



The Impact of Tista Barrage on Socio-Economic and Environmental Conditions of its Basin Area

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Abstract

Bangladesh is a land of rivers. Tista is one of them that flows through India and Bangladesh. The most spectacular changes were the eastward diversion of the Tista River and ensuring development of new channel of the Jamuna which occurred in 1787 with an exceptionally high flood in the Tista. The flow of the Tista reaches the highest during summer. When the monsoon rains heaviest and glaciers supply abundant melt water, its lower reaches are marked by flooding and violent change of course. The construction of Tista Barrage helps to provide irrigation for the plains between the upper Padma and Jamuna which became the lifeline of its basin area of Bangladesh. It is thus important to observe the impact of the dam on Socio-Economic and Environmental condition of its surroundings.

In this paper, the study on the Impact of the Tista Barrage on Socio-Economic and Environmental condition of the basin area in Bangladesh part has conducted using Remote Sensing Technology undertaken by Bangladesh Space Research and Remote Sensing Organization (SPARRSO) .

1. Introduction:

The Tista River is a tributary of the Jamuna River flowing through India and Bangladesh. It rises near Himalayas adjacent to Chunthang in Sikkim. It flows to the south, cutting a deep George through the Siwalik Hills east of Darjiling and turns southeast to run through the Sivok Khola and to pass into the plains of West Bengal. Originally, the river ran southward directly into the upper the Padma river (Ganges river). Constant changes of the river's course constitute a significant factor in the hydrology of the meandering Brahmaputra: The most spectacular of these changes were the eastward diversion of the Tista river and the ensuring development of new channel of the Jamuna which occurred in 1787 with an exceptionally high flood in the Tista.. The water of the Tista suddenly diverted eastward crossing the greater Rangpur region of Bangladesh to join the Jamuna River near Chilmari after flowing total course of about 320 km. The flow of the Tista is the greatest during the summer (June to September). When the monsoon rains are heaviest and glaciers supply abundant melt water, its lower reaches are marked by flooding and frequent and violent change of course. Navigation is impaired by shoals and quicksand near the junction with the Jamuna. The Tista Barrage is a dam that helps to provide irrigation for the plains between the upper Padma and the Jamuna. After the construction of the Tista Barrage, the river Tista became the lifeline of its basin area in Bangladesh part.

2. Objective of the study

The broad objective of the study is to see the impact of the Tista barrage, to find out changes in this region after commissioning the barrage on the socio-economic and environmental point of view and to assess the improvement of the environmental condition after the commission of the Tista Barrage.



3. Methodology

The study area was identified as Nilphamari district, right bank of Tista and beneficiary area of the barrage and Lalmonirhat district left bank of Tista and non-beneficiary area of the barrage. The study includes:

- Primary & Secondary sources and field observation & survey method. Primary sources includes interpersonal interview and interactions with Tista Barrage officials, local beneficiaries and non-beneficiaries public representatives, local Upazila Administrations . Secondary source includes:
- Available data and document collected from Bangladesh Water Development Board (BWDB), Upazila Offices and other non-governmental sources.
- Field investigation along the canal system of the barrage in Nilphamari district, Main Tista river along the upstream and down stream of the barrage, Lalmonirhat district, flood affected and eroded area of Tista river. Participatory observation and survey method were used to gather more relevant data.
- This report was divided in two parts: First part contains information regarding Tista barrage and socio-economic and environmental condition within the commanding areas and outside the commanding areas of the barrage. Second part contains findings derived from the above study.

4. Information about Tista Barrage

Background Information

Tista basin is a drought prone area. Rainfall is minimum in comparison with other parts of the country. Day temperature is very high and night temperature is low. Difference between maximum and minimum temperature is also high. Water scarcity is a common phenomenon. Scarcity of irrigated water made crop damage almost in every year . Drought occurrence is erratic. It occurs not only in the dry season, but in post rainy season, even in the rainy season also. Availability of surface and ground water is very much limited. Except Tista River, the flow of water in other river in this area is very much limited. Therefore, the necessity of utilization of water from Tista River by constructing barrage was felt in the British regime.

The river Tista was very much unstable in nature from its origin to the present time. During last few decades, Tista changed its course several times which makes life of the people of the Tista basin measurable due to loss of their life, home and health and all sorts of assets. To get quick benefit, the project was divided into two phases: first phases and second phase.

First Phase: The Total area under the 1st phase is 1,54,250 hector and irrigated area is 1,11,406 hector in 12 upazilas, which are Dimla, Jaldhaka, Kishoreganj, Niphamari sadar, Saidpur, Rangpur sadar, Taraganj, Badarganj, Gongachora, Parbitipur, Chirirbondor, and Khansama. First phase includes barrage, flood control embankment, flood by pass, silt trap, main canal and part of canal system including the development of existing drainage system. First phase ended in June 1998, which costs Tk. 962.52 crore.

Second Phase: After successful completion of the 1st phase and getting success in irrigation, the 2nd phase of the project are planned to give irrigation facilities in 4,48,774 hector area of Rangpur, Gaibandha, Bogra, and Joypurhat districts of northern area. Total estimated cost of this phase is Tk.1,16,666.54 lacs. This phase is divided into three units. First unit including a budget of Tk. 227.21 crore are implementing to give irrigation facilities to 96,575 hector land.



Table-1: Main parts of Tista Project

Sl. No.	Work detail	Whole Project	Completed in 1 st Phase	2 nd Phase- Unit 1 (Implementing)
1	Benefited Area	7,50,000 Hec	1,26,300 Hec.	1,34,000 Hec
2	Irrigated Area	5,54,000 Hec	91,226 Hec	96575 Hec
3	Tista Barrage	615 meter length, 44 gate	615 meter length, 44 gate	
4	Canal Head Regulator	110 meter length, 8 gate	110 meter length, 8 gate	
5	Total water supply capacity in main canal	383 cusec	383 cusec	
6	Silt Trap	One (45 Hec)	One (45 Hec)	
7	Closer Dam	2470 meter	2470 meter	
8	Flood by pass	610 meter	610 meter	
9	Flood Control embankment	80 Km	80 Km	
10	Main Canal	33.67 Km	33.67 Km	
11	Major Secondary Canal (Dinajpur, Rangpur, Bogra)	275 Km	92 Km	63 Km
12	Secondary canal	757.67 Km	211.70 Km	95.97 Km
13	Tertiary canal	1286. 68 Km	387.65 Km	131.03 Km
14	Drainage canal	1030 Km	380 Km	60 Km
15	Irrigation system infrastructure	----	1110	Large Bridge 49, culvert 198
16	Drainage Infrastructure	310	120	28
17	Field Turn out	8372	2000	399
18	Inspection Road	30.67 Km	20.67 Km	10 Km
19	Project Road	74 Km	74 Km	
20	Land acquired	8960 Hec	3500 Hec	400 Hec

Source: Bangladesh Water Development Board (BWDB), Northern region, Rangpur.

5. Pre Tista Barrage socio-economic and environmental condition

More than 57 percentage of the population in this area were classified as poor. Poverty was the pressing socio-economic issue in that area. The lands were sandy and water holding capacity was very low. Cultivation was very much difficult due to lack of irrigation. Farmers were not able to cultivate most of their lands. They could cultivate one crop in a year and the production was very low, i.e. 4-6 maunds /bigha.

Sustainable economic growth is desired for our country. But it was quite negative in that area. Most of the people passed their days in starvation. Day labourers could not get their work, rate of



unemployment increased day by day. People went different place in search of work. Literacy rate was very low. In a short, socio-economic condition was not good at all.

6. Post Tista Barrage socio-economic and environmental condition:

6.1 Within command area :

After commissioning the barrage, the people within the command areas are deriving benefit in the following pattern:

Agriculture is the thrust sector of the Tista barrage project. To give irrigation facilities in dry season and post rainy season, approximately 4500 km canals were made as main, secondary and tertiary canals. With these canals, it was possible to give irrigation facilities to 1.11 lacs hector of land covering 1.54 hector land at the end of the 1st phase of the project. This irrigation system gives facilities to the agri-based people to cultivate their whole cultivable land and thus the overall crop yield increased to 2/3 times than earlier. Irrigation facilities also changed the crop pattern in this northern part.

Women are about half of our total population. Without the participation of women, our economy couldn't raise. The village women of command area engaged themselves with crop collection, crop processing and in some case rearing of poultry. Through this work, the poor, landless, widows and helpless woman got work and contributed to help rural economy and improved social infrastructure namely constructing better houses etc..

The literacy rate improved with the rapid improvement of socio-economic condition. Thus rural socio-economic condition of the Tista barrage commanding area helped to grow stronger day by day which ultimately contributed to our national economy.

6.2 Outside command area :

The people who are living outside but adjacent to the command areas learnt the technology how to lift water from under ground water using shallow machines. Some farmers were encouraged to cultivate their land using these techniques. Other than these farmers, most of the people remained in the same position as like as pre Tista Barrage. They did not get any facilities applicable for the people who are living within the command areas. Therefore, the socio-economic and the environmental condition these areas were not changed. Moreover they have been suffering a lot due to the riverbank erosion and flooding problems which have been increased alarmingly.

7. Findings:

7.1 Within the Command area :

Advantages: From the above mentioned information it has been found that the socio-economic and environmental conditions of the area have been substantially improved. Living of standard was changed in a positive direction. Literacy rate was also improved. Most of the people who did not get their essential food and cloth during pre- Tista Barrage, now they are getting enough food and cloth. Due to the increase of soil moisture, vegetation coverage has also increased.

Disadvantages: Al most every people were benefited more or less through the barrage. Unfortunately, a few people didn't get benefit and they suffer a lot. Those people who lost their land or houses by the acquisition of the barrage authority, they didn't get the actual price of the land or houses with in proper



time. Moreover, they had to spend a portion of their money in processing of drawing the money of the acquisition land.

The people who were the owner of the low land near main canal suffer much because of standing water. The water could not be discharged instantly due to the lack of proper drainage system. Earlier the fishermen were habituated to fishing in the open water bodies. After commissioning of the barrage, the number of open water bodies area were decreased and the traditional fishermen become unemployed and are now more marginalized.

7.2 Outside the command area:

Advantage: The people who lived outside of the barrage area did get some benefit indirectly. They learnt from their adjacent neighbors, how to use low-lift –pumps for the irrigation purposes.

Disadvantages: On the other hand the Tista Barrage caused a lot of sufferings to the people who are living out of the Tista Barrage. The barrage authority had done river treatment works on the upper stream of the barrage. They didn't undertake any river treatment works in the down stream. Without bank protection, the left side of the river Tista eroded very frequently. Flood by pass situated in the left side of the river. Moreover, when the flood by pass open automatically, the excess water passed away and huge amount of water hit the left side of the river. This water washed away houses, land, tree, cattle etc. of the left side. Flood also occurs frequently in this side. Although, the Tista Barrage situated in the Hatibandha Upazila of Lalminirhat district, the people of this area did get no benefit. Moreover the people of the left side suffer very much from flood, river bank erosion and land slide etc.

The number and area of char with in the bed of the Tista increasing day by day after the commissioning of the barrage.

8. Conclusion:

The present study has clearly identified the prior and post socioeconomic and environmental condition prevailed within and out side the project area. Geographically the area is highly vulnerable to the drought. In the pre Barrage period, the land was sandy. Soil moisture was low. Water retention capacity of the soil was very poor. Vegetation coverage was also very low. The fertility of the soil was also low. Larger portion of the land was not cultivated. Most of the land was mono cropped. Rate of yield/acres was also low. This scenario was changed substantially within the project are after the commissioning of the project. Their socio-economic and environmental condition has been noticeably improved. But outside of the project area, this scenario was not changed, even in some cases, it was degraded alarmingly. The impact of the Tista Barrage to the left side of the Tista River (Hatibandha Upazila and others) appears as curse. Because, aftermath of Tista barrage, thousands of people became landless and homeless by the erosion and flooding problems. In the dry season, river flow is reduced. The reduced flow allows sediment to be deposited on the river beds downstream of the barrage, resulting in decrease water carrying capacity during the rainy season. This reduction in carrying capacity due to river bed aggradations has increased the frequency of severe flood, causing enormous property damage and loss of life.

9. Recommendations:

On the basis of the study findings the following issues can be recommended:

- Since the out come of Tista Barrage has obviously improved the socio-economic and environmental condition of the command areas. Based on this fact it is recommended that, concerned authorities may take necessary steps to implement this type of project in small or large scale in other parts of the country.



- There is a huge potentiality of practicing the fish culture in the command areas. Necessary steps may be taken regarding this matter.
- Proper rehabilitation may be made to effected people who loss their land due to acquisition of their land.
- Necessary arrangement or appropriate measures may be made to discharge stagnant water from low land area with in the command area of the project.
- The people of the Lalmonirhat district may be included within the command area of the project. Water may be supplied to them by low lift pump (LLP) system.
- Embankment and groyne may be made to the left bank of the river in the down stream to make river bank stable in this part.
- This study has carried out based on the public of different category and the project related personnel's participation. Further study may be made using multi dated remote sensing and statistical data of pre and post Tista Barrage period to get the more scientific picture on the impact of the Tista Barrage to the socio-economic and environmental condition.



Control Tower



Main Barrage



Silt rap



Cross Dam



Discussion with Ex-MP



Interview with Teacher



Interview with beneficiary