CHAPTER-II

PLACES OF FLOODING: A PROFILE OF THE BRAHMAPUTRA AND THE SURMA- BARAK RIVER BASINS WITH AN OUTLINE OF FLOODS AND FLOOD MITIGATION IN PRE-COLONIAL TIMES

The colonial province of Assam lied on the north-eastern border of Bengal and was one of the frontier provinces of the British Indian Empire. It was situated between 22° 19' and 28° 16' north latitude and 89°42' and 97°12' east longitude. It was bounded on the north by the eastern section of the Great Himalayan Range, on the north-east by the Mishmi Hills, on the east by the mountains, which were inhabited by the Khamptis, Singphos and various Naga tribes and by the Burmese frontier where it marched with that of the state of Manipur; on the south by the Chin Hills, the Chittagong Hill Tracts and the state of Hill Tipperah and on the west by the Bengal districts of Tipperah, Mymensingh and Rangpur, the state of Cooch Behar and the Jalpaiguri district. The total area of the province, including the native state of Manipur (8,456 square miles) was 61,471 square miles.¹

The Brahmaputra and the Surma-Barak Valleys constituted the two main plains division of the province. The former included the districts of Goalpara, Kamrup, Nowgong, Darrang, Sibsagar and Lakhimpur and the latter Sylhet and Cachar. The present chapter is divided into two broad sections, one dealing with the geo-hydrology of these two important river basins of Colonial Assam and the second examines the nature of flooding and flood mitigation in pre-colonial times. In the first section, contemporary geographical writings were juxtaposed with that of colonial sources to highlight the changing nature of river basins in colonial times. Whereas in the second section,

¹ Report of the Administration of Assam for the year 1911-12, Part-II (Report), p.1
emphasis is on how the pre-colonial states in Assam as well as people in general, negotiated floods before the intrusion of the British. Similarities as well as differences between the valleys will be brought into focus. Secondary sources are chiefly used by us to reconstruct the history of floods and flood mitigation in pre-colonial times to contextualize the changes that had happened once the British started interfering in the riverine landscape of Assam in the early 20th century.

Section-I: Geo-hydrology of the Brahmaputra and the Surma-Barak River Basins

The Brahmaputra Valley: The Brahmaputra (meaning son of Lord Brahma, a God of Hindu pantheon) river is one of the biggest rivers of the world. It rises just south of the Lake Konggyu Tisho in Tibet, very near the Manasarover Lake at an elevation of 5150 metres. The Mariam la pass separates the catchment of Brahmaputra and the Manasarover Lake from which Indus and Sutlej originate. The river under its Tibetan name of Tsangpo flows through southern Tibet for about 1700 kilometres eastward and parallel to the main range of the Himalayas. In this reach, it receives the waters of important tributaries Raga Tsang po, Ngang chu, Kyi chu and Griyamda chu. Beyond Pe (3000 metres) the river abruptly turns to the north and flows in a succession of rapids between the high mountains of Gyala Pari and Namcha Barua (7756 metres) and turns to the south and south-west to emerge from the foothills of Arunachal Pradesh first under the name of Siang and then as the Dihang. Flowing southwards it enters the Assam Valley, west of Sadiya town where two important tributaries, the Debong and Luhit join the river. Thereafter it is known as the Brahmaputra.2

The mighty river then rolls down the Assam Valley from east to west for a distance of about 720 kilometres. The valley of the Brahmaputra, which is a narrow stretch of alluvial plain with an east-west extension, has an average width of about 80

kilometres.\textsuperscript{3} To the north of the valley is the main chain of the Eastern Himalayas, the lower ranges of which rise abruptly from the plains; to the south is the great elevated plateau or succession of plateaus known as the Assam Range, much broken at its eastern and western extremities and along its northern face, but in its central portion, from the eastern border of the Garo Hills to the watershed of the river Dhansiri, it is a region of table land and rolling uplands. The various portions of this range (from west to east) are called by the names of the tribes who inhabit them— the Garo, the Khasi, the Jaintia, the North Cachar and the Naga Hills. At several points on the southern side of the valley the hills of the Assam Range abut on the river and at Goalpara, Gauhati and Tezpur there are spurs belonging to this group on the north as well as on the south bank.\textsuperscript{4} The north bank plain is relatively wider being about 30 kilometres on the average in the lower Brahmaputra valley while it narrows down to an average of about 10 kilometres in the upper Brahmaputra valley.\textsuperscript{5} The broadest part of the valley is where the river divides the districts of Sibsagar and Lakhimpur in colonial times.\textsuperscript{6} The south bank plain, on the other hand, is narrower with an average of about 5 kilometres in the colonial districts of Kamrup and Goalpara due to the jutting out of the Garo Hills. The Khasi Hills also encroach upon the plains in the Nowgong district. The Brahmaputra river opens out in the great delta of Bengal at Dhubri after crossing the confluence of the Manas and the Jogighopa and Pagla Tek Rocks.\textsuperscript{7} Both the north and the south bank built up plains presently support high population concentration, fertile agricultural fields and networks of roads and railways.

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\textsuperscript{4} \textit{Report of the Administration of Assam}, \textit{op.cit.}, p.1
\textsuperscript{5} Abani K. Bhagabati, \textit{et al.}, \textit{op.cit.}, p.22
\textsuperscript{6} \textit{Report of the Administration of Assam}, \textit{op.cit.}, p.1
\textsuperscript{7} \textit{Ibid.}
\end{flushright}
Throughout its course, the Brahmaputra receives a vast number of affluents, great and small, from the hills to the north and south. The greater of the northern streams are snow fed while those from the south depend upon annual rains for their volume, and shrink to small dimensions in the dry season. On the north, the chief tributaries of the Brahmaputra are the Dhansiri, Debong, Subansiri, Bharali, Bornadi, Kameng, Manas, Jiadhal, Thimari, Pagladiya, Champamati, Saralbhanga and Sankosh. On the south, the greater affluents are the Noa Dihing, Burhi Dihing, Disang, Dikhow, Jhanji, Dhansiri (south), Kopili, Bhogdoi or Disai, and the Kulsi. The amount of precipitation is considerable here between June and September. It is more pronounced in the eastern districts than in the west and causes frequent overtopping of banks by these rivers when they fail to carry excess water leading to floods.

The tributaries of the Brahmaputra have widely divergent characteristics. The characteristics of the north bank tributaries are: first, they have very steep slopes and shallow braided channels; second, they have coarse sandy beds and carry heavy silt charge and finally, they bring flashy floods because of the short distances between their source in the hills and the confluence. On the other hand, the characteristics of the south bank tributaries are: first, they have comparatively flatter grades and deep channels right from the foot hills; secondly, the beds and banks are composed of more clayey component, hence more stable and lastly, they carry comparatively low silt discharge.

The Brahmaputra valley as a whole gently slopes from north-east to south-west with an average gradient of 13 centimetres per kilometre. In its upper reach, near Dibrugarh, the gradient is about 17 centimetres per kilometre while the same is about 10 centimetres per kilometre near Guwahati.

The Brahmaputra and most of its tributaries were navigable from a very early time. Communication in pre-colonial Assam almost exclusively depended on these rivers.

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8 Report of the Rashtriya Barh Ayog, op. cit, p.15

9 Abani K. Bhagabati, et al., op.cit, p.21
However, in the dry season extent of communication in the tributaries gets limited. Small dugout canoes become the only vehicle of river traffic during dry period. Foreign travelers to Assam also noticed such preponderance of small sized canoes in pre-colonial times.

Navigation of the Brahmaputra in the 19th century, even in the rains, was beset with hazards, uncertainty and dangers. Moreover, it was time consuming. This was because of crashing banks, floating trees and difficult tracking along the jungle covered banks. A moderate sized boat used to take, on an average, four to six weeks to come from Dhaka to Guwahati. The 450 miles distance between Goalpara and Sadiya, the two ends of the Brahmaputra valley, could be made, in the first half of the 19th century in 34 days by a bajra of Bengal. In the mid 19th century, ordinary time taken by a country boat of 1000 maunds from Calcutta to Dibrugarh was as great as that of a voyage round the Cape of Good Hope to London by a sailing vessel.10

The Brahmaputra river, except where the hills impinge upon it, basically flows between soft sandy banks which are subject to constant changes for a breadth of about six miles on either side of the stream. This type of land called chapari in the British records, lied in the immediate neighbourhood of the river. Within this belt there was historically neither cultivation nor any habitation of permanent nature due to heavy flooding during the rains. It was even in the beginning of the 19th century, covered with high grass jungle, which had to be cut down and burnt before it could be brought under cultivation. But, when floods did not rise soon, it yielded excellent crops of ahu (ashu, aus), or early rice. The seed was usually sown in March or April and reaped soon after the setting in of rains from June to August. Sometimes mustard was also grown in the chars or sandy bars in winter. The river Brahmaputra continuously shifts its course in this belt. One major historical impact of these constant shifts was the creation of Majuli Island in the first half

of the 18th century, which is presently the world’s largest river island. Earlier it was an integral part of the Sibsagar district. It may be noted that Majuli since the earthquake of 1950 is facing a severe threat of bank erosion. Behind the chapari came a belt of low-lying land, in which bao, a long stemmed variety of rice, was grown. It was usually sown in April and May and reaped in November or December. Ahu was sometimes mixed with bao, in the hope of getting a crop before the rise of river. Beyond it, existed the ‘rupit belt’, usually above the reach of ordinary floods, where sali or transplanted winter rice was chiefly grown. It was sown in nursery beds and the seedlings were transplanted in June or July, when they were about two months old, and the harvest was reaped between November and January. Most of the population concentration happened actually in this belt, which also included the most fertile agricultural fields. However, in the early part of the 20th century this concentration was not equally distributed. It was thicker in North Kamrup, Jorhat and Sibsagar than in other places. Beyond this populated belt came the submontane (Dooars) tract where the level of land was much higher and sometimes fields needed irrigation from hill streams. The chief crop was sali or a transplanted form of ahu known as kharma. This land was practically free from all risk of flood and artificial irrigation rendered the harvest practically sure. The chapari belt i.e. the region nearest to the river banks was historically avoided to build urban and rural settlements because of its fickle nature. If at all they were built, they were at those points where rocks gave permanency to the channels. These points were Dhubri, Goalpara, Gauhati, Tezpur, Silghat and Biswanath. Between Biswanath and Sadiya, where Brahmaputra emerged from the hills, a distance of about 200 miles, there was no town or large village on it, Golaghat being 20 miles, Jorhat 10, Sibsagar 8, and Dibrugarh 5, away from the cold weather channel.11 The description given above, although written only hundred years back, portrays a clear picture of how traditionally flood prone areas were avoided by the people for permanent habitation or agriculture purposes. It also shows that population pressure was not yet too acute in the Brahmaputra valley to force people to move towards the flood prone areas such as chars for building habitation sites. There was lot of

11 Report of the Administration of Assam, op.cit., pp.3-13
wastelands available for settlement and extension of agriculture in Assam in the beginning of the 20th century.

However, the situation was fast changing. A constant flow of immigrants started pouring into Assam from the neighbouring province of Bengal, particularly from the district of Mymensingh. Sir Edward Gait first noted it in his Census report of 1891. By 1911, this exodus became overwhelming as recorded in the Census of that year. The district of Goalpara was the first to attract these immigrants. Initially, they occupied char lands. The population of Goalpara, which had increased only by 1.4% during 1881-91 and 2% during the next decade, went up by 30% in 1901-1911. Nearly 20% of the population of Goalpara and 14% in Nowgong were settlers by 1921. The availability of wastelands, better agricultural opportunities and economic hardships at home districts forced the Muslims of Bengal to move into Assam in search of virgin lands where it was abundantly available. Gradually, during the 1920s and 1930s, immigrants penetrated other districts of the Brahmaputra valley. British officials of the province also welcomed them and hoped their industry and skill would be an object of lesson to the local Assamese cultivators. The site of ‘finely harrowed, weeded and newly sown’ char lands were expected to be something not less than any spectacle to an ordinary Assamese cultivator who had for ages hardly set his foot on such lands. It was only later inland migration occurred when riparian lands were exhausted.12

**The Surma-Barak Valley:**13 The Surma-Barak Valley during colonial period comprised the districts of Cachar and Sylhet. It was and is an alluvial tract dotted over


with small hills and marshy hollows called haors. The river Barak or Surma is the chief river, which after rising in the Barail Range enters the valley from Manipur at the extreme northeast corner and flows southwest into the Meghna. The Barak assumes different names before it meets Meghna. At Bhanga Bazar, beyond Badarpur junction it divides into two branches, the Surma flowing north and the Kushiara south. In the early 20th century, the Kushiara became the main stream instead of the Surma, which was considered to be gradually silting up. The Surma and the Kushiara reunite near Markali. In British times, the Surma/Barak was navigable by steamers as far as Silchar in the rains. In the cold weather, however, large vessels did not go beyond Chhatak on the Surma and Fenchuganj on the Kushiara. The lower part of the valley is extremely deltaic in character and many rivers split up and reunite, forming many channels. In the beginning of the 20th century, population was still sparse particularly in the Cachar district, which afforded people to migrate to neighbouring higher or less affected areas in times of heavy inundation.

All the plains portion of Sylhet and Cachar were formed by successive deposits of silt brought down by the Barak and its numerous tributaries like Longai, Manu, Khowai, Juri, Katakhal, Dhaleswari, Sonai, Jiri, Jatinga etc. from the surrounding hills. The presence of marshy hollows or haors has been an important feature of the landscape of the Valley. These depressions play a very important role in absorbing excess flood waters from the river Barak. Some of the important haors in the Surma-Barak Valley included Chatla and Bakri haors in Cachar District and Hakaluki haor in Sylhet district. During the rainy season, these haors give the appearance of a vast sheet of water like a sea. Infact the word haor is a derivative of the word ‘sagar’. The northern and western parts of the Sylhet district and the central portions of the Cachar district, particularly the areas in and around Bakri and Chatla haors have been more susceptible to floods as they are more low lying. In addition, the mean elevation above sea level of the Surma-Barak Valley is much lower than the Brahmaputra Valley. The cold weather zero of the Surma at Sylhet was only 22.7 feet above sea while that of the Brahmaputra at Gauhati was
148.36 feet at the start of the 20th century. As a result of which the river Surma was and is very sluggish and tortuous in its movements and leaves a rich deposit of silt in its banks thereby gradually raising the height of its banks. These raised banks are actually used for building habitation sites from a very ancient time and it still continues. The small hillocks or tilas, which are spread throughout the valley, acts as places of refuge in times of flood. The extremely flat character of the landscape makes it difficult for the flood waters to recede early and any artificial obstruction could only further worsen the situation. This is not to deny the fact that embankments were not built in Sylhet in pre-colonial times. Rather, embankments on the rivers such as Surma, Kushiara and Manu were very old investments and reinforced by successive generations of rulers in Sylhet region to prevent the land being washed away. But, these were not many in number. As the valley is covered from three sides by hill ranges, hill rivers when in spate bring down a lot of water which causes flood in the plains even if there is no rainfall there.

The nature of rainfall and physical feature of the Surma- Barak valley had determined the pattern of agricultural practices. The British records of early 20th century graphically describe these practices. For instance, unlike the Brahmaputra valley, the banks of rivers had always been the highest and the most fertile. Here, both sali and aus crops were grown, although the former was the staple crop. It was further reported that in the western portion of Sylhet which used to become one great swamp during the rains, only the cultivation of aman, a form of long stemmed rice, was done. It was sown broadcast from mid march to mid may. Another kind of rice called boro was usually grown in the haors. It was sown at the end of rains and harvested about May and gave an exceptionally large yield per acre.

14 Report of the Administration of Assam for the year 1911-12, op.cit. pp. 1-3

15 David Ludden, 'Investing in Nature around Sylhet: An Excursion into Geographical History', in EPW, November 29, 2003

16 Report of the Administration of Assam, op.cit., p.13
The hill ranges around the Surma-Barak valley had always experienced one of the heaviest rainfalls. For example at Cherrapunjee in the Khasi Hills, the average annual rainfall was 458 inches and consequently considered the wettest place on earth in the beginning of the last century. The rainfall in the Surma-Barak Valley was also no less, amounting to between 100 and 150 inches annually in Cachar and the southern part of Sylhet district and between 200 and 250 inches in northern Sylhet along the foot of Khasi Hills. Even today, there is hardly any change in the degree and intensity of rains in these areas. Owing to this heavy rainfall in and around the Valley, flooding is a common feature and the British also realized this fact quite early. These periodic floods usually left behind a layer of fertilizing silt considered beneficial to the agrarian regime of the region by the people despite the hardships they had to endure.

Prior to the British occupation, population of Cachar was extremely sparse. But, from the mid nineteenth century, a steady flow of immigrants from the neighbouring district of Sylhet as well as from other parts of India changed the demographic scenario of this district. From a mere 85,000 in 1855, it jumped to 2.3 million in 1981. The increase was caused by largescale migration over a century, first for tea cultivation and construction of rail and roads and later on as a result of the partition of the country. Obviously, such increase had to be accommodated in new rural and urban settlements. The flood plains became the site for this accommodation thereby increasing vulnerability of the people to floods.

17 F.O. Lechmere-Oertel, op.cit.

Section – II: Of Rivers, Floods and Flood Mitigation in Pre-Colonial Times

Jurg Helbling, an anthropologist at the University of Zurich had developed a simple model for a comparative study of disasters in pre modern societies, which allows a description of relationship between the most relevant variables in natural disaster analysis. It is a model that studies the 'relative weight of factors such as natural hazards, inefficient prevention and mitigation strategies by peasants and state failure, in causing a disaster...'

According to him, the two most important actor groups in pre modern societies were the peasants and the elites. About 80% to 90% population in pre industrial societies were peasants and the rest lived in cities relying on the food supplies from surrounding villages. Thus, the chief question, according to Helbling 'is to what extent and by what natural hazards were pre-industrial agricultural systems affected. Furthermore, to what extent did peasants developed preventive and coping strategies as well as whether and to what extent did the state intervene in the prevention and mitigation of natural disasters'

Similarly, for him, the role of elites in providing flood mitigation measures also needs adequate investigation. Many a times, it invested in transport, market and irrigation systems to enhance agricultural productivity and to increase the amount of surplus. The state as an instrument of elite domination, also maintained a system of granaries, invested in water works, organized resettlements and took other measures in order to prevent disasters or minimize its affects. The role of the pre modern state was also crucial in achieving costly public works such as dams or water reservoirs. In imperial China and in the Maya states, successful mitigation and prevention of natural crisis was often seen as a legitimation of elite domination. Moreover, in all ancient societies, the state i.e. the elites appropriated a part of the surplus of peasants as rent, tax or labour and therefore for its

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own prosperity and sustenance it would take steps to see that normal conditions resume after a natural disaster very quickly and peasants commence their work in the fields.

Consequently, any historical study of natural disasters, particularly, in the pre-modern societies, according to him, had to look into the complex interaction of three important stakeholders: the natural hazards and their impact, the peasants and their response and finally the role of the state apparatus and the elites in mitigating its impact. In dealing with floods and flood mitigation in pre-colonial Assam, this model of Helbling has been kept in mind.

The Brahmaputra and the Barak rivers were well known to the people of the sub-continent from a very early period. Both the rivers were considered holy and fabulous stories, myths and legends were attached to them to prove their holiness. Several places of pilgrimage had come up over the years right from ancient times near these rivers and their tributaries. Not only pilgrimage sites, but also administrative centres and villages were located near rivers. People practiced cultivation on lands near these rivers and took advantage of vast water resources of these river systems by building irrigation facilities etc. Conversely, periodic flooding destroyed agricultural fields and caused human and animal casualties. But again, flooding brought rich deposit of silt, which in the long run benefitted agriculture.

The Austro-Asiatics and the Bodos, earliest inhabitants of north-east India called river Brahmaputra by the name of Lao-Tu and Ti-Lao respectively. The name ‘Lauhiya’, which appears in ancient Aryan literature, appears to be a sanskritisation of the Austriec word, while the appellation ‘Brahmaputra’ was coined much later. In the Sabha Parva of Mahabharata, Bhima is said to have reached the Lauhiya region in course of his expedition to the east, where he compelled Mechha kings and subjects to pay taxes. Markendeya Purana refers ‘Lauhiya’ in the sense of a specific area. Ancient sources refer to Lauhiya and Pragjyotisha as two different but contiguous lands. Thus ‘Lauhiya’ has been used to mean both a river and a geographical area. In the Sabha Parva of Mahabharata, Lauhiya is mentioned alongside Karatoya and Atreyi. The Vayu Purana states that the river Lauhiya was a place of pilgrimage and for holding Shraddha
ceremony. The *Brahmanda Purana* informs that the river *Lauhitya* arose from the lake *Lohita*. There are other ancient sources, which also refer to ‘*Lauhitya*’. For instance, Kalidas’s *Raghuvarmsa* (4th century A.D.), Kalhana’s *Rajtarangini*, the Mandasor Stone-pillar Inscription of Yasodharman (6th century A.D.), the Apshad Stone Inscription of Adityasena (7th century A.D), the Paschimbhag Copper Plate grant of Sri Chandra (10th Century A.D.) and Tezpur Copper Plates and Paratya Plates of Vanamalavarmadeva (9th century A.D.). However, the name ‘*Brahmaputra*’ was first mentioned in a much later work, the *Kalika Purana*, which the scholars believe was written around 9th-10th centuries A.D. by an anonymous poet of this region. Some inscriptions of the period also bear the name ‘*Brahmaputra*’, for example, the Nagaon Copper Plate Inscription of Balavarman III (9th century A.D.), The Bargaon Copper Plate Inscription of Ratnapala (11th century A.D.), the Gauhati Grant of Ratnapala (11th Century A.D.) and the Guwakuchu Copper Plate Inscription of Indrapala (11th century A.D.), amongst others. The consistency of references to the Brahmaputra is suggestive of the manner in which the life of people in this region has been interlinked with the river. Before the arrival of the British, regions of the Assam Valley were described in terms of their relationship with the Brahmaputra. Thus the region on the north bank of the river is called ‘*uttarakula*’ and on the south bank ‘*Dakshinakula*’. The island of Majuli emerged during the Ahom period and became a separate regional entity in due course of time. Again, during the British period, the Assam Valley was divided into Upper Assam and Lower Assam. The former is also called ‘*ujani*’ Assam and the latter ‘*Namoni*’ Assam. Whereas, the Lower Assam could claim centre stage for pre- Ahom civilization, the Upper Assam became the locale of all activities of the Ahoms.20

No doubt most of the inhabited and cultivated areas in pre- Ahom Assam between 5th and 13th centuries, lay within the valley of river Brahmaputra and its tributaries. But, no concrete evidence of floods or flood control measures practiced

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during the period could be ascertained from the inscriptions of the period. According to Nayanjyot Lahiri, riverine character of the Assamese settlements during pre- Ahom days can be inferred from the most tangible expression of the spatial limit of villages and settlements in the riverine plain of the valley (rupit belt) in the descriptions of donated lands in the inscriptions of the said period. For instance, the Mayurasalmalagrahara, which was donated to a large number of Brahmins in the 7th century A.D, was marked off almost completely on all sides by the Kausika and the Gangini river beds. Harjaravarman’s Tezpur Rock Inscription of the early 9th century A.D mentions a village called Nakajosa, which was situated, on the northern bank of the Brahmaputra not far from Tezpur. Another 12th century settlement, Guhesvara-Digdola Vridhagrama, was surrounded by various streams or stretches of water (called jolis) such as Chamyala, Nekkadeuli, Singa and the Dijmakka and also by the Jaugalla and Bekkasuska rivers. Similarly, Panduri Bhumi, an 11th century settlement (identified with Rangia sub-division of Kamrup district), was marked off by the Kahavarijola, Sakhotakajola and the Srotasijola amongst other marine boundaries. There are more instances of settlements near rivers but suffice it to say here that they highlight the historical concentration of rural settlements around rivers and streams. Not just rural settlements but urban sites, including capitals of ancient dynasties, from where the kings donated such lands, were all near the rivers. Haruppesvara, the capital city of the Salasthambas (7th century A.D.) has been located by the historians on the site of the modern city of Tezpur on the north bank of Brahmaputra. Similarly, Pragjyotishpura, the capital of the Bhauma-Varman dynasty has been located in the modern city of Guwahati near Brahmaputra.21

There should not be any doubt that these habitation sites were periodically inundated by overflowing rivers on which they stood. Similarly, to think that the states in early Assam remained indifferent to such disasters would be a great mistake on our part. The early state as a surplus appropriating institution had too much at stake to not to effectively deal with floods. Sadly enough, our sources are too scanty to offer a detailed

21 Nayanjyot Lahiri, ibid, pp.89-95.
account of mitigation measures adopted by the early states. Early kings did undertake the building of embankments (Vrihadalis). For example, the Ulubari plates of Balavarman III (9th century A.D.) mention a high embankment constructed by the king. These Vrihadalis, according to Nayanjyot Lahiri, were a common feature of rural landscape and were built to neutralize the rivers when they were in spate. It is interesting to note that these alis or high embankments remained a consistent feature of the history of Assam and during Ahom period, several important and useful alis were constructed which exist even today, after going through several phases of renovation.\textsuperscript{22} The kings were, it seems, also involved in building irrigation networks. This is proved by the accounts of Hiuen- Tsang, a Chinese pilgrim of 7th century A.D to Assam, who stated that 'water led from river or from banked up lakes flowed round the towns.'\textsuperscript{23} Such large-scale irrigation works, for it involved digging earth 'all round the towns' obviously could not be taken up individually and reflected the importance of state in getting such works done.

Although, we know absolutely nothing about the way common people mitigated the extremes of flood situation, Nayanjyot Lahiri had opined that paddy fields were relatively closer to rivers whereas peasant's homestead was in all probability on a comparatively drier piece of land, a little away from the river.\textsuperscript{24} The regularity of flood experience might have taught the Assamese peasant to build their homesteads away from the rivers. The paddy fields in such case acted as buffers and provided ample time to the people to move to safer places with their valuables in times of flood. Lahiri does not cite any source for her supposition, but there are a number of colonial sources, which noted such pattern of Assamese settlement in the 19th century.

\textsuperscript{22} \textit{Ibid}


\textsuperscript{24} Nayanjyot Lahiri \textit{op.cit.}, pp.89-95.
Our information about floods and flood mitigation in pre-colonial Assam proper increases when the Ahoms arrive in upper Assam in the early 13th century. There are several references to devastating floods during the Ahom period. For example, during the time of Sukhampha (1552-1603), in 1570, there was a great flood, which destroyed the crops and caused something like a famine. Again, in 1642, we hear of a flood, which washed away and drowned many cattle. Several earthquakes also occurred in the same year. The Mughals who attacked the Ahoms in the 17th century also recorded their impressions about the moist and wet nature of the Ahom territory. Shihabuddin Talish, the news reporter, who accompanied Mir Jumla to Assam in 1662, informs us in his book *Fathiyyah-I- Ibriyyah* that incessant rainfall and resultant inundation caused great hardship to the Mughal army in its offensive against the Ahoms. He also says that it rains for eight months in Assam and even in the rest four rains are not uncommon. As a matter of fact, rains and floods were considered such a common occurrence that when in 1665 there was a famine situation due to drought, people were astonished and according to Gait, it was the ‘only occasion recorded in the whole course of Assam history when rains failed to an extent sufficient to cause a complete failure of the crops.’ The existential encounter of the people of Assam with floods resulted in people’s developing ways and means to not only mitigate floods but also to internalize floods into their social being comprising their culture, tradition and livelihood pattern. Prof. A.K. Das points out, “the floods which occurred regularly in suburban Dibrugarh due to the Brahmaputra were not considered a threat to local people. Traditional wisdom allowed people to predict their occurrence, magnitude and duration remarkably accurately. Sometimes certain natural signs were taken into consideration such as the movement of the ants, the appearance of certain plant species, the behavior of the gagini insect (a species of

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26 Ibid, p.116

27 Ibid, pp.132-134

28 Ibid, pp.144
locust), some actions of birds and animals etc. Well before the floods came, people were ready tackle them with age-old means. If necessary, they moved to an elevated place.  

This description may well be a too idyllic ecological situation to imagine. Nevertheless, the point to be made here is that although flooding was a problem, it never affected the people too adversely in pre-colonial times. W.W. Hunter, writing about the district of Kamrup in the 1880s highlighted the fact that floods were never of such serious nature as to affect the general prosperity of the district. He further stated that people usually kept a considerable portion of land in the vicinity of larger rivers untitled, owing to its liability to inundation.

When the Ahoms came and settled in the extreme eastern most part of the Brahmaputra Valley, they were not alone in these tracts. Rather, they had to fight for their survival against the Chutiyas on the northern bank of Brahmaputra, which was an agricultural community. Then, on south of the Brahmaputra, there were Moran and Borahi tribes living basically on shifting cultivation. South of them existed the powerful kingdom of the Bodo-Kachari tribe in the central part of the Valley and finally to their west there were a number of petty Hindu chiefs called together as Bara-Bhuiyans. In the western most part of the valley, which later became the British districts of Kamrup and Goalpara, the waning influence of Kamata, a successor state to the ancient Kamrupa empire still could be seen. By the early 16th century, the Koch tribe of neighbouring North Bengal built up their own kingdom on the ruins of Kamata. Their power started to decline from the second half of the 16th century with the onslaught of Mughals from the

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west and the Ahoms from the east, the latter eventually succeeding in unifying the whole Brahmaputra Valley under their suzerainty.\(^{31}\)

The migration of the Ahoms in the early 13\(^{th}\) century had a tremendous effect on the agrarian economy of the region. They were the champions of wet rice cultivation in Assam. Among the three varieties- *ahu*, *bao*, *sali* – grown in the Brahmaputra Valley, *sali* is the most productive and the Ahoms encouraged the extension of *sali* cultivation in upper Assam by various measures. The other tribes including the Bodo- Kacharis preferred the cultivation of *ahu* and *bao* varieties of rice, which required little or no irrigation or flood protection. The Kacharis however, practiced their peculiar form of irrigated rice cultivation in the sub- montane regions by damming a hill stream and then leading its water through various channels to the rice fields. But, still, they were more adept at *ahu* cultivation using hoe rather than plough. Moreover, *ahu* and *bao* are generally sown broadcast although instances of transplanted *ahu* are also available.\(^{32}\)

On the other hand, *sali* is grown in the rupit belt or in the low lying fertile lands dotted with elevated housing and garden sites. The need to safeguard those low-lying fields from annual inundations by building embankments was not unknown in pre- Ahom days, as has been mentioned already, but the ‘scale, extent, and the underlying purpose of such works under the Ahoms were certainly unprecedented’. They had built up over a period of few centuries an extensive network of embankments to cover almost all the rivers in upper Assam particularly in the Sibsagar district, which not only served as *bunds* but also as roads. This was done by peace- time utilization of the labour of ‘national militia’ (*pykes*) in embankment building.\(^{33}\) The mobilization of *pykes* was done with the help of the public works department called Sang-rung or Chang-rung which was placed under the Chief Engineer or Chang-rung Phukan. This department owed its origin

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\(^{31}\) Amalendu Guha, *op.cit.*, pp.61-81

\(^{32}\) *Ibid.*

\(^{33}\) *Ibid.*
to king Suhungmung (1497-1539) who was affectionately called Dihingia Raja because of his building an embankment on the Dihing river to prevent inundation when it was in flood.\(^4\) Most of the kings who followed him till the end of the 18\(^{th}\) century, built earthen embankments. During the reign of Susengpha or Pratap Simha, also called Burha Raja (1603-1641), many important embankments were constructed. Among them, the most important was the Bar Ali on the left side of the Dikhu river from Sibsagar to Dibrugarh. King Sutyinpha or Jayadhvaj Simha (1648-1663) constructed the Cheuni Ali from the present Golaghat district to Jhanjhi on the southern bank of Brahmaputra. The same king was also involved in the building of another bund from Jhanjhi to Gourisagar. Supatpha or Gadadhar Simha (1681-1696) had built the Dhodar Ali from Golaghat to Jaipur which was 105 miles long. The name of Sukhrunpha or Rudra Simha (1696-1714) was associated with the Kharikatiya Ali at Golaghat. Similarly, Swargadeo Rajeswar Simha or Surampha (1751-1769) constructed a very important embankment from Sibsagar to Dibrugarh known as Borborua Ali or the Old Trunk Road. Such examples can be multiplied and no less than 200 such alis were constructed during the Ahom rule.\(^5\) What is important to remember here that such intricate network of embankments built by the Ahoms to protect rice fields in upper Assam covering the river Brahmaputra in its south bank and its tributaries was in a way responsible to legitimize their rule. Not just fields, towns like Gargaon, Rangpur, Sibsagar were also well protected from floods by these bunds or Alis. The Ahom rulers also excavated rivers for the supply of water to towns. For instance, Suklingpha or Kamalesvar Simha (1795-1810) excavated the Bhogdoi river for supplying water to the Jorhat town.\(^6\) Other medieval sources such as Katha Guru


Charit also provide stray references to the construction of embankments by the Baro Bhuiyans.  

The western part of the Brahmaputra Valley however, lacked such network of embankments as it was outside the core of Ahom rule. According to Amalendu Guha there is also a perceptible decline in the importance given to sali crop in this part of the valley. He points out that as late as the beginning of the 20th century, the percentage of total rice lands under sali in the Sibsagar and Lakhimpur districts were the highest, being ninety-two and eighty-five percent respectively. The corresponding figures for Darrang was seventy-seven percent and in Nowgong and Kamrup only fifty percent. This lopsided pattern was obviously the reflection of historical evolution of rice cultivation in the Brahmaputra valley being directly related to flood management.

With regards to the Surma- Barak valley, our sources of information about floods and flood mitigation in pre-colonial times are extremely meagre. Panini, a sixth century B.C. grammarian mentioned in his famous Ashtadhyayi a janapada named Suramasa. It was the easternmost extreme of Aryavarta and had a monarchical form of government ruled by the Kshatriyas. Historian V.S. Agarwala had identified this place with the present Surma valley. The Varaha and the Vayu Puranas on the other hand, refer to a river called Barabakra, which has been identified with the present Barak river of Cachar region.

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37 Jahnabi Gogoi (Nath), op.cit., p.66

38 Amalendu Guha, op.cit, pp.71-72. Guha calculated these figures from An Account of the Province of Assam and Its Administration (reprint of Report for 1901-02), Shillong, 1903.


40 J.B. Bhattacharjee, Cachar under British Rule in North East India, New Delhi: Radiant Publishers, 1977, p.4
The Surma-Barak valley was largely a heavily forested, marshy and low-lying floodplain traversed by a number of rivers in pre-colonial times. However, the eastern part of the valley was comparatively higher than the western portion. The habitation sites in the valley were traditionally built at few elevated places, locally called tilas, to escape floods. Even, in the late 18th century, much of the higher land remained covered with jungle and unpopulated. Unlike the Brahmaputra valley, the river banks were generally used to build villages for they were higher than the surrounding flood plains. David Ludden reiterates the same when he says, ‘amidst massive annual flooding and highest rainfall in South Asia, lowland societies (of Sylhet), have navigated this overflowing geography at strategic elevated sites, where inundated fields meet habitable land hacked out forests, above the flood’\(^1\) Sylhet town’s raised site typifies this particular aspect of the pattern of habitation. The town was not only located at a height, it was also protected by embankments during the 18th century. These embankments, built before the coming of the British, particularly in the Surma, Kushiara and Manu rivers, however fell into disrepair in the initial years of British rule in Sylhet.\(^2\) Besides investing in embankments, artificial channels called khals were also built for communication as well as diverting excess waters from rivers. For instance, the Mouli Khal was built by one Mouli Abdur Rahim, which connected Surma with Kushiara. Then there was the Amiruddin Khal connecting river Barak with the Itakhala river. This khal was traditionally used as a shortcut to travel to Dhaka from Sylhet. Natural channels also existed in the valley such as the Nati Khal, which connected Kushiara with Longai at Karimganj. This Khal carried the excess water of Kushiara into Longai and vice versa thereby providing some protection to Karimganj town during the rains.\(^3\) It may be noted that haors or bils

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\(^2\) Ibid.

(hollows or depressions) also played historically a very significant role in absorbing flood waters from rivers in the Surma-Barak valley. Thus, Nature's topography was vital in the making of the civilization of Surma-Barak Valley.

There is no record of significant measures taken to control or moderate floods in Cachar in pre-British days. But tradition goes that land making or 'bonificazione' schemes, were taken up in the valley by the kings and even by peasant communities themselves called khels or khelma (a voluntary association for the holding of agricultural land collectively by a group of people) to utilize the silt carried by spills of flood water. The spill waters were carried through a variety of natural drainage or artificial channels off taking or taken out from the Barak and its tributaries across the bils and haors and finally out falling into rivers downstream through the link channels from the bils, relieving thereby vast areas in between from inundation during floods. Natural drainage channels were also improved for the purpose of water transport especially of extracted timber. The important spill or silt channels from the left bank of the Barak upstream of Silchar town were: (1) Rangirkhari off taking at Kanakpur and (2) Bualjur connected by a good number of spill channels from the left bank of the Barak and its tributary, the Sonai. These channels used to carry the silt laden flood spills into the Chatla haor and after depositing the silt could outfall into the Barak through the Ghagra river, saving Silchar town and a large number of villages on the banks of the Barak. The temporary capital of the kings of Cachar at Haritikar and the villages adjacent to it opposite Bhanga were saved by a number of channels, which carried the flood spills from the right banks of Jatinga and Barak rivers to the Chandpur and Jaddar haors. Again, the Cachari kings in the 18th century, in order to build up the lowlying areas in and around Bakri haor, once a part of the Chatla haor, in the Hailakandi Valley, constructed an artificial channel called Katakhal which was taken out from the right bank of the Dhaleswari at Rangpur village. Another channel called Baghakhal was also taken out from Dhaleswari downstream of Hailakandi. These channels built by humans provided relief to a number of villages from floods in the Hailakandi region. The khels also took measures for silt clearance of these channels, construction of small embankments across paddy fields as well as along the
upper reaches of the smaller streams to protect farm fields from inundation resulting from local rainfall in pre-British days.\textsuperscript{44}

To conclude, it becomes clear from the description given above that hydraulic intervention by way of making embankments was more popular in upper Assam, particularly in the core region of Ahom rule than in any other part of the Brahmaputra valley or for that matter Surma-Barak valley. In the latter, topographical features themselves provided means to lessen the impact of floods. Here, embankments were few and far between and artificial channels were only occasionally built. The low and plain nature of the riverine landscape obviously made drainage a tortuous and slow process here and so people were unwilling to complicate the process by building any artificial obstructions in the way of discharge of water. In both the valleys, settlement patterns in pre-colonial days reflected a concern to avoid those areas, which were acutely flood prone such as char areas in the Brahmaputra valley or low-lying flood plains in the Surma-Barak valley. More or less a harmonious relationship with nature was achieved. The life world of the people revolved around floods which were annual and its regularity was only occasionally broken. Peasants had evolved their agricultural calendar and practice in response to the timing of floods, the certainty of which was unquestionable.

\textsuperscript{44} Master Plan for Barak Sub basin, op.cit., pp-Chapter-III:1-3