

An Assessment of the extent of redistribution of population in Majuli Island, Assam

Mayuri Das

Abstract:

Majuli, the world's largest inhabited river island has been shrinking in size over the years due primarily to the phenomenon of river bank erosion leaving only 421.65 sq.km of the island by the year 2001 rendering hundreds homeless especially during floods. Needless to mention, this accelerated rate of shrinking in the size of the island cannot be without its impact on the society, economy, demography and culture. An important dimension of the problem relates to redistribution of people on account of the loss of villages, agricultural land and other economic support base. The present study aims at assessing the magnitude of the problem of redistribution in the island both within and out. Using data available from successive census enumeration at the village level; from the year 1971 till 2001, the study measures the extent of population redistribution through an analysis of changes in the number and size of settlements, changes in settlement structure and changes in population distribution, density patterns and growth of population. It is hypothesized that the rate of shrinkage in the size of the island is directly related to an accentuation in the process of internal redistribution of population and/or out-migration of people and changes in settlement structure leading to greater proportion of large sized villages. A section, largely unable to find alternate source of livelihood elsewhere, however may still remain within the island by shifting to another location within the island itself through the process of internal redistribution. The process of internal redistribution is likely to induce changes in settlement structure as many small sized settlements would then become bigger with additional people.

Introduction

River bank erosion which is a fundamental and complex natural process though often influenced by human activities such as land clearance, agriculture, forestry, construction and urbanization is not merely a physical process of serious consequences but also has important demographic, social, cultural and economic implications for the vulnerable section of the people. The problem gets magnified when it involves a captive people such as those residing in a river island. It is however, a perennial problem in Majuli-the river island and the situation worsens during floods, rendering hundreds homeless and many more affected indirectly. The island has been shrinking in size over the years due primarily to this phenomenon of bank erosion. River bank erosion can cause complete loss of farm and homestead land and leave the poor in a totally helpless state without a source of income and livelihood, or even a house. It destroys the existing modes of production and ways of life, affects kinship and community organization and networks, causes environmental problems and impoverishment and threatens cultural identity of the people. Displacement due to river erosion continues to create impoverished families. People living in the marginal lands are severely affected and have to develop mechanisms to cope with this reality. They however cannot escape the prospects of displacement and rehabilitation when the situation goes beyond their control. Forced resettlement tends to be associated with increased socio-cultural and psychological stresses and higher morbidity and mortality

rates. Population displacement therefore disrupts economic and socio-cultural structures. People who are displaced undergo tremendous stress as they lose productive resources – land or otherwise in the adjustment process. Resettling the displaced poor and economically disadvantaged is not always an easy task. Majuli, one of the inhabited fresh water river island in the world happens to be a major seat of rapid social, demographic, cultural and economic change due to flood induced river bank erosion which is taking place at an alarmingly increasing pace year after year. Erosion is likely to submerge the river island in next 15 – 20 years. At stake is the glorious heritage of Assamese culture (already 29 satras vanished out of 65 satras). Population is increasing inspite of exodus due to displacement and per capita cultivable land holding is diminishing consequent threat on culture, socio – economy and ecology. It is a problem region and is a region perceived as highly “vulnerable”.

Study area

The mystical isle Majuli is known to be one of the inhabited freshwater river island in the world, a subdivision of Jorhat District, lies between $26^{\circ} 45' N$ and $27^{\circ} 15' N$ and between $93^{\circ} 45' E$ and $94^{\circ} 30' E$ which is facing extinction from two most serious problems notably from gradual loss of land area due to severe bank erosion and flood inundation. The end result of these twin processes is mostly migration out of the area where people and their forefathers have been living for ages and internal redistribution of population leading to greater proportion of large size villages changing settlement structure. Over the years rural people have migrated to urban areas not because they were fascinated by the glitters of urban life but mainly for not having any other option to keep them alive in the rural setting.

The great earthquake of 1950 brought about astounding natural and geographical changes to the island and to the Brahmaputra, the lifeline of Majuli. The river-bed swelled up due to the deposition of silt and alluvium, which resulted in intense erosion, thus fracturing some fertile areas of the island. Its elevation from the mean sea level is 84.50 metres. It is a second sub – division of Jorhat district of Assam with its headquarter in Garamur, 4 km north of Kamalabari township. The sub–division consists of 3 mauzas – Aahatguri mauza, Kamalabari mauza and Salmora mauza, 20 Gaon panchayats and 248 villages.

Objective of the study

This paper deals with the effect of flood and continuous erosion and shrinkage of the island which further effect the distribution, density, settlement structure and concentration of population

Data and methods

Much of the data required for this paper is based on secondary data collection from successive census enumeration, Agricultural Office (Garamur, Majuli), the Statistical Office in Garamur, the Block Development Office (Kamalabari, Majuli), District Commissioner Office, Brahmaputra Board (Guwahati), Flood Control Board (Guwahati), S.D.C. Office (Kamalabari, Majuli) and data available at N.E.C. Census data has been used to analyse the number of population dislocated and the villages submerged from the Majuli island. Besides, data has been generated to supplement information available from the secondary

sources such as relevant books, historical reports, journals, different maps, satellite images and toposheets of the region.

The study considers a time span of about 30 years, i.e. 1970 to 2001 while making use of secondary sources of data available mainly from census to understand changes that have taken place in the socio-economic, demographic and cultural spheres. This time period has been taken because the great earthquake of 1950 brought about astounding natural and geographical changes to the island and to the Brahmaputra which resulted in intense erosion. It is expected that the information available from the year 1971 would reflect the impact of the accelerated process of erosion on socio-economic, demographic and cultural life of the people. This would provide the much required temporal dimension to the changes in the demographic composition of the population, the redistribution process of the population within and outside the island.

All the secondary data has been analysed at the village level. The villages themselves has been classified according to their location in diverse zones of vulnerability to be identified by frequency of floods experienced and threat to their existence due to bank erosion. Available information from toposheets and remotely sensed data has been profitably used to identify these zones. Once the zones are identified demographic changes have been analyzed separately for these zones using village level data for the three decades. The demographic indicators include the following – changes in the number and size of settlements, changes in the settlement structure, changes in population distribution, density patterns and growth of population.

Analysis

The need to integrate hazard analysis and mitigation with the broader economic and social context is extremely important. It is argued that the capacity of the people to respond to environmental threats is a function of not only the physical forces which affect them, but also of underlying economic and social relationships which increase human vulnerability to risk. Hazard analysis and mitigation can be more effective when it takes into account such socio-economic, demographic and cultural dimensions to disasters. The most important problem that threatens the very existence, the life and properties of the people of this island is the continuous and extensive bank erosion by the mighty Brahmaputra, the Subansiri and the Kherkatia Suti rivers. Available records suggest that the average annual rate of erosion of the island was around 1.77 sq.km during the period 1917 to 1972, 1.84 sq.km during the period 1972 to 1996 and 6.42 sq.km in a span of five years preceding 2001, indicating an accentuated rate of erosion in the recent years. According to the earlier official data, in 1901 the island covered an area of 1325.51 sq.km; in the year 1941, the island had an area of 1324 sq.km which gradually shrunk to 564.01 sq.km by the year 1966-1972; and to 453.76 sq.km in the year 1996. The island's total area has reduced to only 421.65 sq.km by the year 2001 (Sharma and Phukan, 2003). Needless to mention, this accelerated rate of shrinking in the size of the island cannot be without its impact on the society, economy, demography and culture. The consequences of bank erosion and shrinking size of the island over the years may range from acute pressure on the existing land to population redistribution, out-migration, changes in occupational structure, increasing levels of poverty etc. The consequences of these impacts too are never uniform either spatially or socially. People living in the hazard prone areas are more likely to be affected more by the process of erosion than those living far away. Likewise people with poor economic base are more likely to face more adverse consequences of the bank erosion than those with better access to resources and income.

It has been noted that in Majuli till the year 2001 about 78 revenue villages had been affected by severe erosion and accordingly hundred sq.km. area suitable for agricultural land and residential area had submerged into the Brahmaputra River; many of the villages had shifted to Darang district, Titabar and Jorhat circle. A deemed uncertainty prevails in the perception of the people to hazards in the region. They do adjust with the hazards by rescheduling their crop calendar, rescheduling their crop practice using conventions of physiography, etc. They take shelter temporarily at higher places like roads, high mounds at flood times. They use country boat, 'bhur' (made of banana trees) for emergency evacuations and are generally well swimmers and use this art for their rescue and other works. But when these efforts fail, they use to migrate elsewhere or suffer loss. The flood protection works and anti-erosion spurs are not only insufficient but also not up to the mark and the flood water generally breach up or wash away them easily. Therefore this region becomes a playground of flood, bank erosion and channel shifting not only in the active floodplain zone, but also very often destruct heavily the normal flood free area bringing great threat to the whole region.

Demographic aspects

Population is considered as a source of economic development in Majuli. The people of Majuli represent the varied ethnic forms of cultural heritage with a total population of about 1, 53,362 with a sex ratio of 92.93 as per 2001 census with a population density of 364 persons per sq.km as compared to the total population of 1, 35,378 as per 1991 census with a population density of 300 persons per sq.km (Table 1). During the period between 1901 and 2001 the population of Majuli has gone up from 31219 to 153362 with a growth rate of 18.04% from 1951-1971 and 60% from 1971-2001. With the increase of population the density of population has also increased to 364 persons per sq.km in 2001 against 170 persons per sq.km in 1971. This tremendous increase in population has taken place in spite of grave threat to the very existence of this unique river island. In fact the increase in density is perhaps a result of progressive decline in the size of the island itself reflecting increasing man-land ratio in the fragile island. However the population is not evenly distributed. If an analysis of satellite imagery, undertaken by researchers at the Regional Research Laboratory in Jorhat District and the Department of Applied Geology of Dibrugarh University in Dibrugarh District in the eastern state of Assam is to be believed, Majuli may soon 'fall off' the world map due to intense land erosion effecting its unique culture and people's lives which is the cultural capital of Assamese civilization since the 16th century, based on written records describing the visit of Sankardeva – a 16th century social reformer. Mahanta (2001), Goswami (2002), Bhaumik (2003) and Ghosh (2006) noted with concern that the island is facing extinction as it is shrinking rapidly due to excessive flood and erosion, bringing misery to the people and shattering the fragile agro-economic base of the region (Figure 1).

Table 1: Area and the population density

Year	Area (sq.km.)	Population	Population density
1901	1325.51	31219	24
1911	1325.51	40420	31
1941	1324	75040	57
1951	1323.48	81001	61
1961	565.01	93541	165
1971	564.01	95618	170

1991	455.76	135378	297
2001	421.65	153362	364

Source: The Statistical Office, Garamur, Majuli

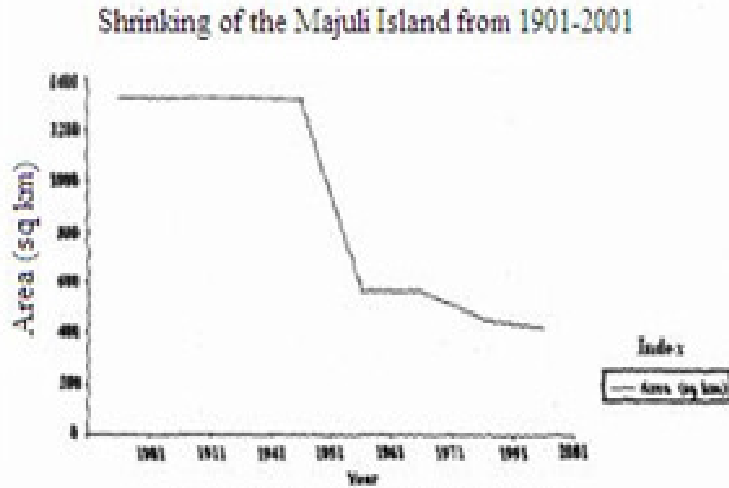


Figure 1: Shrinking of the Majuli Island

MAJULI

Eroded Areas upto 1991



Index

- Sub-Division Boundary
- Mauza Boundary
- Sub-Division H.Q.
- Satra Institutions
- Important Places
- Roads
- Rivers
- E&D Embankment
- Chaparior Charlands
- Eroded Areas Upto 1991



Scale: Not to Scale

In 1971 no census survey was done for Aahatguri mauza, since the Aahatguri mauza in the western part of the Majuli Island experienced flood in most part of its villages. As per the 1971 census records there were 179 villages, of which total number of inhabited villages and uninhabited villages were 158 and 21 respectively and which increased to 248 number of villages in 2001, this is due to the emergence of new villages or the union of villages into other villages, but of the 248 villages 53 villages have become uninhabited which are the areas heavily affected by erosion and floods and are believe to be inhabited before 1971 census and are therefore not included in the 2001 census. Aahatguri Mauza consists of 50 villages where all of them are newly formed and are surveyed only in 1991 census which reveals that Aahatguri mauza is inhabited only in a recent time having the least number of population. Out of 135378 population inhabiting the island in 1991 census only 8701 people are staying in Aahatguri mauza. While Kamalabari Mauza in the central part of the island has the highest number of villages (102 villages) with the least number of villages affected by flood. It also affords the largest number of population residing in the island with a growth rate of 44.15 from 1971-1991 while Salmora mauza in the eastern part of the island shows a growth rate of 25.36 from 1971-1991. But we can see a tremendous decline of growth rate of 12.8 and 11.9 in Kamalabari mauza and Salmora mauza respectively from 1991-2001. In 2001 we could see a decrease in the number of villages in each mauza but an increase in the number of households and population (Table 2). Population growth and distribution has undergone changes through the years and will continue to do so in the following years to come. Since Majuli island has been subjected to frequent flood during monsoon period, many part of the land and inhabitat area are not only washed away but also inundated for a long period of time. This necessitates the movement of large number of population from place to place eventually becoming a landless. The movement of people caused by flood greatly affected the distribution and concentration of population in the island. The Aahatguri mauza in the western part contained the least number of population where more than 80% of the villages are affected by flood whereas Kamalabari mauza in the centre which is least affected by flood and is the seat of the main township afforded the largest number of population.

Table 2: Mauza – wise population distribution from 1971 - 2001

Year	Aahatguri Mauza			Kamalabari Mauza			Salmora Mauza		
	Number of villages	Number of households	Total population	Number of villages	Number of households	Total population	Number of villages	Number of households	p
1971	-	-	-	93	6697	49617	86	5971	
1991	50	1322	8701	102	10932	71523	92	7889	
2001	27	1768	10947	89	13728	80687	79	10240	
Growth Rate (%)									
1971-1991			-			44.15			
1991-2001			25.81			12.8			
1971-2001			-			62.61			

Source: Census report of 1971, 1991 and 2001

Almost most of the villages affected by flood are located along the southern bank of the island where the influence exerted by the Brahmaputra River is greatest which greatly influences the movement of the people. Large chunk of population are concentrated along the central part of the island and if the erosion took place further which will wash the villages located along the southern bank, than movement of the people is likely to take place further northward where density of population is much lesser with more land unaffected by flood. Due to erosion of the land by the Brahmaputra River combine with inundation of villages for long period results in the rise in water level. The main factor influencing the settlement patterns in Majuli is the frequent floods which drive the people to select high lands like embankments and other flood free areas for settlement. In

Table 3: The changes in settlement structure from 1971 - 2001

Population size	1971		1991		2001	
	Number of villages	Percentage of population	Number of villages	Percentage of population	Number of villages	Percentage of population
Without Population	21	11.73	38	15.57	53	21.37
<500	87	48.60	108	44.26	87	35.08
500-1000	43	24.02	59	24.18	58	23.38
1000-1500	21	11.73	19	7.78	23	9.27
1500-2000	3	1.67	12	4.91	12	4.83
2000-2500	2	1.11	3	1.22	7	2.82
2500-3000	1	0.55	2	0.81	5	2.01
>3000	1	0.55	3	1.22	3	1.20
Total	179	100	244	100	248	100

Source: S.D.C. Office, Kamalabari, Majuli

the winter season the people again temporarily settle in the low lying areas for agricultural activities. We can see a gradual increase in the number of villages without population of 21, 38 and 53 number of villages having 11.73, 15.57 and 21.37 percentage of total population in 1971, 1991 and 2001 census respectively due to the monsoonal flood and continuous erosion (Table 3). Number of villages having small size population of less than 500 is more in each of the decade and in 1991 it has the highest number of small size population of 108 numbers of villages. The large sized villages of more than 3000 is gradually increasing from one in 1971 to three number of villages in 1991 and 2001. The process of internal redistribution is likely to induce changes in settlement structure as many small sized settlements would then become bigger with additional people. It is hypothesized that the rate of shrinkage in the size of the island is directly related to an accentuation in the process of internal redistribution of population and/or out-migration of people and changes in settlement structure leading to greater proportion of large sized villages.

Due to regular occurrence of flood and erosion every year, the homeless, landless problem has become a common experience for the people of Majuli (Table 4) and thus the cultural, economic, demographic and social life of the island has been affected tremendously. A number of major floods caused extensive damages and losses after 1950 with different magnitude in different years depending upon the intensity of the flood and the erosion it follows and if we see in the year 1977 it eroded about 15 numbers of villages taking 292 numbers of families which was almost the same from the year 1979 – 1982

except in the year 1978 which eroded only 81 numbers of families. In 1972 seven villages from Aahatguri Mauza got shifted due to high intensity of erosion to Darang district, where 458 numbers of families and 4000 number of population of two Gaon Panchayat got redistributed. Those villages are – Raomari, Gojpuria, Kutumbgaon, Saraibari, Baligaon, Bahumari and Pisola Dakchaponi. The intensity was quite high in the year 1983, 1987 and 1992 which left its impact on 343, 416 and 622 number of families. The damage of floods was much more in 1998, 1999 and 2000 which eroded about 284, 286 and 569 numbers of families respectively and its losses included crops, properties and human lives. Many people were displaced, become frustrated when alternative ways are limited. They have forgotten the otherwise normal life in the region and try to fight or adjust with hazards. A peculiar trend continuous throughout the remaining year. From 1971 till 2001 around 7361 family were redistributed and many people got rehabilitated in Rampur (Jorhat) – 167 family, Kaliyapani (Teok) – 53 family, Tatibari (Majuli) – 62 family, Panikhati (Titabar) – 201 family. Every year the flood inundation and gradual loss of land area due to severe bank erosion leave a trail of destruction, washing away villages, submerging fields and drowning livestock, besides causing loss of human life and property, stopping any kind of developmental activities on that island. Woes and miseries have become part of their life and the homeless, landless problem had become a common sector for Majuli people, which has affected the bio-diversity of the island, flora and fauna, socio-economic and cultural fabric and the demographic pattern of the population.

Table 4: Number of villages and families eroded from 1976 – 2006

Sl.no.	Year	Number of	Villages
1	1976	173	10
2	1977	292	15
3	1978	81	5
4	1979	148	5
5	1980	167	11
6	1981	193	N/A
7	1982	188	11
8	1983	343	16
9	1984	151	10
10	1985	227	12
11	1986	184	8
12	1987	416	N/A
13	1988	206	17
14	1989	308	N/A
15	1990	51	20
16	1991	273	28
17	1992	622	N/A
18	1993	111	10
19	1994	123	5
20	1995	63	7
21	1996	196	11
22	1997	60	7
23	1998	284	13
24	1999	286	20
25	2000	569	28

26	2001	63	1
27	2002	204	14
28	2003	100	8
29	2004	401	26
30	2005	253	15
31	2006	138	N/A

Source: S.D.C office, Kamalabari, Majuli

Conclusion

Rate of shrinkage in the size of the island is directly related to (a) an accentuation in the process of internal redistribution of population and/or out-migration of people (b) changes in settlement structure leading to greater proportion of large sized villages. It is likely that there will be a fall in the carrying capacity of the island with decrease in resource availability particularly that of agricultural land forcing a section of the people to migrate outside the island. A section, largely unable to find alternate source of livelihood elsewhere, however may still remain within the island by shifting to another location within the island itself through the process of internal redistribution. The process of internal redistribution is likely to induce changes in settlement structure as many small sized settlements would then become bigger with additional people. People located in the most vulnerable areas and those belonging to poorer segments internally redistributed. Conversely people from relatively better off socio-economic status and located in vulnerable areas migrate out of the island. It is assumed that the poorer segments are generally confined to the most vulnerable parts of the island and it is this segment which is less likely to find opportunities outside the island. The better off sections however, may find economic opportunities outside the island. Shrinking of the island is coterminous with increasing poverty and marginalization with falling economic base of the island of a large segment of the people. Rapid decrease in the size of the island does not provide adequate time for the affected people to adapt them to the changed economic condition, nor does it permit quick diversification of the economy. The net result may be increasing poverty and marginalization of a large segment of population. There has been an increasing economic dependence of the people on the mainland. It is assumed that the riverbank erosion will seriously hamper self reliance of the island economy at least for a section of the population.

River bank erosion in the river island is seen as one of the major causes for poverty, the degree of economic loss and vulnerability of population which has dramatically increased in recent years as the impact of land loss involves primarily the loss of homestead land, housing structures, crops, cattle, trees and household utensils which forces people to move to new places without any option and puts them in disastrous situations which affects people, irrespective of farm sizes causes setback for village agriculture, erodes farmland, infrastructure and the communication system, affects the crop income of vulnerable groups and the affected people lose their assets and are forced to draw on savings and often fall into further debt which leads to the displacement to distant areas. Thus we can observe the effects of flood exerted by the Brahmaputra River on the Majuli Island. The change in population dynamics thus reflects the history of man's response to environmental possibilities and it is also a determinant of the economic development of the region. The huge amount of pressure from the Brahmaputra on the one hand and the island's geomorphological conditions on the other which is more susceptible to flood and erosion made the island in a gloomy condition resulting in the

sufferings of the people. The uneven distribution and the movements of population in the island can solely be attributed to the work of the Brahmaputra River.

References

- Ahmed, H. (1995) 'Impact of River Bank Erosion on Kinship Relationship', *Samaj Nirikkhon* 6(2): 58.
- Bhaumik, A. (2003) Online: *The Fury of Brahmaputra*. <http://www.telegraphindia.com> (downloaded on 21st August 2006).
- Goswami, D.C. (2002) 'Flood Forecasting in the Brahmaputra River, India: A Case Study', in S.R.Chalise and M.Shrestha (eds) *Regional Cooperation for Flood Disaster Mitigation in the Hindukush-Himalaya*, ICIMOD Internal report: 16-17.
- Ghosh, S. (2006) Online: *Politics of River Island in Asom*. <http://www.majuli.info> (downloaded on 3rd August 2006).
- Hussain, I., Choudhary, J.N., Ghani, M.U. and Naik, S.D. (1993) 'River Bank Erosion of Majuli Island as Deciphered from the IRS Imagery', *Proceedings of National Symposium on Remote Sensing Application for Resource Management with Special Emphasis on North-Eastern Region*: 31-35.
- Hasan, J. (2002) Online: *Living with River Erosion*. <http://www.weeklyholiday.net> (downloaded on 5th October 2006).
- Lubkemann, S.C. (2002) 'Refugees', *In World at Risk: A Global Issues Sourcebook* 23(2):522-544.
- Mahanta, P.K. (ed.) (2001) *Majuli*, Jorhat: New Era Media Service.
- Mutton, D. and Haque, C.E. (2004) 'Human Vulnerability, Dislocation and Resettlement: Adaptation Process of River Bank Erosion- Induced Displacees in Bangladesh', *The Journal of Disaster Studies, Policy and Management* 28(1): 41.
- Rahman, M.M. (1988) 'Vulnerability Syndrome and the Question of Peasant Adjustment to River Bank Erosion', *Flood Hazard and the Problem of Population Displacement* 8: 11-13.
- Sarma, J.N. and Phukan, M.K. (2003) Online: *Origin and Some Geomorphological Changes of Majuli Island of the Brahmaputra River in Assam, India*. <http://www.sciencedirect.com> (downloaded on 4th August 2006).
- Shaw, Rosalind (1989), 'Living with Floods in Bangladesh', *Anthropology Today* 5(1): 10-13.
- Sen, T.K., Nayak, D.C., Maji, A.K., Walia, C.S., Baruah, U. and (2005) *Soil Erosion of Assam, Nagpur*: National Bureau of Soil Survey and Land Use Planning.
- Vadivelu, S., Baruah, U., Bhaskar, B.P., Mandal, C., Sarkar, D., Walia, C.S. and Gajbhiye, K.S. (2004) *Soil Resource Atlas – Jorhat District (Assam)*, Nagpur: National Bureau of Soil Survey and Land Use Planning.
- World Bank/Asian Development Bank Joint Working Paper (2006) 'Future Directions for Water Resources Management in the Mekong River Basin', Washington, D.C.
- Zaman, M.Q. (1989) 'The Social and Political Context of Adjustment to River Bank Erosion Hazard and Population Settlement in Bangladesh', *Human Organization* 48(3): 196-205.