

Transboundary Water Issue: Indo-Bangladesh case

Introduction: The River Network

Bangladesh, a small country of 147570 sq km of surface area is criss-crossed by a network of some 230 rivers of different sizes and shapes. These watercourses cover nearly 7% of the total area of the country. These rivers, with the exception of the few in the south-eastern districts of the country, are either the tributaries or the distributaries of the three mega rivers of the sub-continent, namely, the Ganges, the Brahmaputra and the Meghna. To understand the water problems of this riverine country, a brief description of these mega rivers are in order here, as because Bangladesh is located in their lowermost reaches. In fact, 54 of the big and medium sized ones among them enter the country from India and 3 from Myanmar (Map 1).

The source of the Ganges is in the Gangotry Glacier in the Kailash ranges up in the Himalayas. At origin, one channel, the Bhagirathi and the other one, the Alaknanda after their confluence at Devprayag take on the name of the Ganges. Several Nepalese tributaries, namely the Karnali, the Gandak and the Kosi all of which have their sources in China, join the river. Important to note that the Nepalese tributaries of the Ganges contribute about 71% of the dry season flows of the Ganges. The Yamuna and the Sone being fed by some minor tributaries join the Ganges at Allahabad in India.

The Ganges traverses through India for nearly 2150 kms. Some 18 kms from the Indo-Bangladesh border at Farakka India has built a barrage. Having touched the Bangladesh land on the NNE the Ganges makes the international boundary between India and Bangladesh for nearly 110 km before piercing fully through the Bangladesh territory. Within Bangladesh it meets first the Jamuna, some 209km downstream and takes on the name of the Padma. Another nearly 130 km downstream the Padma meets the Meghna and the combined waters are disgorged into the Bay of Bengal with the appellation of the Meghna. The Ganges has only one tributary, the Mahananda, within Bangladesh coming from the north. It has one small distributary, the Baral, on the left bank. The river throws off several distributaries from the right bank. Within Bangladesh these are the Mathabhanga, the Bhairab, the Gorai-Madhupati and the Arial Khan. These and those branching off from them have formed themselves into a veritable maze. These rivers have built up the Genetic delta of Bangladesh covering nearly a third of its area to the SW of the country (Map-2).

The Brahmaputra takes its origin in the southern slopes of the Kailas range and flows east as the Tsang Po across 1100 miles of Tibetan Plateau, then turns South and enters the Indian landmass whence it is known as the Brahmaputra. In Bangladesh it branches off into two, one the Jamuna, to-day's main channel, flows due S to meet the Ganges at Goalunda, wherefrom, the combined waters stream south east, as discussed earlier. The Teesta, the Atrai and the Karatoya, watering vast areas to the NW of the country are tributaries of the Brahmaputra. It has several distributaries flowing through the central part of Bangladesh.

The third important international river, the Meghna enters Bangladesh through two arms, the Surma and the Kushiara which assume the name Kalni after their confluence for a short distance, and further downstream, the Meghna. The river flows in a north-south direction and is joined by several tributaries from the Shillong Plateau on the north or the Tipperah Hill on the East.

From the short descriptive note above, two aspects of our river network come out clearly. They are:

- a. All the rivers, excepting the ones to the S-E of the country, are either the tributaries, though only a few, or the distributaries of the three international rivers, namely the Ganges, the Brahmaputra and the Meghna.
- b. The three international rivers drain a vast area spread over several countries, Nepal, India, China, Bhutan and Bangladesh, the last-named is situated at the lowermost reaches of them all.

The Farakka saga

To bring home our point as to how water withdrawal upstream is causing the lower riparian Bangladesh irreparable damage to its environment and economy we will focus on only one area to the SW of Bangladesh which at one time, not in the too distant past, used to be enmeshed by a fairly dense network of rivers, the distributaries of the Ganges and their branches and sub-branches.

To understand the sordid story of the decay of the river system of the SW region of Bangladesh involving the life and living of some 40 m people of this poor land we have to refer to the story of the Farakka barrage. Mention has already been made above that at a place called Farakka the government of India in 1951 started to plan for raising a barrage without informing the lower riparian. The barrage site is some 18 kms from the Indo-Bangladesh border upstream of the Ganges. The then government of Pakistan, of which the present Bangladesh was a part, protested. Then started a very tortuous negotiation which began by denial by India of the existence of such a plan. The rigmarole continued for 20 years by which time the barrage was ready for commissioning. The purpose of the barrage was to divert some 40000 cusecs of water from its natural course through Bangladesh to West Bengal via an artificially built canal. In 1974, a decision was reached between the two governments that before commissioning the barrage an agreement as to water sharing would be reached. For some mysterious reasons only next year, India was allowed by the Bangladesh government to test run the barrage and the canal for a period of 41 days only by diverting a quantity of 11 thousand to 16 thousand cusecs of water through the feeder canal in West Bengal. It may be mentioned here that India even after the period of 41 days continued to divert water without informing Bangladesh.

In any case, in 1977, an agreement of water sharing was signed between the two countries for a period of 5 years. On the expiry of the 5-year agreement, an MOU was signed extending the period by 2 years which was renewed by another two years after an interregnum of a year. It is important to note that in the MOU the minimum guarantee clause which was there in the 5-year agreement was withdrawn as a result of which the quantity of flow plummeted down drastically the next year. There was no water-sharing arrangement between the two governments after 1988 till 1996 when a 30-year water-sharing treaty was initialed by the Prime Ministers of the two governments. The moot question now is whether the agreement made between the two governments have worked in their letter and spirit and what have been the hydromorphological effects of these signed documents?

To be more precise,

- (a) Whether the quantity of water that has to flow downstream of Farakka point and should enter Bangladesh has actually taken place? And,
- (b) Whether there has been any morphological changes downstream due to water diversion upstream from its natural course?

Adverse Effect on water Availability

The direct effect of Farakka is reduction in the flow of the Ganges in Bangladesh during the dry season. Some statistics are in order here to bring home the point. The average minimum flow of the Ganges during the dry months for the forty-year-period before Farakka was commissioned was 69700 cusecs. In contrast, in 1976, that is the year the barrage started functioning, it came down to 24500 cusecs at one go. Between 1977 and 1988 the flow was regulated by agreements between the two countries. Later, between 1989 and 1992, the amount of water that had been released down Farakka by the Indian authorities varied between 14756 and 22259 cusecs only. In 1993, it even fell down to as low as 10000 cusecs, according to knowledgeable sources(Miah-2003). Much more vivid a picture of the lowering of dry season flows of the Ganges at Hardinge Bridge and at the Gorai off-take may be had from the two tables quoted below (GRRP-2000).

Table-1: Changes of dry season monthly mean flow in pre- and post-Farakka periods

Period	Mean Monthly Flow						
	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.
1938-74(Pre-Farakka)	7,091	4,180	3,090	2,667	2,287	2,031	2,178
1975-88(Post-Farakka, with treaty)	5,890 (-17)	2,963 (+29)	1,791 (-42)	1,385 (-48)	1,125 (-51)	1,163 (-42)	1,501 (-31)
1988-96(Post-Farakka, without treaty)	4,408 (-38)	2,268 (-46)	1,297 (-58)	768 (-71)	526 (-77)	542 (-73)	1,064 (-51)
1998 (Base year)	5,088 (-28)	5,443 (+30)	4,267 (+38)	2,078 (-22)	1,183 (-48)	1,421	2,380

Note: Changes of monthly mean flows compared to pre-Farakka are shown as a percentage (in parentheses)

Table-2: Changes of dry season monthly mean flow of the Gorai River in pre- and post-Farakka periods

Periods	Monthly mean flow [m ³ /s]						
	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.
1965-1974(Pre-Farakka)	913	490	314	232	170	149	215
1975-1988(Post-Farakka, with treaty)	683 (-25)	293 (-40)	143 (-54)	100 (-57)	69 (-59)	72 (-52)	141 (-34)

treaty)							
1988-1996(Post-Farakka, without treaty)	261 (-71)	68 (-86)	11 (-96)	0 (-100)	0 (-100)	0 (-100)	18 (-90)
1997-1998 (Base year)	245 (-73)	272 (-44)	57 (-82)	0 (-100)	0 (-100)	0 (-100)	

Note: Changes of monthly mean flows compared to pre-Farakka are shown as a percentage (in parenthesis)

Morphological Changes

To reply to the second question, it may be noted that the Mathabhanga and the Bhairab which provided dry season fresh water inflow earlier have long been plugged at their off- take points, perhaps due to unnatural decaying process of these channels.

For hundreds of years the Gorai has been the largest perennial distributary of the Ganges on its right bank in Bangladesh. The dry season flow of the Gorai quite naturally is dependent on such flows in the parent river, the Ganges. The dry season flow of the Ganges has decreased since the commissioning of the Farakka barrage. This has hastened the process of decline of the Gorai resulting from diversion of water by the Farakka barrage since 1975. And that, there has been no natural dry season flow in the Gorai since 1988 (GRRP-May 2000).

How Does the Water Sharing treaty Hold ?

Closely related to the above is whether the 30-year treaty of water-sharing holds in practice. A few facts need to be mentioned in this regard. The operation of the treaty started from January 1997. It so happened that at the very commencement of the treaty the quantity of water that was said to have been released at Farakka for inflow into Bangladesh did not arrive at the Hardinge Bridge where it was to be measured. In fact out of fifteen 10-day slots over which a certain quantity of water is to be released downstream of Farakka point did not tally with the amount said to have been released. After a lot of hullabaloo an investigation into the discrepancy was agreed upon between the two riparian countries. But no report has ever come out and nobody knows what the findings of the committee are. Nobody even knows whether at all the committee was set up and met.

There are other ways by which Bangladesh has been denied its apportioned share of water as stipulated in the treaty. One unsolved issue is the sharp difference as to whether India is obliged as per certain provisions of the Treaty to maintain a pre-Farakka 40-year average flow or not. And Bangladesh suffers a lot (Miah-2003)

Adverse Effect on Navigation

We may now see how lesser or no-flow from upstream has affected navigation in the SW. This region of Bangladesh is strewn with a fairly large number of rivers, big and small. Majority of them were perennial ones, even a few decades ago in spite of a declining trend

that has been observed since long, perhaps, due to the tendency of the Ganges to move farther and farther to the E.

BIWTA sources suggest that whatever might be the factors contributing to the decline of the distributaries of the Ganges taking off from its right bank and those that branch out from them, the fate of these water lines have been finally sealed by the diversion of water at Farakka, as a result of which Gorai and other branches of the Ganges-Padma do not have any fresh water flow resulting in their being cut off from the main channel. Consequently, many of the navigable routes have either become dry or allow only small country boats to ply. The following rivers in the region have in fact become unfit for navigation and the process of decay started since the Farakka barrage was built (BIWTA- verbal communication by Director, Hydrography Division).

Table-3: Navigability loss due to Farakka Barrage

SL No	Name of river	From	To	Distance Km	Water Depth During Dry Season
1	Padma	Godagari	Aricha	209	1.75m
2	Padma	Aricha	Chandpur	130	2.50m
3	Garai	Talbaria	Kamarkhali	70	Dead & Dry
4	Madhumati	Kamarkhali	Hularhat	160	Dead & Dry
5	Atharabanki	Manikdaha	Rajapur	40	Dead & Dry
6	Kaliganga	Kushtia	Sailkupa	40	Dead & Dry
7	Kumar	Sailkupa	Alamdanga	65	Dead & Dry
8	Nabaganga	Jhenidha	Bardia	100	Dead & Dry
9	Mathabanga	Gangni	Jhenidha	70	Dead & Dry
10	Old Kumar	Ambikapul	Char Magura	100	Dead & Dry
11	Kumar	Ambikapul	Manikdaha	105	Dead & Dry
12	Chitra	Narail	Gazirhat	28	Dead & Dry
13	Arialkhan	Chowdhurihat	Saheberhat	95	1.5m & 1.0m
14	Bhairab	Khulna	Noapara	35	1.75m

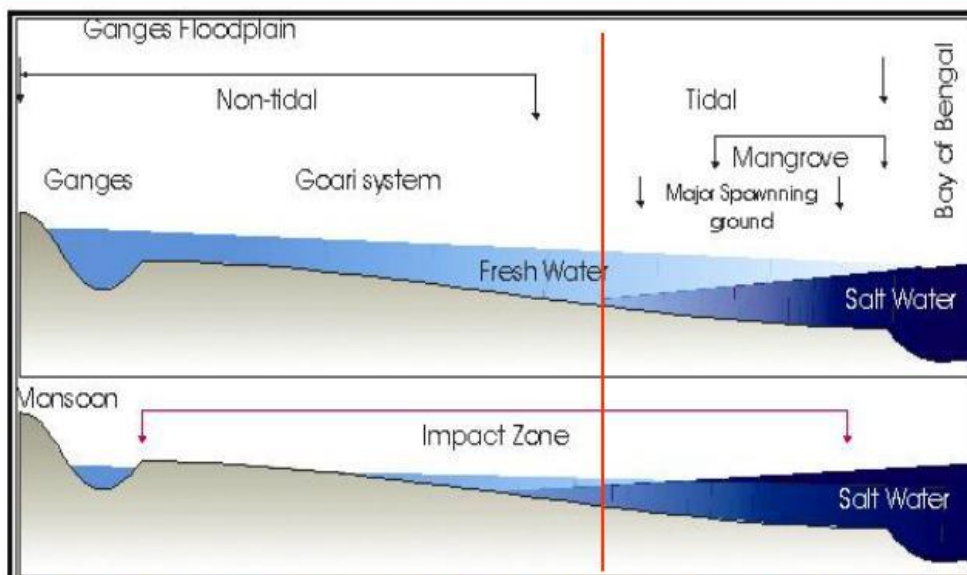
15	Bhairab	Noapara	Raita	295	Dead & Dry
16	Atai	Khulna	Narail	25	1.0m
17	Bil Route	Sindiaghat	Gopalganj	45	1.0m
18	Arialkhan	Sindiaghat	Jajira	35	1.0m
19	Kobadak	Taherpur	Paikgacha	70	Dead & Dry
20	Bhadra	Monirampur	Chalna	32	Dead & Dry

Courtesy: BIWTA

Salinity Intrusion:

As the Gorai mouth has been plugged by sedimentation, there is no flow any longer down the river. Naturally many of the channels connected to it earlier become dry during the dry period and have very little water, if at all, during the rains. Quite naturally salinity intrusion far into the land from the sea front is normal. That there is a clear and direct relationship between Gorai flow and salinity ingress has been noted in the GRRP report of 2001. For example maximum salinity at khulna was less than 1 ppt in the mid 1960s, but reached 18 ppt in 1995. At Baradia an inland place the maximum and minimum were 1 ppt until 1980 but in 1995 reached 7 ppt. Many such examples have been given in the report all pointing to one fact that closure of the Gorai mouth has been the obvious cause of increase of salinity anywhere in the region over a span of some 3 decades or so (Illustration Below). Fig-1:

Effect of reduction in upstream fresh water flow on overall ecosystem



Salinity in the river water, ground water and in the soil has increased significantly due to withdrawal at Farakka

Biodiversity loss:

The area used to have a rich biodiversity. The plants and trees included bamboo clumps, *Areca*, *Moringa*, *Mangifera*, *Anona* etc (GRRP-2001).

A wide variety of animals like leopards, wild hogs, foxes, hares, porcupine, wild cats, snakes, and birds like Siberian geese, wild ducks also used to find the region an easy home for them. But the unfriendly changes in the ecology due to low flow in the Gorai is threatening various species among them. Some have already become extinct, gharial (*Gavialis gangeticus*) for example (Sarker, et al, 2003) while others are gradually disappearing.

Low flow in the Gorai has affected the mango and jack fruit production due to dropping of flowers and that coconut, betel nut, citrus fruits etc are dropped at the immature stage (GRRP-2001).

Floodplain and wetlands in the Gorai river basin extends over 1036620 ha. The entire area used to be a rich fish producing area. Now that water from upstream has substantially decreased, river connectivity of some of the smaller branches has been lost. This has seriously affected the fish spawning and growth. The blockage of the Gorai has reduced several species like *baila* (GRRP). Some of the varieties like *tapashi* and *poa* which used to be abundant even a few years ago have moved to deeper areas to the South (GRRP-2000). Some species like the *hilsa*, a highly-prized one, *air*, *boal*, *chital*, no longer find a suitable environment for their breeding and naturally are dwindling in type and quantity.

Biodiversity of the Sundarbans:

The southernmost part of the SW Bangladesh is covered by a mangrove forest, the largest in the world of such vegetation, occupying an area of some 577000 hectares, of which 401600 ha is land and the rest 175600 ha is water (IUCN, 1994). The rivers, canals and creeks and the vegetation in which roam tigers, deer, and other large animals, the various kinds of birds and a wide variety of other living beings provide an idyllic scene never to forget. Rich in biotic diversity the forest supports 330 species of plants, 400 species of fishes, 35 species of reptiles, over 270 species of birds and 42 species of mammals (IUCN-1994). So wide a variety of plants and animals are supported by the Sundarbans that they account for about 28% of the reptiles, 36% of the birds and 33% of all mammals in the country. The economic value of the forest produce is very significant. It produces timber, fuel wood, pulpwood, thatching materials, honey, bees-wax, fish, crustaceans and molluscs. In the late 70s it could provide employment for 500000-600000 (ESCAP-1988) people for half the year. However, gradual decline of fresh water flow and consequent rise of salinity and its ingress farther inland have all combined to adversely affect such a rich area of biodiversity. The forest cover is on the wane, the fishes and crustaceans are gradually declining both in stock and variety and the birds and terrestrial animals are facing death or decay.

However, it is the lushness of the forest that is being lost gradually due to lack of fresh water supply during the dry period. The following table will show how drastically the flow of the Gorai was decreasing soon after Farakka became operational.

Table-4

Date	Discharge (cfs)
3.4.85	1691
1.8.86	388
1.8.86	255
3.4.87	378
18.4.88	22

Courtesy: Bangladesh Water Development Board

Thus, during the dry season the electrical conductivity increased upto 2500 micromohs/cm in the Rupsa River at Khulna, whereas during the Monsoon it ranges between 250-350 micromohs/cm (Nazrul Islam-1985). We may note that the Sundarbans is famous for its mangrove but also grows some oligohaline variety favoured earlier by fresh water flow from the Ganges through the Gorai.

Among the vegetation *Heritiera fomes* used to be considered the most important variety growing both in obligohaline and Mesohaline zones imparting a unique beauty everywhere. *Nypa fruticans* and *Barringtonia racemosa*, both grow in association with *Heritiera fomes*. UNESCO has designated the Sundarbans as the world heritage site. Unfortunately, due to low water flow consequent upon the operation of Farakka the vegetation is under a severe threat of being obliterated (Nazrul Islam & Miah-1988).

Some of the mangrove species particularly *Heritiera fomes*, *Nypa fruticans* and *Barringtonia racemosa* have been facing insurmountable difficulties to grow and form consociations and are disappearing from the oligohaline zone as because they need sufficient amount of fresh water (Nazrul Islam & Miah-1988).

The report of the GRRP has compiled, from data earlier collected by the forest department, changes between 1985 and 1995 of floristic composition of the Sundarbans and has come out with the conclusion that there has been a remarkable change of species annually depending on varying degree of fresh water flow and salinity.

Heritiera fomes which used to be dominant earlier is no longer so, and is regarded as threatened, albeit, not endangered as yet. There has also been a decline in the many fresh water loving plants such as *Nypa fruticans* (IUCN-1994).

Cultivators' Distress:

The average per capita availability of foodgrains (mainly rice) in Bangladesh has been stagnant over the years from 1980/81 to 1994/95 (Table 1). Of this broadly 10% or less had been from imports while the rest had been domestically produced. Statistics show that between 1985/85 and 2005/06, the total food grain production (rice and wheat) has increased from 16.1 to 26.5 mn mt i.e., by 65% or so. The rate of growth had been 2.9% per annum. However, during the later 11 years of the period there has been a dramatic rise in the rate of growth from 2.1% to 3.7% per annum . Thus, much of the growth had taken place during more recent years.

Table 5: Per Capita Availability of and Import Dependence on Food grain in Bangladesh (5 year average)

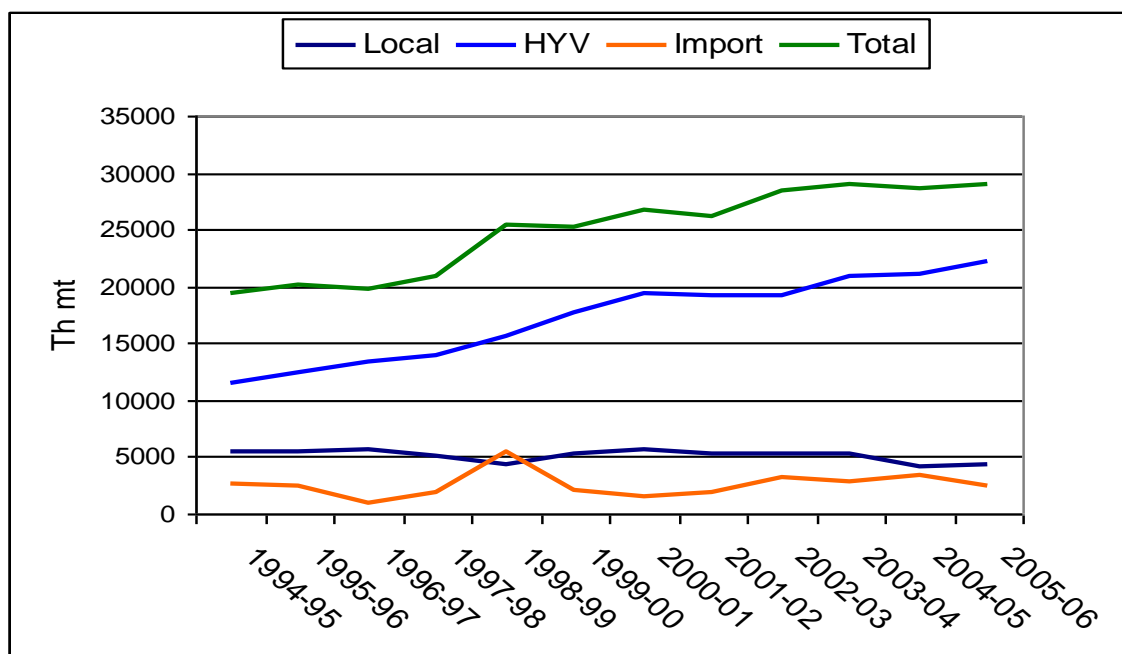
Period	Availability (kg/yr)	Percent imported
1980/81-1984/85	164	11.3
1985/86-1989/90	162	11.2
1990/91-1994/95	163	8.4
1995/96-1999/00	173	11.9
2000/01- 2004/05	198	9.5

Source: Shahabuddin (2006).

There are several factors which have helped the growth of foodgrain production. One major factor has been the introduction and continued expansion of the area under the high-yielding varieties (HYV). Fig. 1 below shows the trend in the total availability in relation to domestic output obtained from HYVs and local varieties. It is clear that while the growth of HYVs has somewhat slowed down in recent years, yet, it has the major share in total output.

Boro or the dry period rice which is grown under irrigated condition accounts for roughly 53% of total present production of the grain. Practically all of boro rice is of HYV variety. HYV aman rice which is the other major HYV rice also needs supplementary irrigation. One can thus say that irrigation has become the lifeblood, so to say of agriculture and food security in Bangladesh. One needs to examine the issue of availability of water, among others, from this perspective.

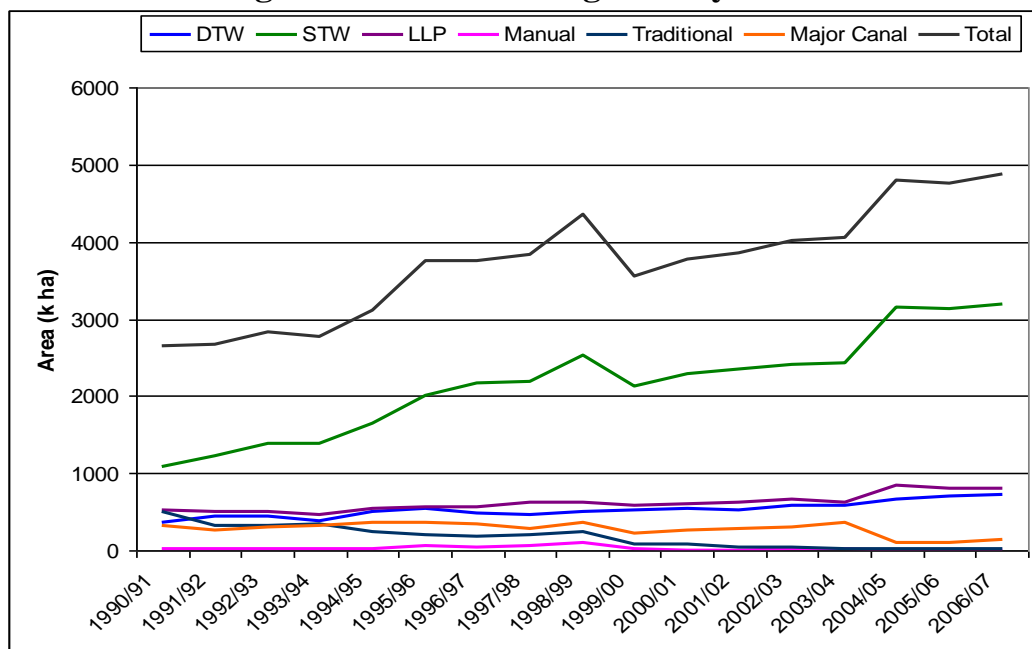
Fig. 1: Availability of Rice from Domestic Production and Imports



Since 1990/91, the area under irrigation has increased from 2.5 mn ha to nearly 5mn ha in the country (Fig. 2). Practically the whole growth had been due to irrigation under shallow Tubewells. It may be noted that such a changeover from canal irrigation to STW is due to non-availability of canal water in turn due to practically no- flow of fresh water in the SW region. The decline in more recent years had been particularly rapid.

What do these trends indicate? First, whatever may have happened, these trends did not stop the continued rise in production of food grains under irrigated condition. But, it may have had its cost. Canal water substituted by shallow or deep Tubewells certainly raised cost of production due to use of diesel or electricity for running them. On the other hand, as water flow in the Ganges falls, this also leads to lowering of the water table during the dry period. As the water table falls, the capacity of the Tubewells to lift water also falls. This also raises cost of production. An approximate idea of such rising cost may also be had from the average output in terms of area under each shallow tubewell by region/division in the country.

Fig. 2: Area under Irrigation by Mode



The most Ganges dependent division is Khulna because only the Gorai river an off-shoot of the Ganges runs through it while water abstraction may lead to rise in salinity level in ground water precluding maximum use of the shallow Tubewells. In any case, the most recent data from the Department of Agricultural Extension show that Khulna division has the lowest area coverage under each shallow tubewell. For diesel driven shallow Tubewells it is only 1.96 ha while the highest is 5.56 ha in Sylhet, the most rain-drenched area in the country. Similarly for electrically driven shallow Tubewells, the figure for Khulna is only 3.06 ha while the highest is for Barisal, 9.87 ha. Very similar is the case with deep Tubewells for which the figures for Khulna are 17.84 (diesel) and 20.67 (electric) per ha which are the lowest in the country. The highest are 34 (Sylhet) for diesel and 50 ha (Barisal) for electric deep Tubewells. While there may be various kinds of reason for such poor performance in the Khulna region, almost certainly a major cause is the fall in the water table or the rise in salinity level both of which may be caused by lower flow levels in the Ganges.

Thus while the teeming millions of Bangladesh with the highest density of population anywhere in the world is gasping for breath for mere survival diversion of water upstream of major river is another name of causing a death blow to them.

India Plans More Diversion

The havoc that has been created and brought to the environment, to ecology and to the economy, in particular, with consequent adverse repercussion on the life and living of the people of a poor country Bangladesh has only partly been outlined above. Even then anyone with a discerning mind can gauge the extent of incalculable damage that the Farakka Barrage has caused. But the misery of the people of a lower riparian does not stop there. A few more words on similar events to come in future.

Bangladesh is surrounded on three sides- the West, the North and the East- by Indian territory wherefrom the major rivers and some of their distributaries and tributaries come and enter Bangladesh. India has already raised some structures, like barrages or regulators to block free passage of water downstream. Such water control works have been built on the Mahananda at Banglabandh on the Teesta at Gazaldoba, on the Manu at Nalkata, on the Khowai at Chakmaghal, on the Gumti at Maharani, and on the Dakatia at Kalsi. All these are common rivers on or near the border between the two countries.

The list also includes another dam, the Tipaimukh dam in the NE of India, close to Bangladesh border. The dam will have a reservoir volume of 15.5 BCM, a huge quantity indeed.

Not only that. India is also going ahead with the realization of a project of an Interbasin Link Project. The project envisages diversion of 200 to 250 BCM of water from the Brahmaputra, Teesta, Ganges and other eastern rivers flowing down from the N to the western and southern regions of the country. Water will be diverted from all the major tributaries of the Ganges e.g. Sarada, Kosi, Mechi, Gandaki, Karnali, Ghagra all originating in Nepal to the western part of the country.

Water will also be diverted from the main courses of Brahmaputra and the Ganges and their tributaries to take them to the South of India.

Concluding Remarks: what choice for a Lower Riparian country

We have briefly recounted, within the space available, the tragedy that has befallen us in Bangladesh due to the unilateral action of water diversion of the upper riparian country. In the first place it has brought in an ecological disaster with a large number of our rivers having been reduced to mere depression or at best closed water bodies during the rains with puddles of muddy water. Even in the once-famous Ganges River itself at least two navigation routes have been closed as has been listed above. Salinity intrusion has reached inland turning vast tracts of land into infertile wastes.

Hundreds of thousands of our boatmen, fishermen, wood-cutters, honey-gatherers and people of similar professions have lost their jobs.

What is more, in the NE of India some 72 dams are proposed to be built. On the otherhand there are a number of international laws, conventions and general principles which guide the use of water by each country of an international river. Access to safe drinking water is a basic human right. Then environmental sustainability to protect the water resources base and associated ecosystems has been reflected in the MDG-goal. Basin approach to water

development has been emphasized in the Dublic statement (1992). Agenda 21 of chapter 18 of Rio conference (1992) on environment and Development emphasized the need for IWRM, a principle which is being pursued all over the world through the GWP. Lastly, both India and Bangladesh are signatories to the convention on Biological diversity (1992) and World Heritage Convention (1972). Incidentally, Sundarbans has been declared by the UNESCO as a World Heritage. Normally one would expect that the two neighbours would have complete harmony in their mutual relationship. Unfortunately the two countries' opinions and points of view in regard to water issues differ widely. For example, over the past 50 years since the Pakistan period our position has been to look at the water problem on a regional basis. But the other side has always been pursuing the matter bi-laterally. And the problem lingers and get complicated

What course is left to us then?

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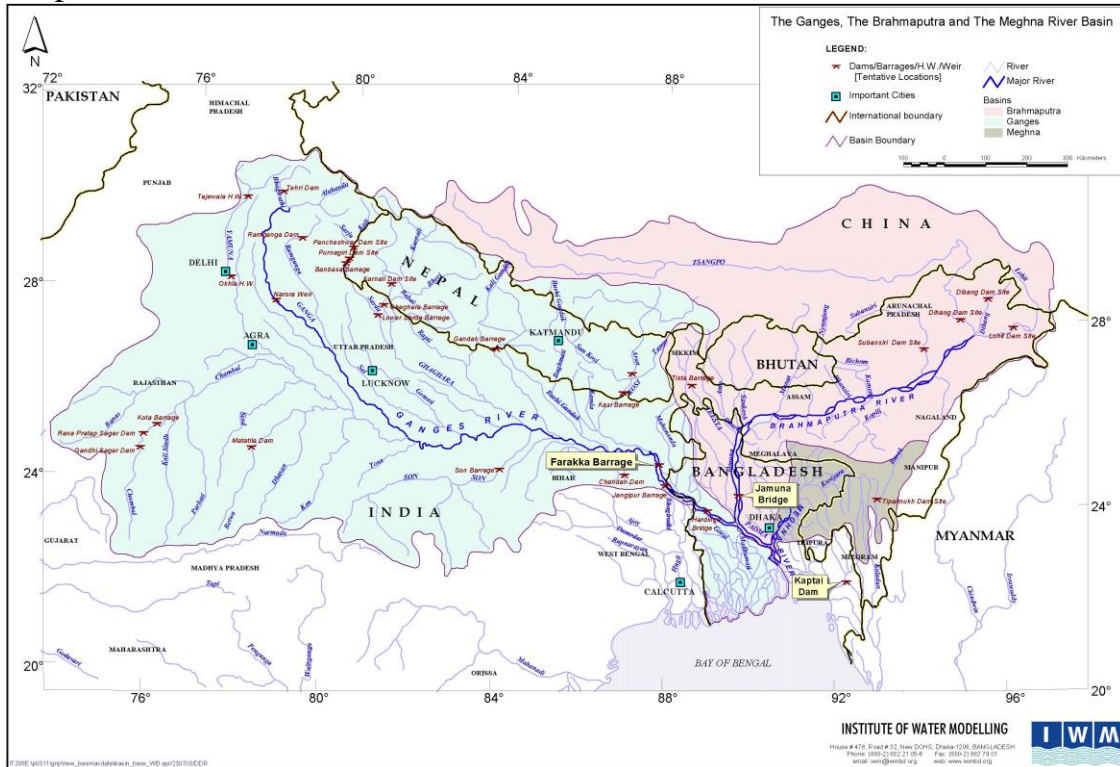
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Abbreviations:

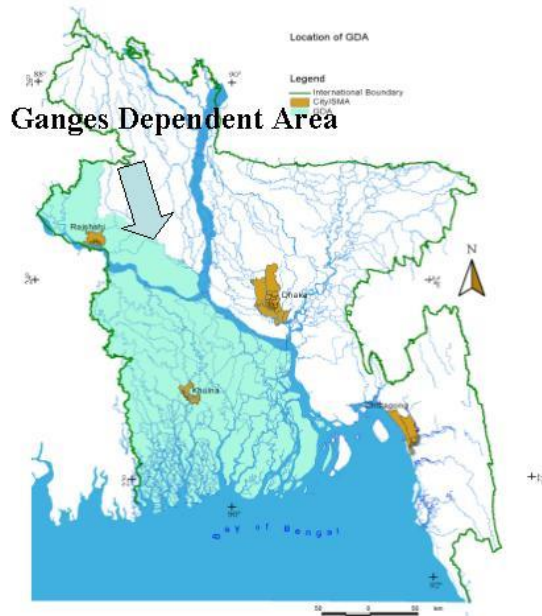
BIWTA- Bangladesh Inland Water Transport Authority

GRRP- Gorai River Restoration Project

Map-1:GBM Basin



Map-2: GDA



Map 3: Border/Common Rivers

