CASE STUDY 2: THE GANGES BASIN (WITH FOCUS ON INDIA AND BANGLADESH)*

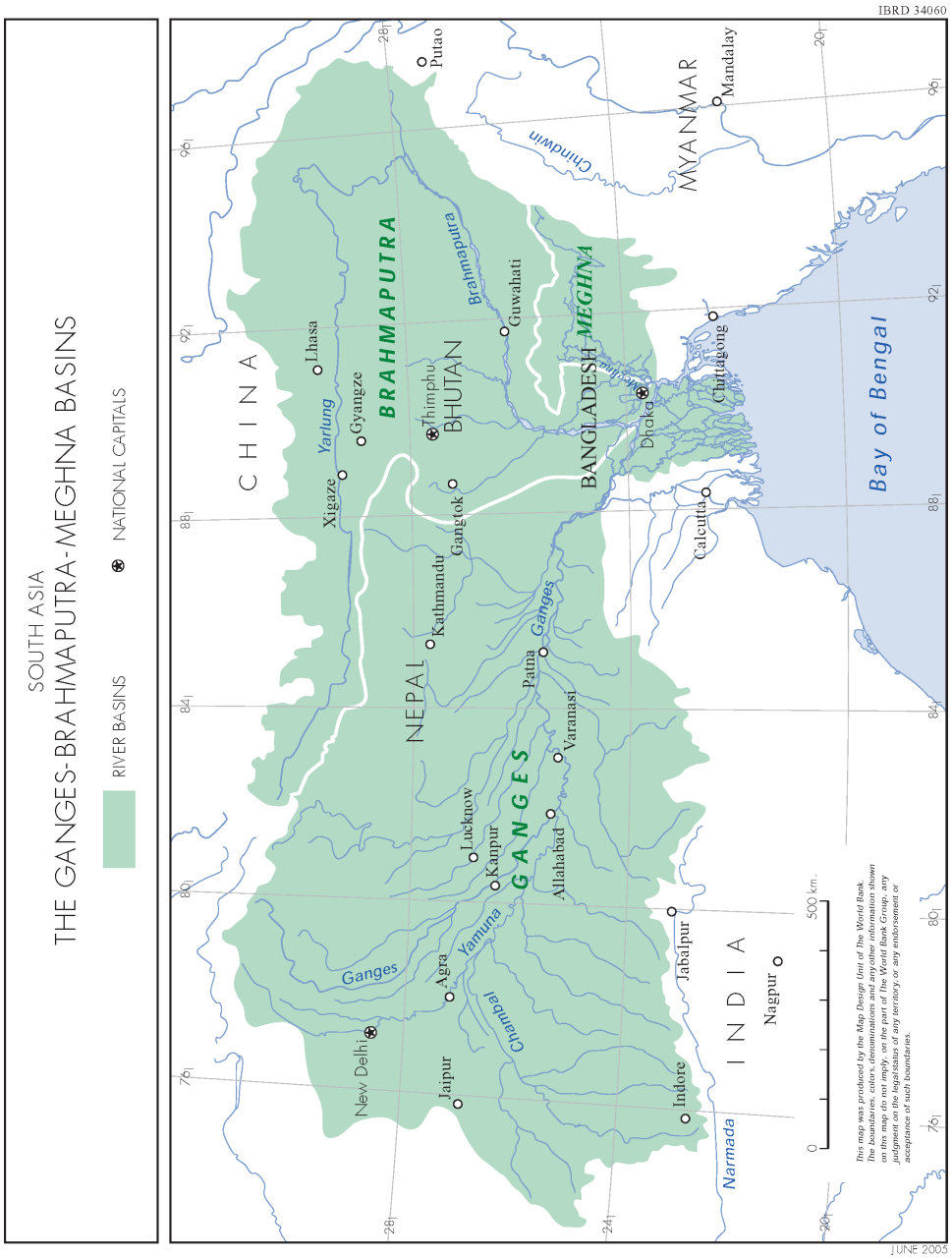
One of the most studied international basins, the Ganges, has tremendous joint development potential that has not yet been realized by its riparian states. Rather, the Ganges Basin is more popularly known for its rich history of disputes. Conflicts and negotiations related to the Ganges have been ongoing for more than 50 years. Though it might seem a long duration, the relevant issues and positions have changed over time, as the number of riparians grew in the southern part of the system from one to three. Sharing (*per se*) of the Ganges water was a strictly domestic problem before the partition of India. With Eastern and Western Pakistan's independence from India in 1947, the conflict became international. With the independence of Bangladesh (former Eastern Pakistan) from Western Pakistan in 1971, the main parties to the conflict were Bangladesh and India and have remained so until now.

For all practical purposes, the Himalayan mountains separate Tibet from the rest of the Ganges riparians. In reality, Tibet was never part of the negotiations that took place. Tibet's geographical isolation, combined with the fact that Bhutan, and Nepal, are land locked, and Bangladesh is surrounded by Indian territory have major implications on the positions and dynamics of the basin's hydropolitics. The long history of disputes and negotiation largely took place between India and Bangladesh, as we shall see later. That has come to a sustainable end by the signing of the 1996 treaty.

FEATURES OF THE BASIN

The Ganges or Ganges–Brahmaputra–Meghna/Barak (GBM) Basin comprise a river system that originates in the eastern Himalayas and spans over 1.758 million km^2, of which 8% lies in Bangladesh, 8% in Nepal, 4% in Bhutan, 62% in India, and 18% in the Tibetan region of China (the literature gives different estimates of the basin's the regional distribution). The three rivers making up the basin meet in Bangladesh and flow to the Bay of Bengal as the Meghna River (Elhance, 1999; Nishat and Faisal, 2000; Wolf *et al.*, 1999, p. 401).

*This case study benefited from research by Kate Bernsohn, Niclas During, Markus Knigge, and Julia Tock. The case study benefited also from review comments by Islam M. Faisal. The case study is not aimed at covering all aspects and details.



Map CS2.1: The Ganges Basin.

Source: World Bank (Permission granted to reproduce the map).

Table CS2.1: Important tributaries of the GBM system.

Ganges	Brahmaputra		Meghna
	In India	In Bangladesh	
Yamuna	Subansiri	Tista	Barak
Mahakali	Jir Bhoreli	Jaldhaka	
Karnali	Manas	Torsa	
Gandak	Buri Dihang	Gumti	
Kosi	Dhansiri		
Mahanadra	Koppili		

Source: Upreti (1993).

A look at the tributaries flowing into the GBM (Table CS2.1) explains some of the complexities of managing this system, and specially since most of the tributaries are international in nature.

The Himalayan glaciers and annual snow cover that accumulate in the winter and melt during the summer constitute the main water source of the GBM. In addition to the three main rivers of the GBM, there are more than 50 smaller rivers and tributaries that enter Bangladesh from India. Because the system is so interconnected, it is very difficult to distinguish how much water contributes to the entire system. The literature is likewise not conclusive about the issue and the best information available relates to the flow of the various rivers in major gauging stations, usually before the river in question merges with another one (Table CS2.2).

How much water is in the basin? This is a very difficult question to answer given the special nature of the region, the river system, and the climatic and weather conditions. The climate in the basin is a temperate subtropical Monsoon climate with annual rainfall ranging between 990 mm/year to 11,500 mm/year. The only problem with this abundant amount of rainfall is its uneven distribution over time, and especially during the summer (wet season — *kharif*) and winter (dry season — *rabi*) months. With the previous comments in mind, the long-term average annual flow of the Ganges and the Brahmaputra is 424 BCM and 555 BCM, respectively

Table CS2.2: Catchment area of the Ganges and Brahmaputra and contribution to flow.

Country	Ganges		Brahmaputra
	Area (km^2)	Contribution to flow (%)	
Tibet			292,670
Nepal	69,930	45	54,390
India	880,600	55	186,480
Bangladesh	3,885		72,520

Source: Based on Upreti (1993, pp. 41–56).
Note: Different estimates that are similar magnitude, estimates are provided in Shah (2001, pp. 19–21).

Table CS2.3: Annual water flow in the Ganges at Farakka during the period 1949–1985.

Year	Flow (BCM/year)	Year	Flow (BCM/year)	Year	Flow (BCM/year)	Year	Flow (BCM/year)
1949	400						
1950	400	1960	370	1970	350	1980	480
1951	305	1961	480	1971	535	1981	390
1952	340	1962	425	1972	240	1982	370
1953	380	1963	465	1973	420	1983	375
1954	460	1964	420	1974	340	1984	385
1955	535	1965	270	1975	465	1985	445
1956	470	1966	275	1976	380		
1957	330	1967	340	1977	400		
1958	410	1968	310	1978	510		
1959	360	1969	360	1979	250		

Source: London Economics (1995).

(these numbers are subject to large variations, depending on the source used). As such, this river system is the most important resource of economic activity in the basin countries, as will be elaborated below. Since our focus in this case study will be the dispute between India and Bangladesh, it is useful to consider the water flow at one of the main barrages: the Farakka Barrage, which is a contested water diversion structure that will be discussed in length in this case study (Table CS2.3).

Following this physical geography section, we will concentrate mainly on the Ganges River and the India–Bangladesh conflict, although we will relate to the rest of the river system and the other riparian — Nepal, when addressing possible cooperation among the three riparian states — Nepal, India, and Bangladesh.

Economic and Other Development Issues

The GBM is considered one of the richest basins in the world in terms of the potential of its natural resources (hydropower generation, fisheries, forestry, irrigated agriculture, navigation, environmental amenities, tourism, minerals, oil and gas). However, the three basin countries, called "the Poverty Triangle" are among the poorest nations in the world. Table CS2.4 provides several

Table CS2.4: Water-related economic indicators for the three basin riparians.

	Nepal		India		Bangladesh	
	1995	2005	1995	2005	1995	2005
Population (million)	25	28	900	1,095	120	147
GDP per capita (current $)	197	237	348	657	246	428
Share of agric in GDP (%)	42	38	29	19	31	20

Source: CIA (2006).

economic indicators that help to grasp the fundamental predicament of the basin's riparian states.

WATER ISSUES AMONG THE RIPARIANS OF THE GBM

The three riparian states in the GBM basin face common externality problems. Some of these problems have been around since the British rule, and others emerged since the independence of India and Bangladesh. A set of major issues are listed below.

Floods

One serious problem faced by all riparians is floods and other ecological disasters, such as sedimentation, soil erosion, and deforestation. Although Bangladesh is most prone to floods in the basin, India and Nepal are faced with similar problems of flood during the wet season, and especially between June and September. Management of the water flow and floods via adequate storage capacity could have solved some of these problems. In addition, information sharing and the establishment of an early warning system between India and Bangladesh are relatively simple cost-effective solutions (Kumra, 1995).

Drainage Congestion

India, the upstream riparian on many of the tributaries that flow into Bangladesh, suffers from the impact of drainage congestion and small-scale diversions in Bangladesh. By changing the slope or by affecting the lateral flow of drainage in the basin, even in downstream locations, the water table rises upstream. This is the case in India when development of roads and diversion of dames by farmers take place in Bangladesh (Kumra, 1995).

Water Availability and Water Quality

About 94% of Bangladesh's surface water sources originate outside its territory. Therefore, Bangladesh is vulnerable to any quantitative and qualitative impacts (externalities) caused by actions of upstream riparians. These impacts include shortage of water flow in the dry season affecting irrigated agriculture, and devastating floods in the wet season (Crow *et al.*, 1995). The Farakka Barrage has contributed to a 50% decline in the dry season flow of the Ganges in Bangladesh (Mirza, 1998). This has caused serious economic (agriculture, industry) and ecological damage (the Sundarban and its biodiversity as well as on the agrarian ecosystem of South West Bangladesh).

At present, Bangladesh is facing similar issues with respect to sharing the Teesta and the Barak. In the near future, sharing the Brahmaputra may become the main contention between India and Bangladesh, as this river alone contributes 67% of the total dry season inflow into Bangladesh from India (Faisal, 2006).

Flow Regulation

Even if the region receives additional water, the intertemporal and spatial distribution of this water is very uneven (dry and wet season floods, monsoons) and has become one of the key issues in the conflict. Most of Bangladesh's area (as well as India) is situated over a large aquifer system, which is part of the Indo-Gangetic Plain (and is used to augment water in scarce time periods and locations). Thirty percent of Bangladesh's land is below hide-tide level, making it very sensitive to seawater intrusion to groundwater aquifers. Therefore, during the dry season, intrusion of saline water makes even the little water available in Bangladesh's rivers (e.g., Meghna and Pasur, in the southern districts along the Bay of Bengal) of poor quality for both drinking and irrigation. Therefore, it is necessary for Bangladesh to maintain a minimum water flow in certain rivers for salinity control (Upreti, 1993).

Siltation and Creation of New Land

About 2.9 billion m^3 of silt deposited on yearly basis the Bay of Bengal creates new land, which is also disputed locally between farmers in Bangladesh and India (Upreti, 1993).[1]

The Need for Minimum Flow in the Port of Calcutta (Kolkata)

Since British rule the Calcutta port has been one of the most important waterways in India. Siltation negatively affects this port and necessitates a steady water flow to flush the silt into the Bay of Bengal. The British planners found that a Barrage on the Ganges at Farakka (The Farakka Barrage) would allow to regulate the flow of water in the river downstream to Farakka and control the siltation level in the port. At that time, Bangladesh was still under British rule as was India. However, it was only after independence that, the Government of India initiated The Farakka Barrage project. The project began in 1961 and was concluded in 1971. Its main

[1]Faisal (2006) argues, however, that almost all of the sediments end up in the Meghna estuary, which is well inside Bangladeshi territory. There is only one island in the India–Bangladesh sea territory which is disputed.

purpose is to divert part of the water from the Ganges to the Bhagirati–Hooghly River Basin (Upreti, 1993; Crow *et al.*, 1995).

Environmental Amenities

Bangladesh part of basin is characterized by a long delta with very complicated environmental issues. They include Fauna and Flora, and Mangrove forest that are affected by the dry season shortage of water and by salinity intrusion because of low water flow in the river system (Upreti, 1993; Mirza, 1998; Kumra, 1995).

River Course Changes

The border between India and Bangladesh passes through the middle of shared rivers in many areas. Because of the erosion problems, the river changes its course which leads to farmers on both sides of the river to face situations where ownership of islands in the middle of the river is disputed (Upreti, 1993). Problems may also arise when one side of the banks of the river erodes and the other side experiences accretion crossing over the international border (Faisal, 2006).

POTENTIAL FOR COOPERATION

The Ganges riparian states make-up some of the least developed economies in the world and display the lowest per capita income (Table CS2.4). Interestingly, the richness of the Ganges–Brahmaputra–Barak Basin has immense potential in the areas of irrigation, power generation, fisheries, and navigation. Nonetheless the region continues to experience rapid population growth, with a significant proportion of the people living in poverty (Table CS2.4; Elhance, 1999). Agriculture, farming, and cattle raising are the principal economic activities in the basin, employing up to 80% of the total population. Agriculture accounts for nearly one-half of all freshwater usage in the basin, making water supply one of the most significant barriers to economic development (Elhance, 1999).

The GBM is the most plentiful basin in the world in terms of water and other natural resources potential. In addition, the geography of the basin and the relative advantage of each of the riparian states calls upon many cooperative arrangements. Many studies demonstrated the potential in regional cooperation in the GBM basin (e.g., Rogers, 1993; Kishor, 1996; Eaton and Chaturvedi, 1993).

We will start by illustrating (Table CS2.5) the interrelations between the three riparians and the possible cooperative activities they could undertake.

Nepal and India both have a vast exploitable hydropower potential from other shared rivers, but presently only generate marginal amounts of energy. Nepal has the potential to produce 83,000 MW, 42,000 MW of which have been assessed to be technologically and economically feasible. Nonetheless, Nepal presently produces

Table CS2.5: Areas with cooperation potential in the GBM basin.

Cooperation issue	Nepal	India	Bangladesh
Flood control	√	√	√
Hydropower generation	√	√	
Navigation		√	√
Irrigation	√	√	√
Forestry	√	√	√
Environment (sedimentation, fauna, flora)	√	√	√
Fishery		√	√
Water quality		√	√
Data sharing	√	√	√

Source: Authors' analysis.

about 250 MW and buys some of its power from India (Verghese, 1996, p. 38ff). Similarly, India exploits only 12% of the hydroelectric potential of the Ganges and 10% from the central Indian tributaries (Elhance, 1999, p. 163). Current exploitation of the Ganges has limited the river's navigation potential as a major waterway. Bangladesh could likewise benefit substantially from an expansion of year-round navigable waterways in the basin (Elhance, 1999, p. 165).

As all of the basin countries attempt to modernize their economies, the need for freshwater and energy will increase significantly with industrial development exacerbating the environmental situation. Water will not only remain critical to economic development, but also increase in importance in the future.

CONFLICTS AND NEGOTIATIONS

The political landscape in South Asia changed radically in 1947 with the departure of the British colonial power from what was then British India (comprising today's India, Pakistan, and Bangladesh). The unresolved boundary disputes and the partition of British India into India and Pakistan in 1947, with little regard for the geography and integrity of the major river basin, play a critical role in the current constraints on water supply.

Currently, central governments in both India and Bangladesh are now run by democratically elected administrations. India is the world's largest democracy, and regular elections have been held to choose central and state governments since independence. The relationship between central and provincial governments in India complicates the situation as the hydropolitics involves several states, such as Uttar Pradesh, Bihar, and West Bengal in India. Since the federal polity gives jurisdiction over all water matters to the state, conflicting needs and interests of the different states must be reconciled domestically before any international agreement can be reached. Bangladesh was ruled by one party and experienced a series of military coups after becoming a sovereign and secular state in 1971. When Bangladesh

declared itself an Islamic state in 1977, relations with India deteriorated considerably, with Bangladesh entering a period of political turmoil. Despite recent democratization, Bangladesh's political realm remains strained, in particular where India is concerned. Political factions and interest groups continue to exploit any dispute with their powerful neighbor to gain domestic political leverage and leaders are aware that cooperation with India could be viewed as compromising national sovereignty and interest (Elhance, 1999; Salman and Uprety, 2002).

The Driver of the Conflict[2]

India first considered distribution of the Ganges waters through a feasibility study back in the mid-1900s, under British supervision. Eastern Pakistan (now Bangladesh) was of course already a central party to the conflict at the time of its inception in 1947, but did not state any clear policy over the issue until 1951. Investigations were under way and East Pakistan referenced this when encouraging India to consider Bangladesh's interests before taking action (Rangachari and Ramaswamy, 1993). In 1951, the main interest of Eastern Pakistan as it is of Bangladesh today, was securing access to fresh water during the dry season for its population. Over the course of time, increasing salinization has negatively affected the agriculture — while the population has increased, the quality of the soil has deteriorated. This has affected the livelihoods of millions of people. For example, increased salinity has forced hundreds of industries to close down in Khulna and Mongla, which had the prospect of becoming thriving industrial zones in Bangladesh. Other agricultural and ecological damages, mentioned earlier, were also paramount (Faisal, 2006).

India's main concern in the 1950s was the water levels in the Calcutta port. The use of the port is made possible if a certain flow of water into and out of the port is secured, and any increase in the water flow out of the port would be beneficial, for this most important port in the eastern and northeastern part of the country. For this reason, India had considered diverting water from the Ganges into the Calcutta port. Consequently the Farakka Barrage was built and began operating in the 1970s, considerably reducing the Bangladesh share of the Ganges waters flows. India has increasingly come to realize that the prospect of keeping the Calcutta port open is unsustainable. Nevertheless, India continues to divert a large share of the waters to keep the port operational. In addition, the diversions continue to provide India's population with fresh water and likewise help keep salinization undercontrol.

Though environmental issues such as salinization, arsenic contamination of ground water (in both countries), in addition to border disputes have occurred throughout the history of the conflict, they never took central stage in the negotiations. Therefore, we have chosen to concentrate on the distribution of the water flows in the following discussion (Kumra, 1995, p. 130; Elhance, 1999, p. 163).

[2]Based mainly on Elhance (1999), Nishat and Faisal (2000), Faisal (2002), and Tanzeema and Faisal (2001).

We will address only issues that prevailed in the period after India's independence. The first conflict over the GBM basin took place in 1951 when the Farakka Barrage was planned.

Pakistan, at that time included Bangladesh as "East Pakistan," claimed that the project will harm East Pakistan, which already suffers from severe water scarcity. India responded that East Pakistan has sufficient amounts of water and suggested that the two countries collaborate on the development of the Ganges waters. However, when Pakistan suggested the countries collaborate on a particular project in East Pakistan and on a joint survey of the upper reaches of the Ganges and Brahmaputra, India objected and argued that Pakistan should survey rivers on its own territory.

When talks resumed in 1957, Pakistan made a few suggestions including:

1. The parties should seek assistance of a UN body in planning and developing eastern waters for their mutual benefits to both countries;
2. Individual projects on the Ganges be reviewed by experts of the two countries before implementation;
3. UN Secretary General be asked to appoint experts to participate in technical meetings in which various aspects of water resources development issues will be discussed.

India did not agree to these suggestions and the issue was discussed again in 1960, 1961, and 1962. With little progress on the Farakka issue, in 1967 Pakistan threatened to bring the matter before an international authority. In fast the issue was raised by Pakistan in the 1967 water peace conference held in Washington, DC, and during the discussions leading to the Tashkent Declaration that marked the formal end to the India–Pakistan war (over Kashmir). The issue was raised again in 1968 in an international meeting of the Afro-Asian Legal Consultative Committee, and again in 1969. At that time, Pakistan requested guarantee from India for a fixed quantity of water from the Ganges to East Pakistan. India rejected the request on the basis that it can be honored only after the parties exchanged data and agreed on basic technical issues.

In 1970, in the last meeting between Pakistan and India on the Farakka Barrage, the parties agreed that water would be discharged from the Farakka to East Pakistan. A year later, in 1971, the Farakka Barrage was completed and Bangladesh gained its independence.

Bangladesh, now an independent state, had several serious reservations about the Farakka Barrage. Its argued that at least of 55,000 m^3/s (cumecs) be released at Farakka in the lean (dry) period so as to prevent water shortages in Bangladesh. Such shortages could affect fisheries production and result in river navigation and irrigation problems. Lowering of ground water levels could likewise result if water flows are reduced.

In 1972, the India-Bangladesh Treaty of Friendship was signed by Sheikh Mujib (Bangladesh) and Indira Gandhi (India), codifying the two countries' desire to collaborate over water issues in the GBM basin. The agreement established also the

Joint Rivers Commission (JRC). Over the years, the JRC has become a prominent body active in the facilitation of interim agreements between the two riparians on the water at Farakka.

THE FARAKKA AGREEMENTS[3]

Since the planing phase in the 1950s and through construction in the 1960s, the Farakka Barrage has between disputed between India and Pakistan. India event the necessary time and completed the project in 1971 (after a war with Pakistan on border-related issues in Kashmir and Jammu), the year Bangladesh became independent (after having uprising and hostile activities against Pakistan for more than five years). Therefore, the Farakka Barrage has become an integral part of the hydro political relations between India and Bangladesh.

As alluded earlier, the central disputed issue between India and Bangladesh over the Ganges has been the sharing of the waters at Farakka during the lean period of January–May (Bangladesh never challenged the existence of the Farakka Barrage). For that reason, we will discuss the history of the agreements over water-sharing at Farakka, mainly during the lean period. It should be mentioned that between 1971 and 1996, there have been about five agreements and this is an indication of the unsustainable allocation regime. The flow of water during the lean season in two gauging stations (Farakka and Harding Bridge) of the Ganges are presented in Fig. CS2.1.

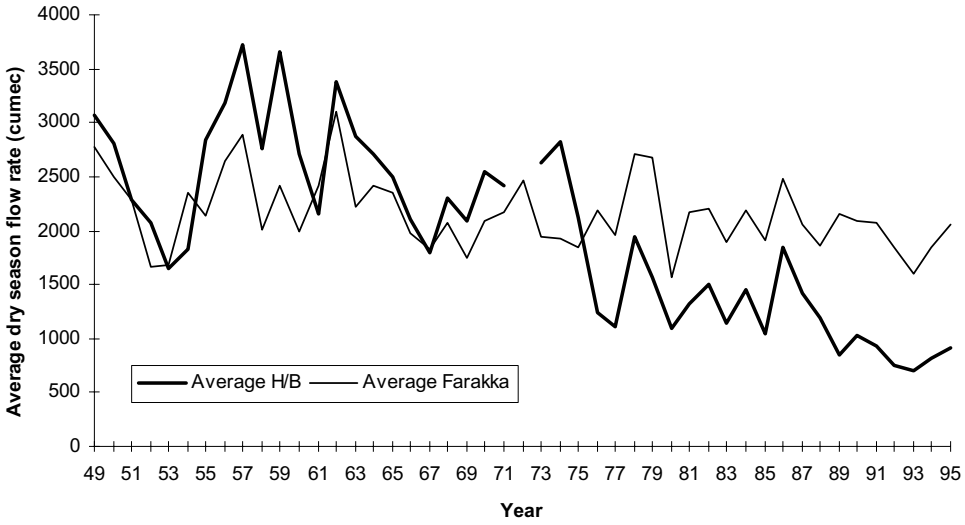


Fig. CS2.1: Water flow in the Harding Bridge and Farakka during the lean period (m^3/s).
Source: JRC and the Hydrology Unit of the Bangladesh Water Development Board. Provided by Faisal (2006).

[3]Based mainly on Upreti (1993) and Salman and Uprety (2002).

The 18 April 1975 Temporary Allocation Agreement of the Ganges Waters at Farakka

This agreement was the result of closer political understanding between the two new countries. This temporary agreement provides Bangladesh 75–80% of the water and leaves India with 25–20%, depending on the exact period. This very generous allocation (Tabled CS2.6) on the part of India may explain the reason for doubt in India regarding its permanent status.

However, in August 1975 after Sheikh Mujib was assassinated in Bangladesh and a military regime was established there, relations between the two countries cooled, especially following allegations regarding the overuse of its sharing of the Ganges water. India, responded by unilaterally withdrawing water at Farakka, based on the fact that the 1975 agreement expired on 31 May, 1975.

Relatively weak compared to India, Bangladesh adopted a different strategy — internationalizing the dispute on water-sharing at Farakka. Between 1975 and 1976, Bangladesh raised the issue with about five international organizations, including the UN General Assembly.

The 5 November 1977 Water Sharing Agreement

This agreement was the result of the 1976 elections in India where by the Janata Party formed the government. The party implemented its policy for regional issues it has on its political platform during the election campaign. The 1977 agreement (Table CS2.7) was signed for a duration of five years and calls on the two riparians to find a long-term solution for the dry season water flow. The agreement was subject to extensions, based on mutual agreement between the two riparians. The agreement allows India to draw a small quantity of water, not to exceed 200 cusecs for local use downstream of Farakka. One of the key elements of the included a "80% minimum flow" guarantee clause for Bangladesh. It also called for finding a mutually agreeable means for flow augmentation in the dry season. The 1977 agreement was criticized in India.

In October 1982, the 1977 agreement was extended for two more years (with minor modifications — Salman and Uprety 2002, Table 7.4). By then, the October

Table CS2.6: The 1975 agreement for sharing of lean season flow at Farakka (Cusecs).

Period	Flow at Farakka	Diverted to Hooghly (India)	Remaining flow to Bangladesh
21–30 April 1975	55,000	11,000	44,000
1–10 May 1975	56,500	12,000	44,500
11–20 May 1975	59,250	15,000	44,250
21–31 May 1975	65,500	16,000	49,500

Source: Upreti (1993).

Table CS2.7: The 1977 agreement for sharing of lean season flow at Farakka (Cusecs).

Period	Flows reaching Farakka	Diverted to Hooghly (India)	Remaining flow to Bangladesh
January			
1–10	98,500	40,000	58,500
11–20	98,750	38,500	51,250
21–30	82,500	35,000	47,500
February			
1–10	79,250	33,000	46,250
11–20	74,000	31,500	42,500
21–28/9	70,000	30,750	39,250
March			
1–10	65,250	26,750	38,500
11–20	63,500	25,500	38,000
21–30	61,000	25,000	36,000
April			
1–10	59,000	24,000	35,000
11–20	55,500	20,750	34,750
21–30	55,000	20,500	34,500
May			
1–10	56,500	21,500	35,000
11–20	59,250	24,000	35,250
21–31	65,500	26,750	38,750

Source: Upreti (1993).

Table CS2.8: The 1985 agreement for sharing of lean season flow at Farakka (Cusecs).

Period	Diverted to Hooghly (India)	Remaining flow to Bangladesh
All dry season	40,000	35,000

Source: Upreti (1993).

1985 agreement was signed (Table CS2.8). Ratified in 1986 for a duration of three years, it was subject to extension.

The various allocation agreements of the waters at Farakka faced one major problem — low water volumes often not sufficient for the needs of the two riparians. Therefore, augmentation of the flow became an important issue for joint investigation. Some proposals included:

1. *The Ganges–Brahmaputra Link Canal*: proposed by India and rejected by Bangladesh for the following reasons: (i) the canal will divide Bangladesh; (ii) it will create a loss of 20,000 ha of agricultural land; and (iii) starting and end points of the canal will be on Indian land.
2. *Storage dams, on Nepalese and Indian territory*: proposed by Bangladesh and rejected by India on the ground of (i) very little water potential for storage; (ii) such storage is distant from Farakka and subject to large losses to seepage. This

proposal was favored by Nepal because (i) it extends its water-related relationships to include Bangladesh; (ii) it will make Nepal less dependent on India; and (iii) it will create an opportunity to fund hydropower projects.

The main problem was that India always insisted on keeping the dialogue "bilateral." Nepal, on the other hand, had its own water issues to deal with and did not show much interest in complicating matters by bringing Bangladesh into the process (Faisal, 2006). In connection with the above proposals, Nepal was invited to participate in the discussions on the augmentation of the Ganges water flow at Farakka, but nothing came out of these talks.

The Road to a Treaty

In 1987 and 1988, severe floods that left an estimated 10 million people homeless obliged Bangladesh and India to commence further discussion about flood control. Bangladesh re-introduced the Farakka issue in international forums and again attempted to internationalize it in 1988. An Indo-Bangladesh Task Force of Experts was set up to jointly study the Ganges and Brahmaputra Rivers and set up an efficient flood management plan. Some limited but effective agreements were reached on monitoring and information sharing issues. In 1992, after several decades of coups and military rule, democracy triumphed in Bangladesh. In India, the United Front Movement (that consisted of 13 regional movements and were the basis for the United Front Government) declared that improved relations with India's neighbors were India's main priority. Both India's and Bangladesh's Prime Ministers agreed shortly thereafter that equitable, long-term, and comprehensive arrangements for sharing the flows of major rivers should be attained through mutual discussions. Several ministers (e.g., water, energy, foreign affairs) ministers were asked to make a new effort to find a long-term solution to the sharing of water flows in the dry season and it was agreed that joint monitoring of releases at Farakka should be undertaken immediately (Salman and Uprety, 2002).

The 1996 Water Treaty Between India and Bangladesh

The treaty (this is the first time that an agreement between India and Bangladesh on the Ganges water is formally called a "Treaty"[4] (Salman and Uprety (2002)) was signed in November 1996 for 30 years. As in many cases, this treaty is mainly the result changes in the governments in both countries, and good relations chemistry between the Prime Ministers of both India and Bangladesh. The treaty allocation schedule is presented in Table CS2.9.

There is an important difference between the flow schedules in the 1977 Agreement and the 1996 Treaty. Specifically, the allocations in the 1996 Treaty are more

[4]There is a technical difference between an agreement and a treaty. The former is limited in scope and may be signed at the ministerial level. The latter requires a full cabinet level approval due to its more comprehensive scope or longer tenure (Faisal, 2006).

Table CS2.9: Ganges Treaty, 1996, Farakka Barrage Water Sharing, January–May.

Flow at Farakka (m^3/s)	India's share	Bangladesh's share
$< 70{,}000$	50%	50%
70,000–75,000	Balance of flow	35,000 m^3/s
$> 75{,}000$	40,000 m^3/s	Balance of flow

Source: Salman and Uprety (2002).

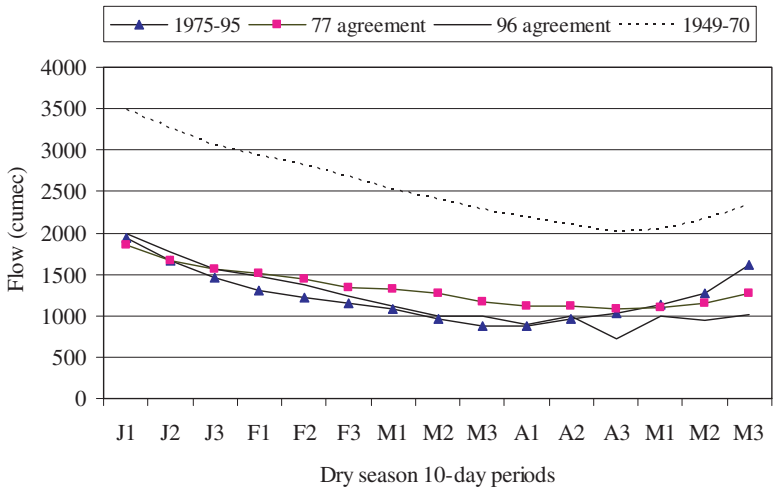


Fig. CS2.2: Historical and simulated flows at Hardinge Bridge (gauging station).
Source: Nishat and Faisal (2000, p. 198).

flexible, and based on shares rather than fixed amounts. Nonetheless, some claim that the schedule in the 1996 Treaty and the 1977 Agreement did not help alleviate the lean season water scarcity in Bangladesh, but rather validated the status quo. However, the 1996 Treaty also calls for augmentation solutions to the flow at Farakka in the dry season. Since the treaty is in force for 30 years, this allows the countries sometime to consider such panaceas. Performance of the schedules in the various agreements is presented in Fig. CS2.2.[5]

THE NEGOTIATION PROCESS IN RETROSPECT

In general, domestic politics is an important driver in explaining the outcomes of a negotiation process (Milner, 1997). The political instability in Bangladesh, for

[5]Another feature that is lacking is the guarantee clause that was part of the 1977 Agreement. By 1996, however, India recognized that its upper riparian states were increasingly withdrawing water from the Ganges before the flow reached Farakka. Thus, it was politically difficult to commit to any guarantee clause.

example, has been accused of was a decisive factor in the negative outcomes of the negotiations. The military rulers of Bangladesh often attempted to gain domestic (and international) political support by bringing attention to its negotiations with India and arousing harsh public opinion. In fact, the military regime unnecessarily raised the issue of sharing water resources to increasingly changed levels, making it a major political goal. As a consequence, India's attitude in the negotiations also hardened and together with an atmosphere of political instability during the military junta in Bangladesh contributed to a lack of progress in the negotiations (Upreti, 1993, p. 134).

Though domestic politics may explain the outcomes of negotiations, India's overwhelming power is another important variable. As the upper riparian and the regional super power, from both a political and economic perspective, India holds much more sway compared to Bangladesh. To some degree this has allowed India to make consistent use of stalling tactics throughout the conflict. Minor issues such as flow measurement were allowed to unnecessarily prolong or stall the negotiation process (Nishat and Faisal, 2000, p. 293; Asafuddowlah, 1995, p. 212).

While the main institutional mechanism in the basin, the Joint Rivers Commission, saw months and years of debate over minor technical details, the real progress was made only when the politicians showed strong will to reach a settlement. For example, the 1996 Treaty was negotiated, drafted, and signed in less than six months primarily due to the favorable political climate in both countries (Nishat and Faisal, 2000, p. 295). A phased chronology of the entire negotiation process is summarized in Table CS2.10.

ROLE OF THE JOINT RIVERS COMMISSION

The JRC was established in 1972 by the governments of India and Bangladesh, in response to potential water-related conflicts (Nishat and Faisal, 2000). The JRC met several times during the year in the period 1972–1996 mainly to address its mandate as shown in Table CS2.11. The JRC's main mission is to maximize benefits from the shared rivers by studying flood and cyclone pattern to formulate control works, flood forecasting and warning systems and; studying irrigation and flood control. While its success record is not impressing, the JRC played an important role in the inter-party dialogue and negotiations (Nishat and Faisal, 2000, p. 296).

ROLE OF INTERNATIONAL COMMUNITY

As a result of its inferior position in the conflict, Bangladesh has shown greater interest and taken more measures to bring external parties into the negotiations, whereas India has advocated a bilateral relationship, a situation in which India would most likely would have greater leverage.

In the 1970s, Bangladesh raised the issue at various international forums. Bangladesh water experts brought up the sharing of river waters in the US and

Table CS2.10: Historical phases of Indo-Bangladesh negotiation.

Phase	Main activities	Comment
Phase I: 1951–1974	Discussion centered on respective claims by India and Pakistan (later Bangladesh) on the Ganges water and their justifications	India assured that shares would be finalized before commissioning of the Barrage
	Pakistan/Bangladesh claimed the entire natural flow of the Ganges reaching Farakka and indicated that reservoir(s) upstream of Farakka should provide any additional flow required for the Calcutta Port	Bangladesh becomes an independent country in 1971
	India, on the other hand, argued that Bangladesh needs a small part of the historic flow as most of it is being wasted into the Bay of Bengal	Joint Rivers Commission was formulated in 1972 to facilitate water-related negotiations
Phase II: 1974–1976	The issue of flow augmentation was raised recognizing that after water withdrawal for the Calcutta Port, residual flow will not be enough for Bangladesh	The Farakka Barrage began operating in 1975 with a test withdrawal of 11,000 to 16,000 cusec through a feeder canal for 41 days
	Bangladesh proposed that a number of dams could be built in India and Nepal to tap large monsoon flows	
	India proposed diversion of flows from the Brahmaputra through a link canal to the Ganges	In 1976 and 1977, India withdrew water unilaterally causing a major water crisis in the southwest region of Bangladesh
	Bangladesh took the issue to the United Nations and the General Assembly adopted a resolution according to which both countries agreed to meet in Dhaka to arrive at a fair and expeditious settlement	
Phase III: 1977–1982	The first water-sharing agreement was signed on 5 November 1977 for a duration of 5 years. Water was distributed based on a 10-day basis schedule in the dry season (January–May)	The agreement expired in November 1982
	It was decided that a mutually agreeable flow augmentation method would be worked out within 3 years. However, no new alternatives could be found and both sides stuck with their initial positions	Because of lack of progress on flow augmentation, the agreement was not renewed after its expiration
Phase IV: 1982–1988	Two Memorandum of Understanding (MOU) were signed. The first one in 1982 for a duration of 18 months covering the dry seasons of 1983 and 1984	No progress could be made on the flow augmentation
	There was no agreement regarding 1985. In November 1985, the second MOU was signed for a 3-year period	The last MOU expired in May 1988

(*Continued*)

Table CS2.10: (*Continued*)

Phase	Main activities	Remark
	A joint team of experts from India and Bangladesh visited Nepal to collect data. Nepal showed keen interest in a tri-lateral initiative for resolving the water crisis	India objected to Nepal's involvement as a third party, emphasizing the bilateral nature of the negotiations between India and Bangladesh
Phase V: 1988–1996	Discussions continued. Heads of states met in Delhi in September 1988. Secretaries of Water Resources were assigned the task of working out a formula for long-term sharing of all the common rivers	India's precondition of having an augmentation plan prevented the signing of any agreement
	Between April 1990 and February 1992, six meetings were held in Dhaka and Delhi with little progress	
	Prime Ministers of the two countries met in 1992 and several rounds of talks were conducted in 1995 at the Foreign Secretaries level	
Phase VI: 1996–1997	After changes in governments in both India and Bangladesh, a 30-year Treaty was signed in December 1996. The treaty became effective on January 1, 1997	Prevailing political mood has always been the main factor in the successful conclusion of negotiations
	The treaty urges the parties to find ways to augment the flow of the Ganges in the dry season as well as devising sharing arrangements to be worked out for all common rivers	
	India is accused of withdrawing more water greater than the amounts stipulated in the treaty	
2005	In September 2005, during the 36th JRC meeting, Bangladesh proposed once again to open tripartite talks that would include Nepal. At stake were investments in reservoirs in Nepal for augmenting the dry season flow of the Ganges	

Source: Information for 1951–1995 is based on Nishat and Faisal (2000, p. 294). Information for 2005 is based on Rahaman (2006).

England in 1976, the same issue was raised before the Economic and Social Commission for Asia and the Pacific as well as before the 7th Islamic Foreign Ministers Conference at Islamabad in 1976. It was again discussed later the same year at the Summit Conference of the nonaligned countries in Colombo, and finally it was on the agenda of the 31st session of the UN General Assembly. The UN made declarations and encouraged the parties to solve the dispute through increased cooperation but the UN did not pass any resolutions. However, the UN did, along with the group

Table CS2.11: Chronological summary of JRC activities (1972–1996).

Committee	Period	Scope	No. of MTGS
Joint River Commission	25 June 1972 to 10 April 1999	Formed in April 1972 to assist the governments of India and Bangladesh resolve common water issues	33
Meetings at the secretary level on sharing of waters of the common rivers between Bangladesh and India	19 April 1990 to 3 February 1992	Discussed water-sharing issues for six common rivers, namely Monu, Muhuri, Khowai, Gumti, Dharla, and Dudhkumar	6
JCE (Joint Committee of Experts)	16 January 1986 to 22 November 1987	First formulated in 1982 but remained inactive until reformulation in 1985 under the MOU of 1985 for sharing the Ganges	9 Secretary level 2 Minister level
Meetings on sharing of the Teesta Waters	16 January 1979 to 13 September 1987	Teesta issues discussed	4 Technical level 6 Secretary level
Joint Committee on sharing of the Ganges	24 December 1996 to 4 April 2000	Ganges issues discussed	15
Joint Committee on sharing of Teesta Waters	29 August 1997 to 30 January 2000	Meetings held between 1982 and 1988 focused on river erosion and border disputes	3
Indo-Bangladesh experts on flood forecasting and warning system	20 November 1997 to 24 October 1998 (meetings also took place during the early seventies and eighties)	Explored the possibilities of improving the accuracy of flood forecasting and warning	2
Standing Committee of JRC	13 April 1982 to 28 October 1999	A permanent committee of JRC	14
Indo-Bangladesh Joint Scientific Study Team	19 June 1998 to 22 December 1999	Formed to investigate the discrepancy in the shared flow after the 1996 Treaty	3
Honorable Prime Ministers' level meeting of Bangladesh and India	11–12 December 1996	Details of the 1996 Treaty were worked out	1

Source: Faisal and Nishat (2000).

of nonaligned countries play a role as a catalyst in the signing of the Ganges water agreement of 1977 (Upreti, 1993, p. 136).

India favored the countries' shared waters were a bilateral and the matter. Internationalization of the negotiations would only serve to deteriorate the relations between Bangladesh and India. India's view prevailed from at least the 1970s until the mid 1990s with Bangladesh's internationlization efforts only aggravating the situation. Consequently, the bilateral approach triumphed during this period (Upreti, 1993). The Ganges issue was raised once again in the General Assembly in 1993, when the Ganges flow reaches its lowest historic levels. The matter drew increased international attention and this time around indirect pressure was exerted on India to work towards a long-term settlement (Nishat and Faisal, 2000, p. 305).

At present, the ideas concerning external involvement point to the potential role for either the UN or the Group of Seven to provide institutional mechanisms for the monitoring of agreements and distribution of benefits and costs. The South Asian Association for Regional Cooperation (SAARC) has been involved in standardizing discussions among basin states of the Ganges and Brahmaputra, which has brought about an increased awareness of the gains that could come to each party from increased regional cooperation over the Basin. That being said, the situation has not advanced notably since the 30-year treaty was signed in 1996.[6]

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[6]The World Bank has likewise been involved to limited degree (Goldman, 1996).

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