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HISTORICAL REVIEW OF FLOOD CONTROL IN ASSAM

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Abstract

Assam is one of the most flood affected states of India. Every year devastating flood causes great loss to life and property in Assam. It is believed to be the measure cause of poverty and backwardness of the state. The task of flood control thus took the centre stage in Assam's political sphere, beginning from the colonial time itself, it continued after independence also. Various committees and commissions are formed time to time to suggest the flood control measures and to form a roadmap in this regard. This article explains how far the recommendation of these committees and various government policies are successful in controlling floods in a historical perspective. Further, it also suggests how future planning in this regard can be done by learning from past experiences. It also throws light on the different projects undertaken at several places to control flood and erosion. This article relies on the primary data collected from Archives as well as all the secondary sources are also consulted.

Keywords: Assam, Flood, Committees, Government policies, Projects.

I. Introduction:

Assam is a north-eastern state of India, alongside Brahmaputra and Barak river valley. The state is bounded on the north by Bhutan and Arunachal Pradesh, on the east by Nagaland and Manipur, on the

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south by Meghalaya, Tripura, Mizoram and Bangladesh and on the west by West Bengal via Siliguri corridor which connects it with the rest of India. The total geographical area of the state is 78,438km²(as per 1991 Census). Assam experiences heavy rainfall and high humidity. About 80% rainfall is concentrated during 4 monsoon months beginning with June. During these months, Assam experiences frequent floods every year. Floods in Assam causes soil erosion, loss of life and property, destruction of infrastructure and agricultural productivity. Roughly around 31.5 lakh hectares of land is prone to floods in Assam. Flood damage became more serious after the great earthquake of 1950 in Assam. Prior to that the problem of flood received little attention in Assam. The earthquake led to the increase in the riverbed of the Brahmaputra and since then recurring flood each year became a common feature in the state.

The total damage to crops, public utilities in Assam due to floods have been increasing over the period, from Rs 15.8 crore during 1970-79 to Rs 175.3 crore during 1980-89.² Every year repeated floods in Assam led to the diversion of funds from developmental activities to relief and rehabilitation works. The total amount of such diversion is Rs 500crores (per year) approximately.³ Thus to control flood various committees are formed by the government to develop a comprehensive state policy for flood control and suggest remedial measures.

The basic purpose of this work is to give an historical overview of flood control works done till now. The present article throws light on various suggestions and recommendations suggested by various committees from colonial times till recently. The present work also shows how far various government policies with regard to flood control are successful in dealing with flood. Further, it also suggests some remedial measure for future flood management works. The projects undertaken to control floods and its related expenditure are also discussed in detail.

II. Colonial Period (1900-1947):

During the colonial times the problem of flood control received little attention up to the first half of twentieth century in Assam. Even collection of data regarding river levels, flood discharges, silt charges etc were not undertaken except for a few river gauges maintained along the Brahmaputra, Barak and a few other rivers.⁴ Probably because of inadequacy of funds and the general conditions prevailing then, floods and resultant damages and problem were accepted both as inevitable and not an evil. In those days the population was less, larger areas were lying under grass and forests and cultivation was limited to

² (Goyari, 2005)

³ (Goyari, 2005)

⁴ (*Report of the Embankment and Drainage Projects Reviewing Committee Assam*, 1960, p. 10)

comparatively higher land free from recurring floods. Accordingly, the intensity of damage to cultivation and property was also less.⁵

But after the floods of 1929 and 1934, several investigations were carried out to look into the causes of flood and the possible remedies. One such survey was by G. Retd Shaw at the direction of the provincial government. Shaw noted that that the inundated areas were those which were recently brought under Jute cultivation and settlement by Jute peasants. Basically these were low lying areas earlier left fallow by the people.⁶ Thus, the problem of flood was created only after the low lying areas were brought under cultivation. Before, that flood was considered as a natural phenomenon and not a problem.

Following an unprecedented flood in the Barak valley in 1929, a flood inquiry Committee was also set up to inquire “how far railway embankments and public roads built over embankments have aggravated the effects of the floods in two valleys and what remedies could be suggested to minimize the effects. This committee recommended –

1. The formation of a waterways Division to study and deal with the subject.
2. Fixation of afflux gauges along certain section of the Railways.
3. Fixing gauges in certain rivers for recording of water levels.⁷

Until, 1940 there was practically no mentionable activity in the state with regard to collection of data or carrying out of other flood protective measures.⁸ But, in 1941 Assam government passed the Assam Embankment and Drainage Act. It was passed for the purpose of careful assessment before building the embankments. This was also the time when large scale settlements in low lying areas were taking place because of expansion in Jute cultivation.⁹

Due to gradually increasing public demand for flood protection and irrigation schemes all over the state, Embankment and drainage (E.&D.) Division was created in July 1940 to collect necessary data regarding the assessment of damage and undertaking small E.&D. schemes in different areas. However, funds available for E.&D. works were very meager, a limited number of small works were undertaken by this Division in different areas of the state up to 1946-47.¹⁰

⁵ (*Report of the Embankment and Drainage Projects Reviewing Committee Assam*, 1960, pp. 10–11)

⁶ (Saikia, 2019, p. 419)

⁷ (*Report of the Embankment and Drainage Projects Reviewing Committee Assam*, 1960, p. 18)

⁸ (*Report of the Embankment and Drainage Projects Reviewing Committee Assam*, 1960, p. 11)

⁹ (Saikia, 2019, p. 420)

¹⁰ (*Report of the Embankment and Drainage Projects Reviewing Committee Assam*, 1960, p. 13)

Again following a high flood in the Kopilli basin in 1946, Central Water and Power Commission (C.W.& P.C.) was asked for advice on the flood problem of the state. Their recommendation was strongly against construction of embankments and included-

1. Provision of adequate openings in the Railway and road Embankments.
2. Improvement of spill and drainage channels.
3. Construction of flood moderating reservoirs.
4. Stopping of Jhum cultivation in the hills.
5. Contour survey of the valley and systematic collection of hydraulic data.¹¹

Thus, it is to be noted that the problem of flood was very minimal, and government was little concerned about the flood control works. Whatever little flood problem was there was because of reclamation of low lying areas because of jute cultivation.

III. Post Colonial Period (1947-1990)

The problem of flood aggravated after independence, particularly after the great earthquake of August 1950. It happened due to change in the river regimes because of excessive pouring of debris in the river by the landslides caused by earthquake in the hills. This led to rise in the riverbed and decreased water holding capacity of Brahmaputra and its tributaries. The government appointed a committee under the chairmanship of G.R. Garg, to study the situation and suggest remedial measures. The committee recommended providing new channels for small silted up rivers. They also recommended collection of data and the construction of stone revetment for protection of Dibrugarh town. They advised against the construction of embankments, along north bank tributary of Brahmaputra.¹²

In 1951-52, the First Five Year Plan was launched. Total of 87 small Embankments, drainage and irrigation programme were included in the first five year plan at a total cost of 197 lakhs.¹³ Later in 1953, 80 more schemes for permanent improvement of scarcity areas and for irrigation schemes were included under the first five year plan. Up to the end of the first five year plan, the following works on flood control, Drainage and Irrigation were carried out in the state beginning from 1947-48.

- a) Embankments along the Brahmaputra – 290 miles
- b) Embankments along tributaries of the Brahmaputra – 856 miles
- c) Embankments along the Barak – 25 miles

¹¹ (*Report of the Embankment and Drainage Projects Reviewing Committee Assam*, 1960, pp. 12–13)

¹² (*Report of the Embankment and Drainage Projects Reviewing Committee Assam*, 1960, p. 14)

¹³ (*Report of the Embankment and Drainage Projects Reviewing Committee Assam*, 1960, p. 15)

- d) Embankments along tributaries of the Barak – 32 miles
- e) Drainage channels along the Brahmaputra valley – 139 miles
- f) Drainage channels along the Barak valley – 42 miles¹⁴

In the year 1952, there was again abnormal flood in the State and great damage occurred. At the request of the State Government, the Government of India appointed a committee under the chairmanship of Shri H.V.R. Ienger to examine the problems of flood. The Ienger committee laid emphasis on the necessity of comprehensive collection of data for flood control schemes. The problem of protection of Dibrugarh town was also examined by the committee, and it made recommendation for central assistance in carrying out the protection measures there. According to the recommendation made by the Ienger committee one C.W. & P.C. division was started in Assam in 1953 to collect river data which was expanded into a full Investigation circle.

In the year 1954, unprecedented and devastating flood hit the state of Assam. More than half of the valley's jute crop was damaged. The only railway connection with other parts of India was snapped.¹⁵The government of India took comprehensive measures to control these recurring floods and to provide early protection against them to the extent possible. In September, 1954, The Union Minister for Irrigation & Power, Gulzarilal Nanda made a policy statement in the Lok Sabha and declared that all emergent flood control schemes were to be tackled on war footing. The government of India brought National Flood policy after the flood in 1954. In implementation of this policy, a Central flood control board was set up, along with state flood control boards. Technical advisory committees were constituted to assist the state flood control boards. A number of River Commissions were also set up to co-ordinate and give technical advice on problems of inter-state rivers. The C.W.&P.C was strengthened by the addition of a flood wing to co-ordinate all flood control works and assist in drawing up an integrated plan.¹⁶

After 1954 floods in Assam, The ministry of Irrigation and power drew up an outline programme of flood control works which was divided into three phases:-

- i. **Immediate:** - This was to cover Investigation and preparation of plans and estimates. It also involves investigation and collection of rainfall and hydrological data of the eastern Himalayan region. Small embankments were also to be constructed in selected localities.
- ii. **Short term:** - During this phase embankments and channel improvement would be undertaken. This type of protection would apply to a major portion of the areas subject to floods.

¹⁴ (*Report of the Embankment and Drainage Projects Reviewing Committee Assam*, 1960, p. 18)

¹⁵ (Saikia, 2019, p. 424)

¹⁶ (*Report of the Embankment and Drainage Projects Reviewing Committee Assam*, 1960, p. 16; Saikia, 2019, p. 426)

iii. **Long term:** - This phase would cover construction of storage reservoirs on rivers and tributaries which would, in general, be taken up along with Irrigation & power projects for the multi-purpose development of the basin.¹⁷

The flood control proposals for the Second five year Plan (1956-1961) comprised of various programme with an estimated budget of 720 lakhs.

- a) Investigation & Survey- Rs 57.0 lakhs
- b) Construction of embankments-521 miles- Rs 579.8 lakhs
- c) Raising and strengthening of previously constructed embankments on Brahmaputra and Barak tributaries- 217 miles- Rs 94.0 lakhs
- d) Construction of drainage channels- 50 miles- Rs 49.3 lakhs
- e) Town protection schemes- Rs 77.0 lakhs
- f) Miscellaneous- Rs 3.0 lakhs¹⁸

In April 1957, the government of India appointed a High Level Committee on Floods with the following terms of reference:-

- a) To analyze the factors responsible for heavy floods in the Ganga and Brahmaputra basins in the recent years and to recommend, after an examination of the hydrological and other relevant data available, the lines on which the flood problems in the various areas should be tackled.
- b) To review the measures already taken and to suggest the ways how flood protection works will be carried out in future along with the collection of data.
- c) To report on the circumstances in which embankments can be considered as a suitable method of flood protection

This committee submitted its report in December 1957. In general, the committee recommended that embankments are a satisfactory means of flood protection when properly designed, and adequately maintained in locations where construction of embankment is technically indicated along with other flood control measures such as storage dams, detention basins, etc.”¹⁹

In the context of growing concern about embankments, the Assam government constituted an Embankment and Drainage Projects reviewing committee (Bhagawati committee) in 1957. Senior

¹⁷ (*Report of the Embankment and Drainage Projects Reviewing Committee Assam*, 1960, p. 16; Saikia, 2019, p. 426)

¹⁸ (*Report of the Embankment and Drainage Projects Reviewing Committee Assam*, 1960, pp. 19–20)

¹⁹ (*Report of the Embankment and Drainage Projects Reviewing Committee Assam*, 1960, pp. 21–22; Saikia, 2019, p. 439)

Congress politician, Bijay Kumar Bhagawati was the chairman of committee with several technocrats as member. The committee was given following task-

- a) To review the impact of embankment and drainage projects executed in Assam on the economy of the State, basically on the agriculture and fisheries.
- b) To assess the difficulties created by the embankments and drainage projects with regard to exclusion of flood irrigation and change of crop pattern
- c) To study and recommend safeguards and other technical considerations to remove the disadvantages so far experienced.²⁰

The committee travelled widely in Assam, met officials and common people and finally submitted its report in 1960.²¹ In its report Bhagawati committee recommended:

- a) Carry out regular sample surveys of the economic condition of the people of the different parts of the state annually to assess the impact of the embankment and drainage projects.
- b) Preparation of a comprehensive plan for flood control and provision of adequate number of sluices in the future embankments.²²

In 1967, Pagladiya inquiry committee was constituted in Assam to look into the problems related to multipurpose river project in Pagladiya River at Thalkuchi in the Nalbari district of lower Assam (India).²³ Apart from that, the commission also suggested several measures for flood control in Assam. Main suggestions of the commission were-

- a) Raising and strengthening of existing embankments
- b) Provision of flood escapes at suitable locations.
- c) Adequate waterways for roads and bridges.
- d) Investigation of detention dams in the upper reaches of the Pagladiya.²⁴

Apart from embankments dredging of Brahmaputra was also suggested as a possible flood control measure by different expert committees. In the year 1972 the Central Water Commission provided two cutter suction dredgers. The dredgers were named as Kopili and Disang. At first dredging was carried out at Simina, located downstream at Palasbari during 1974-75. The next phase of dredging was Alikash near Chayagaon in 1975-76. The third place was the Tuni River at Kamalabari of Majuli during 1977-78. Experts opined that dredging will solve flood and erosion problem of Assam. But the government

²⁰ (*Report of the Embankment and Drainage Projects Reviewing Committee Assam*, 1960, pp. 2-3)

²¹ (Saikia, 2019, p. 442)

²² (Goyari, 2005)

²³ (Goyari, 2005; Ranjan Dutta, 2003)

²⁴ (Goyari, 2005)

suspended the dredging operation in 1979-80 because it didn't solve the problem as Brahmaputra got silted up very quickly.²⁵

In 1975, the prime minister of India, Indira Gandhi, had declared a political emergency in India. During this period, the government machinery functioned under highly techno-bureaucratic regime. Several flood in the Brahmaputra and Barak valley in 1976 led the government to take steps to secure from floods. Government established Rashtriya Barh Ayog (National commission on Floods) in 1976, to overcome floods and for overall agrarian prosperity. The task before the commission was to evolve a national plan to control floods. After four years of elaborate discussion and study, the commission submitted its two volume report in 1980.²⁶Main takeaways of the commission were-

- a) It largely agreed that embankments stop the much needed distribution of silts, enhance velocity of flood flows, congestion in drainage and cannot prevent erosion.
- b) It finalised the proposals regarding Dehing and Subansiri dam projects in the Brahmaputra valley and Tipaimukh on the Barak for the purpose of flood control and power generation.
- c) It helped the government in finalising the location and spacing of embankments to minimise the danger of erosion.²⁷

Finally, In 1982, Brahmaputra Board was set up under the Ministry of Irrigation by the Government of India by the act of Parliament called 'The Brahmaputra Board Act, 1980 for planning and implementation of flood control measures. The jurisdiction of the board covers entire Brahmaputra and Barak valley, spreading in all the states of the North Eastern Region including Sikkim.²⁸Main functions of the board was-

- a) Preparing master plan for planning and implementation of measures for the management of floods and bank erosion in the Brahmaputra valley.
- b) Suggesting Management of major tributaries in Brahmaputra and Barak valley.

Brahmaputra board also submitted feasibility reports on Dehing and Subansiri dam projects.²⁹

Several surveys were carried out throughout the twentieth century to Study Rivers's behavior and suggest possible remedies. Broadly these surveys are carried in three phases, colonial period(1902-52), post colonial period(1954-78) and (1980-2000).The first phase was mainly limited to the collection of hydrological data and construction of embankments to protect low lying areas from inundation. It was

²⁵ (Sarma, 2021, p. 271)

²⁶ (Saikia, 2019, pp. 445-446)

²⁷ (Goyari, 2005)

²⁸ (Brahmaputra board)

²⁹ (Goyari, 2005)

during the second phase, dredging of river and construction of reservoirs along with embankments were also suggested as possible protection against floods. During the third phase, storage reservoirs came to be seen as the best possible alternative to control floods.³⁰

The different projects undertaken as suggested by various expert committees and their related expenditure are indicated in Table 1.

Table 1: Achievements under various Flood control Programmes in Assam

Projects	Unit	Up to the end of Eighth five year plan	1997-98	1998-99	1999-2000	Total
Embankments	Km	4448	2.5	2	1.8	4454.3
Town protection works	Nos.	629	14	10	4	657
Drainage channels	Km	850.69	Nil	Nil	Nil	850.69
Major sluices	Nos.	85	Nil	Nil	Nil	85
Benefited area	Lakh ha	16.147	0.003	0.003	0.006	16.159

Source: Flood control Department, Assam, reproduced in Economic Survey, Assam, 2000-2001

Thus from time to time various committees formed by government suggested several remedies for flood control and various projects were also taken up. But, these measures are only partially successful in dealing with the floods.

IV. Way Forward:

Its high time to learn from our past experiences while dealing with floods. The future flood planning must incorporate the good suggestions of expert committees and avoid the mistakes done in the past. According to Bhagawati committee future flood control works, priority must be assigned as follows: -

- a) Completion of any incomplete works.
- b) Strengthening weak embankments
- c) Stabilizing conditions where embankments are already constructed, providing sluice openings, improvement of drainage, and elimination of pockets.³¹

³⁰ (Saikia, 2019, p. 439)

³¹ (Report of the Embankment and Drainage Projects Reviewing Committee Assam, 1960, p. 83)

Most flood control measures undertaken so far have been of short term nature, concerted policy decisions on long term measures, both on the part of State and Central governments, and cooperation by neighboring countries are needed to solve flood problems permanently.³²

Zonal planning based on watershed management can solve flood problem up to an extent. Structural measures such as dams, embankments, dykes can be used as combination. Alternative adjustment to flood loss is flood insurance, change in existing crop calendar and cropping pattern, strengthening of flood forecasting and warning system through application of satellite remote sensing are essential for meeting the challenges caused by floods. Floodplain zoning can be used as an effective tool for management of flood affected areas. Moreover, the Brahmaputra being an international river, there should be adequate regional and international cooperation in tackling flood hazard and management of its water resources.³³

The government will do well to adopt a comprehensive State-level policy for flood and river erosion management with adequate provisions for guidelines for construction and maintenance of flood mitigation structures as well as nonstructural measures. To resolve the conflict, the government must recognize the community's demand for a right to participate in the decision making process of flood mitigation.³⁴

Lastly, the government and technocrats should accept flood as a natural phenomenon, and not seeing it as a disaster always. They should not always try to find technological solutions to flood problem. Instead of this encouraging people to accept flood as a normal thing and to generate suitable conditions to live with floods can go to a long way in dealing with floods.

V. Conclusion:

In sum, by the middle of the Twentieth century, the river technocrats began to argue about the need for flood control and constructing embankments as a remedy against recurrent floods in Assam. It was believed in techno-bureaucratic circle that floods could be controlled by erecting embankments which would help prevent water from spilling over to the fields. This would in turn protect both crops and human lives. Embankments would help to stabilize courses and regulate a regime of controlled water flow in river channels.³⁵ The introduction of cash crops in the flooded areas of the valley had firmly connected Assam's agrarian economy to the international economy. The late colonial government introduced flood

³² (Goyari, 2005)

³³ (Sarma, 2021, pp. 271–272)

³⁴ (Joy et al., 2018, p. 162)

³⁵ (Saikia, 2015)

control measures to protect these cash crops. Their flood protection policy, despite providing occasional relief to crops and human lives, ultimately led only to an intensified flooding. Flood protection invited more settlement in the low lying areas, and as flooding intensified, these areas witnessed serious damage to life, property, and crops.³⁶

As discussed above, though various expert committees are constituted time to time to deal with flood problem, inefficiency of the flood management approach, misappropriation of funds, mistiming of resource allocation, and frequent failure of flood mitigation structures, led to conflicts between people and government, and ultimately led to the failure in flood management. Institutions created for flood management, both at the Central and State levels, do not show the adequate commitment, efficiency, transparency, accountability, flexibility, innovation and vision needed for effectively managing these water induced hazards. There is poor implementation of the existing policies at the State and district levels. Also in many cases, policies are inadequate or nonexistent when it comes to ensuring good governance of flood management, to make it transparent, participatory, equitable, technically efficient and socially just.³⁷ Thus, till these issues are not resolved, flood control measures will remain insufficient to deal with the flood problem.

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³⁶ (Saikia, 2015)

³⁷ (Joy et al., 2018, p. 161)

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