

INDUS WATER DISPUTE FROM BRITISH TO AYUB KHAN

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Abstract

The Indus River, one of the world's largest river basins, is an important economic engine for the surrounding area. Due to its critical economic importance and potential, the water of the Indus River has been a divisive issue among its users for many years. The partition of British India in 1947 is the root cause of the water disputes between the newly formed states of Pakistan and India. The World Bank was instrumental in facilitating the mediation that led to the Indus Water Treaty in 1960. Once the Indus Water Treaty was put into force, both nations could advance agriculturally in areas bordering the Indus River System, which brought about peace. In order to understand how the resolution was reached, the essay explores the main issue and the reconciliation procedure. Focusing on the central issue and the reconciliation process that resulted in the successful Treaty, the story delves into interpretation, economic progress, and the political atmosphere between the two nations. The article also plans to draw attention to the recently surfaced allegations and issues raised by the stockholders of the Indus River system, which are causing new concerns. Finally, drawing on pertinent previous work, new understanding, and the enduring influence of the Indus Water Treaty, the paper proposes methods to end the water conflict and strengthen relations between the two countries.

Keywords:

Indian sub-continent, Indus basin, water dispute, Indus Water Treaty.

INTRODUCTION

The Indus Waters Treaty, which came out of a World Bank proposal in 1954 and was ratified in 1960, is widely regarded as a landmark achievement in the realm of international water issues. In 1990, Syed S. Kirmani said that the Indus Waters Treaty "led to successful management of conflicts between sovereign riparian countries of a large Indus River and served to promote development and prosperity in both countries."

Because the treaty was in place even after Pakistan and India fought each other many times, there was a spurt of new building on both sides of the border. The Indus basin, partitioned into two distinct "national" parts by the treaty, is one of the largest and most complex irrigation systems in the world. By 1947, efforts to "use" a growing percentage of the river basin's total flow were already underway.

The treaty's most fundamental assumptions revealed the irony that permeated its formulation of the community's connection with the environment. The signatory governments had utilized their connections to science and nature to justify new notions of national community and authority since 1947, but the treaty severed these so-called natural unities that had been crucial to the Indus basin's growth. Both the river basin and its human-made surroundings were considered when the pact was signed. While the spirit of the agreement sought to establish decentralized authority based on natural laws, the letter of the agreement sought to change the environment to conform to the artificially created borders that defined the divide. Ironically, the Treaty, which reduced nature to "politics" and "national" property, undermined these claims—this despite the fact that the Treaty marked a turning point in the efforts of the two postcolonial states in the Indus basin to claim scientific supremacy over nature as a crucial component of postcolonial statecraft, continuing the practice begun by the colonial regime.

Disputes over water have evolved since 1960, with new forms of water politics emerging as a result of the merging of technical issues with community mobilization based on emotional ties to the water environment, both on the federal and provincial levels. Achieving this was made feasible through the technical reconstruction of the divided river basin.

Natural phenomena the Indus River, which had been given first billing in David Lilienthal's treaty-initiating vision, remained a major factor in political debates on both sides of the border. This conception underwent changes following the treaty as a result of the actual demarcation of the partition line as well as the new, separate framework of statecraft that each bordering party had to employ to implement this vision.

An analogy to the water war between the federal government and the provinces might assist shed light on the environmental goal of the river basin and its political importance. At the heart of these disputes was the river basin, which was considered as both a scientific fact and an emotional one. On one hand, it defined the "natural" meanings of national and provincial identities in relation to the emerging political systems in India and Pakistan. On the other hand, it dealt with the technical connections between the various components that make up larger systemic wholes. Provincial animosity inside a "system of multiple parts" started to boil up in the years following 1920, as we have seen, and this is where the complicated history of these disagreements begins. The impacts of water shortage on agriculture on both

sides of the border, caused by increasing demands for water due to the green revolution and a growing human population, transformed their political shape after 1960.

Tensions in India precede partition, as seen by the long history of fighting between the old and new east Punjab authorities. After the split, people began to doubt the geographical significance of the Sikh group. The management of the eastern rivers' water resources was influenced by the changing water environment, India's links with Pakistan, and the interaction between "national" and "regional" community viewpoints. The water shutdown of 1948 and the border flow control disputes in 1952 and 1953 are examples of this. The 1954 World Bank recommendations, which were not completely implemented until the treaty terms of 1960, changed the trajectory of these confrontations because they effectively recognized India's complete control over the eastern rivers. The reason behind Delhi's hasty rise to power was the 1955 Interstate Water Agreement, which allocated the rivers Ravi and Beas to five states: Punjab, Rajasthan, PEPSU (Patiala and East Punjab State Union, which merged with Punjab in 1956), and Kashmir (despite the fact that the 1960 treaty, which ended after a ten-year transitional period, did not fully "use" the rivers until 1970). During the treaty discussions, Prime Minister Nehru willfully left out the Sutlej waters, which had previously been allocated to the Bhakra project. Nonetheless, the agreement did establish a framework for the central government's "integrated program of development" along the entire eastern river watershed; this program would eventually incorporate and disregard provincial concerns in favor of a unified goal.¹

Controversy has surrounded the Indian government's long-standing ambition to merge the "eastern rivers" into a new "natural" river basin. In this new courtroom, the "nation" will play the role of judge. An explanation put up by James Wesco is that "the allocation of tributary rivers" no longer "lent itself" to the "'river basin' approach," rendering it obsolete. In order to bring these minor rivers together and classify them as one larger river system, a network of dams and connecting canals was built, the most notable of which being the Ravi-Beas link, completed in the 1950s. The lower river basin, which had once connected the rivers and flowed to the sea, remained as a metaphor of their lost wholeness, like a severed limb, bringing them sorrow, even though the rivers were rebuilt to form a picture of the river basin. Reconstructing a "eastern" Indus basin had always included these "natural" ties to the world downstream, but they were formally rejected by the new treaty framework with Pakistan, rendering them invisible to the public.

One possibly equally important point is that the center's efforts to assert responsibility for the integrated development of the Indus River Basin exposed numerous ambiguities. The Rajasthan canal was important to the 1955 agreement between Delhi and Pakistan. It was envisioned as a way for India to recapture the civilizing colonial paradigm of cultivating deserts, which involved transforming these erstwhile pastoral "wastelands" into profitable agricultural areas. For this massive undertaking, the agreement stipulates that Rajasthan will receive somewhat more than half of the water from the Ravi-Beas. Since Rajasthan was not officially an Indus riparian state, many Punjabis viewed this idea as a challenge to the federal government's efforts to create its power by changing a "natural" river basin. Because of the prepetition Bikaner state's claims to Sutlej flows and the proposed Rajasthan canal's significance in India's negotiations with the World Bank and Pakistan, Rajasthan was legitimately included in the water-sharing

¹ Ibid., 316–40, 364–83.

agreement. However, the state did not own any riverfront property on any of the Indus tributaries. The 1955 accord, which envisioned the reconstruction of a multi-part "eastern" river basin, laid the groundwork for the continuing water disputes between the federal government and Punjab. There is a gulf between them because they value the river basin's integrity differently.²

The broader cultural and political dynamics of India's state reform in the 1950s gave rise to a new aspect in the Indus basin water disputes. The formation of Haryana province from the now-defunct Punjab province in 1966 marked a watershed moment in this evolution. It was made possible by the 1956 States Reorganization Act, which, in opposition to Nehru's evolved mentalist perspective, gave priority to the creation of provinces according to cultural and linguistic identities. Accordingly, disputes over water in the Indus basin became entwined with questions of autonomy and identity. In the wake of the 1948 water blockade, Nehru began to harbor suspicions that the establishment of a Punjabi-speaking state was really an attempt by the British to cover up a Sikh militant agenda. There was a risk that this agenda would undermine national unity and disrupt water-sharing agreements, which worried him.

Following Nehru's death, a distinct Punjabi-speaking state was eventually established based on linguistic criteria. However, the central government remained intent on retaining authority over water-related issues. This intent was clearly evident in a clause added to the Punjab Reorganization Act of 1966, which granted the federal government a significant role in distributing water rights and responsibilities between the newly formed states of Punjab and Haryana, even though irrigation matters legally fell under provincial jurisdiction according to the Constitution.³ The legislation specified that if Punjab and Haryana failed to reach a mutual agreement on water sharing within two years, the central government would assume the authority to decide the allocation. This led to the 1976 decision during Indira Gandhi's emergency rule, where Delhi unilaterally issued a water distribution award. From the beginning, the decision sparked controversy, with both states alternately supporting and opposing it. Many in Punjab, however, grew increasingly skeptical of the central government's impartiality, especially as it appeared more inclined to divert river water outside the basin—initially to Rajasthan and later to Haryana—raising questions about the legitimacy of Delhi's role as a fair mediator.⁴ Throughout the following decade, disputes over the distribution of river waters between provinces significantly contributed to the worsening relationship between the Akali Sikh leadership and the central government. These tensions eventually escalated and played a key role in the chain of events that led to the 1984 Operation Bluestar and, later, the assassination of Prime Minister Indira Gandhi.

One of the most significant developments was how the concept of the river basin, once symbolizing unity and environmental integrity, was reinterpreted to question the central government's authority. The Akali leadership, in particular, framed their opposition to federal water policies by emphasizing Punjab's—and specifically the Sikh community's—longstanding cultural and historical connection to the region's river systems, known as the "land of five rivers." They argued that Haryana's share of water was unjust, as it

² Vijepal Singh Mann, *Troubled Waters of Punjab* (New Delhi: Allied Publishers, 2003), 17–23.

³ Mahesh Chandra Chaturvedi, *India's Waters: Environment, Economy, and Development*, Boca Raton, Fla.: CRC Press, 2011, p. 176.

⁴ Santosh Kumar Garg, *International and Interstate River Water Disputes* (New Delhi: Laxmi Publications, 1999), 54–62.

lacked direct access to the Indus tributaries. From the central government's perspective, however, Haryana's entitlement was legally valid, stemming from the 1976 allocation based on the division of pre-1966 Punjab and the 1955 Interstate Water Agreement. Yet, for many in Punjab, this legal stance appeared to disregard natural geography and historical bonds, casting doubt on the center's legitimacy in managing river water fairly.

Trying to consolidate state power, Muhammad Ali Jinnah and his heirs incorporated a model of governance reminiscent of the British colonial rule, that is, a powerful executive with the military under its patronage. This strategy resulted in the overthrow of non-compliant civilian administrations in 1953, the stalling of a constitutional draft, the disbandment of the Constituent Assembly in 1954 when it offered a federal democratic system, the toppling of an elected government in East Pakistan in 1953, and the rehabilitation of the provinces of West Pakistan into a single entity the One Unit scheme of the period 1955-1956 to bring East and West Pakistan into balance. This kind of centralization undermined the legitimacy of the government especially in East Pakistan and created suspicion in the military that parliamentary democracy was viable in a country that was under threat and at the same time was riddled with tension. By the early 1950s the military with the leadership of General Ayub Khan, gave up its position of political neutrality and looked beyond its role of merely protecting its autonomy and budget to a vision of a sort of controlled democracy which suited the peculiarities of Pakistan.⁵

Controversy escalated when Indira Gandhi was assassinated by her Sikh bodyguards in 1984 and Sikhs in Delhi retaliated by unleashing violence against them, reportedly backed by the local Congress leaders. The name of the canal was changed in the aftermath with the central government calling the Rajasthan canal the "Indira Gandhi Canal for many it was an extension of the power by the state to exert its centralized claim of water resources. This renaming figuratively transformed what started as a national development project, based on post-partition ambitions of agricultural modernization, to a political gesture, particularly to many Sikhs who interpreted it as an attack on Punjab.

Most importantly, water political turmoil in Punjab was not only grounded in economic and environmental realms. The call to equitable water allocation, which became central to the political agenda of the Akali Dal, was driven by the fact that the region has suffered an agricultural boom since 1966, occasioned by Green Revolution technologies. These advances dramatically increased the need for irrigation water, even as water became scarcer due to the expansion of irrigated areas and the allocation of "new" water to India under the Indus Waters Treaty. The treaty, like British policies before 1947, encouraged widespread but thin distribution of water, prompting tensions over regional access. Disputes over the distribution of canal water—especially concerning the rollout of the Indira Gandhi Canal in Rajasthan, which began irrigating land in 1961—further exacerbated concerns in both Rajasthan and Punjab. To compensate for insufficient surface water, farmers turned to intensive groundwater extraction, which eventually led to severe depletion. By the early 21st century, this groundwater stress significantly shaped public attitudes toward water management in Punjab.⁶

⁵ Gurdev Singh, *Scramble for Punjab Waters* (Chandigarh: Institute of Sikh Studies, 2004), 52.

⁶ Gian Singh, Harminder Singh, and Surendar Singh, *Groundwater Development in Punjab: Alternative Perspective and Policy Issues* (Patiala: 21st Century Publication, 2003).

These developments revealed that the Akali concern with water issues was not merely rooted in cultural or identity-based politics, but was deeply connected to the real and growing economic challenges faced by Punjabi farmers. These farmers were experiencing major shifts in agriculture, including the rapid adoption of new technologies and a shift toward mechanized and diversified farming practices. This transformation followed the widespread introduction of Green Revolution crops, which, while boosting yields, also demanded significantly more water. Such water-related anxieties were especially visible during the political turbulence of the 1980s and persisted afterward, as consistent water shortages continued to affect agricultural productivity. The framing of Punjab's water needs through the lens of river basin integrity was crucial, as it linked the immediate concerns of individual farmers with a broader, historically rooted view of the region's identity and natural geography. This perspective emphasized the idea that Punjab's rightful water share was tied to the natural flow of the rivers, and positioned its demands in opposition to claims from surrounding states.⁷ The long-running conflict triumphantly resumed in 2004 due to the intensification of water scarcity in Punjab. That year, in reaction to a Supreme Court ruling that required the completion of the Sutlej-Yamuna Link (SYL) canal, Punjab passed the Punjab Termination of Agreements Bill. As a result of this statute, which effectively nullified all previous agreements regarding the completion of the canal, disputes over water distribution have resurfaced. The adoption of the Punjab Termination of Agreements Bill was a direct challenge to central authority, so the President of India took the matter to the Supreme Court. The concept of the river basin was used to assert a "natural" identity for Punjab and its Sikh community that went beyond political boundaries. However, the issue became a pawn in the continuous conflicts between the federal government and the states, as well as in internal political maneuvering. Three eastern rivers of the Indus basin—the Sutlej, Ravi, and Beas—have never had a "riparian relationship" with Haryana or Rajasthan, even during periods of sufficient flow, according to a Sikh author's 2004 criticism of the still unfinished SYL canal.⁸

The river basin concept, which stands as a symbol of defiance against federal water regulations, arouses feelings connected to a "natural" identity as well as more practical worries. As part of their attempts to reclaim their culture, Punjabis are reawakening a sense of identity that was strongly linked to the river basin before division. This ideal has slowly faded away. The idea of the forgotten river basin provided a way for Punjabis to rediscover their historical connection to the region, which was especially important while talks with Pakistan stagnated. Sacred Sikh shrines, rivers that are now in Pakistan, and famous Punjabi stories like *Hir-Ranjha* and *Mirza-Sahiban* are all part of this history. The very rivers that give the Punjab its name—the five rivers—may tell us something about the people who live there. It was once believed that the rivers encircled the land like a silver wreath, symbolizing love.⁹

In order to overcome the legal and technical obstacles, the idea of the lost river basin had to be emotionally reconstructed when India's new water control system was introduced following the treaty. At this point, the story is making an effort to paint the river basin as a setting conducive to personal and professional development. One such coordinated attempt was the Indian government's plan to demonstrate a unified community of production throughout the country's provinces by asserting control over a "natural" river

⁷ Bharat Bhushan, "The Origins of the Rebellion in the Punjab," *Capital and Class* 8, no. 5 (1985): 5–13.

⁸ Singh, *Scramble for Punjab Waters*, *Ibid.*, p. 22.

⁹ Singh, *Scramble for Punjab Waters*, *Ibid.*, 57.

basin created by the rivers in the east. Yet, from the very start, the political and moral effort by the federal government to reenact the conquest of the desert during the colonial era ran into problems. Those who saw the political efforts made in the middle as an intrusion on the "natural" river basin were the ones who initially opposed the idea of developmental unity for the eastern rivers. A foundation for organized and fruitful planning was offered up by the proposal. Both community visions—one based on the concept of a natural river basin and the other on productive environmental management—had their origins in the eighteenth century, but the water treaty of 1960 marked a turning point that transformed both in extraordinary new ways.

In Pakistan, a similar process unfolded, though the developments there took a different trajectory. From the announcement of the World Bank's 1954 plan, the central state in Pakistan began to assert its technical authority, especially in response to the projected national crisis caused by the loss of the eastern rivers. The need to redesign the Indus basin as an integrated system to compensate for the lost water was presented as a necessity for national survival, requiring the subordination of local elements to the technical needs of the larger system. This technical framework was positioned as a depoliticized, state-driven imperative, and its success relied heavily on foreign aid and expertise. This approach aligned with a distinctive form of Pakistani statecraft emerging at the time, one that emphasized the idea of a neutral, above-society state, reflecting the aspirational vision that had informed Pakistan's creation. The treaty's structural implications were, therefore, quite different for Pakistan than for India.

The reliance of Pakistan on foreign technical and financial assistance became evident between the introduction of the World Bank's plan in 1954 and the finalization of the treaty in 1960. The initial perception of Pakistan and India engaged in a water war in the shared river basin shifted when the bank appeared to deny Pakistan's assertions to continue utilizing the eastern rivers, despite public requests to back Pakistan's water demands. Rather than focusing on the reasonableness of Pakistan's claims, the government prioritized extracting the maximum amount of money from India and, more crucially, the international community, in exchange for the water that would be lost during discussions. This shift was already apparent before Ayub Khan's 1958 military coup, which enthusiastically accepted this approach. In its 1956 Aide Memoire, the World Bank acknowledged that Pakistan's water difficulties and the construction of new infrastructure would necessitate substantial financial resources and international assistance. Securing compensation was Ayub's negotiating strategy as the treaty's ratification drew near.

Foreign sources provided the whole funding for Pakistan's recently constructed Indus Basin Project (IBP) following the final treaty. The project involved constructing numerous dams and barrages on the western rivers to make up for the water lost from the eastern rivers. The Indus Basin had a long history of colonization and had constructed the world's most advanced irrigation system by 1947, making the sheer scale and cost of this endeavor incredible. Aloys Michel claims that it eventually became "the largest single irrigation project in the world's history." In the final round of treaty negotiations before 1960, Pakistan's demands against India were more essential than the creation of a huge aid package. Despite India's prior commitment to contributing to Pakistan's replacement costs—some of which were financed by the World Bank—the principal focus was on securing substantial foreign contributions. While it should have been the other way around, Michèle points out that the Indus Waters Treaty of 1960 was "published as an Annexure to the Development Fund Agreement," which laid out the external funding for Pakistan's

infrastructure projects. That the US and other benefiting states "purchased" an agreement with World Bank funds is proved here. During this time, the Pakistani government's duties shifted significantly. Once a state that supported Pakistani farmers' rights in a fight for "national" justice against India—an effort related to the principles that formed Pakistan, as evidenced by public support for the BRBD canal and other comparable projects—it is now primarily a channel for foreign financial and technical aid. By aligning with the international development environment of the Cold War era, donors viewed financial aid as a means to maintain geopolitical stability in South Asia, and Pakistan fell into step with this change.¹⁰

Unlike their Indian counterparts, water disputes between Pakistani provinces did not go away. Since the decision to divide the rivers was made, technical power was consolidated inside a newly constituted "national" engineering bureaucracy, and it was tasked with overseeing the restoration of the river basin. Irrigation was primarily overseen by provincial governments prior to division. A major shift had occurred. For the purpose of developing comprehensive strategies to conclude the Indus Basin Project (IBP), the Indus Basin Advisory Board (IBAB) was established in 1959. The Water and Power Development Authority (WAPDA) of West Pakistan (WPA), established in 1958 with wide-ranging operational and planning responsibilities across the river basin, was another significant entity within this new framework. Following its fast expansion, WAPDA reportedly became "one of the largest river basin planning organizations in the world—similar to the Tennessee Valley Authority (TVA), but on a national scale" (Wesco 2014). Much like Lilienthal's "apolitical" river management plan, it aimed to keep natural resources inside the political boundaries of the country (in this instance, West Pakistan) rather than extending outside national borders.¹¹

A greater political shift in Pakistan, most noticeably in the relationship between the federal government and the provinces, was influenced by and contributed to the "nationalization" of water management. During this time, there was an intersection of problems with water management and wider statecraft concerns. In 1955, Pakistan started to merge all of West Pakistan into one entity, while India was also moving toward its "linguistic states" concept in the mid-1950s. A more "depoliticized" perception of West

¹⁰ Critiques of the treaty's provisions were dampened in Pakistan by Ayub Khan's martial law regime, but the government's acceptance of the loss of water in return for foreign aid subsequently came in for its share of internal critique. A good example was Fatima Jinnah's criticism when she challenged Ayub in 1964–65: "Mr. Ayub Khan said that he did get Rs. 900 crores for it [the treaty]," she noted in a press statement. "I ask him is that adequate price for losing permanently the water for all times?" Quoted by Malik, *Indus Waters Treaty in Retrospect*, 153.

¹¹ Wescoat, "Historical Geography of Indus Basin Management," 424. WAPDA also came to depend significantly on foreign consultants; by 1961, it had "the services of 28 foreign consulting firms," including the large American firms of Tipton & Kalmbach and Harza Engineering and the British firms Hunting Technical Services and Sir M. McDonald and Partners. See Edwin Bock and Albert Gorvine, *A Scientific Panel in Foreign Affairs: The Revelle Report* (Syracuse, N.Y.: Inter-University Case Program, 1982), 5. Such foreign input helped, as Daanish Mustafa has put it, to make the Indus basin "a veritable laboratory for international and national research" in water matters. Daanish Mustafa, "Social Construction of Hydro politics: The Geographical Scales of Water and Security in the Indus Basin," *Geographical Review* 97, no. 4 (Oct. 2007): 484.

Pakistan as an integrated "developmental" entity connected by the Indus River system, with its administration seen as a purely technical and non-political issue, reflected in this change, even though the stated objective was to achieve constitutional harmony with East Pakistan. This was made very clear by Ayub Khan, who was the military chief of Pakistan at the time and still is now the country's military dictator, when he pushed for the "one unit" idea. In 1954, Ayub said that West Pakistan "must be welded into one unit," abolishing the entirely fictional province borders that, in his opinion, sprang from political ambitions rather than genuine distinctions. According to him, "Lying as it does in the basin of the Indus River and its tributaries, West Pakistan's future economic development must be considered as a whole to achieve maximum results." This led Ayub to portray river basin management in Pakistan as separate from and even at odds with the provincial identities fostered by the country's fragmented regional politics..¹²

In the late 1960s and continuing into the 1980s, Ayub formed multiple commissions to allocate water between provinces. The goal was to treat provincial water relations more like a technical issue and less like a political one. When it came to the distribution of water in the Indus basin, Sind had previously been the most outspoken region. The 1950s saw a number of massive projects that altered Sind's position in the basin before to partition. These included the Kotri barrage in lower Sind, located at the head of the Indus delta, and the Guddu barrage in upper Sind, north of the Sukkur barrage. Both projects were started in 1957 and ended in 1962; the former was finished in 1956 and the latter in 1962. In terms of modern irrigation practices within the greater Indus basin infrastructure, these advancements caused a shift from flood-based to weir-controlled canals, drawing Sind closer to Punjab. Concerns about the distribution of water among the provinces became more vocal in the late 1960s due to the Indus Basin Project (IBP) and other developments. In the midst of the chaos brought about by West Pakistan's invasion of East Pakistan and the establishment of Bangladesh, these issues only became worse after the "one-unit" model fell in 1969 and democratic governance was reinstated in 1970–1971. The system established during Ayub's reign had a significant impact on the numerous commissions that spent the next twenty years attempting to determine the distribution of water among the provinces. This arrangement "technicalized" and simplified the water distribution issue to a technical detail. Attempts to establish technical, non-political formulas for water allocation according to the technical needs of the river basin were made by the West Pakistan Water Allocation and Rates Committee (also known as the Akhtar Hussain Committee) in the late 1960s, the Fazle Akbar Commission in 1970, the Anwar-ul-Haq Commission in 1981, and the Haleem Commission in 1983. Regardless, they were confronted with the reality that prior "technicalization" of river basin management had made "technical" language appear to be little more than a cover for political goals.

Considering this in context aids in clarifying the distinctions between the Sindi provincial resistance of Pakistan in the 1970s and 1980s and its Indian Punjabi equivalent. Landholding discrepancies and the lack of Sikh groups such as the Akali Party and the Central Gurdwara Management Committee (SGPC) distinguished Sind's political atmosphere from Indian Punjab. While Punjab, Pakistan, and India's agricultural sectors were greatly influenced by the green revolution, Sind was left out in the cold. However, a few of powerful Sindhi politicians began to associate the river—a symbol of Sindhi identity—with the anti-authoritarianism movement. Sind focused on challenging the federal government's technical

¹² Michel, *Indus Rivers*, *Ibid.*, 271.

approach to the river basin, in contrast to Indian Punjab where the idea of the river basin was utilized as a more generic symbolic weapon of opposition. An emotionally charged presentation of this disagreement was achieved by emphasizing Sind's unique connection to the Indus River. Because of the river's cultural significance to Sind, it came to symbolize the province's right to water, which posed a challenge to Punjab's claims and the Pakistani government's monopoly on the river basin.

The Indus River, which Sindu calls the Darya-i Sind or the "River of Sind" in regional languages and Urdu, is the source of Sind's territorial claims and challenges to its lower riparian status. A Sindhi author once said that the Indus was an integral part of Sindhi history, religion, and community. There was never a formal signing of the 1945 draught agreement that acknowledged Sind's distinct claim to the Indus River, despite negotiations between the two provinces' top engineers. As evidence of Sind's right to the river, this was used by those who supported Sindhi rule. This proposal recognized the Indus as a separate river system, rather than seeing Sind's claims as those of a subordinate riparian system. of the agreement, it was specified that 75% of the Indus's flow would go to Sind, while 94% would go to Punjab from the five rivers of Punjab. While Sind's engineers were aware that their irrigation system was actually a part of the bigger interconnected river basin, they nevertheless utilized the 1945 agreement draft to support Sind's exclusive claim to the Indus River. As a result, the Indus was given special attention, unlike its western tributaries. The cultural ties that Sind had with the Indus, however, laid the framework for their resistance to centralized control of water resources and ultimately solidified their attitude.

Many in Sind believed that the Indus Waters Treaty had facilitated what they perceived as an encroachment by Punjab—backed by the federal government—on their distinct cultural and environmental connection to the Indus River. While the Mangla Dam, built on the Jhelum River between 1961 and 1967 with financial support from the World Bank, didn't directly affect the Indus, the construction of the Tarbela Dam in 1976 changed that. This dam, positioned on the Indus itself, began to carry a symbolic weight beyond its functional purpose of power generation. It became central to the redistribution of water through a series of barrages and canals that rerouted flow to southern Punjab, compensating for losses caused by eastern river diversions. Sind's technical experts acknowledged the dam's usefulness, especially during the rabi growing season, but also recognized that it left the province vulnerable to upstream management decisions. Their primary criticism, however, targeted the infrastructure that redirected stored Indus water—particularly the Taunsa-Panjnad and Chashma-Jhelum links. The latter, completed in 1971, enabled the diversion of Indus water into the Ravi and Sutlej systems, extending all the way to Bahawalpur to support Punjab's agricultural schemes in the Sutlej valley.

A comparison with Indian Punjab helps illuminate the unique nature of water-related disputes in Pakistan, particularly how certain canals can come to symbolize deeper environmental and political tensions. In Pakistan, the Chashma-Jhelum Link (CJL) became a potent symbol in Sind, much like the Sutlej-Yamuna Link (SYL) did for the Sikhs in Indian Punjab, representing a perceived diversion of resources. However, while in India the resistance centered on protecting a natural river basin from external claims, in Sind, the CJL was seen as threatening a cultural and historical relationship with the Indus River. The canal became associated with efforts by a centralized engineering authority to override provincial concerns, framing water management as a purely technical matter rather than acknowledging the emotional and identity-based ties of Sind to the Indus.

The cultural standpoint of Punjab in water-related disputes was not straightforward, as illustrated by the remarks of Hanif Ramay, a prominent figure in Bhutto's Pakistan People's Party and former chief minister of Punjab. Reflecting on the closure of the Chashma-Jhelum Link (CJL) canal during the 1980s, Ramay used religious symbolism to express the depth of the crisis. He was not a religious orator, but he likened the misery of the water scarcity in Punjab to the historical tragedy of Karbala and made a comparison between the deprivation of people in the area and martyrdom of Imam Husain. This framing highlighted the moral and emotional weight of Punjab's grievances, presenting them as more than technical concerns. Ramay emphasized that the incident reignited a strong sense of Punjabi identity, suggesting that such hardships could revive regional consciousness much like Karbala reinvigorates Islamic faith.¹³ In this context, the idea of Punjabi identity (*panjabiyat*) was deeply tied to emotional connections with the natural water landscape, expressed in ways that went beyond technical or administrative concerns. For many, this sense of belonging drew inspiration from Punjab's precolonial, pastoral heritage and was reflected in traditional Punjabi folklore that existed long before the development of the canal colonies—echoing similar cultural narratives found in Indian Punjab.¹⁴

Despite these symbolic gestures, the broader framework of centralized, technically driven water governance remained largely unchanged—and was still viewed by most Punjabis as essential to securing their economic needs. Hanif Ramay even proposed renaming the Indus River, traditionally known as the *Darya-i Sind*, to *Darya-i Pakistan* to reflect its importance as a national lifeline and emphasize its role in a unified river system. While this idea acknowledged space for regional voices and interprovincial dialogue, it reinforced a national approach to water based on the interconnected nature of the basin. Unsurprisingly, this proposal was not well received in Sindh, where people continued to reject both the renaming and the overarching national management structure, which many believed prioritized Punjab's interests.¹⁵ According to Daanish Mustafa, Punjab's stance in interprovincial water disputes was typically framed using terms such as national loyalty, scientific reasoning, economic necessity, and concerns over population pressure. These arguments often aligned with broader nationalistic and technical narratives, rather than drawing upon a unique regional or environmental identity tied specifically to Punjab.¹⁶

This dynamic led to the most consequential and protracted water dispute in Pakistan in the 1980s, which centered on the Kalabagh project in the Punjab. This was a second big dam on the Indus River below Tarbela. After receiving approval from the Pakistani government in the 1970s, the Kalabagh dam was set to commence construction in the mid-1980s. Structure and original IBP thought were inseparable. Building a second Indus dam was crucial for the long-term operation of the Indus water system and, by extension, for Pakistan's economic future, as engineers expected that Tarbela would have a short lifespan owing to extensive silting.¹⁷

¹³ Muhammad Hanif Ramay, *Punjab ka Muqaddimah* (Lahore: Jang Publishers, 1985), 149.

¹⁴ David Gilmartin, "Environmental History, Biradari, and the Making of Pakistani Punjab," in *Punjab Reconsidered: History, Culture and Practice*, ed. Anshu Malhotra and Farina Mir (New Delhi: Oxford University Press, 2012), 310–14.

¹⁵ Anshu Malhotra and Farina Mir, *Ibid.*

¹⁶ Anshu Malhotra and Farina Mir, *Ibid.*

¹⁷ This problem has been partly addressed by the decision to build another dam on the Indus, the Bhasha

Nothing here rules out the prospect of collaboration among the provinces. The provincial political leaders of all four provinces were members of Prime Minister Nawaz Sharif's Muslim League-N, but in 1991, after the military dictatorship of General Muhammad Zia-ul-Haq was deposed, they negotiated and signed an interprovincial Water Accord. Having settled their water resource allocation conflict in 1991, the provinces formed the Indus River System Authority, with equal participation from each province, to head off any future disagreements. Getting the provinces to agree on the most fundamental technical parameters upon which the accord rested was so difficult that it eclipsed its operations in the end. That technical measurements were seen as "covers" for political purposes during the lengthy years of dictatorial rule was reflected in this. The logic of the Indus Waters Treaty had a lasting impact on the distinct ways in which national and regional identities were mirrored in diverse environmental viewpoints, as shown by the continuing controversies around the operations of the Water Accord.

Irrigation in the Indus basin relied heavily on groundwater, which was obviously not a novel concern during this time. An important engineering worry during the colonial era was the level of groundwater as well as the subsidence of land due to waterlogging and salt. In 1908, engineers in the Chenab colony conducted the first thorough study of the water table. They continued to monitor the water table, record changes in spring levels, and use this information to calculate irrigation "intensities" (the amount of land that could be watered per year per canal or colony chak). Several provincial bodies were formed in the early 20th century, including the Punjab Water Logging Board in 1912, the Drainage Board in 1917, and the Waterlogging Enquiry Committee in 1925. The committee's studies were supported by the Irrigation Research Institute in Lahore, which was also founded about this time. On a yearly basis, waterlogging conferences were held to deliberate on ways to address the issue. Even in Sind, waterlogging remained a major concern, especially after the Sukkur barrage canals were opened.¹⁸

Although waterlogging was recognized as a major problem, it was addressed before to partition using ad hoc, piecemeal solutions rather than the systematic research that developed surface-flow integration hydraulics. 39 The reason for this was that the majority of colonial-era engineers held the belief that surface-flow development defined the systemic contours of the river basin. The dominant colonial engineering philosophy, which favored increasing "acreage per cusec of water rather than to get the maximum yield per acre," strongly discouraged any comprehensive waterlogging strategy that could have disrupted this development. The science of surface-flow hydraulics and the interconnection of rivers, which had first propelled colonial water engineering to the forefront of international attention, ultimately determined the epic technological story of the Indus basin transformation. One example is the 1935 Anderson Committee report, which states that certain government officials deemed waterlogging a "so serious" issue that warranted a restriction on "demands for perennial irrigation,... where there is any danger of water-logging." A."¹⁹

dam, upstream from Tarbela in Gilgit-Baltistan.

¹⁸ Report of the Sub-Committee of the Central Board of Irrigation Appointed to Enquire into the Question of Waterlogging in Sind (Simla: Central Board of Irrigation, 1936), 1–19.

¹⁹ Anderson Committee Report, 10th December 1935.

REPORT OF A COMMITTEE
 OF THE
Central Board of Irrigation
 ON
Distribution of the Waters
 OF THE
Indus and its Tributaries.

1st. to 8th. March 1935,
 17th. to 20th. June 1935.



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SIMLA.
 16th. September, 1935.

Even while conducting water table investigations and taking salinity and waterlogging hazards into account were crucial to the planning of only a small number of canal projects at the time, very few were willing to let these worries prevent ongoing surface-flow developments. A shift in emphasis from supply limitation in the 1920s to drainage works in the 1930s and finally to "reclamation supplies to wash salts out of the soil" in the 1940s occurred as a result of authorities bemoaning the unending lack of technical agreement on how to resolve the problem. In order to resolve the waterlogging problems, no one developed a thorough strategy. According to Punjab chief engineer A. M. R. Montagu, who made the comment during a 1946 speech given to the Punjab Engineering Congress just before the British left, "the Punjab Irrigation Engineers" had achieved so little in the 38 years since the initial thorough assessment of waterlogging in the Chenab colony that, in effect, they were "back to the same position as in 1908." Many engineers have expressed frustration with groundwater issues, and this statement echoes that sentiment."²⁰

²⁰ History of Irrigation in Indus Basin, Ibid., p. 52.

But in the 1950s, new approaches to waterlogging treatment became available. When the international specialists finally arrived in Pakistan, they convinced the government to undertake the country's first ever in-depth investigation of the "geology and hydrology of the Indus Plain." The goal of this study was to chart the flow of groundwater, a crucial part of the Indus basin's water system, in accordance with recent developments in river basin science on a global scale. Set against this backdrop, the Chenab colony hosted the inaugural Salinity Control and Reclamation Project (SCARP-I), a test run of deep tube wells to bring the water table down, backed by a low-interest loan from the United States. In the early 1960s, after the Indus Waters Treaty was signed, the vertical and horizontal movements of groundwater started to play a larger role in the basic modeling of the Pakistani river basin as a water system. This sparked fresh interest in groundwater among scientists, who subsequently rethought their understanding of the basin. Part of the reason for this shift occurred in 1961, when Ayub Khan, just after the treaty was signed and as plans were being made for the massive Indus Basin Project (IBP), declared that the continuous loss of farmland owing to waterlogging and salinity constituted an imminent "national catastrophe" that could derail other investments in the basin. Shortly thereafter, he directed WAPDA to promptly address the issue of waterlogging by developing a plan. Wells and their management became the focal point of the larger Indus "system" as deep tube wells and their connection with surface canal flow dynamics were prioritized in this concept. The WAPDA plan states that in order to make the most use of West Pakistan's water resources, it is necessary to coordinate the supply of both surface and groundwater."²¹

The majority of these were installed in areas with relatively low groundwater salt concentrations, therefore the Punjab bore the brunt of the burden instead than Sind, which had much greater groundwater salt concentrations. The tubewells were significant not only for the sites in question, but also for the improved control of waterlogging and the crucial recognition of groundwater's function in the system's storage capacity. To compensate for the loss of the eastern rivers, enormous new dams and connecting canals are being built, and this groundwater is an important supplementary resource. The goal of these public tubewells, as mentioned by Frank van Steenberg and William Oliemans, was to link their supply to the existing surface delivery systems. "The deep drainage-cum-irrigation tubewells were usually installed at the head of a tertiary channel [that is, a chak watercourse]," with the intention of compensating for the inconsistency in canal supplies to village watercourses, primarily due to the mixing of groundwater with canal supply. Groundwater storage, along with surface storage at the Mangla and Tarbela dams, was already seen as critical to the overall development of IBP water storage, according to a USAID-sponsored study from the late 1960s on the Indus Basin Project. This storage was also vital for lowering water tables.²²

These problems were certainly brought to light by the expansion and the specific shape that expansion took in groundwater development. Soon after the public tubewells expanded as a result of the SCARP groundwater projects, privately held tubewells proliferated across all SCARP regions, especially in the Punjab. It was because of this shift that new concerns regarding irrigators' role in the wider water

²¹ Quoted from the WAPDA plan in *ibid.*, 8

²² D. W. Greenman, W. V. Swarzenski, and G. D. Bennett, *Ground-Water Hydrology of the Punjab, West Pakistan, with Emphasis on Problems Caused by Canal Irrigation*, Geological Survey Water-Supply Paper, no. 1608-H, prepared in cooperation with the West Pakistan WAPDA, under the auspices of the USAID (Washington, D.C.: Government Printing Office, 1967), 60–61.

distribution system emerged. As evidence of how rapidly this change took place, private tubewells started to surpass public ones in the mid to late 1960s according to the SCARP program. The development lacked any foundation in large-scale water planning from the beginning as it was so contrary to the system's long-standing philosophy of surface-flow. At the midpoint of the 1960s, reports from the World Bank noted that "the expansion of canal water and Government tubewells was a planned development much of which was financed by foreign aid from the IBRD [i.e. the World Bank] consortium." Prior to a 1964 survey, the anticipated contribution from privately placed tubewells was largely unexpected and caught people off guard. It happened in this environment." In the decades that followed, groundwater for irrigation primarily came from private tubewells, not from publicly shared wells. From 8% in 1960 to 60% in 2006, the proportion of groundwater supplies in Pakistan's system increased steadily. More than 300,000 privately owned tubewells supplied 40% of the nation's irrigation water to farms by 1996, with the majority of these wells being in the Punjab. Because of these major shifts, some specialists started discussing canal supply in terms of its function in recharging groundwater rather than merely delivering water directly; this led to the idea that surface flows should take a back seat to pumping groundwater in the delivery system. These alterations have far-reaching effects on the water system underneath the river basin, its dynamics, and the management of waterlogging.²³

To establish formal Water Users Associations (WUAs) in rural Pakistan during the 1980s. It was possible to organize and mobilize these communities for more efficient watercourse upkeep after they were formally recognized as collectives of entitled water sharers at each outlet. Structured around documented warabandi shares, the idea was born. Efficacious water management practices on farms were also linked to this. With a well-designed system in place, the theory went, all parties with a fixed amount of water to provide would be motivated to cooperate in order to enhance the watercourse, resulting in increased water availability and overall system efficiency. Every province of Pakistan has passed enabling laws to legalize such chak-level WUAs, and programs were launched to spread them. This resulted in 14,000 water user associations in Pakistan by the early 1990s, with their primary focus being the improvement of rural watercourses.

The fate of customary law has long been and remains a contentious issue in Pakistani culture, illustrating the challenges that such ambitious endeavors inevitably bring. After "custom" was replaced as a source of formal law with Pakistan's founding in 1947, the codification of sharia law in personal law matters was a manifestation of a new Pakistani nationalism that went beyond the politics of regional particularisms, blood, and local particularisms. The authority of the landed power holders was determined by the local genealogical and patriarchal authority, which prohibited women from landed inheritance, according to Matthew Nelson, who demonstrated that "custom" in inheritance concerns continued to be a social order pillar in Punjab fifty years after 1947. Local officials in Punjab were chosen to shield landowners from the implementation of sharia law, according to Nelson, who claims that this occurred around the turn of the twentieth and twenty-first centuries, despite the landowners' enthusiastic embrace of sharia law as a representation of national Islamic identity.²⁴

²³ Briscoe and Qamar, *Pakistan's Water Economy*, Ibid., xiv.

²⁴ Matthew J. Nelson, *In the Shadow of Sharī'ah: Islam, Islamic Law, and Democracy in Pakistan* (New York: Columbia University Press, 2011).

Changes to the Indus basin's irrigation system can be seen in a similar light. The appeal to markets may have suggested, on one level, a broader and more integrated goal for Pakistani society and the state. It seemed to offer a lot to some people, including a new "civil society" connected to the rise of the middle class and new media, and a new "state-society synergy" made possible by bureaucratic reform. The framework provided a solid foundation for presenting irrigation reform as an essential part of a social movement that could transform Pakistan for the better. Within the realm of water policy, the introduction of new personal responsibility regulations may disrupt long-established patronage and community networks while also creating opportunities for greater social harmony and development. Both biradari and traditional patronage were unnecessary vestiges of an earlier time. The Indus basin's altered ecosystem is a result of a colonial community structure established in the 1800s according to modern political economics ideas. They banded together because they were at odds with other communities that had different relationships to the natural world. Given this background, it is not surprising that Pakistan's local Indus basin history and its contingent position in the global system have made open water entitlements and markets problematic.

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