Academia Journal of Environmental Sciences 1(3): 036-052, March 2013
DOI: http://dx.doi.org/10.15413/ajes.2012.0105
ISSN: 2315-778X

Academia Publishing

Research Paper

Farakka Barrage, the greatest ever riparian bluff for upstream water piracy

Accepted 23rd March, 2013

ABSTACT

Upstream India's Hooghly River is a south-flowing canal-like off-shoot from the Ganges before its entrance to Bangladesh. India constructed the Farakka Barrage on the Ganges about 16 km beyond the Indo-Bangladesh border. India has been pirating about 60% of the Bangladesh Gangetic ecosystem's water since 1975 for maintaining the navigability of the Calcutta Port located about 510 km downstream from the Farakka Barrage and at the mouth of the Hooghly River. The riverine ecosystem of Bangladesh has been facing ecocide. Investigation has been made to know how the Calcutta Port lost its navigability, how it maintained navigability prior to the water piracy, how critically important it was to cause the irreversible ecocide in the downstream riparian country, and if India had any other motive with the looted water resources. These important issues were not explored before the piracy of water started because of this South Asian giant's clamoring to restore the navigability of the Calcutta Port. Information was obtained from relevant literatures on the Hooghly basin, related published articles in electronic and print media, site visitations, field work, interviews of veteran engineers working in the affected area, travel reports, research institutions and government offices. Before the splitting up of India, Calcutta Port had the golden days for exporting Indian goods from Bengal. In post-partition days, India's attention was diverted for development of other ports. Most importantly, India constructed dams and reservoirs on the sub-tributaries and the tributaries of the Hooghly obstructing water flow to it. India's Calcutta Port siltation was not so acute and immediate a problem as publicized since more than thirty-five years later India was just about to estimate dredging cost for the Calcutta port. India, rather, wanted to develop year-round inland navigable water ways for tourism starting from downstream Haldia Sagar, the mouth of the Hooghly to upstream Farakka, Patna, and Allahabad totaling a stretch of 1620-km water ways. The revision of the Tennessee Valley Corporation engineer's plan deleted the issue of navigability maintenance in the basin development plan. India has not followed the rules for the intergovernmental Ramsar Convention she has been with since 1971 to advocate for saving even a seasonal water body irrespective of its size and depth even through international cooperation. Downstream country's ecocide outweighs the benefits earned by the upstream riparian country through development of tourism for luxury cruises. She deserves retrospective paybacks, at least, 60% of the upstream country's earnings from the Calcutta Port's navigability maintenance and her number one waterways.

Key words: Farakka Barrage, Ganges River, Hooghly River, river basin, Calcutta Port, riverine wetland, ecosystem, tributaries, dams, reservoirs, siltation, arsenocosis, Ramsar convention.

Miah Muhammad Adel

Interdisciplinary Sciences Research Center, Department of Chemistry and Physics, University of Arkansas at Pine Bluff, 1200 North University Drive, Pine Bluff, AR 71601

Email: adelm@uapb.edu.

INTRODUCTION

There are instances of multiple nations-based river basin development plans. The Rio Grande and the Colorado water sharing treaty between Mexico and the USA was signed in 1944, France has fulfilled all the demand of Spain. India and Pakistan signed the Indus River treaty. Besides, there are the Tigris and the Euphrates river treaty, the Nile River

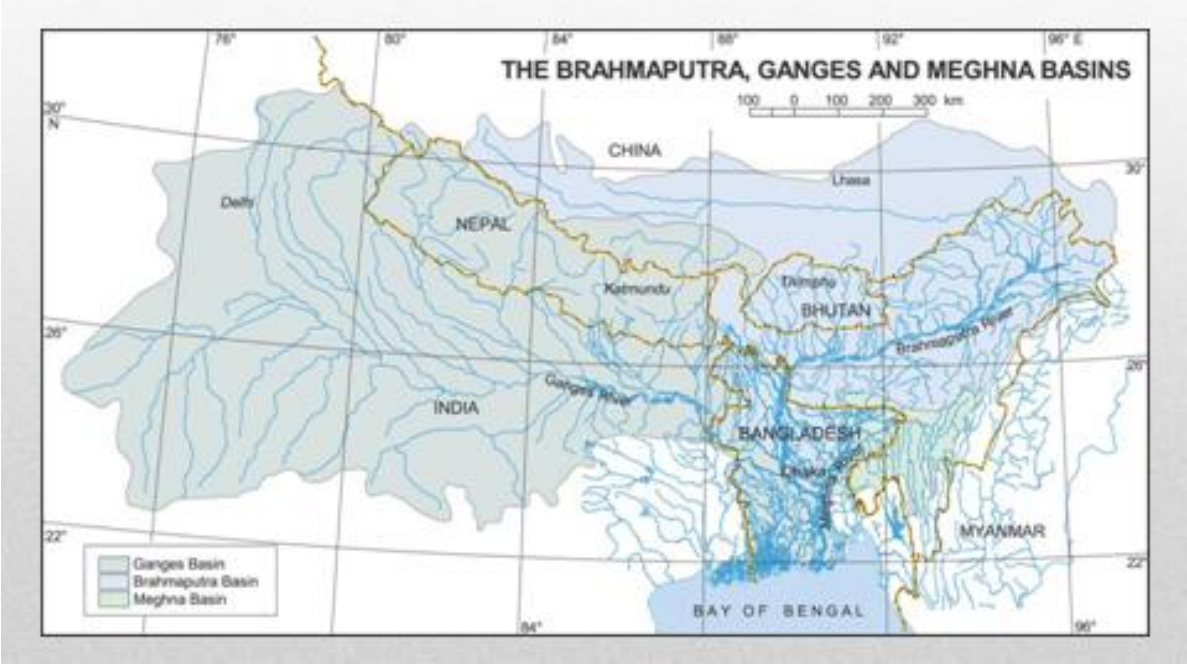


Figure 1. The Brahmaputra-Ganges-Meghna Basins[1] .

treaty between Egypt and Sudan, the Senegal River treaty among Gini, Malee, Mouratania, and Senegal. All riparian nations except China and Burma have been working together in the Mekong River Commission (Satter, 1998). There have not been any instances of pirating downstream ecosystem water by any upstream nations as reviewed in this article..

The location of the South Asian country, Bangladesh in the world's largest agricultural plain, the Ganges-Brahmaputra-Meghna basin, lies in the latitude range of 20°34' to 26°38' and longitude range of 88°01' to 92°41' E (Figure 1). The Ganges enters Bangladesh through the north-west, the Brahmaputra comes from the northeast and enters through the north, and the Barak comes from the east and splits into the south-west flowing Surma and the Kushyara on entering Bangladesh, and forms the headstreams of the Meghna. The land area of Bangladesh is about 141,000 km^2, and it forms the outlet of the world's largest agricultural plain. A complex interrelationship binds her riverine wetland ecosystem elements – sunlight, water, air, soil, people, aquatics, amphibians, animals, birds, plants, trees, and micro-organisms. The abiotic elements, being the elixir of the biotic elements of the ecosystem, have become extinct due to the loss of an adequate amount of it.

For years, the major roles of the Ganges basin wetland ecosystems have been groundwater recharge, groundwater discharge, groundwater quality maintenance, floodwater storage, storm surge, irrigation, filtering system for polluted/stagnant water, shoreline stabilization and erosion reduction, obstruction to salinity intrusion, sediment trapping, soil fertilization, nutrient deposition, food chains maintenance, crop production, livestock grazing, fisheries production, essential minerals and other nutrients provision, wildlife habitat provision, sports and recreation facilitation, religious ritual observations, natural heritage values maintenance, aesthetic beautification, biomass production, wood/fuel provision, goods transportations, inland river port developments , bio-diversity presentation, and micro-climate stabilization (Dugan, 1990; IWRB, 1992; Rashid et al., 2011; Adel, 2001, 2012a, 2012b, 2012c, 2012d).

Bangladesh water bodies include rivers, natural lakes, reservoirs, haors, oxbow lakes, beels, ponds and tanks, estuaries, seasonal water covered floodplains, and mangrove forests (FAO, 1988; Akonda, 1989; Khan, 1993). Table 1 gives their quantitative figures. This wetland ecosystem of Bangladesh survived on about 1200 billion m^3 of river discharges, mainly from these three principal ones – the Ganges, the Brahmaputra, and the Meghna- out of fifty-eight international rivers, 343 billion m^3 of rainfall, and 23 billion m^3 of groundwater. The Ganges basin (Figure 2) ecosystem nourished about one-third of the Bangladesh ecosystem.

The Ganges basin ecosystem faces ecocide due to the lost of an inordinate amount of its elixir element water that maintained it for hundreds of years. Grossly mentioning, the ecosystem has lost surface water resources, the inland navigable routes, the natural breeding and raising grounds for more than 100 species of Gangetic fishes, groundwater in the continued absence of recharging surface water resources and people's over-dependence on it. Also, people drink arsenic-contamination groundwater that risks more

Table 1. Bangladesh wetlands.

Water bodies	Coverage
Rivers	> 1000 58 international
Natural lakes	-
Reservoirs	-
Haors	about 400
Oxbow lakes	544.88 km²
Beels	1,000
Ponds, tanks and estuaries	
Seasonally water-covered floodplains	1,470 km²
Mangrove forests	5,771 km²

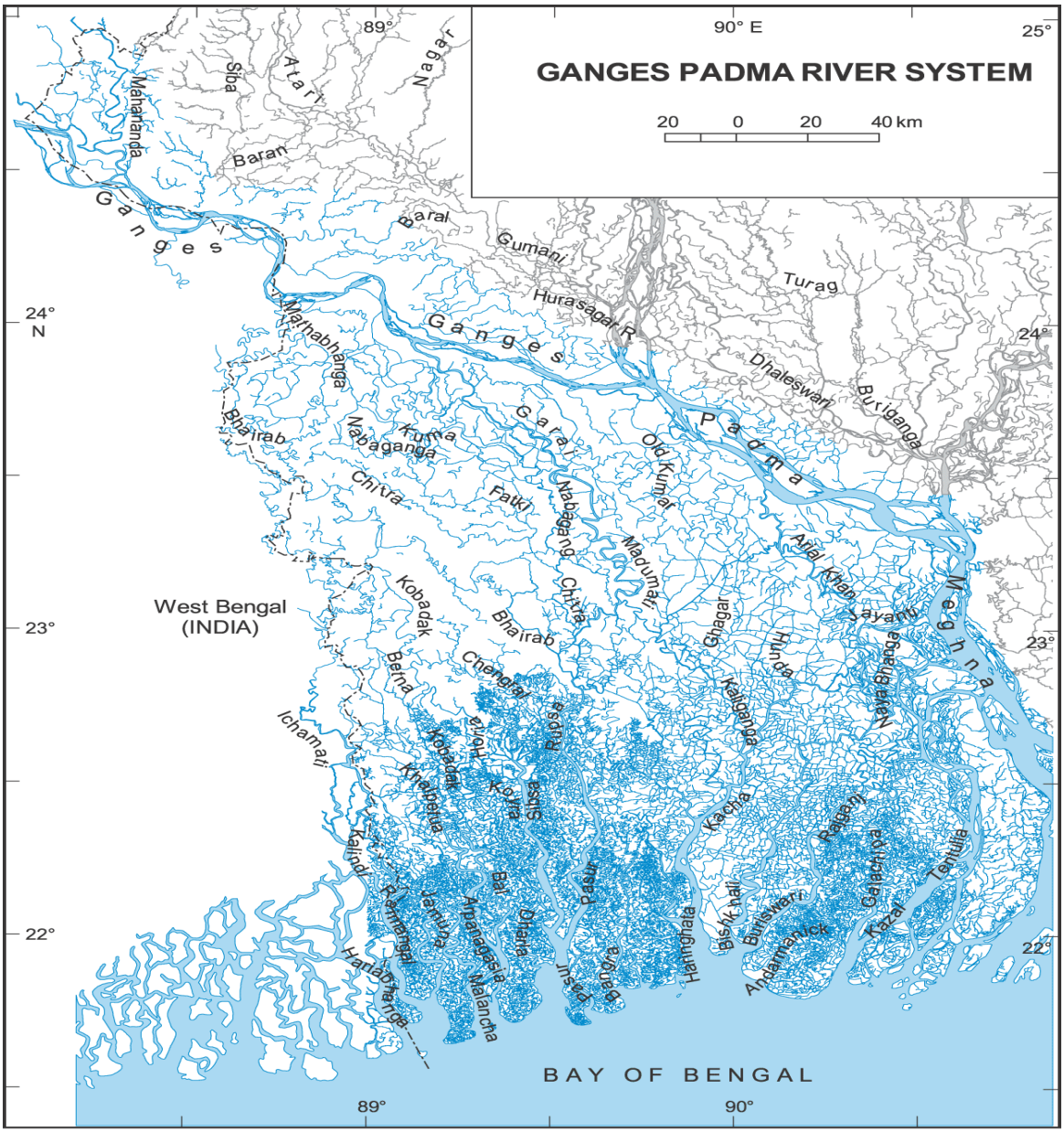


Figure 2. The Ganges basin in Bangladesh[2].

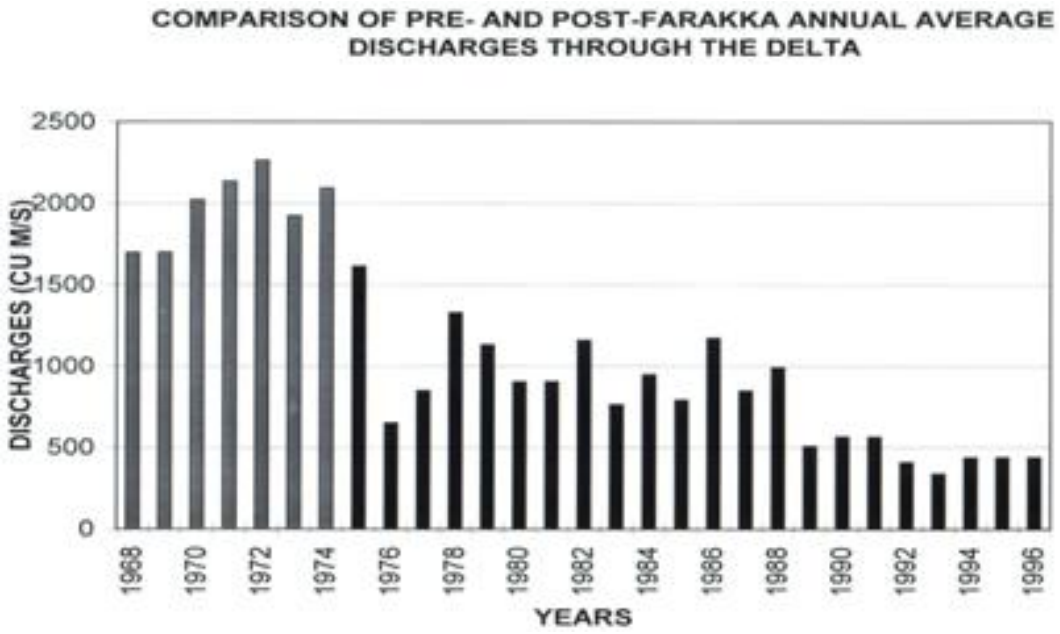


Figure 3. The dark bars represent the water available for Bangladesh ecosystems after Indian piracy of water. The grey bars represent pre-piracy discharge (Hebblethwaite, 1997).

that 75 million people and breaks marriage ties of families with spouses suffering from arsenicosis. They suffer from increased malnutrition having lost fishes, the cheapest source of calcium and animal protein, and they lost their seasonal and annual livelihoods which were tied to the Ganges, its distributaries and sub-distributaries, and other surface water bodies. Moreover, climate has turned extreme with an increased number of warmer summer days and colder winter days than pre-Farakka time, rainfalls have become scanty and erratic, and there has been a numerous loss of biodiversity before any inventory could be made. Additional effects include increased coastal erosion, widespread inland advancement of saline water front, and the deterioration of the Ganges water quality (Adel, 2001, 2012a, 2012b, 2012c, 2012d).

India is a signatory of the intergovernmental Ramsar Convention that stresses on international cooperation for saving even a seasonal water body without regard to its size. Yet, she being the upper riparian neighbor, deprived Bangladesh's inland and coastal ecosystems of about 60% of Ganges water (Figure 3) in the name of maintaining the navigability of Calcutta Port located about 510 km downstream of the Hooghly River, originally a south-flowing seasonal canal-like off-shoot from the Ganges in India and which takes the shape of a river from its tributaries farther downstream in its course. Although the discharges through Bangladesh have been shown in Figure 3 up to 1996, the trend still continues today in a worsening manner. Unfortunately groundwater recharges the Ganges water where the discharge measuring station is located. As a result, how much shorter water India releases through the Farakka Barrage to let flow through Bangladesh is very difficult to measure.

This article explores the reason for the navigability loss of the Hooghly River under which pretension India pirates 60% of the Bangladesh Gangetic ecosystem's water along with India's other motives to use the looted water resources. No attempts were made by the downstream country to investigate these important facts in the upstream country; this was kept hidden to bluff Bangladesh for water piracy, a strategy that worked in their favor.

MATERIALS AND METHODS

Both the condition of navigability and the claim for the loss of navigability of the Hooghly River are matters that rose hue and cry decades ago in the mid-seventies of the last century. That is why reviews of the past relevant materials have been carefully made. Data on the Calcutta Port's traffic in pre- and post-independence India were collected to find the trend of the port traffic. Searches were made, in post-partition India, if Indian attention was diverted for the development of other ports neglecting the Calcutta Port because of losing the major part of its hinterland. Also, searches were made to find the tributaries and sub-tributaries of the Hooghly that kept the river and the port navigable in pre-partition India. Further, searches were made as to how the discharges to the Hooghly were controlled. Data on the dams and reservoirs in the downstream were collected. Finally, searches were made on if India pirated water for developing inland navigability for commercial purposes. Relevant books, thesis, articles, websites, photographs, maps, and construction information

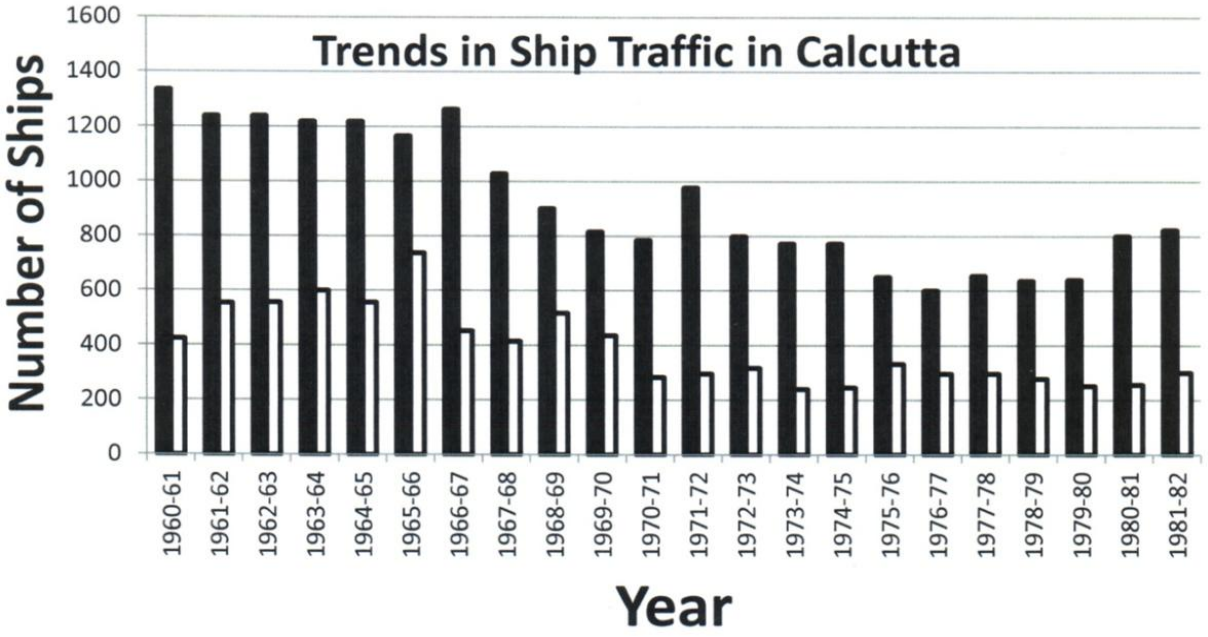


Figure 4. Trends in ship in Calcutta Port the dark columns stand for the domestic and the white bars for the foreign one.

were consulted. Site visitations, field work and interviews of experts' involved in related projects were conducted.

RESULTS

On the state of the traffic in Calcutta Port, it was found that after the partition of India, she has spent less for the Calcutta Port than any other ports. During the British colonial rule (1870-1946), the entire Bengal was the hinter land of the Calcutta Port. All raw materials from India were exported to the UK through the Calcutta Port. The greater part of Bengal became East Pakistan. The port carried 40-50% of India's imports and exports prior to and around the independence time of India. In the 1960's, the port use dropped to 23%. It further dropped to 11% in the late 1970's. In the 1980's, the use declined to only 10% (Crow, 1995). Figure 4 shows the trends in ships in Calcutta Port (Bindra, 1982),

On the navigability of the Hooghly and the Calcutta Port in pre-partition India, it was found that the Hooghly is a very tributary-rich river (Figure 5). Right after independence, India built dams and reservoirs in the basins of the tributaries and sub-tributaries of the Hooghly under the Damodor Valley Corporation (DVC) that came into existence on July 7, 1948 by an Act of the Constituent Assembly of India (Act No. XIV of 1948)[3,4]. These dams stopped the timely forceful flow to the Hooghly that would have stopped the siltation of the river. Table 2 enlists the dammed tributaries and sub-tributaries of the Hooghly.

The Hooghly River is a distributary of the Ganges that offshoots in the form of a canal from the Ganges near the town of Tildanga in the district of Murshidabad in West Bengal, India (Figure. 5). The Hooghly gets the shape of a river after Jahangirpur (which flows in the shape of a canal) discharges its water seasonally into it. After the construction of the Farakka Barrage, Indian water piracy turned out to be a seasonal canal into a perennial source of water, discharging more water than the 5-km wide Ganges itself discharges through Bangladesh. As it flows south, it passes through Jiaganj, Azimganj, Murshidabad, Baharampur, Katwa, Navadwip, Kalna, Halisahar, Chunchura, Rishra, and Kamarhati. It bends southwest before entering the Calcutta-Howrah. It flows in an old channel of the Ganges at Nurpur, turns south, and falls into the Bay of Bengal.[6] The left side of Figure 6 shows the Farakka Barrage across the Ganges and the Hooghly canal on the left side of the barrage. The right side of Figure 6 shows the Bangladesh's Ganges basin ecosystem's water-fed Hooghly River.

A brief introduction of tributaries and sub-tributaries of the Hooghly along with the available information on dams and reservoirs in their basins has been provided below. The Ajoy is a tributary of the Hooghly (Figure 7). It originates from 300 m high hill at Mungar in Bihar. It meets the Bhagirathi at the town of Katwa in West Bengal. The 288-km long river has 152 km in West Bengal and the rest in Jharkhand Province. The Ajoy has four tributaries – the Parth and the Joyanti in Jharkhand and the Tumuni and the Kunur in West Bengal. The Sitkia Dam is on the Ajoy in Jharkhand. The Punasi Dam is being built on the Ajoy near Deogarh. The Hinglo is another tributary of the Ajoy (Figure 8).

The Damodar River separates the Dhanbad District of

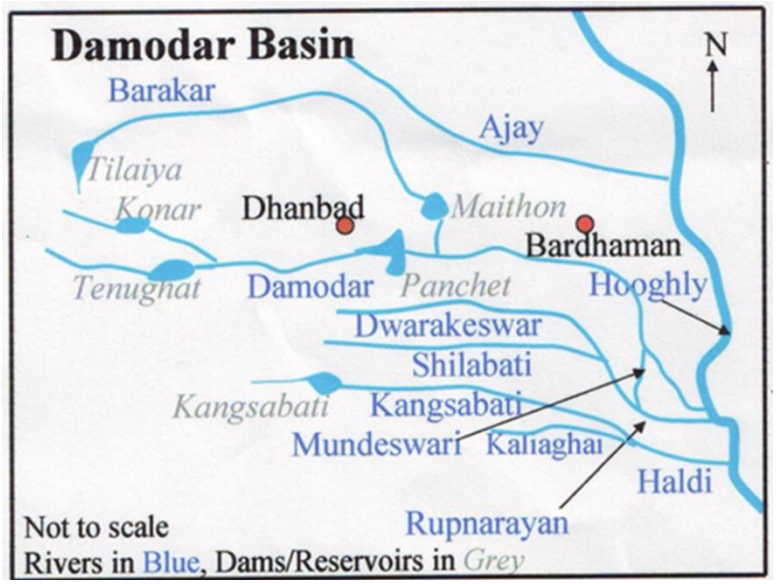


Figure 5. The dam-locked tributaries of the canal-like off-shoot Hooghly at its downstream[5]

Table 2. Dammed tributaries and sub-tributaries of the Hooghly River.

Hinglo	Tributary of Ajoy
Ajoy	Tributary of Hooghly
Konar	Tributary of Damodar
Barakar	Tributary of Damodar
Damodar	Tributary of Hooghly
Gandeshwari	Tributary of Dwarakeshwar
Dwarakeshwar	Tributary of Rupnarayan
Shilabati	Tributary of Rupnarayan
Mundeshwari	Tributary of Rupnarayan
Rupnarayan	Tributary of Hooghly
Kansgsabati	Tributary of Haldi
Kaliaghat	Tributary of Haldi
Haldi	Tributary of Hooghly
Bakreshwar	Tributary of Mayurakhi
Mayurakshi	Tributary of Hooghly

Jhankhand and the Purulia District of West Bengal. The Barakar and the Damodar meet at Dishargarh. The Panchayet Dam was constructed near their meeting place upstream on the Damodar. The Tilaya Dam is on the Barakar in the Kodema District in Jharkhand (Figure 9).

The Konar Dam (Figure 10, left) is on the Konar River, a tributary of the Damodar. It is located in the southern part of the Hazaribag District in Jharkhand

The Bokaro Dam is at the confluence of the Konar and the Bokero Rivers. This Dam supports the Bokero Thermal Power Plant.

The Barakar River is the principal tributary of the Damodar River (Figure 5). Its main tributaries are the Barsoti and the Usri. Additionally, fifteen small and medium size streams fall into it. Tilaiya is on the River Barakar (Figure 11)[15]

The Gandheshwari River is a tributary of the Dwarkeshar. It flows through Bankura District of West Bengal. It meets the Dwarkeshar River near Bhutsahar after flowing on the southwest of the Susunia Hill and north of Bankura.

The Runnarayan is a tributary of the Hooghly (Figure 12). It originates from the Choto Nagpur Plateau where it is called the Dhaleshwari. Near Bankura it is named the Dwarkeshar. It meets the Shilai River near the town of Ghatal and it is being called the Rupnarayan. The Rupnarayan support a thermal power plant at Kalaghat.

The Kangsbati River originates from the Choto Nagpur Plateau in Jharkhand Province. Near Keshpur, it bifurcates

Figure 6. (Left) The canal-like off-shoot representing the Hooghly beside the Farakka Barrage upon the Ganges. (Right) Bangladesh's Ganges basin ecosystem's water-fed Hooghly River. Withholding the tributaries discharges, India pirated water from Bangladesh ecosystem.[6]

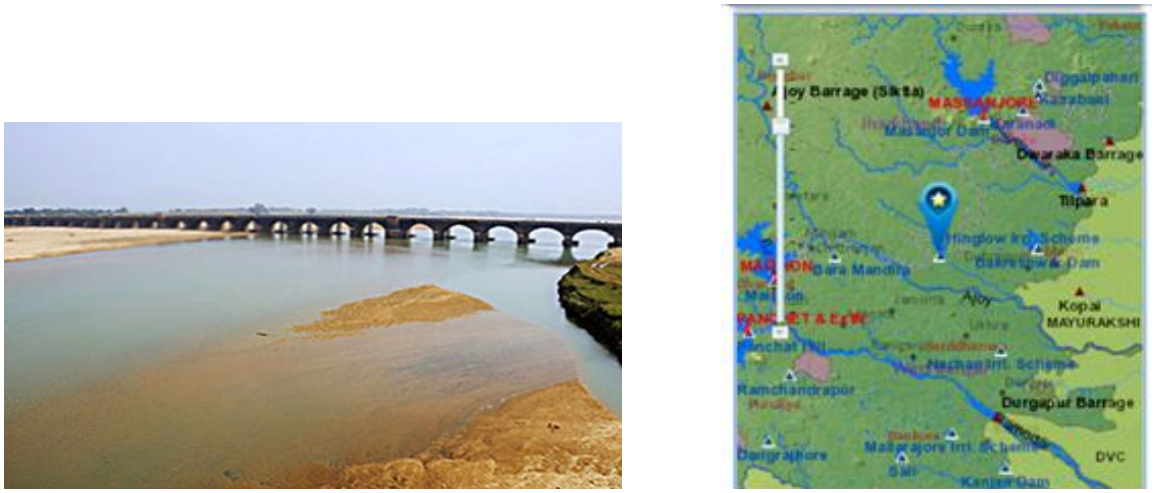


Figure 7. The Ajoy River (left) and its basin area (right)[7].

into the north-flowing Palarpai that flows into the Rupnarayan and a southeast-flowing branch that meets the Kaliaghai River and flows under the name of Haldai and then falls into the Hooghly near Haldai. Under the Kangsbati Project falls the Kangsbati Irrigation Project and the Kangsbati Reservoir. The irrigation project uses the water from the Kangsbati, the Shilabati (Figure 5), and the Bhairab Rivers. A dam was built in Kangsbati near Medinipur in 1972 which has been brought under the Kangsbati Project (Figure 13).

The Haldi River is the southernmost tributary of the Hooghly (Figure 12). It flows through Medinipur District. It is the joint flow of the Kalighai River and the Kansai River.

The Bakreshwar is a tributary of the Mayurakshi. It originates from Saontal Pargana District of Jharkhand Province. It passes through the Birbhum District and meets the Kopai River (Figure 15). The combined stream falls into the Mayurakshi River in Murshidabad District of West Bengal Province. The Bakreshwar Canal is used in irrigation while the Bakreshwar Thermal Power Plant is located near Chinpai.

The Mayurakshi is one of the main rivers of West Bengal. It originates from the Trikut mountain of Jharkhand Province. It passes through the districts of Bardhaman and Murshidabad before falling into the Hooghly River. There is the Masanjore Dam (Figure 14) also known as the Canada Dam about 65 km upstream of Seury in West Bangal. The Tilpara Dam (Figure 16) is located 32 km downstream from the Masanjore Dam (Figure 15). Figure 15 also shows the rivers Brahmani, Dwarka, Bakreshwar, Siuri, and Kopai,

Table 3 enlists some of the available features of rivers, their basins, dams, barrages, and reservoirs.

On the point of urgency of the Calcutta Port's navigability regain, it was found that the navigability loss of the Calcutta port, 126 km above the sea was not of such critical issue that necessitated deprivation of the Bangladesh Ganges

Figure 8. Hinglo River (left) and its dam site (right)[8] .

Figure 9. The Damodar River and its water development projects[9, 10, 11, 12]

Konar Dam[13] Maithoon Dam[14]

Figure 10. Konar and Maithoon Dam[14]

Figure 11. Tilaiya Dam upon the Barakar[15] .

Figure 12. The Hooghly, the Damodar, the Rupnarayan, and the Haldia rivers[16] (left) The Rupnarayan River[17] (right) .

ecosystem's elixir water. It is reflected in the Indian government's estimation of the dredging and maintenance cost of the Calcutta port, an accounting which is being done three and one-half decades after the construction of the Farakka Barrage[24].

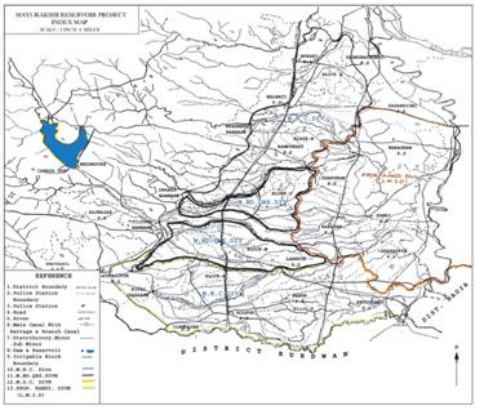
In the search of the Indian government's other motives behind water piracy, it was found that she made the declaration of the Ganga-Bhagirathi-Hooghly river system including Hooghly canal from Allahabad to Haldia as the number one (1) National Waterway in 1982 which was just about seven years after the construction of the Farakka Barrage[25]. It started operating from 27th Oct 1986 after the formation of the IWAI. The waterway stretches out from Haldia to Allahabad, a distance of 1620 km as shown in Figure 17. Table 4 enlists the features of the waterway.

DISCUSSION

With respect to these findings, the loss of traffic at the Calcutta Port and India's attention to develop other ports, it

Figure13. The Kangshbati project[18].

may be said that India lost what the British colonial power used as the hinterland, the undivided Bengal. She received an area of Bengal that measures barely 60% of independent Bangladesh. Any industrial development the colonial power made in and around Calcutta was going to falter due to lost of the greater raw material production area of Bengal. In the post-independence days, activities in the port could not be maintained at a level the British did. That is, possibly, why India neglected the development of the Calcutta Port in the post-colonial period.



Project Area[20]

Figure 14. Massanjore Dam on the Mayurakshi[19] .

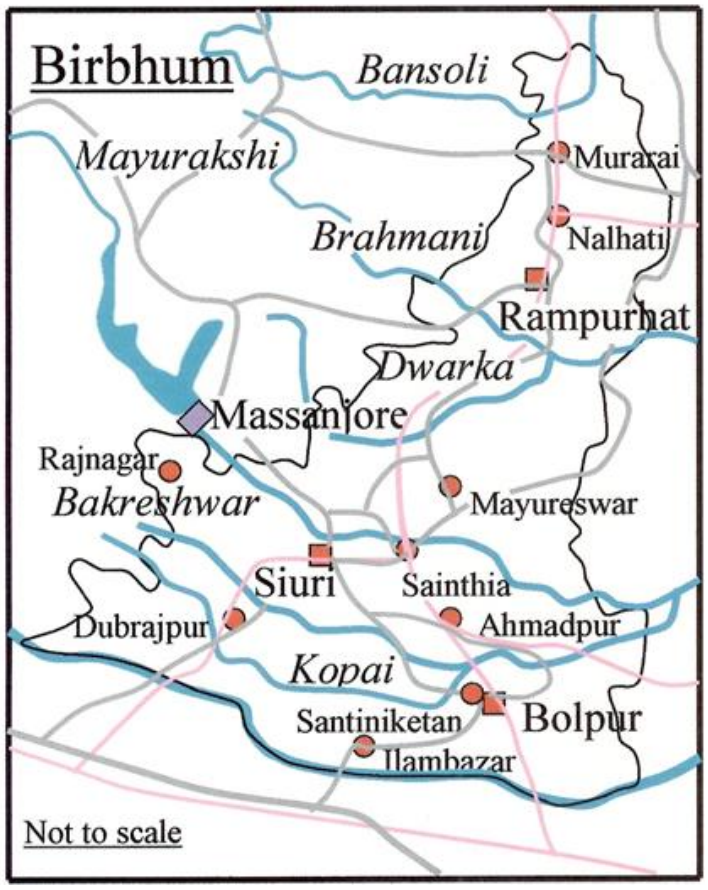


Figure 15. Location of the Massanjore dam[21].is shown in the district of Birbhum in West Bengal Province.

For the post-Faraka days, Patel (1996) writes that the dredging of the Calcutta Port was probably the only effective solution because the volume of traffic did not increase significantly. He further wrote that the importance of the Farakka Barrage was not demonstrated in a convincing manner.

Crow (1995) referred to a study conducted by Sau on the decline of the traffic in Calcutta Port and said that there were no physical or organization constraints against the increase of the traffic in Calcutta Port. He points to the

Table 3. Features of rivers, their basins, dams, barrages and reservoirs.

River/Canal	Length	Basin Area (km^2)	Dam (length, Height)/Reservoir Capacity (m, m)/(m^3)
Hooghly Canal	25	-	-
Hooghly R.	260	-	-
Ajoy R.	288	6,000	Sitkia Dam
		243	Punas Reservoir 149,350,000 m^3
Canal	77.94	-	-
Hinglo	201	Hinglo Dam	17,102,000 m^3
Rupnarayan R.		-	Kalaghat Thermal plant
Damodar R.		-	Panchayet Dam 170,370,000 m^3
Barakar R.		6,159	Tilaya Dam (366 m, 30.2 m)
Konar		997	Konar Dam (4,535 m, 48.77 m)/ 27.92 km^2 area
Bokaro		-	Bokaro Dam, thermal power plant
Kangshabati R.		3,484.77	Kangshbati Project (10,098 m, 38 m)
Mayurakshi R.		-	Canada Dam/ 67.4 km^2 area, 620 million m^3
		-	Tilpara Dam, 309 m long
Bakreshwar R.	-	-	Neel Ranjan Reservoir, Thermal power plant,
Bakreshwar Canal	-	-	-
Subarnarekha R.	470	193,000	-
Haldia	24	-	-

Blank space in the table indicates that the information is not available.

Bakreshwar, Mayurakshi's Tributary[23]

Figure16. Tilpara Barrage[22] .

decline of the industrial activity and overall economic activity as the more likely causes than the siltation of the Hooghly for the short fall of traffic at Calcutta Port.

On the loss of the navigability of the Calcutta Port, it appears that it was the tributaries of the Hooghly - the Ajay, the Damodar, the Mundeshwari, and the Rupnarayan - at its downstream that maintained Calcutta Port's navigability. Damming those tributaries reduced the Hooghly's flow and caused the siltation (Adel, 2012a). India used this opportunity to pirate downstream ecosystem's water

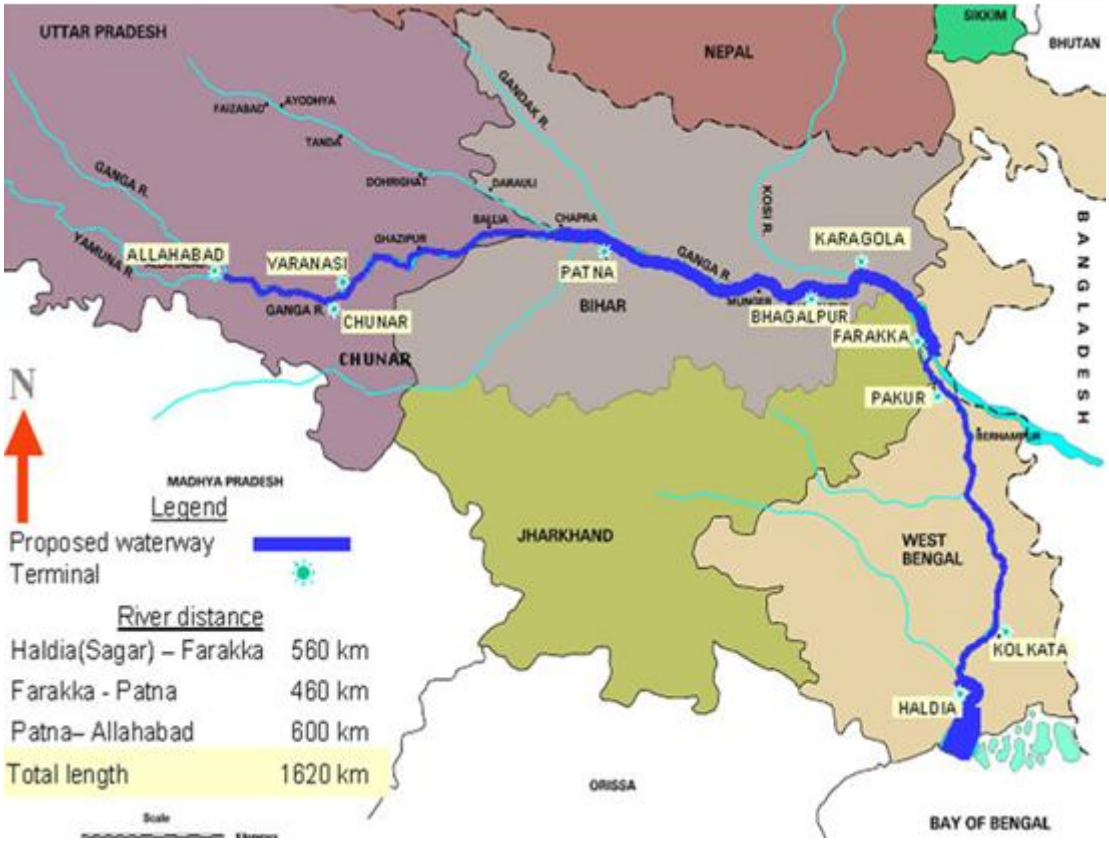


Figure 17. Ganga-Bhagirathi-Hooghly river system from Allahabad to Haldia[26] was declared as National Waterway No.1.

Table 4. Length and depth of the Indian number one national waterway

Places	Distance (km)	Average Depth (m)
Haldia-Farakka	560	3.0
Farakka-Patna	460	2.5
Patna-Varanasi	420	2.0
Varanasi-Allahabad	180	1.5

although it was she who preserved water in reservoirs behind the dams on the tributaries and sub-tributaries of the Hooghly. The four dams built under DVC – the Tilaiya Dam upon the Barakar River (1953), the Konar Dam (1955), the Maithun Dam upon the Barakar (1957) and the Panchet Dam upon the Damodar – can control 18,400 to 7,100 cu m flood water. If the flood water were not controlled this way, India could not avail the chance of bluffing Bangladesh for the loss of navigability by storing water at the upstream of the Hooghly's tributaries and sub-tributaries.

Further on the navigability loss issue, it is found that trapping the water resources in the sub-tributaries and tributaries instead of letting it discharge in the Hooghly was guided by the setup of the Damodar Valley Corporation that came into being in 1948. W. L. Voorduin, a senior engineer from the Tennessee Valley Corporation in the USA gave an outline of a plan of eight dams and barrages designed for flood control, irrigation, power generation, and navigation. Contrary to Voorduin's plan of eight dams and barrages that would save navigability, India went with the above four dams – Tilaiya, Konar, Maithon and Panchet, and Durgapur Barrage (Jain et al., 2007). The proposed eight dams replaced by only four, certainly, envisaged the piracy of the Ganges water since it was in 1951, just within three years, when India flashed the news of the construction of the Farakka Barrage in Indian news media. The timeline of the landmark events is given in Table 5.

India preserved her water in reservoirs and then goes for pirating water from the downstream ecosystem of Ganges in the name of maintaining navigability of the Calcutta Port. Had she been considerate of the water rights of all living

Table 5. Timeline of activities

Year	Activities
1947	Independence
1948	DVC
1951	Farakka Barrage Plan News Flashed
1953-57	Completion of Four Major Dams
1971	Wetland Preservationist Group Ramsar Convention Membership
1975	Completion and Operation of the Farakka Barrage
1982	Declaration of Hooghly Canal as Part of No. 1 National Waterway
1986	Operation of the No. 1 Waterway
2011	Calcutta Port's Dredging and Maintenance Cost Estimate

beings in an ecosystem, she would kill the snake without breaking the stick – she should have managed her problem without pirating downstream ecosystem's water.

The intergovernmental Ramsar Convention understands the wetland as "areas of marsh, fern, peat land of water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brakish or salt, including areas of marine water the depth of which at low tide does not exceed six meters." This broad definition includes, inland wetlands (such as marshes, lakes, rivers, peat lands, forests, karst, and caves), coastal and near-shore marine wetlands (such as mangroves, estuaries, and coral reefs), and human-made wetlands (such as rice fields (paddies), reservoirs, and fish ponds)[27]. According to this definition, two-thirds of Bangladesh is being classified as wetland, that is, the heart of the country is wetland. That makes two-thirds of the Ganges basin wetland. And a 60% loss of water cannot keep the ecosystem alive. The Ramsar Convention mission reads "the conservation and wise use of all wetlands through local, regional, and national actions and international cooperation, as a contribution towards achieving sustainable developments throughout the world".

Being a responsible member of this great convention, India violates the pillars of the organization by causing depletion and contamination of surface and groundwater, eradication of inland waterways and natural breeding and raising grounds of more than 100 species of Gangetic fishes, depriving people of their cheapest source of calcium and indispensable animal protein from fish, loss of people's seasonal and annual livelihoods that were tied to the Ganges, its distributaries and sub-distributaries rivers and other surface water bodies, contamination of more than 75 million people's drinking water with arsenic, break off of families with a spouse suffering from arsenicosis, 20% fatalities from arsenicosis, climate change with an increased number of warmer summer days and colder winter days than the pre-Farakka time, scanty and erratic rainfalls, loss of numerous biodiversity before any inventory preparation, inland intrusion of saline water front and increased coastal erosion, destruction of the facilities for the observance of the minority Hindu's religious rites and general people's learning and performing water sports and other recreational activities, etc. etc. India has caused an ecosystem crash in the Ganges basin (Adel, 2001, 2002, 2003, 2004a, 2004b, 2005, 2008a, 2008b, 2008c, 2008d, 2012a, 2012b, 2012c, 2012d, 2013a, 2013b).

India availed the benefit of being an upstream riparian country to pirate Bangladesh ecosystem's water. She pirates additional amounts of Ganges water by some 300 hundred large and small constructions located in Uttar Pradesh, Bihar, and West Bengal on top of pirating water from 30+ smaller size international rivers located around Indo-Bangladesh. Figure 18 shows the rivers marked red with water diversion constructions on them around the Bangladesh border (Adel, 2001, 2013a, 2013b). Similar ecocide are seen in the downstream basins of these small international rivers.

India feels proud of being the world's 11th largest economy and the 4th largest in terms of purchasing power[28] at the base of which stands her piracy of the 60% Ganges water from the downstream ecosystem. She claims to have provided leadership in third world countries on many issues notably environmental degradation. As it has been shown above, she actually has caused environmental degradation to such a degree that words cannot tell. Also, she claims to have provided leadership on trade imbalances whereas Bangladesh Bank and Export Promotion Bureau data show a galloping economic imbalance existing between India and her next door neighbor Bangladesh- $1,998.58 million in fiscal 2006-07 reached $4,057 million in 2010-11 (Figure 19). Indian policy is against responsibility-to-protect principles.

Depriving humans and other living beings of their elixir water is a grave violation of their water rights and a violation of their rights to exist. When the United Nations raises the slogan for saving the diversity, a prospective permanent member to the Security Council does the opposite. Such a UN Security Council member has already proved to have provided insecurity through her ambitious actions upon the neighbors. Little fair service can be expected of her if she gets her coveted position.

The whole situation can be compared with the *Aesop's Fables* story of frogs in a pond and the sporting boys pelting at the frogs, where the frogs said that what was play for the boys was death for the frogs. The looted water was used by the Indians for cruising whereas people in downstream Bangladesh have 20% fatalities because of arsenicosis

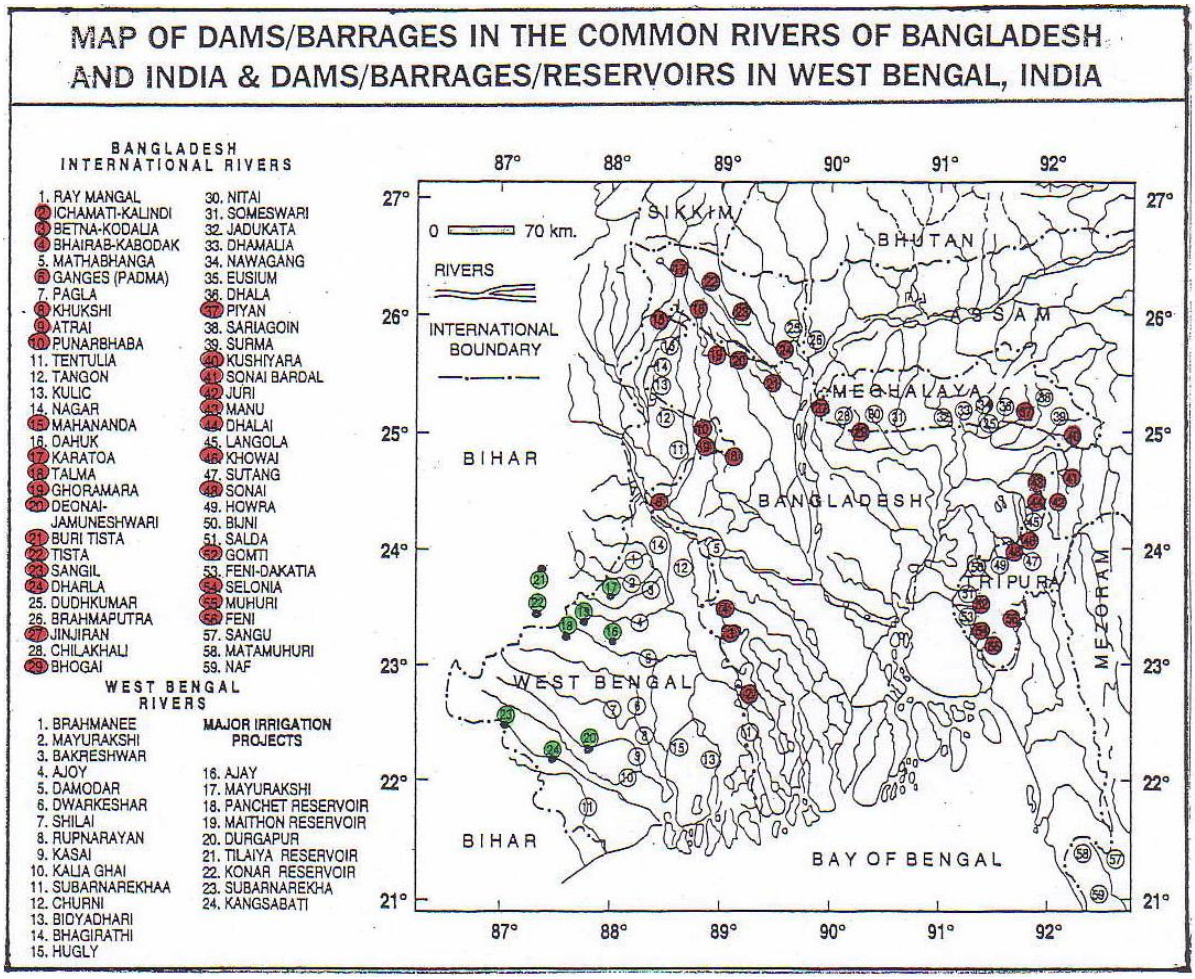


Figure 18. The fifty-eight international rivers which are common to both India and Bangladesh. India's water piracy takes place in, at least, the ones marked with yellow circles (Adel, 2001).

associated with arsenic contamination of drinking water and a significant number of winter fatalities, losing the water bodies which are also heat reservoirs.

It is a corollary that the water that leaves the border belongs to the downstream riparian region. Robbing this water resource, is robbing that ecosystem's water resource. On a fair ground, India should pay back to Bangladesh 60% of what she has made so far in serving the Calcutta Port and establishing the number one (1) National Waterway by looting the downstream water resources. Bangladesh deserves all the 60% pirated water of the Ganges for reestablishing her wetland ecosystem. If all upstream riparian countries follow Indian policy, downstream riparian countries cannot survive.

Conclusion

It was also found that in the post-partition days, India gave more importance to the development of other ports. The loss of the navigability of the Calcutta Port was due to damming the tributaries and the sub-tributaries of the Hooghly for storing water in their basins. India has been robbing at least 60% of the downstream Bangladesh Ganges basin ecosystem's water without regard to the state of the ecosystem there. India's actions demonstrate her investment of the seized water resources for development of commercial cruise line. It is very strange to think India's high hopes for becoming a permanent member to the UN Security Council when she uses the survivability elixir water of the downstream ecosystem to develop commercially luxury cruise line in her upstream. The interval between the Indian false slogan of regaining the lost navigability and the proposal for consideration of silt removal spans over a few decades. It is not certain yet when the silt will be removed.

Recommendation

Water is the most vital element of an ecosystem. It is time for India to give back to Bangladesh the looted water

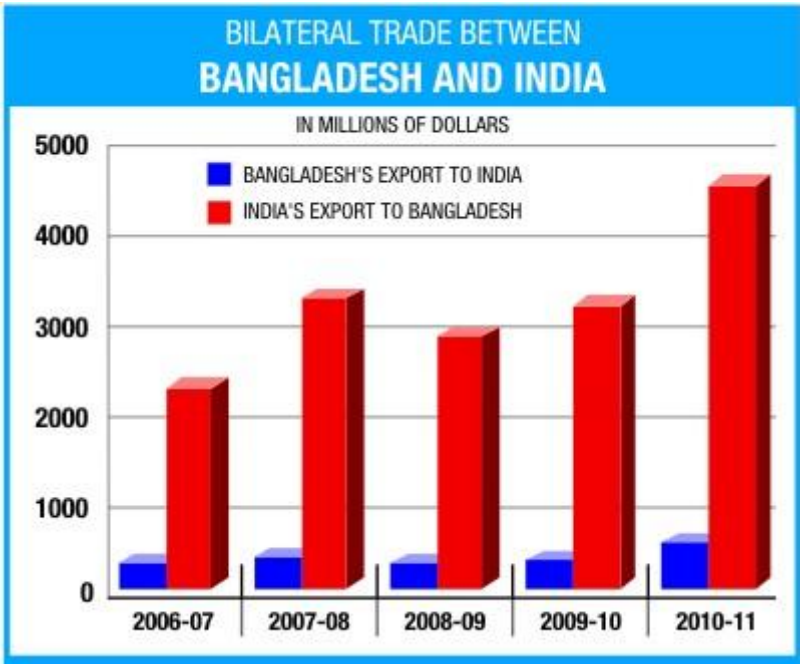


Figure 19. Trade disparity between India and her neighbor[29] .

resources and the profits that she has made so far. She must not ignore the fact that a nation stands on her natural resources. She should go ahead and perform the dredging of the Calcutta Port which will let it regain its navigability. She should demolish the dams upstream of the Hooghly's tributaries and distributaries to let them discharge in the Hooghly in a timely and forceful manner so that no silt is deposited. Bangladesh may try to use the water resources to revitalize gradually her Gangetic wetland ecosystem to get rid of some of the calamitous problems like arsenic-contamination of water, groundwater recharging, climate change, etc.

ACKNOWLEDGEMENTS

I am thankful to the persons and/or agencies whose illustrations and facts I have used in this article.

REFERENCES

Adel MM (2001). Effect on water resources from upstream water diversion in the Ganges basin, *J. Environ. Qual*. 30:356-368.

Adel MM (2002). Man-made climatic changes in the Ganges basin, *Int. J. Climatol.* 22:99-1016

Adel MM (2003). Biosphere III: The site of unprecedented ecocide in the Ganges basin, in J. Ahmed, ed., *National Documentation on the Problems of Arsenic and Farakka*, pp. 59-79.

published by the International Farakka Committee, Inc. , New York, NY

Adel MM (2004a). Impacts from trans-boundary water rights violations in South Asia, p. 205-214, in R. Murray, K. Jacobson, and S. Anderson, eds., *Pr.oceedings of the 2004 Water Management Conference: Water Rights and Related Water Supply Issues,* Salt Lake City, Utah

Adel MM (2004b). Upstream water diversion constructions on transboundary rivers, in R. Murray, K. Jacobson, and S. Anderson, eds., *Proceedings of the 2004 Water Management Conference: Water Rights and Related Water Supply Issues*, Salt Lake City, Utah pp. 547-556.

Adel MM (2005). The background state leading to arsenic contamination of Bengal basin groundwater, *J. Water and Health*, 03.4. DOI: 10.2166/wh.2005.053

Adel MM (2008a). International migration of Gangetic fishermen in South Asia, International Conference on Environment, Forced Migration & Social Vulnerability, Bonn, Germany, 9-11October, 2008.

http://www.efmsv2008.org/files/International+Migration+of+Ganges+fishermen+In+South+Asia+?menu=12

Adel MM (2008b). Natural river flow obstruction risks groundwater arsenic contamination, UNESCO-Sponsored International Conference on Water Scarcity, Global Changes and Groundwater Management Responses, University of California at Irvine, California, 1-5 December, 2008.

http://www.groundwater.conference.uci.edu/files/chapter1/2008_conf_AR

Adel MM (2008c). Ordeals to have due share of trans-boundary river water, UNESCO-Sponsored International Conference on Water Scarcity, Global Changes and Groundwater Management Responses, University of California at Irvine, California, 1-5 December, 2008. http://www.groundwater.conference.uci.edu/files/chapter2/2008_conf_AR

Adel MM (2012a). Jaladasyuta (in Bengali), *Thikana*, 24 February 2012, Vol, 23(2):163-169.

Adel MM (2012b). Mamatadeer Mathabatha Hooghly Gangar Sanghare na Farakkar Fatole (in Bengali), *Thikana*. 23(9):10- 94

Adel MM (2012c). Downstream ecosystem sustainability challenge from international river water plunderage, in S. Rab (ed) *Proceedings of the 3rd America Bangladesh Canada Convention 2012*, pp. 58-66

Adel MM (2012d). "Downstream ecocide from upstream water piracy". *Am. J. Environ. Sci.* 8:528-548.DOI: 10.3844/ ajessp.

2012.528.548, URL

Adel MM (2013a). *Jaladasyupana* (in Bengali), Dibbo Prakash, 32/2 Khan Bangla Bazar, Dhaka 1100, Bangladesh.

Adel MM (2013b). *Treeteo Jibjagat* (in Bengali), Dibbo Prakash, 32/2 Khan Bangla Bazar, Dhaka 1100, Bangladesh.

Akonda AW (1989). Wetlands of Bangladesh, in Scott, D. A. (ed), *A Dictionary of Asian Wetlands*, International Council for Bird Preservation: International Waterfowl and Wetlands Research Bureau

Bindra SS (1982). *Indo-Bangladesh Relations*. New Delhi, Deep and Deep Publications.

Crow B, Linquist A, Wilson D (1995). *Sharing the Ganges – The Politics and Terminology of River Development*. Dhaka, University Press Limited

Dugan PJ (ed) (1990). Wetland Conservation: a review of current issues and required action, IUCN, Gland, Switzerland

FAO (1988). Agro-ecological regions of Bangladesh, FAO, Rome

Hebblethwaite G (1997). The impact and implications of the Farakka Barrage upon Bangladesh. B. Sc. Thesis. Newcastle University. UK

IWRB (1992). Action Program for Conservation of Wetlands in South and West Asia. Northeast Regional Water Resources Development Project (FAP 6), 1992. Draft Thematic Study, Regional Water Development Status, Flood Plan Coordination Organization, Government of Bangladesh, Dhaka

Jain SK, Agarwal PK, Singh VP (2007). *Hydrology and Water Resources of India* 57:395.

Khan AA (1993). Freshwater wetlands in Bangladesh: Opportunities and options, in *Freshwater Wetlands in Bangladesh: Iaasues and Approaches for Management*, ed. Ainun Nishat et al, IUCN-The World Conservation Union, Dhaka, Bangladesh.

Patel T (1996). Bridge over Troubled Waters, *New Sci.* 152(2058):12-13.

Rashid M, Pereira JJ, Begum RA, Aziz S, Mokhtar MB (2011). Climate Change and its Implications to National Security, *Am. J. Environ. Sci.* 7(2):150-160.

Sattar A (1996). Farakka Bangladesher Bhagyo Zekhane Bondi (in Bengali), Padma-Jamuna Prakashani, Dhaka, Bangladesh.

[1]http://maps-of-bangladesh.blogspot.com/2010/12/map-showing-brahmaputra-ganges-and.html

[2]http:www.dvc.gov.in/activitiesdamsbarrages.htm

[3](http://www.banglapedia.org/httpdocs/maps/mg_0027.gif)

[4]http://envfor.nic.in/divisions/cltech/Damodar/1.1.htm

[5]http://en.wikipedia.org/wiki/Damodar_River

[6]http://wn.wikipedia.org/wiki/River_Hooghly.

[7]Courtesy of Google Earth

[8]http://india-wris.nrsc.gov.in/wrpinfo/index.php?title=Hinglow_Irri._Scheme_D00124

[9]http://en.wikipedia.org/wiki/Hinglo_River

[10]http://en.wikipedia.org/wiki/Damodar_Riverhttp://en.wikipedia.org/wiki/Damodar_River

[11]http://www.telegraphindia.com/1090227/jsp/jharkhand/story_10595121.jsp

[12]http://www.google.com/search?q=Panchet+dam&rls=com.microsoft:en-us:IE-Address&ie=UTF-8&oe=UTF-8&sourceid=ie7&rlz=1I7DKUS_en

[13]http://www.google.com/search?q=Durgapur+Barrage&rls=com.microsoft:en-us:IE-Address&ie=UTF-8&oe=UTF-8&sourceid=ie7&rlz=1I7DKUS_en.

[14]http://en.wikipedia.org/wiki/Konar_Dam

[15]http://www.google.com/imgres?imgurl=http://www.powermin.nic.in/ministry_of_power/generation_plants/hydro_electric/images/A%2520View%2520of%2520Maithon%2520Dam.jpg&imgrefurl=http://www.powermin.nic.in/ministry_of_power/generation_plants/hydro_electric/pages/A%2520View%2520of%2520Maithon%2520Dam.htm&h=195&w=350&sz=12&tbnid=4nO4lo8njdhZGM:&tbnh=67&tbnw=120&prev=/search%3Fq%3DMaithon%2BDam%26tbm%3Disch%26tbo%3Du&zoom=1&q=Maithon+Dam&usg=___I7P1YAjk3QqmZkEgVC6kLbVe40=&docid=gpBkkbeDMjditM&sa=X&ei=1igLUIA6o-DZBbTW7Ss&ved=0CGYQ9QEwBA&dur=310

[16]http://en.wikipedia.org/wiki/Barakar_River

[17]http://www.panoramio.com/photo/65906361

[18]http://www.hdaindia.com/geography.html.

[19]http://en.wikipedia.org/wiki/Rupnarayan_River (Courtesy of Google Earth)

[20] http://wbiwd.gov.in/irrigation_sector/major/maps/kangsabati.htm

[21]http://www.google.com/search?q=Massanjore+Dam&hl=en&rls=com.microsoft:en-us:IE-address&rlz=1I7DKUS_en&prmd=imvns&tbm=isch&tbo=u&source=univ&sa=X&ei=8y0LUOGfJ6LE2wWgq_jxDw&ved=0CEwQsAQ&biw=904&bih=507.

[22]http://wbiwd.gov.in/irrigation_sector/major/maps/mayurakshi.htm)

[23]https://www.google.com/search?q=Bakreshwar+dam&hl=en&rlz=1C1CHFX_enUS437US437&tbm=isch&tbo=u&source=univ&sa=X&ei=GytFUcS-B5G-2AWnrIEw&ved=0CEwQsAQ&biw=1366&bih=643#imgrc=wGkrzeJ1N-4_PM%3A%3BVMxKdYXvnhIERM%3Bhttp%253A%252F%252Fimages1.wikia.nocookie.net%252F__cb20071117225407%252Fgenealogy%252Fimages%252F4%252F41%252FBirbhum_Map.jpg%3Bhttp%253A%252F%252Ffamilypedia.wikia.com%252Fwiki%252FBirbhum_district%3B854%3B1070;)

[24]http://www.panoramio.com/photo/24483989

[25]http://www.panoramio.com/photo/52174794

[26]October 25, 2011 Business Line

[27]vide National Waterway, Allahabad-Haldia stretch of the Ganga Bhagirathi- Hooghly River, Act 1982 (49 of 1982)

([28]http://india-wris.nrsc.gov.in/wrpinfo/index.php?title=National_Waterways-1).

[29](http://www.environment.gov.au/water/topics/wetlands/ramsar-convention/index.html).

[30](http://www.prep4civils.com/blog/daily-editorial/621/india%E2%80%99s-impetus-to-permanent-membership-of-security-council/)

[31]http://www.thedailystar.net/newDesign/news-details.php?nid=201273

Cite this article as:

Adel MM (2013). Farakka Barrage, the greatest ever riparian bluff for upstream water piracy. Acad. J. Environ. Sci. 1(3): 036-052.

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