Pakistan supply almost 50 percent of the crop-water requirements in the country.²⁷ One of the consequences of this major groundwater development has been the secondary salination of 4.5 million hectares of land, half of which affects the Indus basin’s irrigated lands. An additional 1 million hectares of the 16 million hectares of irrigated land in the Indus are affected by waterlogging from canal seepage and inappropriate irrigation practices. The problem of salinity is acutest downstream in Sindh province, where 70 to 80 percent of the soils are classified as moderately to severely salinized. This land degradation is severely hurting agricultural productivity, and most remedies have largely been unsuccessful.²⁸ The simmering ongoing conflict between Sindh and Punjab on surface-water supplies should be viewed in this context, where land degradation and groundwater salinity in the downstream province make its thirst for surface-water supplies much more pronounced. This is apart from the province’s pervasive problems of poverty, lost productivity, and consequent social instability, which have not attracted the resources or attention from the country’s water managers that they deserve.

The seemingly perpetual water conflict between Sindh and Punjab had a tentative settlement in the form of the interprovincial water accord of 1991, when four provincial governments, all governed by the same political party for the first time in Pakistan’s history, agreed to set allocations among the four provinces. The accord, which was based on the assumed average flow of 114.35 million acre-feet (MAF) of water in the Indus system, allocated 55.94 MAF of water to Punjab and 48.76 MAF to Sindh province, the remaining 9.65 MAF divided between Khyber-Pakhtunkhwa and Balochistan provinces.²⁹ Although it has been argued that the actual apportionment came closest to what a reasonable apportionment could be, the accord nevertheless suffered a crisis of legitimacy. The legitimacy was in question primarily because the negotiating process leading up to the accord was not transparent and did not include all the stakeholders, particularly from the smaller provinces, and because of the suspect legitimacy of the political setup in Sindh province at the time.³⁰

The Dam Controversy

The official figures for average annual flows for the Indus basin used in the interprovincial water accord and subsequent justifications for additional storage on the Indus River, particularly for Kalabagh Dam, on the main-stem Indus River in Punjab province, are suspect. Many have convincingly argued against the official methodology of using the higher number for flows in the Indus system, particularly because it is based on a shorter time frame—that is, since 1977—and because the higher number works to the disadvantage of the downstream riparian.³¹ The official argument in favor of the construction of the Kalabagh Dam on the Indus River paints the picture of a scarce water resource, which is being wasted by being

The accord [of 1991] nevertheless suffered a crisis of legitimacy. . . because the negotiating process leading up to the accord was not transparent and did not include all the stakeholders.

allowed to flow out to sea, and outlines a doomsday scenario should additional storage not be built on the Indus River.³²

On the internal security front, the water scarcity in Sindh, especially in the aftermath of the drought in southern Pakistan in the latter half of the 1990s, coupled with the single-minded focus of the Pakistani water bureaucracy on water development, has made the issue of the construction of the Kalabagh Dam project a surrogate for a litany of Sindhi grievances against the Punjabi-dominated political, military, and bureaucratic system in Pakistan.³³ The controversy is beginning to polarize public opinion in Pakistan, particularly in Sindh province, where more than 80 percent of the groundwater is saline, making the province's farmers exceptionally dependent on surface-water supplies, which itself may be compromised by the upstream dam. Furthermore, the ecology of the Indus Delta and the livelihoods of hundreds of thousands of Sindhi fishermen are also in jeopardy because of reduced fresh water flows to the delta, which are likely to be reduced further if the dam is built. On the other hand, for the Pakistani water managers, Kalabagh Dam has become a metaphor for the persistent meddling of the "untrained" and "nonexpert" politicians in what they perceive to be, or wish to be, a purely engineering issue. All types of appeals to patriotism, science, economics, and neo-Malthusian scenarios are being pressed into service by the Pakistani government and the engineering establishment to make the case for not only Kalabagh Dam but also other storage projects on the Indus. The dam project at the moment is in cold storage, particularly on account of the combined opposition of not just Sindh but also of Khyber-Pakhtunkhwa and Balochistan.³⁴ Khyber-Pakhtunkhwa is concerned about the potential flooding of rich farmland and Pashtun cultural heartland by the lake that will be created behind the dam. The province is also reluctant to lend its support to the project because of suspicions based on the poor record of the Pakistani government in providing for the rehabilitation of those affected by earlier large-dam projects.

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The objections to additional storage on the Indus are not limited to the nationalist politics of smaller provinces. Other convincing arguments have also been made by environmental and citizen groups in Pakistan, pointing out that Pakistan's irrigation sector has some of the lowest conveyance efficiencies in the world. The detractors argue that instead of going for very expensive, environmentally damaging, and economically dubious storage and megaproject solutions to the water issue in Pakistan, enhancement of the existing infrastructure's efficiency, coupled with better on-farm water management and more appropriate irrigation and farming techniques, would perhaps more than make up for any additional water that might be gained from megaprojects.³⁵ In addition, the lack of sufficient flows in the Indus Delta adversely affects the ecology of the delta, which has a direct effect on the livelihoods of thousands of fishermen and farmers in the lower basin. The interprovincial water debate is a vigorous one and is frequently waged at expert forums in Pakistan. But as far as the Pakistani press and public are concerned, the parameters of the debate are limited to how to build more megaprojects and increase water supplies. A more sensitized and informed media coverage of the debate could go a long way toward lowering the temperature on the issue among politicians and the public.

Recent Developments in the Subnational Water Debate

In 2004, the Indus River System Authority (IRSA), which is the main interprovincial water-management body in Pakistan, installed a satellite-based telemetry system on the Indus basin rivers to provide real-time flow data to all the provincial water managers and thereby diffuse the atmosphere of mistrust between the provinces. The system unfortunately has not worked—largely to the disadvantage of Sindh. Some in the government have blamed the faulty design parameters of the system for this, but others have convincingly argued that

the faults with the system are not unfixable and that field engineers and their leadership were so disposed the system could be made functional.³⁶ In addition, there are perpetual tensions between Sindh and Punjab on the opening or closure of link canals in Punjab and on the whole issue of Sindh's allocated water share not getting to the province because of thefts in Punjab. Again, there could have been a substantive basis for arbitrating those conflicts if the data from the telemetry system were available. This issue is beginning to get considerable attention from the Pakistani press, and there are legitimate concerns that an expensive technology (it cost US\$5.4 million in 2004) that is already in place and has the potential to make water flows between the provinces more transparent, is not working because of incompetence or worse (malice on the part of vested interests).

The Indus waters distribution controversy, at the moment, is limited to sloganeering and street protests by part of the populace of Sindh and to a lesser extent of Khyber-Pakhtunkhwa, as well as heated debates among the water managers and provincial governments of the Pakistani federation. Incidentally, in the Punjab, the province that stands to benefit the most from the potential construction of the Kalabagh Dam and other water development projects (e.g., the Greater Thal Canal project, which is to supply additional water from the Indus to the arid Thal area of the Punjab),³⁷ public opinion at the grassroots level is uninterested at best, unlike in the case of Sindh. This is one controversy where the dissonance between the engineers' conceptions of how to manage and develop water seems to be driving the conflict more than any popular demand for additional water projects on the part of the residents of Punjab province. For example, both factions of the ruling Punjabi-dominated Pakistan Muslim Leagues (PML-N and Q) have been at great pains to try to mobilize grassroots public support for the dam, with little evidence of success.³⁸ This is in stark contrast to the Indian Punjab situation, where public opinion was quite inflamed in support of keeping Punjab's waters from Haryana. Whereas in Sindh there may have been a fusion of hydro politics with identity politics of Sindhi nationalists, in the Pakistani Punjab, there do not seem to be any popular passions regarding hydro politics. Consequently, given the shallowness of popular support for additional water development on the Indus River, there is an opportunity for a more enlightened and multidimensional policy dialogue to resolve the controversy. The specter of an Indian Punjab-style insurgency with hydro politics as one of the key issues is a nightmarish scenario for Pakistan but is an entirely avoidable one, provided the parameters of the discourse are widened from purely engineering concerns to wider social, cultural, environmental, and equity- and justice-related concerns on water resources.

The subnational water issue in Pakistan took a new twist in 2010 with the worst floods in the country's history. The floods were a consequence of the anomalous intense rains in the western Indus basin, something that was once observed every few decades but that has been experienced more than three times in the past decade alone. The enormity of the disaster and the role played by the highly regulated river channels and the irrigation-system management procedures have drawn renewed scrutiny from the public and the media. There is concern that the single-minded focus on maximizing water withdrawals and on greater regulation of the river system may have contributed to accentuating the already high flood peaks.³⁹ Furthermore, the issue of deliberate breaching of side levees to protect irrigation infrastructure—something that is routine operating procedure for flood management—drew media attention and accusations of favoritism when it came to protecting some parts of the flood plains at the expense of others. The floods are being used by the pro-dams lobby to call for construction of more storage on the Indus, but the tragedy also ought to inspire a more nuanced and comprehensive reevaluation of the water-management system in the basin. Such a reevaluation would likely lead to a new balance between the benefits and hazards associated with the river system and more equitable distribution of the same, both spatially and socially.

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Moving Ahead: Prospects for Cooperative Hydropolitics

As long as the two countries continue to be hostile and mutually suspicious, the imperfect IWT will have to be the medium for the conduct of hydropolitics.

At the bilateral level, the IWT has served an important moderating function in the hydropolitics between India and Pakistan. The treaty is a product of its time and could be fruitfully modified and renegotiated to bring it more in line with contemporary international water-course law, the Helsinki rules,⁴⁰ and emerging concerns with water quality, environmental sustainability, climate change, and principles of equitable sharing. But that renegotiation, if it ever happens, is going to be contingent on significant improvement in bilateral relations between India and Pakistan. As long as the two countries continue to be hostile and mutually suspicious, the imperfect IWT will have to be the medium for the conduct of hydropolitics between the two countries. In the meantime, however, India could be more forthcoming with flow data and be more prompt and open in communicating its planned projects on the Indus basin to Pakistan, particularly in the western basin. Pakistan, on the other hand, could engage with India within the context of the IWT more positively than defensively, and also educate its media and politicians so as not to sensationalize essentially technical arguments by representing them as existential threats. India too will have to be mindful of the fact that although no single Indian project presents a substantial threat to Pakistan's water security, India's planned water development projects on the Indus will have the cumulative capacity to substantially reduce water flows to Pakistan during low-flow months. Pakistan's anxieties about that future capacity are understandable and reasonable, and India must acknowledge and address those anxieties. Claiming compliance with the letter of the IWT will only add to the mistrust between the two countries.

Within Pakistan, considerably greater research needs to be undertaken to establish the relative weight of violence vs. cooperation as a means of conflict resolution over water. The fact that more than 95 percent of water withdrawals in the Indus basin are dedicated to agriculture, where its efficiency does not exceed 36 percent, is a clear indicator that the scarcity of water is institutional rather than absolute.⁴¹ Increased irrigation-water-use efficiency through engineering as well as institutional reforms, coupled with intersectoral water transfers, has the potential to more than make up for any water scarcity. Consequently, the question of whether water shortages and inequities in its distribution will lead to violence or threats to human security also becomes contingent on how water-related institutions behave. This point also relates to the international dimension, whereby a recognition of Pakistan's problems as fundamentally internally driven will provide the necessary perspective to the Pakistani public and media in evaluating the potential threat of Indian projects in the Indus basin. In other words, allowing the experts in the room to negotiate the details of proposed Indian projects in the context of the IWT is the best course of action for Pakistan—short of a future renegotiation of the treaty along the lines mentioned earlier.

The following recommendations to the international community are given with the intent of promoting more cooperative international and interprovincial hydropolitics in Pakistan's Indus basin:

- Provide technical assistance to both India and Pakistan to enable more accurate and timely stream-flow data that is readily accessible to decision makers and the public. This will prevent ignorance, rumors, and emotion from taking hold in the absence of hard data. The provision of more accurate and timely data can be a very important confidence-building measure.
- Encourage the Indian government to take Pakistan's concerns—for example, with regard to data availability or storage capacity in individual projects—more seriously and to address those concerns on merit. Often, with regard to the water sector, the issue is not what the Indian government is doing, it is how it is doing it.

- Utilize World Bank levers to facilitate greater openness of communication and data sharing within the IWT's Indus Commission and between the commission and the public.
- Facilitate a debate on how a more cooperative tenor, such as through a renegotiated IWT treaty that is in line with the principles of equitable apportionment and other contemporary international legal doctrines, could be beneficial to all relevant parties. A large portion of the subnational problems in Pakistan are partially a function of the treaty, because the Sindhis perceive, with some truth, that Sindh compensates Punjab for water that Pakistan negotiated away to India. The principle of allocating entire rivers may have appeared to be an elegant solution when the IWT was negotiated, but the IWT could be fruitfully renegotiated in the future provided there is sufficient trust between India and Pakistan.
- Provide technical assistance to Pakistan to improve its irrigation-system efficiency. Much more water can be realized from a more efficient distribution system than from any dam.
- Train and sensitize Pakistani water managers to the issue of equity in water distribution. The engineers dominating Pakistan's water bureaucracy do not have the skills to deal with the all-important social-equity aspects of water, which often lie at the heart of water conflict.
- Provide technical assistance to Pakistan so that it can bring its surface and groundwater laws more in line with contemporary developments in water law.
- Provide training and technical assistance that could address the long-term legitimate storage needs of the country. Groundwater storage capacity and knowledge is extremely underdeveloped in Pakistan.

Notes

1. Indu Agnihotri, "Ecology, Land Use and Colonisation: The Canal Colonies of Punjab," *Indian Economic and Social History Review* 33, no. 1 (1996): 37–58; Imran Ali, *The Punjab under Imperialism, 1885–1947* (Princeton, NJ: Princeton University Press, 1988).
2. James L. Wescoat Jr., Sarah J. Halvorson, and Daanish Mustafa, "Water Management in the Indus Basin of Pakistan: A Half-Century Perspective," *International Journal of Water Resources Development* 16, no. 3 (2000): 391–406.
3. See, for example, Peter Gleick, *The World's Water 2000–2001* (Washington, DC: Island Press, 2000).
4. See, for example, Chris Sneddon and Coleen Fox, "Rethinking Transboundary Waters: A Critical Hydropolitics of the Mekong Basin," *Political Geography* 25, no. 2 (2006): 181–202.
5. Daanish Mustafa, "To Each according to His Power? Access to Irrigation Water and Vulnerability to Flood Hazard in Pakistan," *Environment and Planning D: Society and Space* 20, no. 6 (2002): 737–52.
6. Shlomi Dinar, "Water, Security, Conflict, and Cooperation," *SAIS Review* 22, no. 2002: 229–53.
7. Haris Gazdar, "Baglihar and Politics of Water: A Historical Perspective from Pakistan," *Economic and Political Weekly*, February 26, 2005, 813–17.
8. Ibid.
9. For details of the treaty negotiation process, see Asit K. Biswas, "Indus Water Treaty—the Negotiating Process," *Water International* 17 (1992): 201–09; Aloys Arthur Michel, *The Indus Rivers: A Study of the Effects of Partition* (New Haven, CT: Yale University Press, 1967).
10. Muhammed Siyad, "Indus Water Treaty and Baglihar Project: Relevance of International Watercourse Law," *Economic and Political Weekly*, July 16, 2005, 3145–54.
11. Article VIII of the Indus Water Treaty of 1960 provides for the formation of the permanent Indus Commission. The commission is responsible for facilitating exchange of information and routine treaty-related matters between the two countries.
12. Ramaswamy R. Iyer, "Indus Treaty: A Different View," *Economic and Political Weekly*, July 16, 2005, 3140–44.
13. The Indus Basin Water Development Project comprised World Bank–financed storage, link–canal, and regulatory–structure projects to facilitate realization of the water demand in the two signatory countries in order to compensate for the water the two countries had negotiated away to each other in the treaty.
14. Nawaz Sharif, *Crossed Swords: Pakistan, Its Army, and the Wars Within* (Karachi: Oxford University Press, 2008), 209.
15. R. Rao, "Pitfalls of the Indira Gandhi Canal," *Ambio* 21, no. 6 (1992): 439.
16. Annexure F of the IWT allows for the appointment of a neutral expert for arbitration in case the dispute between the two countries cannot be resolved at the Indus Commission level.
17. Rajesh Sinha, "Two Neighbors and a Treaty: Baglihar Project in Hot Waters," *Economic and Political Weekly*, February 18, 2006, 606–08.
18. Iyer, "Indus Treaty," 3143.
19. Mary Miner, Gauri Patankar, Shama Gamkhar, and David Eaton, "Water Sharing between India and Pakistan: A Critical Evaluation of the Indus Water Treaty," *Water International* 34, no. 2 (2009): 204–16.
20. John Briscoe, "War and Peace on the Indus?" *News* (Pakistan), April 5, 2010, www.countercurrents.org/briscoe050410.htm.
21. Ramaswamy R. Iyer, "Was the Indus Waters Treaty in Trouble?" *Economic and Political Weekly*, June 22, 2002, 2401–02.
22. Employee of Pakistan's Water and Power Development Authority, personal communication with the author, March 28, 2010.
23. M. S. Shafique, "Telemetry System and Confidence Building," *Daily Dawn*, August 9, 2010, www.dawn.com/wps/wcm/connect/dawn-content-library/dawn/in-paper-magazine/economic-and-business/telemetry-system-and-confidence-building-980.
24. Michel, *The Indus Rivers*.
25. Mir Atta Muhammad Talpur, "Water Shortage in Sindh: Causes and Consequences," March 2001, www.scribd.com/doc/529124/Water-shortage-in-Sindh.
26. See, for example, www.sindh.ws/indusfarming.
27. A. S. Qureshi, P. G. McCormick, M. Qadir, and Z. Aslam, "Managing Salinity and Waterlogging in the Indus Basin of Pakistan," *Agricultural Water Management* 95, no. 1 (2008): 1–10.
28. Ibid.
29. Simi Kamal, "Pakistan's Water Challenges: Entitlement, Access, Efficiency, and Equity," in *Running on Empty: Pakistan's Water Crisis*, eds. Michael Kugelman and Robert M. Hathaway (Washington, DC: Woodrow Wilson International Center for Scholars, Asia Program, 2009).
30. H. L. Afzal, "Settling Disputes between Ethno-Regional Groups in Young Democracies: Distributing the Indus Waters of Pakistan" (PhD dissertation, University of Michigan, 1995).
31. See, for example, Abdul Majid Kazi and A. N. G. Abbasi, "Kalabagh Dam: Look before Your Leap," 2003, www.angelfire.com/az/Sindh/indus4.html; Shaheen Rafi Khan, "The Kalabagh Controversy," 2003, www.sanalist.org/kalabagh/a-14.htm.
32. Government of Pakistan, "Report of the Technical Committee on Water Resources," August 2005, www.dawn.com/events/tcr_on_wr/text1.htm.
33. Erik Eckholm, "A Province Is Dying of Thirst, and Cries Robbery," *New York Times*, March 17, 2003, www.nytimes.com/2003/03/17/world/gharo-journal-a-province-is-dying-of-thirst-and-cries-robbery.html.
34. Balochistan's own water projects, such as the Pat Feeder canal, are vulnerable to potential water stoppages from the proposed dam.
35. See Daanish Mustafa, "The Dam Dilemma," *Newsline Magazine*, October 2005, 68–70; Khan, "The Kalabagh Controversy."

36. Khaleeq Kiani, "Faulty Telemetry System Leads to Dispute over Water," *Daily Dawn*, July 9, 2010, www.dawn.com/wps/wcm/connect/dawn-content-library/dawn/the-newspaper/national/19-faulty-telemetry-system-leads-to-dispute-over-water-970-hh-06.
37. See Actionaid, "Greater Thal Canal: A Misadventure," 2009, www.scribd.com/doc/9707184/Greater-Thal-Canal.
38. See "PML-QA to Form KBD Committee," *Daily Times* (Pakistan), September 4, 2003, www.dailytimes.com.pk/default.asp?page=story_4-9-2003_pg7_31. In addition, no political party of any significance in Pakistan in general and in the Punjab in particular has ever passed a resolution in support of Kalabagh Dam, nor is there any evidence of a public rally held in support of the dam in Punjab. The Punjab Assembly in the aftermath of Pakistan's nuclear tests in 1998 did pass a resolution congratulating then prime minister Nawaz Sharif for the nuclear tests and for his announcement on the construction of Kalabagh Dam. There is, however, no resolution of the assembly specifically supporting the construction of the dam.
39. Robert Mackey, "Attempts to Tame Indus River Contributed to Disaster in Pakistan, Expert Says," *Lede Blog*, August 18, 2010, <http://thelede.blogs.nytimes.com/2010/08/18/attempts-to-tame-indus-river-contributed-to-disaster-in-pakistan-expert-says/>; Daanish Mustafa, "Pakistan Floods: Living with the Mighty Indus," *New Atlanticist Policy and Analysis Blog*, August 23, 2010, www.acus.org/new_atlanticist/pakistan-floods-living-mighty-indus.
40. The Helsinki rules, established in 1966, address the principles governing use of international surface waters and aquifers connected to those surface waters. The rules' key overarching principle is of equitable use and apportionment between upstream and downstream riparians in international watercourses. The IWT, however, rather than designating equitable apportionment, designates entire flows of rivers to one or the other riparian.
41. M. A. Kahlowan and Abdul Majeed, "Water Resources and Management in Pakistan," in *Water and New Technologies*, ed. Ishfaq Ahmed, 19–60 (Islamabad: Global Change Studies Center, 2002).

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