

CHAPTER-1

INTRODUCTION

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1.1 Statement of the Problem:

Erosion of the river takes away valuable land on its banks and impoverishes the people affected. Mighty rivers like the Brahmaputra, the Ganga and their tributaries causes immense annual soil loss due to erosion. The erosion process of soils due to winds and floods have increased enormously in many countries of the world. The total land area subjected to erosion throughout the world is estimated at 600 to 700 million hectares and this constitutes about half the total cultivated area of the world (Thorne, 1992). River erosion has a long-term impact on human life. The victims of the erosion are bound to displace as they become destitute. The altered flow of rivers due to bank erosion also affects river ecology. Due to loss of agricultural land those displaced people are face acute economic insecurities when migration causes on erosion. The victims are sufferings from social insecurity due to deprivation of civic rights, health insecurity due to lack of basic infrastructure etc. All these uncertainties arise from forced displacement led to deprivation, destitute, fragility and increased vulnerability of the families. The flood problem in Assam in its nature is severe and found to be a different one in the country (GoA 2017).

Displacement or Migration can be voluntary or involuntary (forced migration) according to the reason. Migration may be due to either the pull factor or the push factor or both. Generally, pull factors leads to voluntary migration and are commonly depicted as better job opportunity, improved life style, better civic amenities, environment friendly climate and so on.

Involuntary or forced migration take place due to push factors like natural disasters, war, communal riot, development activities etc. A forced migrant is also known as an internally displaced person when he or she is forced to leave his or her home region because of unfavourable conditions but does not cross any boundary and hence known as internal displacement. Internal displacement is a matter of concern as it implies the humanitarian crisis, having many complex manifestations (Zetter, 2012). The causes of forced migration are not new, although they vary in time, geographical location and different socioeconomic and political conditions. The major causes of internal displacement are natural or man-made disasters, social or political conflicts and development policies. According to the survey of National Sample Survey conducted during July 2007 to June 2008, more than 4 percent of the total migrants are forced migrants and among them nearly 24 percent of the total forced migrants are found to be due to natural disasters.

India is a land of rivers and river bank erosion is a normal phenomenon. It causes suffering to millions of people every year. The river system in India consists of seven major rivers along with their numerous tributaries. Recurring floods every year cause severe bank erosion over the country. The River Ganga and the Brahmaputra are two major rivers that are subject to severe bank erosion. Bank erosion of the river cause forced migrations to thousands of people in the country. Displaced people experienced substantial socio-economic impoverishment and marginalisation because of flood and erosion and lack of proper means of living.

In order to control the flood in the state, various steps including the erection of embankment have been taken up. Particular mention could be made of the erosion problem of the embankment systems in some states like Assam, Bihar, West Bengal, etc. (India-WRIS). But the embankment itself are under challenge of erosion by the rivers and hence is not free

from the criticism about existing embankments. Now there are distinctly two opposite views (Planning Commission, 2011) on the issue of flood control'. The one opinion said that the problems of flood can be solved by removing all the existing embankments and allowing natural bank erosion of rivers i.e., co-habitation with flood and erosion. The other opinion is that the problems of flood and erosion can be solved by constructing more and more embankments and also by raising and strengthening them.

Brahmaputra river bank erosion remain as issue of the many studies. These studies are useful in taking measures on erosion control as they identified the causes and reasons liable for an equivalent (Sarma & Acharjee, 2012). The Brahmaputra bank erosion causes poverty, illiteracy and unemployment to the displaced people (Talukdar, 2012). After the earthquake in 1950, Brahmaputra and its tributaries has removed vast area on the bank. People habitation like villages, town, river port, agricultural land, Government reserved land, forest land etc are fall under erosion. Such sort of erosion affected area is found altogether districts situated on the bank of Brahmaputra in Assam like Dhubri, Barpeta, Bongaigaon, Goalpara, Nogaon, Morigaon, Jorhat etc. Khan (2012) mentioned in his study that folks migrated into different safe places once they displaced in erosion. He was found that the essential source of livelihood of most of the people sleep in char areas were agriculture and its allied activities. The frequent erosion, happening per annum, reduced land for agricultural use and it causes the people to be landless and marginal farmer. Landless and marginal farmers couldn't feed their families through agriculture and that they are taking resort of daily earner. The dimensions of landless labourers are increasing day after day. Scarcity of cultivable land, change of the occupation, high growth of population in char area had obviously a long-term impact on the people. Poverty become a never-failing friend in their life.

Erosion causes illiteracy and malnutrition among the youngsters within the affected area due to the shortage of education and health care facilities. Alongside land, the erosion takes away all educational and clinic of the affected area. After displacement from char, people move to new places. As most of the displaced people are poor, they sure to settled down them on the river embankment, road sides and Government reserved land. In the villages on this land category, the govt couldn't provide them basic amenities like school, health care centre etc. By this way, erosion causes illiteracy and malnutrition in char area. To char area people, erosion brings them 'identity crisis'. People after displacement face suspicion by some pro-active organisations at different town and cities particularly in upper Assam and that they were labelled as illegal migrants. This unfortunate occurrence happened at the work place where they were in search of job. Erosion in Assam also causes environmental degradation. People having no other alternatives occupy lands in reserve and forests land. Peoples habitation in reserved and forest land cause deforestation which is also result ecological imbalance.

1.2 The Brahmaputra River:

The Brahmaputra is one of the world's mightiest and trans-boundary River which flows through China, India and Bangladesh. It is the 10th largest river in the world by discharge and the 15th by longest. With the origin in the northern Himalaya of Tibet as the Yarlung Tsangpo, it flows across southern Tibet. Then it flows through the Assam valley as Brahmaputra and Bangladesh as Jamuna in the south-west direction. It became merged with Padma (popular name of Ganga in Bangladesh) in Ganga Delta region and finally the Meghna and from here it is known as Meghna before emptying into the Bay of Bengal. (Wikipedia 25th July 2017)

The Brahmaputra is about length of 3848 km. This is an important river that facilitate irrigation and transportation in the region. The average depth of the river is 124 ft (or 38m) and maximum depth is 380 ft (or 120m). The river is prone to catastrophic flooding in the spring when Himalaya's snow melts. The average discharge of the river is about 19,800 cubic metres (Brahmaputra River, Encyclopaedia Britannica) and flood can reach over 100,000 cubic metres. It is classic example of a braided river and is highly capable to channel migration and avulsion. The lives of millions of people are reliant on the Brahmaputra River and thousands of people live on the riverine islands i.e., *chars*. The char dwellers are relying on the annual 'normal' flood to bring moisture and fresh sediments to the floodplain soils, hence providing the necessities for agricultural and marine farming. (Wikipedia 25th July 2017)

The normal flood occurred during the monsoon season (June–October). Different kinds of deforestation activities in the Brahmaputra has resulted in increased siltation levels, flash floods, and soil erosion in downstream of lower and middle Assam. Every year huge amount of flood causes large size losses to crops, life and property. Normal and periodic flood is a natural phenomenon and it is ecologically a necessary because it helps maintain the lowland grasslands and associated wildlife. Periodic floods deposit fresh alluvium, restock the fertile soil of the Brahmaputra River Valley. Thus, flooding process is closely related with the agriculture and agricultural practices.

The effects of flooding can be devastating and cause significant damage to crops, houses and livestock etc and the bank erosion with consequent loss of homesteads, school and land, and loss of many lives and fisheries. Various flood-control measures are taken by Government departments like water resource department and the Brahmaputra Board, but until now the flood problem remains unsolved. One third Land of Majuli Island has been

eroded by the river. In recent years, it is planned to construct a highway protected by concrete mat along the river bank and excavation of the river bed can curb this menace. The Brahmaputra River Restoration Project, is a multipurpose project and it is yet to be implemented by the government. The Central Government approved the construction of Brahmaputra Express Highways on both the banks.

The river is the life source to millions. It supplied vital nutrients to the plains of Assam and other areas, but it causes widespread misery when it flowing fast during flood. In 2020, more than 5.4 million people in Assam were displaced by floods, with many lives lost and whole villages washed away (Hindusthan Times, 20 July, 2020).

1.3 Char Areas:

Char area also referred to as Char-Chapori. This included those land areas located on the bank and within the river. Char area in Assam has a neighbourhood of 3,608 Sq. Km i.e., 4.6 % area of the state. In Assam there are 2251 number of villages are included in char area of the river Brahmaputra. About 25 lakhs of individuals are live in char areas fall into 14 districts in Assam. The Socio-economic condition of char people is extremely miserable. Poverty may be a common characteristic of the people where 68% of the them are BPL household. A series of problems like frequent flood, land erosion, mass poverty, illiteracy, high rate of growth of population, superstitions etc are taking them into a backward society. (Das, 2000).

1.4 Background and Rationality of the Study:

In the pre-Independence period, the population of Assam was very thin. Zamindars of that time exists in undivided Goalpara district were took up farmers and settled them in the low lying riverine and fertile vacant areas and such a way civilization grow on both the banks

of Brahmaputra and other tribute rivers. As erosion occurs every year, agricultural land becoming reduced along with other reasons. As Dhubri district is much backward in respect of industrial development, people of char areas displaced due to erosion become jobless from agricultural sector and also shelter less. They start search of job in towns in and outside the state. The migration of labourers into various towns, cities and other districts also creating problems among other caste, race etc.

In this way, continuous erosion of Brahmaputra and other tributaries has changed the occupational pattern, income and living standard of the people in the char areas of agrarian district like Dhubri. This study aims to enquire into the problem in scientific manner. Study on the strength and extent of the erosion and its impact on agricultural production, extent of displacement, income, occupation and employment is very much needful and important.

1.5 Objectives of the study:

The main focus of the problem of erosion is multi-fold, i.e., reduction of agricultural land and productivity, changes on the occupational pattern, income and employment, agro-based trade and commerce and so on. Many works have been appeared in recent years on the issue of erosion of land, but most of them are confined to state level. The present study is based on the objective to find out the socio-economic impact of erosion upon the people and society under taken in the District of Dhubri of Assam. The other objectives are:

- To find out the extent of displacement.
- To find out the socio-economic impact of flood and erosion.
- To analyse the socio-cultural impact.
- To assess the government measures on flood and erosion control.
- To put forward remedial measure.

1.6 Scope of the Study:

- a) This study includes basic characteristics of the Char society viz. Education, Housing Condition, Drinking Water, Sanitation, Livestock, holding of Durable goods, Availability of Financial services, Occupation etc. Data and information relating to these objects are not available up to date. In many cases old information has been used in analysis.
- b) There only two surveys carried by the Government in the year 1997 and 2002-03. In order to find out the impact of flood and erosion on the people of char areas information from this old survey revealed inappropriate. Therefore, the study is mostly based on the field survey information.
- c) As the Government record, char areas are a special and peculiar geographic zone in Assam. Studies and research work found on such special area is found insufficient. There is an enormous scope to examine the success of various Government policies in respect income, education, poverty and social progress etc.

1.7: Research Questions: Research questions of the study are listed as follows:

- Does the river bank erosion lead to displacement at mass level?
- Does erosion affect the socio-economic life of displaced people?
- Does erosion is blessings for few people?
- Does erosion lead to out migration?
- Does erosion disturb social harmony?

1.8 Hypothesis of the Study:

In this study, we have examined the validity or otherwise the following hypothesis:

- That the flood and erosion does not have any impact on the socio-economic condition of the people of the char dwellers.
- That the erosion does not changed the occupational structure of char dwellers of the District.
- Educational status of the head of the family does not determine the size of the family.
- Income and education are independent component to each other.
- Poverty of the household is not related with the occupation.

1.9 REVIEW OF LITERATURE:

1.9.1. Review on Basics of Flood and Erosion:

Keeping the char area in consideration, literature found available on the difficulty of flood and erosion are reviewed. Literatures skilled enables us about understanding the matter of flood and erosion also because the impact of it on the people sleep in river bank area. Reviewed literature are presented below under three groups viz. a) Basics of flood and erosion, b) Migration into char area and settlement and c) Char area's social organization. Literatures reviewed for the aim forms the idea and background of our study.

Flood is the one devastating natural calamity which is caused mainly due to heavy rainfall and damages human life and social developments (Kandilioti and Markopoulos, 2012). Based on the characteristics, flood is classified into four categories viz. flash flood, standing flood, coastal flood and riverine flood. Of these four categories 'riverine flood' is more difficult to control (Cuny, 1991). The Indian sub-continent endowed with many natural water resources, suffers annually from flood of different magnitudes. The north eastern region alone generates one third of the country's total flood through the Brahmaputra and Barak river system (Wiebe, 2006).

Originating from Tibet, the Brahmaputra River enters into Arunachal Pradesh in India, after which it runs through Assam and Bangladesh. Finally, it drains out into the Bay of Bengal. In this long journey the river picks up a large load of sediment, making the river highly unstable in the upper reaches of the Assam Valley. With increased deforestation due to several factors soil erosion has increased and which in turn has increased the amount of sediment carried by the river (Sharma, 2012). The river carries a large volume of water along with huge sediments. The Brahmaputra has over 100 tributaries, of which 15 large ones

originate in the north due to the melting of snow in the Eastern Himalayas (Ghosh & Dutta, 2012). The river Brahmaputra in the Assam Valley deposited silt and it leads to a change in the slope of the river. This change become the causes for erosion of river banks, frequent migration of the river's course and heavy floods as the river cannot contain the volume of water (Sharma, 2012). This high amount of rainfall during the monsoon season is equally to blame for the river's flood. Landslides and flash floods occurring due to a combination of all these factors are, as a natural consequence, extremely common. Unfortunately, the disaster does not end there; a vicious cycle follows the onset of landslides, as the falling debris block the course of the river, forcing it to flood elsewhere (TERI, 2008). Due to these factors, the flood-prone area in Assam totals to 3.1 million hectares, which is 40 per cent of the state's area, of which, 560 villages dotting the banks of the Brahmaputra are particularly vulnerable (TERI, 2008; TNN, 2013). Every monsoon, the state experiences flooding, with major floods occurring at least once every four years (Directorate of Economics and Statistics, Assam, 2011). Despite the suddenness of such events, the government has ample warnings of their potential magnitude and should be therefore able to implement flood-control measures to minimize the destruction. However, they still cause immense destruction 931,000 hectares are affected each year, eroding at least 8,000 hectares annually. After 1950, the state has been lost 7.4% of its land area. Financially, the cost of major floods is extremely high, Rs. 7.7 billion in damages to utilities, crops and houses when Assam was badly hit in 2004 (Kalita, 2013). Majuli has also been heavily eroded due to the annual flood of the Brahmaputra and the migration of the rivers bounding the island. Between 1998 and 2008, the island lost an average annual amount of 5,000 hectares, while 14,834 hectares of land remain constantly under water (Dutta, Barman, & Agarwal, 2010). Subtracting this land from the island's total, along with the land unsuitable for agriculture and the land reserved by the government, only

32,237 hectares, or 25 per cent of the island's total area remains available for cultivation (ASI 2004).

The recurrent flood and erosion continued to be the burning problems of Assam. Assam has an area of 78,438 Sq. Km. taking both the Brahmaputra Valley and the Barak Valley. The Brahmaputra and Barak are the two main rivers, which cause major problems during the monsoon period of every year in the form of flood, bank erosion and drainage congestion (Goswami, 1985). In fact, the successive waves of devastating floods in almost every year have virtually destroyed the economy, more particularly, the rural economy of the state. The main factors causing extensive floods are the adverse physiography of the region, heavy rainfall, and excessive sedimentation, frequent occurrence of earthquakes, reduction of forest area and encroachment of the riverine area (Valdiya, 1999). Usually, Assam experiences incessant rainfalls during the monsoon season, which normally commence from the month of May till mid-October. Apart from this, occurrence of floods in Assam has direct correlation with rainfall in the neighbouring states of Arunachal Pradesh, Meghalaya, Mizoram, Nagaland and the adjacent country of Bhutan.

Despite building 3647 km of embankments, 599 km of drainage channels and 431 sq km area of soil conservation, Brahmaputra continues to wreak havoc by uncontrollable floods year after year (Goswami, 1998). The recurrent occurrence of such type of devastating floods may be due to the presence of the active faults and continuing crustal movements in this geodynamical unstable region. The width of the alluvial plains of Brahmaputra basin (less than 100 km) is also having a significant role to play in the flood phenomenon which is much narrower than the flood plains of Sindhu and Ganga (350 to 300 km respectively).

The state has not been able to achieve the desired level of development in spite of having vast natural resources due to recurring flood and erosion problem. Country's total

9.4% flood prone area is fall in the state of Assam (National Flood Commission). The damages caused by flood and erosion in the state at the beginning of the century are depicted in Table-1.1 and Table-1.2.

TABLE 1.1: Flood damage in Assam.

Item	Unit	2000	2001	2002	2003	2004
Area effected	Hectare	966053	239511	674148	932113	314268
Population effected	Nos	3888385	542634	7550581	5651954	13493392
Human lives lost	Nos	36	4	65	52	497
Effected villages	Nos	5090	1277	6807	7565	1223
Eroded land	Hectare	-	5348	429657	12589	7829
Crop value	Lakh Rs	17351.0	835.00	14559	14700.0	-
Total damages value	Lakh Rs	19000.0	1095.00	18678.0	16569.0	-

Source: Government of Assam, Flood report.

TABLE 1.2: Flood damage in Assam.

Item	Unit	2013	2015	2016	2017	2018	2019
Population effected	'000	100	1,650	1,600	4,000	4500	44081
Human lives lost	Nos	-	-	-	85	-	-
Villages effected	Nos	396	2100	-	-	-	3,024
Crop area affected	Hectare	7000	4400	4900	-	11,243	1,63,962

Source: Flood reports, Government of Assam

Flood in Assam, characterized by their extremely large magnitude, high frequency and extensive devastation, constitute an awesome natural hazard that repeats itself almost

every year and devastates the economy of the state which is overwhelmingly agrarian. The situation is worsening as erosion is accompanied by flood, which further aggravates the problem (Goswami, 1989).

Human occupation and development of alluvial river floodplains are adversely affected by river channel lateral migration. The ecology of riverine corridors is dependent upon the processes of erosion and sedimentation, which lead to lateral migration. Multiple uses of floodplains adjacent to active rivers also influence the probability and magnitude of channel movements, with implications for habitat type distribution and ecosystem integrity (Shields, 2000).

Riverbank erosion is an endemic and recurrent natural hazard in many parts of Brahmaputra valley of Assam. When rivers enter the mature stage (as in the case Brahmaputra) they become sluggish and meander or braid. These oscillations cause massive riverbank erosion (Alam, 1993). Every year, thousands of people are affected by erosion that destroys standing crops, farmland and homestead land. In fact, bank erosion and flood hazard has become almost a regular feature in the district.

The unstable character of the river Brahmaputra is one of the causes for its eroding nature. The river is assuming a braided pattern consisting of several channels separated by small islands (*chars*) in its course. During the last few decades, the channels have been swinging between the main valley walls and during the monsoon season extensive overbank spills, bank erosion and bank line shifts are typical. The erosion not only affects the rural floodplain population but also urban growth centre and infrastructures as well (Mamun and Amin, 1999).

There is involvement of a large number of variables in the process of riverbank erosion. The intensity of bank erosion varies widely from river to river as it depends on such characteristics as bank material, water level variations, near bank flow velocities, platform of the river and the supply of water and sediment into the river. Loosely packed, recently deposited bank materials, consisting of silt and fine sand are highly susceptible to erosion and rapid recession of floods accelerates the rates of bank erosion in such materials (Kotoky, 2005). Moreover, in recent years, human interventions in the Brahmaputra are growing. Construction of Bridge and bank protection structures thereof has reduced the freedom of the river to widen through bank erosion in that area resulting in greater flow rate and when the river reaches downstream it slows down and deposits silts and causes erosion through widening process. The embankments also contributed to increased suspended loads especially during the summer months which are deposited in the riverbed contributing to the braided nature of the river. This, in turn, will contribute to directing more and more of the finer flow towards the banks accelerating the bank erosion (Kar, 1994).

The Brahmaputra valley in Assam represents a sedimentary province. The channel of the river itself occupies about one-tenth of the valley of which more than 40% of its area under cultivation and housing of the people. In Assam, the river flows in a highly braided channel characterized by numerous mid-channel bars and islands. The Brahmaputra is the fourth largest river in terms of average discharge and second in terms of sediment transport per unit drainage area in the world (Goswami, 1985). Migration of the channel towards the south is a characteristic feature of the river.

The flow regime of the Brahmaputra possesses the seasonal rhythms of the monsoon and freeze-thaw cycle of the Himalayan snow. Along the channel of the Brahmaputra bank materials are not homogeneous in composition, and result in uneven bank slumping. This

causes the flow to take a different path and the orientation of the bank line to the direction of flow also changes and at some locality's older alluvium protruding into the river offers significant resistance to the flow regime and causes changes in hydraulic conditions (Kotoky, 2003).

The finely divided bank material and the constant change in flow direction produce severe bank caving along the channel. When the flow approaches the bank at an angle, severe under-cutting takes place resulting in slumping of sediments. Kotoky (2005) observed that, slumps are more common among banks composed of clay silt. Quite often, the highly saturated clayey silt will liquefy and tend to flow towards the channel. As the materials flow, the overlying, less saturated bank sediments tend to slump along well-defined shear planes. However, the intensity of slumping is more acute after the flood stage. The accumulated water level during the flood stage provides additional support to the bank material as the pore spaces of the loosely bound bank materials are occupied by water and act as a continuous system. With the fall in water level, the support diminishes abruptly and the bank materials are subjected to different degrees and nature of failure. In some localities, stratified fine sand, quite massive channel sands and silts underlie the silt clay of the natural levee deposits. During high stage of the river, water is forced into the strata, raising the pore pressure in the strata. As the water level in the river falls rapidly and the pressure against channel wall is lessened, water moves from the formation back into the river. This causes a lateral flow of sands and silts into the channel, resulting in subaqueous failure. This normally produces a bowl-shaped shear failure in the overlying cohesive natural levee deposits (Coleman, 1969). These types of failure with semi-circular outlines of different magnitude area abundant along the Brahmaputra River channel.

Development of some waterlogged areas after the flood near the bank of the river, related with the construction of embankment, without having any direct outlets to the river is also a characteristic feature. Water from these areas moves through permeable levee materials and oozes out along the bank of the river when water level in the river recedes during the post-flood period, failure of bank materials occur (Lawler, 1992). Another type of failure is related to the subaqueous flow. Because of the braided nature of the river channel and its constant migration, many abandoned channels intersect the newly formed bank-line. This gives rise to a zone of well-sorted silt and fine sand localized in the abandoned channel fill. During rising and flood stage, the sand and silt become highly saturated. The rapid drop in water level in the channel results in rapid withdrawal of water from these sediments. The highly saturated liquefied sediments flow towards the channel. As the materials flow, the overlying less-saturated bank sediments tend to shear along well-defined planes (Lawler, 1997). Shear failure is one of the most effective causes of bank-line recession of the Brahmaputra. The other major cause of shear failure is over-steepening of the bank which always enhances the failure of the bank (Coleman, 1969). Fluvial erosion, in turn, is linked to mass-failure processes through the concept of basal end-point control (Thorne, 1982). Fluvial erosion of the basal area of the bank can lead to undercutting and subsequent cantilever failure. The formation of mud cracks can directly be attributed to sub aerial processes, which include wetting and drying of soil. These are commonly thought as 'preparatory' rather than 'erosive' processes (Lawer, 1999). Although sub aerial 'wakening and weathering' of the soil can occur in a number of ways, all are associated with moisture conditions within the material (Dierith and Gallinati, 1991) and with the physical state of this moisture (Thorne, 1990). Both Wolman (1959) and Simonet (1999) found that the highest rate of retreat occurs as a result of high flow during prolonged wet periods, rather than by floods. On the other hand, as the cohesive soil mass dries, volumetric shrinkage results in the formation of a 'pad fabric', with

blocks of soil separated by desiccation cracks (Thorne and Lewin, 1979). These desiccation cracks provide lines of weakness in the bank face and Green (1996) found desiccation to be one of the dominant forms of bank erosion on the tributaries of the Namoi River in Australia.

Braided river like Brahmaputra represents a high-energy fluvial environment often characterized by non-cohesive banks lacking vegetation and consequently, high rates of bank erosion and deposition. The in homogeneity in bank materials and the constant change in flow direction have caused severe undercutting, which enhances the intensity of slumping along the banks (Mamun and Amin, 1999).

Dhubri district faces an acute erosion problem as no permanent anti erosion measures based on proper geohydrological models have been adopted so far. Geomorphologically, the most parts of the plains fall under the flood plains of the Brahmaputra river. The district suffers from severe bank erosion on its southern side due to the erosive action of Brahmaputra River. The district is subjected to severe annual floods under the influence of the SW monsoon. The erosion is mainly attributed to extreme sediment charge to the braided river and formation of sand bar in the midst of the river (Baker, 1988; Goswami, 1985). Along the channel of the Brahmaputra River, bank material is rarely homogeneous in composition and uneven bank-slumping is a characteristic feature. Often, highly saturated clayey silts liquefy and tend to flow towards the channel. Consequently, the overlying less saturated bank material tends to slump along well-defined shear planes. Thus, there appear two prominent types of slumping, (a) undercutting during flood stage and (b) flowage of highly saturated sediments during the falling stage of the river (Kotoky, 2003).

Several studies (Talukdar 1995, Barman 1981) have indicated that the Brahmaputra River changed its course abnormally after the earthquake of 1950 and the attendant historic flood. There was a balance between sediment supply and transport up to 1950, which was

disrupted by the great earthquake which produced severe landslides within hilly tracts suddenly providing a large quantum of additional sediment. These extra sediments choked the river channel gradually and initiated bank erosion causing channel-widening. Moreover, there has been a gradual increase in channel slope since 1920 (Goswami, 1999). The riverbed of Brahmaputra has also shoaled following heavy siltation due to the construction of flood embankments, deforestation, etc.

The velocity of the river diminishes when large quantities of sediments are deposited and mid-channel bars or chars are formed. Once formed, the chars locally decrease the cross-sectional area and cut the bank laterally to maintain a proper cross-sectional area that is in equilibrium with discharge (Kotoky, 2003). Kotoky (2003) also compared the satellite imageries of 1998 with the topographic base map of the year 1920, and found that the Brahmaputra channel has increased its width from 7.00 to 9.25 km, with significant expansion on the southern side of the river.

Riverbank erosion is a significant problem worldwide and is associated with land loss and deposition of sediments along the river course. Land loss is a consequence of river erosion not only threatens the existence of infrastructures or agricultural land near to the river bank but also pose threat to aquatic habitats and causes sedimentation downstream due to the generation of fine-grained sediments (Darby & Thorne, 1995).

Bank erosion is a dynamic and natural process as rivers meander across the landscape. However, bank erosion of river Brahmaputra has attained a menacing proportion in many parts of Assam including Dhubri district of Assam. Taber and Ahmed (1998) stated that, side by side with floods, bank erosion of some major rivers also causes immense long-term destruction every year. The river Brahmaputra has been shifting slowly southward. Erosion and floods are a perennial problem of the district. Since the last three decades 56 revenue

villages have been affected by erosion by the river Brahmaputra out of which 107 revenue villages have been completely wiped out (Sheikh, 2013) and hundreds of villages are partially eroded. More than 80% of the lost land even rich agricultural land that produces some of the finest variety of jute in Assam. Thorne (1982) stated that, the erosion of the banks takes away valuable lands and destroys towns built on its banks and impoverishes the people affected.

Dibrugarh town protection work in 1954, the town was threatened by the erosion of the Brahmaputra. The flood forecasting and warning system was first started in India in 1959 on the river Yamuna for the benefit of the union territory of Delhi. Sarmah (1993) explained about the origin and drainage patterns of all the major rivers in Assam. The flood havoc in the Brahmaputra valley and causes of occurrence of floods in Assam was properly explained by Ahmed (1991). Deuri (1994) explains the major problem faced by the people of Morigaon district is the flood and bank erosion.

The study of economy and farm management in Nagaon district of Assam by Goswami and Bora (1997) provided some basic information on inputs and production of crops in the Nagaon and Morigaon district. Das (1984), in his published doctoral thesis, "Peasant Agriculture in Assam", presented the structural analysis of peasant agriculture in Assam. The "Agricultural Problems in India" published by Singh and Sadhu (1991) considered flood as major problem of agricultural development in river valley areas. Goswami (1979) in his paper mentioned the nature and causes of flood in the depressed belt of southern West Bengal. The high flood proneness of the belt and the nature and development of land settlement have been studied. According to the Department of Agriculture, flood affected areas of the Brahmaputra valley is accounted for about 98.8 thousand hectares, out of which 24.5 thousand hectares of land is chronically flood affected in Assam, besides 90 thousand hectares being occasionally flood affected, Mahanta (1979).

Saikia (1992), in his unpublished doctoral thesis emphasizes the flood and soil erosion is the severe problem faced by the farmers of Assam. Problems of fluvial erosion are very severe along the river Brahmaputra and its tributaries.

Mukhupadhyaya (1996) in his 'Hydro-Geomorphology of the Brahmaputra -Barak-Manipur basins with special reference to Neo-tectonics' mentions the evolution of the drainage basins including its distinct suite of landforms and peculiar drainage pattern by explaining their regional disposition and dispersion.

The river Kosi rightly is described as the 'Sorrow of Bihar.' Flood has itself been partially responsible for some of the observed changes particularly because of its effect on atmospheric quality due to water pollution and its influence on settlement as well as on agriculture because of land damages (Chahaukar, 1995).

Davies and Walsh (1997), in their paper regarding the flood hazard at Khartoum, Sudan, explain that the 1988 floods at Khartoum were frequently described as 'Unprecedented.' They argued that most problems were created by complacency, lack of planning and mismanagement.

Mahela (2001) in his seminar paper explain that, except embankment no other methods have so far been applied to minimise the damage due to flood & bank erosion in the Brahmaputra valley. The existing embankment system has not been raised and strengthened to withstand against the pressure of increased high flood level, and as a result every year embankments are either breached or overtopped. On the other hand, land use and agriculture are also affected by flood. The agricultural growth is basically related to the analysis of changes occurred in the growth components, that are, area under cultivation, crop-yield and the cropping patterns of particular area.

According to the additive growth model of Minhas and Vidyanathan (1965), the obscured increase in aggregate output has been decomposed in to four component elements, that is, the contribution of the changes in (a) cultivated area (b) crop-yield (c) cropping pattern and (d) the interaction between latter two elements.

Das and Kalita (1993) in their study on Agricultural development of North East India show that there is a direct relationship between the land productivity and the physical factors.

Morgan (1969) has stated that erosion which is also a part and parcel of the activities of a river, effects greatly the flood plain occupancies, in human terms, the most far reaching and devastating consequence of excessive uncontrolled run of is soil erosion. Studying the flood hazard of North Bihar, Choudhury and Kumar (2001) explains that, design of flood mitigation works for long return periods of flood is uneconomical and beyond the means of a developing country like ours.

Although, Assam is one of the most severely flood and erosion affected states of India, not much academic research has been done on this problem. However, geomorphologic accounts of the valley including the flood plain areas are available in several published reports (Murphy 1968, Taber 1975, Kar and Goswami 1993).

The problem of flood and erosion havoc and its impact on various human activities are also studied by Goswami (1989), Bordoloi (1986), Kar (1994), Pal & Bagchi (1983), Bordoloi (1995) and Gogoi (1997). Plains of north India support some of the highest human population densities on earth (Kar 1994). One important reason for such a high population density has been soil fertility recharged by annual alluvial deposition by the rivers flowing through them. The Brahmaputra valley in Assam is an example of such an area. In such systems, inward human migration is a common feature and in fact it has attracted human

settlement from time immemorial. But, the human settlements just adjacent to the Brahmaputra river banks are becoming worst sufferers from riverbank erosion that is taking place since last few decades.

The Brahmaputra river system is located in a seismically active area, thus have a varying geomorphologic behaviour and its erosion is causing serious and disastrous socio-economic implications. The erosion phenomenon is a serious problem for the people residing in the bank of the braided Brahmaputra river channel (Valdiya, 1999). Riverbank erosion takes away all everything belongs to and hence is one of the major causes for poverty for majority of the affected people. As erosion leave nothing, people force to move to new places for shelter and live. The displaced persons usually take shelter on roads, embankments and government lands. Erosion affects most the marginal farmers followed by medium farmers and those big farmers less.

Displacement is the immediate impact of riverbank erosion. The displaced usually move to nearby areas but migration to distant places is not uncommon (Guha, 1977). Most of the displaced persons turn mainly into agricultural labourers, wage labourers in other activities or in occupations like rickshaw pullers. A large proportion of the victims remain unemployed due to lack of work opportunities. However, it is observed that the female-headed households displaced by riverbank erosion and residing on embankments are the worst affected group.

A large number of studies on population redistribution relate to displacement of population due to various development activities in India as well as in whole of South Asia. Kayastha and Yadav have analysed the impact of flood including migration and redistribution of population in the Ghaghar flood plains. Ahmed (1991) has attempted redistribution of tribal population in India on account of developmental processes. The role of partition in the

redistribution of population in India has been the major focus in a large number of studies by Mukherjee (1991) and Gosal and Mukherjee (1970). Premi (1974) has made a specific reference to migration as a major focus in the population redistribution tendencies in India. Likewise, Bose (1967) uses differential growth patterns in different areas of the country as a major focus in the population redistribution.

The vulnerability of households headed by women is based on lack of access to education, training, and employment opportunities, as well as discrimination in the job market. In addition, socioeconomic and political structures exclude women from playing an active role in the functions of their communities (Rossiasco, 2003).

The economic activities that families are involved in before being displaced (usually farming) are impossible to carry over to resettlement sites. The effects of this are felt on an individual level when displaced people are forced to make the difficult adaptation to new forms of work. The first consequences of forced displacement are a lack of access to basic necessities, as well as vulnerability and insecurity, especially for women and children (Shrivastava and Hienen, 2005).

However, migration in Assam as a whole is widely recognized as having exerted a disproportionate effect on local demography relative to other parts of India. Most of the riverbank settlers, who had to migrate to other parts of the locality due to erosion of the river belonged to the immigrant settlers. Thus, they have also affected the local demography of their new settlement areas. In addition to the effects of migration, recent research from the Indian Himalayas indicates that immigrants have greater resource needs than settled households (Hazarika, 1993).

Khandakar (2016) in his works enquire the issue of social exclusion of the people living in char areas of Assam. Taking 100 respondents as sample population of Baladuba village in the Dhubri district social exclusion is discussed in respect of life, livelihood and social relations. To him, the conflict between indigenous and immigrant people is the root of the relational exclusion of char people in Assam. Size of per head landholdings is too little and majority of the households are BPL. Health care facilities is likely to be absent in char area. They rely upon the untrained rural practitioner and traditional *baid*s and *kobiraj*. Both fertility and mortality rates are also very high compare to the state average.

Exclusion of char from the mainland society may be a character of char area. The temporary existence nature of char is liable for its exclusion. Besides, economic and social exclusion due to its nature, the char areas also are deprived from required attention for policy interventions. The pro-active groups harass and assault those displaced people within the new place. Economic exclusion has found within the sort of low wage, physical assault etc.

The study also highlighted the cultural exclusion. Cultural traits, physical attire and occupational features of char people are dissimilar to the mainland dwellers. The mainland people not maintained an honest relation with the labour of char area. They use slung words to char people. Occupational status of the displaced char dwellers within the cities creates another sort of exclusion. They engage themselves within the work like mason, jogali, house labour, garbage picker etc. usually avoided by local people.

Exclusion of a marginal society from all kinds of basic necessities never be welcome. during a democratic society, all social groups desire civil right and therefore the opposite of which can mean failure of excellent governance. People of char area proved their skill in several field, particularly agriculture, but remain to be a marginalized group by virtue of prolonged negligence and discrimination. to beat this example of exclusion and

discrimination to char people, it's an urgent got to develop the social and economic infrastructure in char area. Removal of illiteracy and poverty is far important. Providing health care service, loan and job-oriented training facilities will help them to breakdown their 'vicious circle of poverty'. Over and above, measure to alleviate from recurring flood and protection of their land from erosion should be undertaken with priority.

In his work Chakraborty (2008) has mentioned that the process of human civilisation started with cultivation. Being the mother of other sectors, the Primary sector gradually gave birth of secondary and tertiary sectors. The growth of non-agricultural sector was the result of ever ending demand for varieties of consumption goods and services. Although there was continuous increase in the consumption of industrial and service sector products, the importance of agriculture sector was never reduced. Because food is the basic need of human being.

The sectoral dynamics is accompanied with the continuous change in the occupational structure. Normally, any individual worker will change his occupation in search of higher wage or higher productivity. Fluctuations in the income and employment shares of different sectors are two essential parts of the structural change of any economy. The study emphasised on the works of Lewis, Rostow, Fischer and Clark, Chennery and Kuznet on structural changes. A typical structural progression must be accompanied with rising per capita income, which in turn will enhance the opportunities for more and more people to achieve a decent standard of living in terms of development indicators.

The per capita income of northeast India is continuously rising but this is not exactly the reflection of structural change. Statistical tests have shown that per capita income is highly correlated with the per capita allocation of central resources in north-eastern states. Besides, the performances of these states are highly disappointing in terms of

income/expenditure ratio, buoyancy of own tax, own tax/total tax ratio etc. compared to any other general category states. It is easily understandable that economy is basically a dependent economy and cannot sustain in the long run without external assistance. Development experiences of north-eastern states raise different research questions and accordingly the study has formed different hypotheses and to test the hypotheses different research techniques have been applied on the relevant data. The major research techniques applied are trend analysis, regression analysis, principal component analysis, Granger causality test etc.

Sarma (2012) embodies an attempt to capture the totality of labour commitment of female cultivators and agricultural labourers. He took the composition of income and consumption expenditure and economic condition in terms of assets and liabilities, housing status, availability of safe drinking water, percent of household having electricity as a source of lighting, adult literacy rate and health care services of Assam. The study revealed that majority of female workers of rural areas is either female cultivators or agricultural labourers. The study found that female cultivators and agricultural labourers contribute a significant share of the labour use in crop production, but also spend a considerable amount of time in livestock rearing, food processing, Sericulture and weaving activities. These time commits are in addition to the amount of time spent in household cares. There is substantial gender specificity to many agricultural operations. Women agricultural workers continue to be paid less than their male counterparts, and suffer seasonality in employment. Though there are no inter village and intra village differences regarding labour time use, income and consumption expenditures of female cultivators and agricultural labourers, yet there are inequalities between the two sections of the rural society on some basic parameters of economic well-being like assets and liabilities, housing conditions, availability of safe drinking water, literacy rate, health care services and sanitation among the groups of villages under study.

This work employs ANOVA Technique (one-way classification model), Co-efficient of variation, Z- test, Composite Z-test to calculate the variation in income and consumption of the female agricultural labourers and cultivators in the different groups.

1.9.2. Review on Migration into *Chars* and Settlement:

Since day immemorial, different groups of people had been migrated into Assam. Migration from different angle created differences of language, caste, creed and society among the people of Assam. During the colonial period, the process of migration into Assam achieve the highest level (Gohain and Bora, 2007). For the expansion of colonial economy through tea plantation, coal and mining the then British Government imported labour from different parts of India (Chakraborty, 2009). Again, to meet the increasing demand for food crop in the state millions of peasants from erstwhile East Bengal were imported and most of them were Muslim (Kar 1980, Boruah 1980, Hussain 1993). The vast tract of virgin land in Assam was also attracted many of poor peasants of neighboring state (Bhagabati, 2005).

Assam got much abundant through the in-migration to its economy (Chakraborty 2009). Within an equivalent time, it causes a change within the demographic composition of the state. Indigenous people expose their awareness about migration and demographic alteration in 1916 (Guha 1999). In response to awareness of the local indigenous people, policies a bit like the 'line system', 'colonization scheme' were undertaken to ascertain settlement and occupation of land by migrants (Hussain 1993). The line system divided indigenous and immigrants into two classes. the first one was supporter of the line system while the later one was opposed (Ahmed 2005). Muslim migrants were reclaimed vast cultivable waste land within the riverine area (Bhagabati, 2005).

The tactic of migration into Assam didn't come to an end after the independence period too (Gohain and Bora 2007), but continues from Bangladesh. Indigenous people expressed their distress against immigrants and cause the Assam movement (Jana 2008). Though Assam Movement was against the immigrants but there wasn't uniform opinion on their numbers (Mahanta 2013). Immigration into Assam was considered a haul by one section of scholars while other opined it as colored. The Assam Movement was an expression of anguish against immigrants, no matter their religion. But communal instances were also not absent (Hussain, 1993). During the 1980's Muslim migrants were the soft target of the agitators, they taking bloody revenge against Muslim immigrants (Gohain and Bora 2007). It's matter of sad that the Muslim migrants were came into Assam during pre-independence period, but today also, they're called Bangladeshi illegal immigrants. The statistical evidence tells that the conception on Muslim illegal immigration isn't true. Migration of Muslim peasant from East Bengal into Assam has been continuous since 1891 (Das 1980: 859). That's Muslim migrants in Assam has been from pre-independence period. The notice for socio-economic and cultural safeguard of the indigenous people become popular within the Assam Movement but, to form sure the dominance over political power was the foremost aim of frontline leaders of the movement (Gohain and Bora 2007). Muslim migration was happening under the sponsorship of British administration which was supported by Assamese bourgeoisie. These people overnight become foreigner and soft target for attack (Boruah 1980: 56-57).

1.9.3. Review on *Char* Areas Social Structure:

The river Brahmaputra gives birth to numerous river islands which is known as chars and chapori (Bhagabati, 2005). The peculiar nature of char area distinguished itself from other parts of the state. Most of the char habitat villages are bounded by the water of river.

Those area located on the bank of the river is known as chapori. The society existing in char area is a marginal society and poverty is seen in all respect of the economy, society and livelihood pattern of char area (Chakraborty 2009). Due to lack of sufficient fund, Government initiative towards the development of char area is found to be insignificant impact (Chakraborty 2011).

As compare to the other area of the state char area is much unstable in respect of its existence. This instability causes various problems to the people of chars. People are deprived of all basic facilities essential to human life. There found lack of health facilities, educational infrastructure, employment opportunity along with other socio-economic problems. Uncontrol birth and high growth of population is a vital problem in chars. Demographic statistic for death and birth rate, immunization etc. are low as compare to the state average (Goswamy, 2014).

Erosion and its inherent displacement are common to chars. People once displaced are to move to another place. This displacement and movement are more or less frequent in all chars. People of chars are to fight against flood and erosion every year. Recently another issue says 'foreigner issue' is added to the above two. This is as because the entire flood-erosion victimized people are belonging to a soft targeted community in the state (Jana, 2008). Erosion induced displaced persons of chars are open and frequently termed as illegal immigrants as they go for job in other places (Jana 2008, Chakraborty 2011, 2012). This process led to exclusion of the char community from the mainstream Assamese community (Chakraborty 2011).

M. Kar (1990) has opined that the western part of the undivided Goalpara district viz. South Salamra, Lakhipur and Bilasipara was the earliest and mostly affected areas by immigration. The number of immigrations till 1881 was 49059. The population of the district

was increased by 1.4 percent during 1881-91 and 2 percent during next decades. But from 1901 onwards a fairly large number of people from Moymonsingha entered into Goalpara. The decade witnesses a natural growth of population at 15.6 percent. The number of immigrants rose from 49050 to 1,18,233 i.e., 19.7 percent of the actual growth of population of Goalpara district. The census report of 1911 was the first document on the extra ordinary influx of farmers to the chars of Goalpara from East Bengal district like Moymonsingha, Pabna, Bogura and Rongpur. Soon, almost all the available lands of Goalpara which were found suitable by migrants were covered. It was the next decades that immigrant's people spread to other districts of lower Assam and the colonist formed important element of the population in the four lower and central districts of Assam.

In 1911, total migrants numbered 2,58,000 in the Brahmaputra valley. They formed 20 percent in Goalpara district and 14 percent in Nogaon district. In Kamrup, they rapidly took up lands especially in the Barpeta sub division. During the decade, the settlers had not explored much in Darrang district and did not penetrate far from the Brahmaputra bank.

But as the inflow continued and their number increased, they expand further up the valley and away from the river bank. By the time, the entire waste land in the Goalpara and Nogaon district had been explored by the immigrants. Barpeta could actually hold no more and the Darrang district had already taken up.

Santo Barman (1994) had nicely explained the agrarian system under the Zamindars of Goalpara district. According to him, the relation of the Chukanidars or the actual cultivators of the land with the Zamindars were much pathetic. The influx of the immigrants' settlers of the East Bengal brought about a new state of things. It had rapidly raised the value of the land and a rise in the rent consequently. The increasing demand for land had created a desire on the part of the Zamindars and middle men to take every advantage of the new

comers. Referring to the situation, the then EAC. Babu Mohindra Dey in his note dated 13th February, 1914 pointed out that the total population of Goalpara district in 1891 was 4,52,773, 4,62,052 in 1901 and 6,00,643 in 1911. The large size of population attracted by the presence of char lands which has situated in the riverine tracts of the Brahmaputra. The *Jotedars* having *Jotes* in the tracts put these up to auction on the highest bidder. And naturally those who could afford to pay heavy '*salami*' in addition to rent were allowed to take up land in detriment of those who were already in possession but were unable to satisfy the capacity of those Jotedars.

The immigrants were settled mainly in permanently settled tract. Of course, they were hard working made excellent cultivators and had taken largely to the growing of jute. They may be called as enterprising cultivators. They were ready to offer higher rate of rent to the Zamindars of Jotedars.

The work '*Socio-Economic Life of the Char-People*' have a deep through the different problems and prospects of chars (Hussain and others 2005). People live in chars has contributed much to the economy of Assam particularly in agricultural sector. They have introduced multi crop at once in one piece of land and they never leave their agricultural field vacant in any season of the year. But the mainstream society did not like to recognised their contribution (Zaman 2005, Hussain 2005).

1.10. An Eye view on *Char* Area:

Char area is included those area which is found either on the bank or within the river like Brahmaputra. The size, shape and stability of these chars are subject to vary once a year with the mercy or anguish of the river. These char areas are affected by flood and erosion of the river Brahmaputra once a year (GoA, 1983). From Sadiya within the east to Dhubri

within the west of the state, there are 2251 char villages within the Brahmaputra valley. The govt through its 'Directorate of Char Areas Development', conducted two surveys for the people and society of chars. During the first survey (1992-93) number of char villages in char area were 2,089 which found increased to 2251 during the second survey 2002-03. The absolute best number of char villages were found in Barpeta district (351) during 1992-93 followed by Dhubri district (313). But after 10 years Dhubri district (480) takes the first position in respect of the quantity of char villages followed by Jorhat district (293). The chars have an area of 3,608 sq. km. and it constitutes 4.6% of the planet of the state.

The intensity of char land is particularly depending upon the flow pattern, discharge and erosion on the upstream. Existence of a char, thus, influenced by the above elements (Chakraborty 2011). Char lands are divided into three categories viz. Permanent, Semi-permanent and Temporary depending upon their longevity (Sarma 2014). Generally, first two categories are found with human settlement.

Dhubri could also be a bordered district. The district is surrounded by both international and inter-state boundaries. The Brahmaputra is that the most river within the district and there are other tributaries like Gadhadhar, Tipkai, Gourang etc. Char found both just in case of Brahmaputra and its tributaries, but char within the tributaries within the district aren't officially recognised. Both quite char i.e., chars located on the bank and attached to the mainland and other people chars are surrounded by river water, are found within the district. The later one is more flood prone than former. But so far as erosion cares, challenges are same for both the case.

Compare to the other region in Assam, the socio-economic status of the people sleep in char area are much pathetic and thus the condition. Within the Dhubri district the case isn't different, frequently speaking is more pathetic. Size of population of chars within the district

is 6.8 lakh and constitute 35% of the district (SESR 2002-03). Poverty and illiteracy at mass level are common altogether chars. Poor people (69%) of chars couldn't afford education to their children then that the literacy rate (19.3%) is way low than the state average 72.1%.

Agriculture is that the most occupation of char dwellers. They cultivate their land in both summer and winter season. The principal crop produced are paddy, jute, various oilseed, mustard and vegetables. Recently the traditional crop pattern found little change in char area. Because of heavy pressure of population in one hand and loss of land because of erosion on the other hand led to return away from the traditional farming. Now, a significant portion the landless and marginal farmers of the district are earning their livelihood from daily wage as labourer.

1.11 Importance of the study:

Dhubri is an agrarian and backward district in Assam. All the characters of an indigenous society are found in the districts. As more than 80% of the people earn their livelihood from agricultural sector which lost a vast tract of cultivable land every year due to flood and erosion. Consequently, these displaced people become landless, jobless as well as shelter less. They appear as migrating labourer and create many of the social and economic problems. Therefore, a systematic and scientific study on the problem like erosion and its impact on occupational structure or pattern are significant and important.

Every year a vast area of land is going into the Brahmaputra River as erosion in Assam as well as in Dhubri. During the period 1950-1980, the numbers of revenue villages fully eroded by Brahmaputra in the Dhubri District are as- Bagribari Revenue Circle- 06, Dhubri Revenue Circle- 06, South Salmara Revenue Circle- 56. On the other hand, numbers of villages partially eroded by Brahmaputra were as, Bagribari Revenue Circle- 124, Dhubri

Revenue Circle- 39, South Salmara Revenue Circle- 81, Mankachar Revenue Circle- 19, Chapar Revenue Circle- 11, Bilasipara Revenue Circle- 34. As per Government record there were 147 Revenue villages fully eroded till 1997 in only South Salmara Revenue Circle of Dhubri District in Assam. The number of people displaced due to erosion of Brahmaputra is 1.5 lakhs. Government initiative to control flood and erosion are seems to be insufficient.

Thus, a scientific research on the problem of erosion and its impact upon various segment of the society in char areas of the district of Dhubri is much necessary. Once the extent and acuteness of the problem and their impacts is sort out, then it will be helpful for the planners and policy makers to make and implement of appropriate measures to the problem.

1.12 Reference Period:

The reference period in this study includes the range of period 1950-51 to 2009-10. Due to non-availability of data, information of all the relevant variables could not be covered the entire range. The special significance of the period is that there has drastic change been take place in respect of intensity and depth of the river Brahmaputra and its char areas during this period. In our reference period, great earthquake (1950) taken place and then several great flood and erosion has been taken place in the Brahmaputra valley.

1.13. Limitations of the Study:

The main constraints in conducting research on the displacement and changes in the livelihood in the erosion effected char areas are non-availability of consistent data, lack of sufficient literature, communication gaps etc. Data, related with extent of erosion, displacement and damages of live and assets have suffered from the problem of inconsistency

with respect to different sources. As we had no option, we have chosen any one of those sources. Some literatures have not properly mentioned the data source.

1.14. Schematic Arrangement:

Chapter I: In this chapter we have discussed Statement of the problem, Objective, Justification, Scope, Hypotheses, Research questions, Review of literature and Schematic arrangement of the study.

Chapter II: This chapter deals with the Data base and Methodology of the Study.

Chapter III: This chapter presents a brief history of people living in char areas. It deals with background, history of immigration and land tenure system exist in the char areas.

Chapter IV: This chapter presents a discussion on flood, erosion and displacement. This chapter trying to analyses the extent of flood and erosion took place in different periods and number of damages thereon.

Chapter V: This chapter deals with the status of Government measures to control the flood and erosion problem in the state. The policy on the flood and erosion problem, anticipated measures, financial aid and rehabilitation has been analyses.

Chapter VI: This chapter deals with the analysis of the impact of flood and erosion on the socio-economic aspect. How the occupation, education, health and other amenities influenced by flood and erosion have been discussed.

Chapter VII: This chapter provides summary of findings, conclusions, suggestions and further scopes of research in connection with our entire study.