

## **Flood Hazards and Management Issues in Bhuragaon Circle, Morigaon District of Assam, India**

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**Abstract:** The river line locations always attracted the growth and development of human settlement since time immemorial. Though river valley is advantageous in many aspects for settlements and agricultural activities, it can be a mixed blessing too. In Assam, most people are living in the Brahmaputra valley, where flood and bank erosions are becoming common natural phenomena. Flood havocs have always brought misery to millions of people, particularly in the rural areas. When large areas are flooded for a week or so with a few decimetres deep water, the houses collapse, roads and railways are breached at a number of places. Now, it is felt imperative to study the flood hazards and its management issues in Bhuragaon circle in Morigaon district of Assam which are mostly affected by flood hazard.

**Key Words:** Assam, Bhuragaon, Brahmaputra River, Erosion, Flood Hazard Management, Morigaon, Adjustment.

### **INTRODUCTION**

The Brahmaputra is a major river system of the world characterised by exceedingly high rates of basin erosion. In many parts of the world, mostly belonging to the developing countries of the tropics and subtropics including India, the vastly increased erosion rates have already set a difficult to reverse chain reactions leading to degenerated environment, reduced agricultural productivity, increased run off and accelerated siltation in rivers, reservoirs and lakes. The Brahmaputra River in Assam provides another example in which high erosion rates of the drainage basins results in rapid aggradations of the channels and over bank flooding. It is estimated that India losses 6000 million tonnes of soil along with the major plant nutrients annually due to erosion, causing a production loss of 30 million tonnes of crops, Besides being a major threat to continued productivity of the land, soil erosion is now viewed as a major non point source of environmental pollution.(Goswami, 1985)

To protect the valley dwellers from these relentless flood and erosion embankments are constructed in the year 1962. Subsequently several parts of the 42 km stretch of the

embankment from Dhing-Borbeel to Mayong-Hiloikhunda was washed away by the mighty river Brahmaputra. Faulty implementation of construction of rocky spur along the southern part of the valley including Dhing, Moirabari, Laharighat and Bhuragaon and subsequently erection of bamboo spur could not prevent the erosion process of the river. (Islam, 2004, Assam Bani, 27<sup>th</sup> May, 2002). Thus the gaps in the dyke enabled the flood waters to affect the adjoining villages and in fact such a flood in 1992 had made a devastating effect in 43 villages of BokaniMouza. (Alam, 1993)

Prevention of flood is a very difficult and costly task. Various preventive measures such as construction of permanent embankment erection of tie bunds or by adopting natural way of protection through scientific plantation of selected plants may protect the river banks from flooding.

### **STATEMENT OF THE PROBLEM**

Flood is a natural calamity that leaves the trails of misery for the people and shakes the regional economy. Frequent occurrence of floods in the recent times is also becoming an ecological crisis. Increasing flood frequency and the number of flood waves are causing damages to vast properties and lives in extensive areas and affect the socio-economic condition of the region. The losses of income and properties to the individuals and the state are increasing by leaps and bounds. The individuals suffer more from floods whose impact persists for a long time.

The Assam valley is a fertile belt, which is affected seriously by flood havocs. Heavy rainfall during the rainy season in North-East India is the chief cause of flood. The Brahmaputra, which drains this valley, receives from its tributaries a large amount of water heavily laden with silt. The silt, which is deposited in the river channel, makes it shallow. Thus the capacity of the rivers to carry the load is reduced. Besides, landslides are frequent in North-East India. Huge landslides which obstruct the flow of water for sometime yield lateral pressure of accumulated water. Earthquakes, which are common in Assam, cause floods in number of ways.

Morigaon district of Assam is located in the south central part of the Brahmaputra valley of Assam having a population of 7,76,256 and about 600 inhabited villages. It is one of the most worsely flood affected district of Assam. Though more than 70% of the population is dependent on agricultural, the occurrence of annual flood in this region severely affects cultivation as well as the livelihood pattern of these affected people within the flood prone area.

Therefore, it is felt imperative to study the flood hazards and its management issues in Bhuragaon circle in Morigaon district of Assam which are mostly affected by flood hazard.

### **RELEVANT WORKS**

A good number of scientific researches on subjects like fluvial Geomorphology, Hydrology, relating to the problems of river basins – its planning and management, flood hazard, human response to flood, protection measures taken against flood, flood plain

management and human occupation have been carried out so far in different parts of the world, specially in the USA and UK. In recent years many scholars have devoted themselves to the study of problems like flood as natural hazard, human perceptions of hazard, adjustment to flood for mitigating the losses etc. *Gilbert White (1939, 1942)* at the university of Chicago was the pioneer in studying the flood hazard and human adjustment to floods.

Throughout history it is seen that people are attracted to the lands adjacent to rivers. The reasons behind it could be easily perceived. The riverine tract contains deposits of fertile alluvium for raising different crops, level lands for easy means of transport and communication and for construction of houses etc. Besides, various economic as well as aesthetic considerations provide some attractions. In many places, especially in the west, riverine locations carry a prestige value for private homes. Similarly, a large number of researchers have examined the problems of floodplain management.

Although, Assam is one of the most severely flood and erosion affected state of India, not much academic research has been done on these problems. However, in recent years few scholars have studied the physical and ecological aspects of flood plains and their human occupation. Few relevant works worth mentioning that analysis the problem of flood that have been recurring features since early time in Assam. The state of Assam has been the variably inundated by the flood of Brahmaputra and Barak river system in different period.

## **THE STUDY AREA**

The Bhuragaon circle is one of the greatest revenue circle of Morigaon district. The district Morigaon is located in the central part of Assam. It is located in the southern part of Brahmaputra between 26°00'N and 26°40'N latitude and 91°59'E and 92°35'E longitude. A geographical area of 1431.5 square km. The geographical boundary comprises with Nagaon district in east, Darrang district in north, Karbi-Anglong district and Meghalaya State in the south and Kamrup district in the west side.

The major river flowing through the district is the mighty Brahmaputra in the northern boundary. The Bhuragaon revenue circle is also located in the northern part of the district, it is located in the river line of the Brahmaputra.

## **OBJECTIVES**

The study proposes to examine the impact of the flood hazards and its management issues. The principal objectives of the present study are-

1. To examine and analysis the periodical flood situation in the Bhuragaon area as well as in Morigaon district.
2. To analysis the flood affected areas, causes of flood and its effects.
3. To analysis the damage and losses of flood in agricultural sector, transport, properties, houses, cattle, man-power etc.
4. To analysis the erosion of flood, causes of erosion and its spatio-temporal pattern.

## 5. Suggestive measures.

### **METHODOLOGY AND DATABASE**

The study undertaken in Morigaon district of Assam specifically in the Bhuragaon circle. The detail flood situation in the district and the circle and the pattern of landuse were studied with the help of primary and secondary data. Village level maps were collected from circle offices to locate the village which are affected by floods. Primary data was collected through schedule-questioner from the flood affected areas. Necessary secondary data for the present study was obtained from different Government reports, documents, revenue circle offices, Brahmaputra Board and other relevant offices. Agricultural damage data due to flood are collected from agricultural department and District Statistical Department. The land erosion data are collected from the Bhuragaon Revenue Circle Office. Some of the acquired data were presented graphically through maps and diagrams using various cartographic and statistical techniques.

### **SIGNIFICANCE OF THE STUDY**

As already mentioned, the river has significant influence on the people settled in the floodplain. Attraction of the floodplain is due to presence of a number of facilities there, despite the usual migration. There has great impact on floodplain occurrence. It effects adversely the settlement, land use culture and economy of the country. As already mentioned, due to availability of fertile lands for agriculture and other facilities. It always attracts people to settle on it. It always attracts people to settle on it. The area covered by the present study is a highly flood and erosion prone belt along the south bank of the river Brahmaputra. The area is important for high agricultural productivity and it thickly populated. Since the great earthquake of 1950, heavy erosion started in the area resulting heavy lost of the people in these areas knows no bound. The activities of the people is affected in different ways. The rational behind selecting this area for the present study is that no systematic study has yet been made to examine the effect of channel migration on landuse and settlement pattern and the nature and level of adjustment of the people to the hazards of flood and erosion in the area. As large parts of the floodplain area in Assam is affected by river erosion and flood hazards. The nature of perception, behaviour and adoption relating to the hazard of flood and erosion in the case of different ethnic, social and economic groups of people are different due to the varying nature of impact of these hazards.

### **GEOLOGY AND GEOMORPHOLOGY**

Physiographically the district Morigaon can be divided into three regions viz. eastern low lying plain, the central and the eastern built-up plain and the south western interspersed with hillocks. The north-eastern low lying plain covers the northern part of the mouzas of Bhuragaon, Bokani, Pakria to the western part of the Mayong. As there is no embankment on the southern bank of Brahmaputra, this area is inundated by the floods of the river chronically during summer. The plain covers the northern part of the Mouzas of Bhuragaon, Pokria, Bokani to the north western part of the Mayong. As there is no embankment on the southern

bank of Brahmaputra, this area is inundated by the floods of the river chronically within summer. The plain possesses a number of swams and water logged area here and there.

The central and the eastern built-up plain is an extensive alluvial plain covering southern part of Bhuragaon, Iaharighat, Moirabari, Mikirbheta, Silpukhini, Dandua, Charaibahi, Niz-Gerua, part of Manaha, Tetelia and the Uttakhula Mouzas. These built-up plain is drained several river channels and dotted with beels and marches. Between the Brahmaputra in the north and foothills of the Meghalaya plateau in the south-west, this plain is the extension of the Brahmaputra plain of the Morigaon district, built up partly by the Kollong and Kopilee which flows from east to west. The region is a severally flood affected areas. Apart from this, the region has a chronic problem of soil erosion on the river bank. Sometimes leads to submersion of many villages by the flood waters of the river Brahmaputra. Many swamps and marshes are created within this built up region due to intrusion of water of the river Brahmaputra.

The geographic unit making the south-western plain interspreed with hillocks district bordering the Meghalaya plateau covers the southern parts of Mayong, Monoha, Uttarkhola and the whole of the Gobha Mouza. Being the extension of the Meghalaya plateau has many isolated hillocks surrounded by fragmented plains interspared by numerous beels.

### **CLIMATIC CHARACTERISTICS**

Being a part of the Brahmaputra valley the Morigaon district also influence of the humid mesothermal Gangetic type. Climatic condition of the region is hot and humid during the summer and cold and dry during the winter. The coldest month of the year is the January with a mean daily temperature ranges from 9.9°C (minimum ) to 24°C (maximum). From the month of April to September the mean temperature ranges between 32°C to 34°C. The month of July being the hottest monthly temperature ranging from 34°C in the maximum level to 25.3°C in the minimum level. Humidity is also very high (80%) during this period.

The region is influence by south-west monsoon in the summer and north east monsoon in winter season. Rainfall due to south west monsoon occur during June to September and due to north east monsoon during October to November. This receives an annual of 1772.4 mm in an average compared to state average of 2856.3mm. season wise average rainfalls are also lower than state average. There are found maximum rainfall in the month of July and minimum in the month December.

### **VEGETATION AND SOIL**

Varieties of trees and bamboo are found in the area. Some valuable plants like Gamari, Segun (teak), Simalu (simul) and some medical plants like Neem, Tulsi etc are found in the area. Besides these, there are also Battle nut and coconut trees in large number.

The flood plain is mostly made up sandy, silty loam to clay loam, light gray to dark gray in colour with moderate to high permeability mostly developed under Brahmaputra influences. It is composed of varine proportion of sand and silt with occasional presents of

clay (generally less than 10%). The flood situation greatly affect the quality and composition in some parts.

## **SOCIO-ECONOMIC CHARACTERISTICS**

**LITERACY:** Literacy is one of the most important factors for determining various socio-economic parameters of a population. According to 2001 census, the district has 58.53% literacy of the total population as against 63.25 % of Assam and 65.49 % for the nation as a whole. Moreover a large proportion of them have only preliminary level of education.

**POPULATION:** The population of the district stood at 775874 accounting for 2.91% of the population of Assam and its area wise 1587.7sq. Km. accounting for 2.02% of the total area of Assam. Density of population is rapidly increased in the district from 375 in the year 1991 to 450 in the year 2001. It is observed that the population distribution within the district has not been uniform because variation in the environmental condition. Before 1931, the distribution of population was very scanty in most parts fo the district, especially along the bank of the river Brahmaputra.

There are found various immigrants in the MouzasofMoirabari, Laharighat, Bhuragaon, Bokani and Pokaria on the bank of the river Brahmaputra. The immigrant Muslim community has settled in the northern riverine tract towards north of the Sonai river upto the bank of the Brahmaputra. The people are generally settled near the bills and rivers where there are facilities for fishing.

**TRANSPORT ND COMMUNICATION:** It is well recognized that various social and economic activities are inherently upon transport network. However, lack of adequate and efficient transport has a major obstacle towards economic exploitation and utilization of potential resource of the districtThe district is connected with the rest of the state via routes, railways and waterways. There are several waterways which links the district with the north bank of Assam. Roads are the major mode of communication of the district. Though there have found railways in the district but there are not found railways in the Bhuragaon circle

**ECONOMY:** The economy of Morigaon district is principally agro-based. Sericulture, fishing and agro-based business is carried out by people in smaller scales. However river erosion, sand deposition and adverse effects of chronic floods on fertile agricultural land have made even affluent farmers. Lack of good communication system shortage of power and lack of proper irrigation and many other facilities add to the poverty of the district. The local economy is characterised by subsistence level of production and consumption.

## **FLOOD OCCURANCE SCENARIO IN THE STUDY AREA**

**DUARTION AND TIME OF FLOODING:** The Brahmaputra displays two or three major flood peaks. In the mid zone, generally the river swells and the first flood peak occurs. Than just after these rapid increase in water volume, the level of water falls slightly. Again in the later part of July or in the first part of August, the major flood peak occurs. It continues for nearly a month and than drops slightly. During the last part of September or first part of

October, the river begins to subside. There is rapid rise and fall of water levels associated with the flood stage.

**TREND OF FLOOD OCCURANCE:** Bhuragaon circle is highly flood prone area of Morigaon district. In the year occurrence flood are – 2004, 2007, 2009, 2018 and there are found loss of human life, damage and destruction of public and private property, crop and livestock.

**PLACES OF FLOOD OCCURANCE:** There are found all the villages of Bhuragaon circle are affected by flood. These are mainly flood and erosion prone areas are – Balidunga, Tinsukia, Tengaguri etc.

**Table 1: Land loss due to bank erosion since 1998 to 2012**

YEAR	AREA/VILLAGE NAME
1998	(i) Baruating
	(ii) 2 no. Barkur
	(iii) Seujipather
	(iv) Halowkandha
	(v) Nitmari
	(vi) Kahitoli
1999	(i) Barukati
2000	(i) Dighali-ati
	(ii) Malahu
2001	(i) Bihu Bari
2002	(i) Sutirpar
2003	(i) Barukata-Saharia
2004	(i) Pavakati
	(ii) Barukati
2005	(i) Barukata-Saharia
2006	(i) Duarbandhi
	(ii) Rupahi Bill
	(iii) Jeng-pori
	(iv) BihubariKachariGaon
	(v) Malahu-Jatiabori
	(vi) Nij-Saharia
2007	(i) Pavakati
	(ii) Malahu
	(iii) Dighali-ati
	(iv) LengriBori
	(v) Pavakati
	(vi) Jeng-pori
	(vii) Sutirpar
	(viii) Bhuragaon Re. Town
	(ix) BarukataSaharia
	(x) BaramariKachariGaon

2008	(i) Bhuragaon Re. Town
	(ii) Barukati
	(iii) Pavakati
	(iv) LengriBori
	(v) Dighali-Ati
2009	-
2010	(i) BaramariKachari
	(ii) BarukatiSaharia
2011	(i) Jeng-Pori
	(ii) Baramari
	(iii) KachariGaon
2012	(i) LengriBori
	(ii) Dighali-Ati
	(iii) Jeng-Pori
	(iv) Sutirpar
	(v) Baramari
	(vi) Kacharigaon
	(vii) Barukata-Saharia
	(viii) Holowkandha
	(ix) Kapurpura
	(x) Bar Holowkandha
	(xi) JatiaBori
	(xii) Kupatimari
	(xiii) 2 no. Barkur

Source: Bhuragaon Circle Office.

**Table 2: Affected people due to Brahmaputra bank erosion in 2004**

Sl. No.	Village Name	No.of Family	Adult	Minor	Total
1	SahariaGaon	48	375	306	681
2	DurabandhiGaon	32	284	207	491
3	No. 2 Barunguri(Total)	30	277	215	492
4	BarukataSaharia	17	72	39	111
5	Sutirpar	21	89	92	181
6	Malahu	37+	93	135	228
7	Baruating	28	180	90	270
8	Malahu	180	564	634	1198



9	No. 1 Barkur	10	41	40	81
10	No, 2 Barkur	53	114	137	251
11	BihuboriKacharigaon	29	146	125	271
12	Betoni	14	70	50	120
13	Rupahi Bill	42	279	110	389
14	Bihubari Bill(Total)	24	180	144	324
15	Barukati	35	175	110	285
16	BihubariKacharigaon	16	50	62	112
17	No. 2 Barkur	72	265	213	478
18	Nit Mari(Total)	11	33	35	68
19	JatiaBori	10	36	28	64
Total		709	3323	2772	6095

Source: Bhuragaon Circle Office

**Table 3: Affected people due to Brahmaputra bank erosion in 2005**

Sl . No	Village Name	No.of Family	Adult	Minor	Total
1	BarukataSaharia	49	221	85	306
2	Malahu	58	163	231	394
3	Malahu	123	492	369	861
4	Dighali-Ati	25	56	60	116
5	Rupahi Bill	140	699	574	1273
6	No. 1 Barpathar	135	853	735	1588
7	No. 2 Barpathar	20	110	104	214
8	Betani	100	-	-	-
Total		650	2594	2158	4752

Source: Bhuragaon Circle Office

**Table 4: Affected people due to Brahmaputra bank erosion in 2006**

Sl. No	Village Name	No.of Family	Adult	Minor	Total
1	Durabandhi	22	115	20	135
2	Malahu	238	625	1071	1696
3	Jatiabori	54	286	251	537
4	Supati Mari	18	84	64	148
5	Jeng-Pori	163	634	389	1023
6	Saharia	60	241	119	360
7	BaramariKacharigaon	40	160	90	250
8	Durabandhi	40	166	44	210
9	BarukataSaharia	106	452	303	755
10	Hindu Japari	34	174	118	292
11	Rupahi Bill	46	247	166	413
12	Dighali-Ati	226	797	534	1331
13	Pavakati	38	185	63	248
Total		1045	4166	3232	7398

Source: Bhuragaon Circle Office

**Table 5: Affected people due to Brahmaputra bank erosion in 2007**

Sl. No.	Village Name	No. of Family
1	Dighali-Ati	169
2	LengriBori	86
3	Malahu	145
4	Pavakati	16
5	BarukataSaharia	24
6	BaramariKacharigaon	5
7	Sutirpar	17
Total		462

Source: Bhuragaon Circle Office

**Table 6: Affected people due to Brahmaputra bank erosion in 2008**

Sl. No.	Village Name	No. of Family
1	Bhuragaon Re. Town	6
2	Barukati	9
3	Pavakati	23
4	LengriBori	101
5	Dighali-Ati	476
6	Barukata-Saharia	28
Total		643

Source: Bhuragaon Circle Office.

**Fig: 7: Erosion Affected Areas of Morigaon****Table 9: Report on flood during sept,2012(as on 27<sup>th</sup> September) (As per Govt. Format)**

Name of revenue circle	Name of ADO circle	No. of village affected	Crop area submerged in hector						No. of farm family affected
			Bao paddy	Sali paddy	Vegs ssss	Pulse crop	Others	Total crop area	
Bhuragaon	Gerua	69	78	3640	695	220	237	4870	7200
	Bhuragaon	39	105	3540	845	448	430	5368	9870

Source: District Agricultural Officer, Morigaon

## FACTORS CAUSING FLOOD IN THE STUDY AREA

There are various Physical and Anthropogenic factors of causing flood in the study area, In the physical factors there are includes the geologic, tectonic and physio-graphic

factors. Besides these, rainfall is the main causing factors of flood. Amount and intensity of flood- As soon as the monsoon starts, most of the rain water runs into the Brahmaputra river, carrying high volume of water and sediment load, when additionally charged with heavy concentration of rain during monsoon, obviously becomes capable of creating unbelievable flash floods.

The earthquakes of 1950 caused tremendous changes in the fluvial regime of the state, particularly the Brahmaputra valley by suddenly raising the river beds. In that area, the duration of heavy rainfall occurs in the monsoon season and creates heavy flood in that particular area.

In that study area, deforestation and unwise tree felling are the important causes of flooding in that area. The absence of protective cover of vegetation, accelerates soil erosion. The flood problem has become more serious due to some other human induced factors like large scale human occupation in the floodplains, destruction of wetlands, unscientifically construction of dam and failure of dam, breaking of embankment and there are found insufficient drainage system in that locality. In recent years, the local people encroachment on the floodplain and low lying areas for habitation and cultivation due to their land loss of erosion has significantly aggravated the flood problem.

#### **NATURE OF HUMAN ADJUSTMENT (AGRICULTURE, SETTLEMENT, DRINKING WATER ETC.)**

The human occupation of the flood plain is related to the prevailing fluvio-geomorphic environment of the region, characterised by hazardous processes like floods, erosion, sand deposition and channel shifting. In the study area people have taken various measures to adjust with the flood hazard. Although the traditional methods of adaptation and adjustment may possibly disappear due to the introduction of flood control measures by the Government, still in the actively flood affected areas people have adopted some structural measures to minimise the losses and damages due to flood. Planning cultivation of varieties of crops before and after the flood. Planning fishing ponds, safe-guarding them with high boundary bunds, planting trees on to check erosion of bunds.

In this area every house has facilities to prepare platforms or “chang” during the flood. Besides, during the flood season, people of this region commonly adopt the following adjustments. In this parts of the study area, people generally migrate to nearby high lands, sometimes live on roof tops and store food grains above ground level. In the water logged areas and lower active flood plain, country boats and rafts made with banana trees and bamboo sticks (generally known as “bhur”) are used for evacuation. During the flood seasons many people migrate to their relatives house or go to their own house outside the flood region.

Although different adjustment measures are practised by the people to minimise the loss and damages of flood, still the flood damages are increasing year by year. Therefore, peoples adjustment to flood, bank erosion, sand deposition and channel migration hazards are

accepted as an unavoidable loss. It is a traditional and common form of adjustment to flood hazard in areas of depressed economy and high hazard risk.

### **GOVERNMENT MEASURES**

In the study area, there are found some embankment are formed which are provided by the government scheme – NREGA. These embankments are very low quality and traditional, there are no technical use of erosion protects measures. Due to these, the soil embankments are eroded day by day and causing tremendous flood hazard in that area. Government helps the local people in short term reliefs like distribute food and other essential goods in the flood affected season but there are not found permanently measures.

### **NGO'S AND PUBLIC EFFORTS**

There are also helps various local NGO's and public efforts in the flood season but they also do not create any measure for permanent. Therefore, the local people are always try to adjustment with the flood hazards.

### **MANAGEMENT AND STRATEGIES FOR FLOOD CONTROL**

The present study has to be considered only as a first approach, and so a lot of information is needed to obtain for a longer period of time on rainfall, occurrence of flood, damage during the flood etc. There is a need for identification of priority investment and development of non structural measures for flood control. There is a need to develop and apply rigorous policy related to land use pattern to control the increase of run-off, erosion and water contamination and decrease of soil fertility due to frequent occurring of flood. Need to formulate economic and poverty reduction efforts should be made for the benefit of the flood affected areas. Development of a comprehensive cost effective and affordable flood mitigation management strategy should taken by the relevant authority and specialists. Strengthening of dykes, erection of protective spurs, plantation of trees at the foot hills and river banks need to be taken up aggressively to stop erosion and control the damage during flood. Farmers should be introduced to a cropping system that starts in winter season to reduce the impact of crop loss during flood and for food security in the flood affected areas. Besides agriculture, other income generating activities like- sericulture, handloom, textiles, riverine and pisciculture etc. Need to be promoted and strengthened in the flood affected areas. Practise of short duration crops such as ahu and paddy, and potatoes should be encouraged in these areas. The agricultural department should keep stocks of non-perishable goods that do not require cooling for the use during flood. Provision of transfer of women and children to take shelter on embankments, roadway lines and foothills should be there till flood stops.

### **SUMMARY AND CONCLUSIONS**

The present study has been an endeavour to examine the various types and intensity of damages incurred due to flood in the Bhuragaon circle over the salient features of the Brahmaputra river in that area. The frequent flood has been responsible for the many agricultural problems in the district. And here we studied their impact on each other. These

include location, physiographic, climate, soil, vegetation and socio-cultural background of the district, duration and time of flood, trend of flood occurrence, places and effects are studied. Then, there are studied the nature of human adjustment, Government Measures, NGO's efforts etc. are studied. Assam has the potential of attaining high agricultural productivity and production based on its endogenous resources and advantages. But the sustainable growth of rice and other crop has been threatened due to the flood problem in the form of soil erosion, sand casting, water logging, damage to standing crop etc. The need of controlling the flood problem in Assam, mainly Morigaondistrict is very critical for ecological security, livelihood security and flood security of the district. The maximum flood control measures are taken in short term in nature. And by flood damage every year in the district we can tell that the works of the flood control board are insufficient. Even though there are some flood control measures they are less effective.

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