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Impact of Flood on Rural Development in the Brahmaputra Valley, Assam: A Challenge

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ABSTRACT

The term rural development implies to the process of developing the status of life and economic wellbeing of people living in relatively peripheral and sparsely populated areas. It is also characterised by its emphasis on locally produced economic development strategies. In contrast to urban regions, which have many similarities, rural areas are highly distinctive from one another. In Assam, especially in the Brahmaputra valley economic development in the rural areas is a task of serious matter. The river Brahmaputra is one of the master stream of the region which is also recognised as lifeline of people of Brahmaputra valley. For this reason there are a large variety of rural development approaches in the floodplain or basin area of the river Brahmaputra. For this reason, all the floodplains of the world have been the areas high human significance in the interlinking arena of use-response-adaptation-management-development. Floods in recent years have posed serious problems almost in floodplains and fluvio-geomorphologically unstable river basins like Brahmaputra valley. In the last two or three decades, flood and its associated problems all over the world have been investigated and mitigated by adopting both the structural and non-structural methods. As such recent advances in science and technology on the one hand, and the strong human response at different levels and activities on the other are best applied to cope with the troublesome floods in a river area to develop the rural economy. In this paper, a preliminary attempt is made to bring forward the nature of flood problems and rural development in the Brahmaputra valley, Assam.

Key words: Rural development, Natural Resources, Floodplain, Flood damage.

INTRODUCTION:

Development means a succession from a simpler or lower to a higher, mature; or intricate form or stage. In other words, development can be defined as the continuing advancement or growth through a series of remarkable progressive changes. Development is a corridor to reach certain goals. Rural development generally refers to the process of improving the quality of life

and economic wellbeing of people living in relatively isolated and sparsely populated areas (Malcolm, 2003). Rural development traditionally based on the natural resources available on the surface of the earth. The infrastructural facilities are the vital element for the socio-economic development of a rural area. Rural development criteria are mainly development of education, health care, drinking water, transport and communication system, financial institutions, social institutions, electrification, market and commercial centres etc. in rural areas. From the dawn of human civilisation on the surface of the earth, economic activity started with primary level such as agriculture, forestry, mining, hunting etc. These economic developments first started and flourished in the river valleys of river Tigris and Euphrates. Most of the world developed countries are always rich with a big river system because river valleys are very fertile than the other existing landforms of the earth. Rivers are dynamic entities having hydrologic, geomorphic, ecologic, environmental and economic significances. They cause boon, belief hazards and disasters mostly in the riverine areas of high to medium rainfall and high concentration of human habitation. But, one of the most important developments of the rivers is the flood. Flood creates problems, makes hazards and disasters and damage land and floodplain dwellers' habited, standing crops and many others. In recent years, onslaught of floods has become more intensified in the volatile riverine areas. Therefore, studies on flood have taken a new shape with the flood problem solvers and strategy makers for sustenance of land, peoples, habited, society, polity, economy, ecology and environment of the areas concerned. In spite of dangers and hazards of waters of the rivers their banks and valleys have, since the human inception over the surface of the earth, been the cradle of human civilisation.

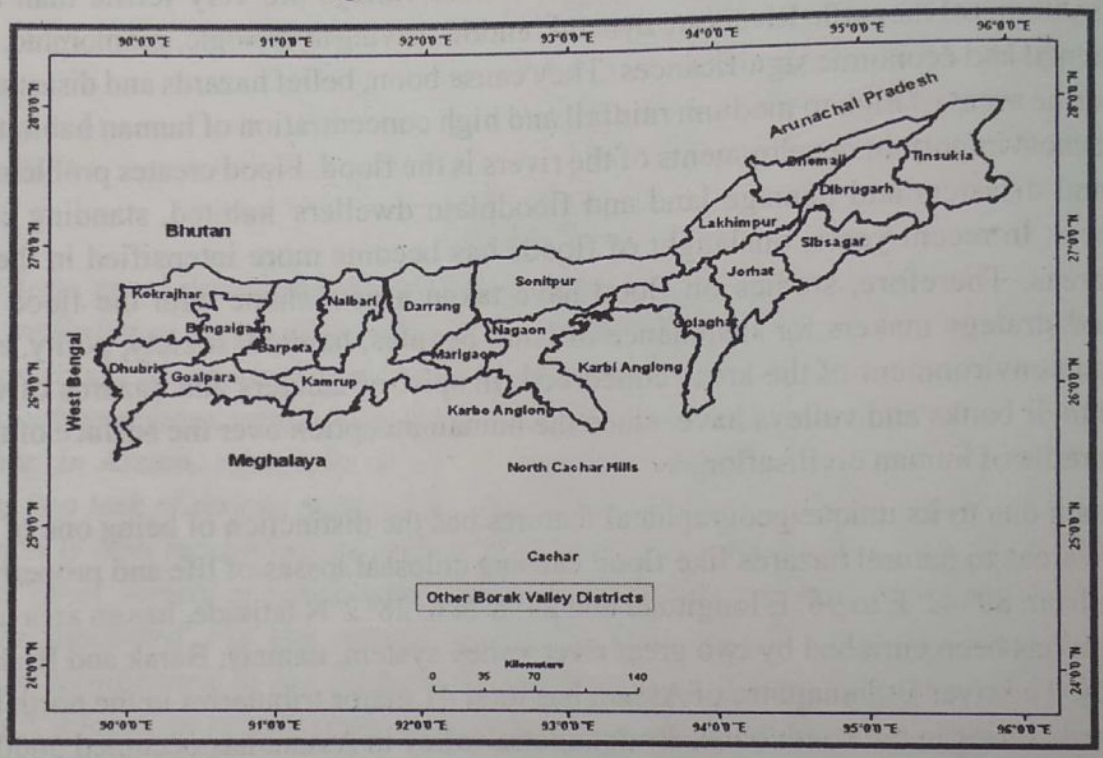
Assam due to its unique geographical features has the distinction of being one of the most vulnerable areas to natural hazards like flood causing colossal losses of life and property. Assam extending from 89° 42′ E to 96° E longitude and 24° 8′ N to 28° 2′ N latitude, has an area of 78, 438 km². Assam has been enriched by two great river valley system, namely, Barak and Brahmaputra river valley. The river Brahmaputra of Assam has total 41 major tributaries in the north bank and 26 major tributaries in the south bank. Brahmaputra valley in Assam has occupied 56000 sq km. area which is rich with alluvial soil. The Brahmaputra river valley suffers from very high to medium flood almost in every year of long durations. As the economy of Assam is basically depending on agriculture, almost 80 per cent peoples are engaged with primary economic activity in rural areas. Therefore, flood problem is one of the major hindrance and challenge for the rural development of Assam. The flood affected area is least studied in respect of flood genesis, flood enhancement and proliferation, and flood damage. Such kind of studies has already received due momentum in advanced countries like the U.S.A., U.K., Japan and many other temperate countries. The districts of Assam needs careful studies on flood, flooding and flood problems towards their evaluation management and decision-making so that the land as well as the human economic conditions and rural development may be protected for their sustenance.

GEO-ENVIRONMENTAL SETTING OF BRAHMAPUTRA VALLEY:

North east India basically the northern part of the geological province is constituted by the Assam Arakan basin which includes Assam, Nagaland, Manipur and Tripura (Mathur and Evans,

1964). The Brahmaputra valley had undergone a series of geological and tectonic events. The whole of the Brahmaputra valley in Assam represents a thick cover of surroundings hills and mountains (Figure-1). The entire Brahmaputra valley is a part of narrow elongated trough called the fore-deep (Krishnan, 1982). The Ganga-Brahmaputra basin is covered with thick old alluvium sediment deposited by the numbers of streams flowing from the mountains and hills. Between Kobo and Dibrugarh a distance of 70 km long the river has steep gradient, but immediately after crossing Dibrugarh the river basin is flat and only 30 meter height from the mean Sea level (MSL) to Dhubri district of the valley.

Figure-1 Brahmaputra Valley



From the origin of Brahmaputra valley, the region is undergone a number of geologic and geo-environmental disturbances because of its structural frame work. Assam possesses a special fluvial environment, with large plains and dissected hills of the South Indian Plateau system abutting the Himalayas to the north, north-east and east. Geomorphic studies also conclude that the Brahmaputra is a paleo-river, older than the Himalayas, which often crosses higher altitudes in the Himalayas eroding at a greater pace than the increase in the height of the mountain range to sustain its flow. Remarkable tributaries of like Kapili, Subansiri, Pagladia, Manas, Jia Bharali, etc. are passing over some faults and the basin lie on sunken blocks (Goswami, 1978; Rao, 1979). Because of structural framework, geologic and geo-dynamic characteristics of the valley, the region is greatly faced by number of problems in the form of earthquake, landslide, channel shifting flood, etc. (Gregory, 1977; Schumm, 1971). The Brahmaputra valley receives heavy rainfall in the monsoon period amounting annually from 2300mm up to 5000mm. Because of heavy incessant down pour in the river valley, there have been acute problems of flood, soil and river bank erosion. Some of the rivers of the valley partly fed by snow melt water and partly fed by the rain water. On

the basis of location and its character, the entire Brahmaputra valley may be divided into four parts namely North Bank Plain (NBP), Upper Brahmaputra Valley (UBV), Central Brahmaputra Valley (CBV), Lower Brahmaputra Valley (LBV).

RURAL DEVELOPMENT OF BRAHMAPUTRA VALLEY, ASSAM:

According to Barron's real Estate Dictionary, rural means pertaining to the area outside the larger and moderate-sized cities and surrounding population concentrations. Generally, rural area is characterized by farms, ranches, small towns, and unpopulated regions.

The concept of rural development is spreading and linked with global economic system. Increasingly tourism, niche manufacturers, and recreation have replaced resource extraction and agriculture as dominant economic drivers. The term rural development is the process of enhancing the standard of living and economic wellbeing of people living in relatively isolated and sparsely populated areas. Basically rural development depends on exploitation of natural resources and good use of those resources by using new tools and techniques. Now a day's rural areas are highly influenced by the globalization concept and economic networking with urban centres. Education, entrepreneurship, physical infrastructure, and social infrastructure all play an important role in developing rural regions. Rural development is also characterized by its emphasis on locally produced economic development. As Assam is a motherland of river so its economy is also highly related with water. One of most important area in rural development is agriculture. Entire Brahmaputra valley is composed by very fertile soil i.e. old and newly form alluvium soil (Goswami, 1985). Many steps have been taken to improve the agriculture specially in the interior part of the villages. Table-1 shows the different types of agricultural activity in different districts.

Table-1 Types of Agriculture in Different Districts

Major flood prone districts as on 1978	Areas in lakhs Hectares			Flood prone area in Percentage	
	Total	Gross croppes	Flood prone	To the total	to the gross cropped area
1. Kamrup	9.9	6.3	6.1	61.60	897.0
2. Darrang	8.3	1.5	4.3	48.70	45.6
3. Dhemaji	9.0	4.3	4.5	50.55	104.7
4. Nagaon	5.6	4.0	5.0	53.60	75.9
5. Goalpara	10.4	5.2	7.0	47.50	134.6
6. Lakhimpur	5.6	2.0	2.1	36.70	105.0
7. Dibrugarh	7.0	2.4	4.4	62.60	183.3
8. Cachar	7.0	2.9	2.6	37.90	89.7
9. Dhubri	-	-	34.0	-	-

Source: Economic and Statistics Departments, Government of Assam

The villagers always like to settle near the river bank or in a big water bodies as it helps to implement minor irrigation and ground water for agriculture. A related scheme on rural development

is the programme on drinking water supply and priority has been given on providing safe drinking water supply in rural areas.

Another important area in rural development is primary health and hygiene. Indeed, the rural development of Assam is a challenging task. It involves combating elements like floods and drought and cyclones on the one hand and an enormous rise in population on the other. However, with the positive steps taken in this direction, it is easy to see that major improvements have been taking place throughout the state. As the economy of Assam is basically depending on rural development so it is one of the vital issues before the Government of Assam. Various kinds of schemes and policies are introduced to develop the rural economic activities by the concerned government. Highest priority that needs to be given for rural development is the abolition of poverty. It is observed that small scale and cottage industries can play a very effective role in this direction. Father of the nation Mahatma Gandhi said during the visit of Sualkuchi in 9th of January, 1946, that "every woman of Assam is a born weaver, no Assamese girl who does not know how to weave can expect to become wife". According to a census report (2001) the country has a total of 38.9 lakh looms and the share of Assam is 41 per cent or 12, 22,956 looms on which 17, 16,440 weavers are working. Apart from weaving, there are many more cottage and small scale industries in Assam like bee keeping, net keeping, handicrafts making and so on. The Community Development Programme was started in Assam on 2nd October, 1952 aiming at the improvement of the economic, social and cultural life of the rural people by means of comprehensive programme of agricultural development and other allied sectors. Now a days, government has introduced many valuable and profitable financial schemes for the unemployed youths. With the help of such kinds of schemes, many small Self Help Groups and NGO's are developing their economic structures by fishery, livestock, horticulture, floriculture etc. The District Rural Development Agencies (DRDA) and the State Khadi Board have given assistance and credit to thousands of villagers under the scheme of rural development.

FLOOD IN BRAHMAPUTRA VALLEY:

By the term 'flood', we generally mean the river floods. It is defined as an unusually high stage of water in a river. Normally, the level at which the river overflows its banks and inundates the adjoining area is called the flood stage, (Subramanya, 1994). Mutreja (1987) has also defined the flood compensable is actually very difficult as it encompasses a number of conceptions. All the above meanings of flood are not actually enough for all the people because flood is perceived differently by different sections of people. They consider its impact on environment, economy, society, etc. differently. From this point of view, flood is always a word of complex meaning and conception (National Flood Commission, 1980). In general, we think that flood is common phenomenon of a river or its basin since its existence. Still many complexities are to be understood as regard floods. Floods in different rivers occur differently irrespective of rivers' bank levels and overflow conditions of waters. Hence, the most common and easily comprehensible meaning of flood is a "body of water which rises to overflow land which is not normally submerged" (Ward, 1978).

Flood in the Brahmaputra is a regular event. The flood waves generally are recurring four to five times annually (Kalita, 2010). The Brahmaputra basin in India, particularly its valley in Assam

represents and acutely flood prone region characterized by flood and flood associated problems causing loss and damage of life and property. The Brahmaputra valley is surrounded by hills and plateaus and therefore environmentally sensitive to floods. Assam has a total flood prone area of more than 3.40 million hectares of land. The dimension of river strength and erosion of land due to floods in the district can be judged from the governments record that during 1954 to 2003, more than 4 lakh hectares of plain land (equivalent to 4000 sq.km or 6.70 per cent of the plain areas in Assam) in Assam were eaten away by the monsoon floods (Water Resource Dept, Government of Assam, 2003). Due to rains and flood during 2003 (Provisional, as on 10-07-2003) in Brahmaputra valley, 2614 villages were affected and total 18.18 lakh peoples were severely affected. Here, it is again mentioned that floods and their impact on land and people have been historical. Historical record (Gait, 1926) reveals that the severe earthquake of 1897 caused heavy siltation along the river beds in lower Assam and very high flood was observed. Table-2 shows a picture of flood prone areas in different districts of Assam as on 1978. As per an estimate of the Rastriya Bada Ayog, 2004, only an area of 1.62 million of hectares of land in Assam is protected from flood. An estimate by Rashtriya Bandh Ayog 2005 shows that Assam has a total flood prone area marked within 3.15 million hectares to 3.82 million hectares of land out of the state's total area of 7.85 million hectares. This natural hazard is a chronic problem in the Brahmaputra valley since long and becomes well pronounced.

Table-2 Flood Prone Areas in Different Districts of Assam

Major flood prone districts as on 1978	Areas in lakhs Hectares			Flood prone area in Percentage	
	Total	Gross croppes	Flood prone	To the total	to the gross cropped area
1. Kamrup	9.9	6.3	6.1	61.60	897.0
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3. Dhemaji	9.0	4.3	4.5	50.55	104.7
4. Nagaon	5.6	4.0	5.0	53.60	75.9
5. Goalpara	10.4	5.2	7.0	47.50	134.6
6. Lakhimpur	5.6	2.0	2.1	36.70	105.0
7. Dibrugarh	7.0	2.4	4.4	62.60	183.3
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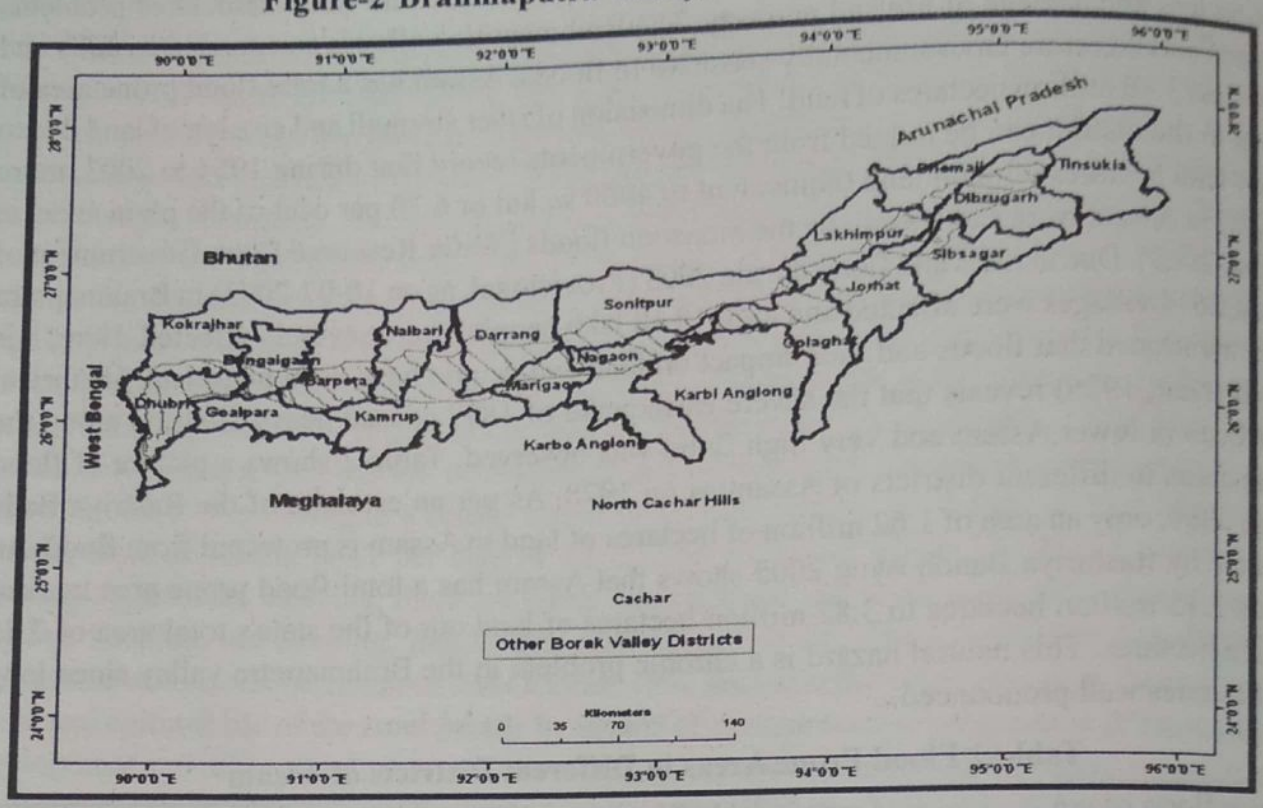
9. Dhubri	-	-	34.0	-	-

Source: Water Resource Dept., Government of Assam.

Historical records reveal that the process of siltation caused by flood waters along river beds has also become a big problem in Assam since 1897 earthquake (Gait, 1926). The extent of flood damages in the Brahmaputra valley during 1954 to 2007 is enormous (Table-1). It indicates that flood damage rose up to as high as year after year. During mentioned periods, the remarkable major floods years were 1954, 1962, 1966, 1972, 1977, 1984, 1986, 1988, 1998, 2000, 2002, 2004, 2007 and 2012 (Figure-2).

Figure-2 Brahmaputra Valley, Flood Affected Areas



Assam, being a land of numerous rivers, supplies excess surface waters to cause floods differently at different locations. Most of the river valleys particularly the Brahmaputra valley, in India have today attained high magnitude floods, for example, the high flood of 10th August, 2004 and 2nd July, 2012. The floods of such magnitude greatly disturb land and people of the basin areas. The rivers, mostly the big tributaries to the Brahmaputra in Assam cause heavy floods due to the heavy downpour during the monsoon period. The high floods of 2004 and 2012 well exemplifies that Assam's floods are mainly due to cloud outburst during the monsoon season. The flood in 2004 broke all previous records affecting 28.5 million hector of land, 12.3 million people, 12.6 million hector of crop land and 10,560 villages besides claimed 251 human lives. The floods that began in July have so far hit more than 10 million people covering about 9,000 villages - the worst hit districts being Cachar, Karimganj, Hailakandi, Dhubri, Morigaon, Barpeta, Goalpara and Nalbari. Incidentally, the districts are Muslim populous who make nearly 31 per cent of state's total population.

According to 2001 census, total population of Assam is 2, 66, 38, 407 and flood displaced are more than one third of the total population. There are reports of breaches in embankments in 60 places. Flash flood partially damaged National Highway (NH) 31 and 52 and posed a threat to state's main life line NH 37 by eroding basement area of an important bridge in Golaghat district. An Assam government statement said 'a total land area of two million hectares was affected, besides nearly 4.8 million hectares of crop land, since July'. A total of 70 people have been drowned in separate incidents till 15 September 2007. The State Disaster Management Authority (SDMA)

said conditions were improving in almost all the 27 districts except Dhemaji. Over 800,000 people are still affected by floods in 12 districts while conditions have improved in 15 districts till Thursday, according to SDMA. It said 2, 99,872 people were residing in 536 relief camps in 12 districts. The state government had set up 622 relief camps, it added. SDMA also said that the floods had breached 42 embankments in Assam's Brahmaputra Valley including that of Brahmaputra river and 14 of its tributaries. An estimated 22 lakh people have been affected in severe flood in the year 2012 causing huge damage in 2,809 villages.

IMPACT OF FLOOD ON RURAL DEVELOPMENT:

Man's affinity for floodplain has a long history and now not less than 70 per cent of the total population of the world have their occupancy in floodplains. For example, it is estimated that in the United States 10 million Americans live in significantly defined floodplains and another 25 million could settle in the areas affected by floods (American Water Resource Association, 1972). Nearly half of the population of the Far East continually faces the danger of floods in their riverine habitats. They influence on the distribution, growth and redistribution of people, and occupancy as well over space and time. Actually, the recurrent threats by river bank erosion and channel shifting, etc. have been the matters of serious concern. In Brahmaputra valley, the riverine areas being under excessive supply of water due to heavy rains cause floods which badly affect human settlement, agriculture and occupation etc. The frequently occurring channel shifting, high floods, river banks erosion in many parts of the districts of Brahmaputra valley, specially in the rural areas which is active floodplain area have been rendering out migration of a section of indigenous people who are unable to adjust with the floods. Such a feature of out -migration has occurred highly along the northern tributaries of the river Brahmaputra. The floods in 1988, 1998, 2003, 2005, 2004, 2007 & 2012 were worst in recent history. Major flood affects the land, crop land, people, cattle and wildlife, road, transport and communication system, diseases, economy, trade and commerce, social status etc.

Floods in Brahmaputra valley caused huge destruction and irreparable loss to the state's economy and people which is largely agrarian. It causes great damage to grazing lands and fodder crops, affect grains as well as seeds stored in granaries and destroy cattle. Agricultural fields are highly affected by the flood problems because generally all are in rural areas and they are the victims of flood. It occurs due to failure of embankment, almost every year 100 embankments are breached out by the heavy flood water. The zones, namely, Lower Brahmaputra Valley, Middle-Lower and Upper Northern Plains, are characterized with more or less similar kind of high mean annual rainfall (3000 to 5000 mm), high soil moisture, severe occasional floods and, resultantly, more soil erosion (National Bureau of Soil Survey, 2003). Some of the district of Brahmaputra valley are rigorously affected by soil erosion, these are Rahmaria in Dibrugarh, Majuli in Jorhat, Gamiri, Gangmouthan, Singri, Nanoi in Sonitpur, Dhkuakhana in Lakhimpur, Palashbari and Rangia in Kamrup (Rural), Sipajhar and Mangaldai in Darrang, Maoirabari, Howly, and Moinbari in Barpeta, Gaouripur, Salmari and (many part) in Dhubri, and some other parts of the Bongaigaon and Goalpara district. As a result, these zones had less inter- zone differences at their agricultural productivity levels in the early as well as the late nineties. Agriculture was among the severely

affected areas during the recent floods in the Brahmaputra valley with 2, 54,959 hectares of crop land under flood damage (Assam Tribune, 2012). It is notable that out of the total area, maximum portion belonged to rural areas of the valley. Severe damaged was observed in Lakhimpur (22,221h.), Dhemaji (N/A), Jorhat (16,821h.) Nalbari, (19,001h.), Nagaon (18,077h.), Darrang (18,413h.) and Chirang (14,052h.) districts of Brahmaputra valley. Upper part of Brahmaputra river having comparatively high slope than the downstream part of the river Brahmaputra, the flood havoc is very high in lower part of Brahmaputra valley. In Rangia sub-division of Kamrup (Rural) district nearly 1, 94,916 numbers of people and around 1, 05,000 live stock cattle were affected by the river Puthimari and backward force of the river Brahmaputra in the flood of 2012 (Rangia administration, 2012). Since years 2003, 2004, 2005, 2007 and 2012 have seen massive destruction in the Brahmaputra valley specially in the rural riverine areas, the rivers along with their floods greatly influence road and communication network of the rural area than the urban area. It is observed that every year the roads constructed specially by the government of Assam under different programmes meant for elevating the rural communication and mobility are very much disturbed almost everywhere in the Brahmaputra valley. The gravel as well as metalled roads including the National Highways across the rivers is often breached at different locations by floods. These sorts of breaches do occur specially in the rural areas of chronically flood affected. For example, the river Subansiri, Pagladia, Beki, Manas, Nanoi, etc. caused damage to iron bridge in many villages in 2000, 2003, 2004, 2007 and 2012.

It also takes away the nutrient rich top soil. Malaria, Cholera and other disease appear causing a heavy loss of life. Most of the damage is caused in the rural areas leaving the people poorer and starving. On the other hand, because of growing fertility of soil in the seriously flood affected low-lying rural areas due to recurring floods; areas in these points have been the concentration of the Muslim. The main reason behind such a feature of concentration of Muslim peasants is that the peasants are very poor. They can grow jute and various kinds of vegetable in the low-lying areas and can well adjust with the floods. It is also true that long continuous flooding in the riverine areas in Brahmaputra valley has been contributing towards creation and maintenance of natural fertility of soil and ecological sustenance of the wet land system (Bhagawati, 2007). It is significant to note that the regular incidence of floods has created an unexpected and harmful impact in the agricultural production and caused wide fluctuation on economic growth rate (Alam, 1987). As maximum people of Brahmaputra valley are engaged in agricultural sector directly or indirectly so their annual income is also not high. Subsequently the flood problems always trouble them to develop their living standard and economic condition.

STRETAGIES FOR FLOOD MANAGEMENT IN RURAL AREAS:

In Brahmaputra valley of Assam despite chronicle flood menaces and consequent damage on land, economy and river channels the studies have arrived only within the last two decades or so. Therefore, there is the out most need of investigating floods in this remote part of India in a more pragmatic way. Such kind of studies has already received due momentum in advanced countries like the U.S.A., U.K., Japan and many other temperate countries. In India due weight on the studies of floods and river basin problems has been given only after formulating strategies and

carrying out activities on river basin development in integrated manner. For safeguard against flood, the suffering people adopt some indigenous method for risk reduction of flood such as food store, livestock, shelter, sanitation, transport system etc. The approach and technology of indigenous methods varies with the variation of socio-economic and environmental settings of the study area. On the basis of the nature of flood and the flood affected rural areas of Brahmaputra valley, the following strategies may be formulated in order to mitigate flood problems.

i) Climatic, hydrologic and geomorphic details of the landform of the valley play an important role in the genesis and enhancement of flood problems. Therefore, a comprehensive stock of knowledge of them definitely helps in understanding, identifying and evaluating the real facts of flood problems.

ii) High growth of population and their nature in the river valleys have rendered low to high risk of flood problems. Therefore, strategic steps have to take to minimise the flood problems by constructing the body of Flood Risk Management (FRM).

iii) Due to two major earthquakes of 1897 and 1950, it is observed that much of the drainage platform in the basin has metamorphosed causing hindrance to free pass of flood waters along the channels. The human interference has added a more dimension to it. It has, therefore, been the need of training or regulating the channel direction or making channel diversion to mitigate the flood problem and protect the land use potentials and practices.

iv) Various structural measures such as dams, reservoirs, levees, flood walls may be constructed specially in the areas of low slope gradient and water congestion to fulfil the long term aim of flood control/amelioration, etc. As construction of reservoirs will help the growth and development of agricultural potentials and practices in the river plains and flood plains in a systematic way, a number of such reservoirs can be spotted in the interfluves of even the small streams. The beels, wetland, marshes, swamps, abandoned channels may fulfil such objectives. They may be interlinked with rivers to check floods and enhance land use potentials and practices.

v) Method of agricultural practices and types of crops has their far-reaching impact on landform and run-off processes. So, there should be appropriate soil drainage system in terms of availability and design in the agricultural field to control their soil water content and ground water level to check soil erosion and to avoid sediment deposits on river bed.

vi) Road cum embankments can be constructed along the banks of the big or more vulnerable streams. At the same time, trees can be planted to serve purposes of flood abatement and resources raising, checking soil erosion and ultimately making flood control.

vii) Afforestation specially in the upstream and more flood vulnerable spots and areas, is to be executed to mitigate heavy down-flow of water, slope wash and sedimentation on the channel bed from check and flood menace and damage ultimately leading sustainable productive land uses in the river bank areas.

CONCLUSION:

It is observed that the drainage basin has been identified as one of the most resourceful areas for new order of production and sustainable development of land, water and man. The

Brahmaputra valley specially rural areas needs serious investigation in the contexts of hydrologic, geomorphic, ecologic, environmental, economic, and even the social significances exist or felt in the face of a drainage basin. The Brahmaputra valley has been the source of potential resources related to diverse capability for land use, human habitation etc. The valley being fed with a number of big and small streams carrying much water including the flood waters creates flood havocs differentially at different locations. The floods in the valley are always recognised as the curse not the boon where numbers of cattle and wild life are lost and where submerged the National Highway destroy road connectivity and increase the prices of different commodities. Due to flood problem, the state has not been able to achieve the desired progress and prosperity in spite of having abundant natural resources.

If the access water carried by the flood is stored somewhere in the valley, the valley may grow up substantially in the arena of land use and development of progressive human society and sound environment. Unless the multifaceted behaviours of landforms, landscape, and the pattern of human habitation and activities, and the human need as well are investigated properly, the real facet of flood and its associated problems could never be understood. At the present juncture of use of high technology in investigation, evaluation and management many things can be done in order to contain flood problems. The above work is actually a very preliminary step to understand a number of basin parameters including the floods and land use. Central government as well as State Government of Assam have not provided adequate steps or measures for mitigating flood. Short term and ad-hoc measures are now proved to be inadequate and incapable to combat the chronically flood affected rural areas, because floodplain dwellers are basically poor rural people of the state. Rural areas are considered as important as urban areas, and all efforts are made to develop them equally. The implication is that, unlike in some other European countries, where rural areas are known for being backward when compared to urban areas, in Germany, the trend is changing. Due to the country's policy of equal living conditions, this is not the case in Germany. Rural areas receive nearly equivalent attention as the urban areas do. Also, through a special approach to rural development, usually referred to as Village Renewal, the challenges of rural Germany are taken care of. There arises an urgent need for evolving some time being effective strategies in reducing these ever expanding problems by adopting some indigenous methods.

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