

# Background Material on State's Susceptibility to Disasters, Coping Mechanism of the Community and the Administration

## 1. Introduction

Disasters cause sudden disruption to the normal life of a society and cause damages to property. Community and officials are both caught unawares and in the circumstances lose their sense of initiative and direction. Consequently relief work is hampered and unnecessarily delayed.

Disasters cannot be stopped or eliminated, but their effects can be minimised if proper disaster Preparedness plan is formulated. A disaster preparedness plan essentially contain measures to be taken before, during and after disaster strikes. Disaster management needs a collaborative effort from government, NGOs and community. Community participation is essential component for successful implementation of relief activities because it helps to understand the need of affected people, reduces the overhead cost of relief operation and increase transparency between two parties: the provider and recipient. And reduces corruption too, and teach to fight for survival.

## 2. Earthquake Occurrences

Wedge between two plate collision boundaries, the Himalayan in the north and The Indburman in the east, this region has been under continual threat from major earthquakes. The two great earthquakes of magnitudes 8.7 in 1897 and 1950 are memorable events in the annals of earthquake history of the world. These earthquakes have been so intense that the rivers changed their courses, ground elevations immensely affected. Besides as many as twenty destructive earthquakes of magnitudes 6~7 rocked this region during the past century (Fig.1).+ At the same time the possible threat of a great earthquake looms large over the region and being seriously debated in national and international forums. The intense continental convergence of the northward moving Indian plate at the rate of 5 cm / year can produce earthquakes of magnitudes 8 and above every few hundred years. Some better known damaging earthquakes of NE Region are given in Table -1.

**Table -1.**

The following is the list of important earthquake events in this region:

| <b>Place</b>        | <b>Year</b>       | <b>Magnitude</b> | <b>Remark</b>   |
|---------------------|-------------------|------------------|---|
| Cachar              | March 21, 1869    | 7.8              | Numerous earth fissures and sand craters.                             |
| Shillong Plateau    | Jun 12, 1897      | 8.7              | About 1542 people died.   |
| Sibsagar            | August 31, 1906   | 7.0              | Property damage.  |
| Myanmar             | December 12, 1908 | 7.5              | Property damage.  |
| Srimangal           | July 8, 1918      | 7.6              | 4500 sq. km area suffered damage.                                     |
| SW Assam            | September 9, 1923 | 7.1              | Property damage.  |
| Dhubri              | July 2, 1930      | 7.1              | Railway lines, culverts and bridges cracked.                          |
| Assam               | January 27, 1931  | 7.6              | Destruction of Property.  |
| Hojai Assam         | October 23, 1943  | 7.2              | Destruction of Property.  |
| Upper Assam         | July 29, 1949     | 7.6              | Severe damage.  |
| Upper Assam         | August 15, 1950   | 8.7              | About 1520 people died. One of the largest know quake in the history. |
| Indo-Myanmar border | August 6, 1988    | 7.5              | No casualty reported.   |

Every earthquake disaster has proved that adequate preparations to face the earthquake are not there and that people of the region are not even aware of earthquake resistant design characteristics and do's and don'ts before, during and after the event.

In that context, with the growing expansion of human habitats and rapid development activities, replacement of the traditional houses by concrete jungles, the risk to the society posed by earthquakes has increased considerably during the recent decades. The low rate of death toll due to past earthquakes cannot be justified in the present day context. Therefore, there should be considerable concern that future earthquakes can have terrible impact upon Assam and region's wellbeing and development. We must, therefore, take a pragmatic view

and act timely so that we prepare our people to face the impending danger bravely. A growing level of confidence amongst the community would do a great service in minimizing the impact of major disasters. The need of the hour, therefore, is to educate the community at stake and carry the message to grassroots level.

Fortunately, following the devastating earthquake in the State of Gujarat, the Home Ministry in collaboration with UNDP started some groundwork towards this direction. Recently a *Centre for Natural Disaster Management* has been set up at Assam Administrative Staff College, Guwahati with the aim of having activities like liaison, training, research, documentation, database and awareness programmes. The State Government under supervision of the Relief Commissioner also established a Control Room aided by UNDP. Oblate many institutions, organizations have been taking programmes on disaster management.

### 3. Floods occurrences:

Nowhere in our country flood problem is more acute than in the flood plains of the river Brahmaputra and Barak basins and other smaller river sub-basins in the flood plains of Assam. Historical records reveal that the valley faced flood hazards since primeval times. It is said that a great flood in 1570 nearly reduced the region into famine. Also there are innumerable references to floods which occurred during the reigns of the Ahom dynasty (12<sup>th</sup> to 18<sup>th</sup> Century). In the past, floods were considered to be boon, rather than a problem, because the flood replenished the soil annually, which helped peasants in agricultural productions. Since the great earthquake of 1950, the furry of flood damages has been on the increase, and the river once identified with the life process and culture of the people of Assam, now decried as menace.

#### 3.1. The Basin configuration:

The Brahmaputra basin covers an area of 5,80,000 sq. km out of which 70,634 sq. km falls within Assam. It is bounded on the north by the Himalayas, on the east by the Patkai range of hills along Assam-Myanmar border, on the south by Assam Meghalaya range of hills and on west by the Ganga basin. The Assam basin has a length of about 1540km in EW direction and maximum width of 682 km in NS direction. The State of Assam lies in the middle reach of the river Brahmaputra and Barak. The river Brahmaputra has braided platform multiple channels. The valley width in the Brahmaputra and Barak basins is very limited with substantial areas covered by hills, railways, and national highways. The adverse geographical features coupled with the heavy rainfall ranging from

248cm to 635cm and largely concentrated during 4 to 5 monsoon months is responsible for frequent and damaging flood.

### 3.2. Causes of Flood

Floods in Assam are caused by a combination of several natural and anthropogenic factors. The unique geographic setting of the region, high potent monsoon rainfall regime, easily erodable geological formations in the upper catchment, seismic activity, accelerate rate of basin erosion, rapid channel aggradation, massive deforestation, intense landuse pressure, explosive population growth especially in the flood prone belt and adhoc type of temporary measures of flood control are some of the dominant factors that cause /or intensify floods in Assam. The single most important cause for frequent occurrence of flood in this region is the extremely dynamic monsoon regime vis- vis the unique physiographic setting of the basin.

The water yield of the basin is one of the highest in the world. High rates of yield together with the limited width of the valley (50--80km) and greatly fattened gradient lead to tremendous drainage congestion and resultant flooding. The river itself occupies a width of 6 to 10 km at most places. The impact of earthquakes on the regime of the river, especially on the morphology of the channel, has considerable influence on the flood potential of the Brahmaputra. Because of the heavy silting, the bed levels of the Brahmaputra and some of its tributaries have risen considerably reducing the carrying capacity of the channel and causing them to spill over the banks during summer high flows and inundate the surrounding lowlands. Further, the short term adhoc type of flood protection measures so far adopted in the case of the Brahmaputra, especially the extensive network of earthen embankments, has deleterious impact on the regime of river, more specially its aggradational character, thus contributing to further intensification of flood hazard potential of the valley. Human intervention and depredation in the watersheds also aggravate the problem. Because of denudation of forest cover the surface runoff has considerably increased. Encroachment of large number of wetlands that serve as natural reservoirs like beels, swamps and marshes has also reduced the retention capacity of the drainage system causing flood level to rise. The improperly planned road and railway embankments, settlement areas and landuse policies also affect the drainage system.

There are natural constrictions at various locations along the Brahmaputra influencing the drainage pattern. The constrictions are at

|               |          |
|---------------|----------|
| Murkonselek   | - 4.8 km |
| Disangmukh    | - 5.1 km |
| Dhanshirimukh | - 4.4 km |
| Tezpur        | - 3.6 km |
| Pandu         | - 1.2 km |
| Soalkuchi     | - 2.4 km |
| Pancharatna   | - 2.4 km |

3.3. The tributaries of the Brahmaputra have widely divergent characteristics, that too contribute towards frequent floods.

### 3.3.1. The characteristics of the north bank rivers:

- rivers characterised by very steep slope and shallow braided channels,
- have coarse sandy beds and carry heavy silt
- bring flash floods because of short distance between their source in the hills and the confluence,

### 3.3.2. The characteristics of the rivers of the south bank:

- \* rivers have comparatively flatter grades and deep channels right from the foothills,
- \* the beds and banks are composed of more clayey component, hence more stable,
- \* carry comparatively low silt charge.

### 3.3.3 Drainage Pattern after 1950 earthquake

After the 1950 earthquake, there was a general rise of the low water level by 3metres of the Brahmaputra river at Dibrugarh. The Dihang river silted up by 6 metres near Sadiya. The extreme braided nature of the river coupled with silt and sand strata of the banks is the main cause of erosion. The excessive sediment load of the Brahmaputra and its tendency for lateral shift, towards south in many stretches for geological reasons appear to contribute for instability. The continuous migration of both banks on large scale in between these constrictions has affected a number of villages, towns and embankments. Construction of embankment widely adopted as structural measures of flood management though has provided reasonable degree of protection, it has also become a topic of criticism on the ground of:

- loss of land for construction and resettlement
- risk and effects of sudden embankment failure
- disruption of fish breeding cycle between river sand food plain
- increased flooding in unprotected areas
- loss of sediment for nutrient and land building.
- Reduced passage for flow of flood water and consequent rise of the level of flood waters,
- Drainage congestion behind the embankment

## 4. Enormity of the Problem

According to the government of Assam Relief Manual the extent of damage of life and property caused by floods and human sufferings can be attributed to the following factors:

- unpreparedness
- failure to give timely warning to all concerned particularly to the people of villages exposed to floods,
- lack of accurate information regarding the areas cut off by floods,
- lack of boats,
- inability of the administrative machinery to establish immediate contact with the affected areas,
- inadequate coordination between various departments and between the official and non- official agencies,
- unplanned action, and
- time lag in mobilising resources.

The extent of flood problem in Brahmaputra valley is much greater than any other flood prone valleys in India. Analysis of flood damage figures for Assam since 1953 reveals that annually an average of 9,590 sq. km (about 12% of the total geographical area) of the State gets affected by floods whereas in 1988 nearly 38,200 sq. km (about 48 % of Assam ) was under flood disaster.

Food damage statement of Assam during 1953 to 1995.

## 5. Government Plans

The Assam Government has a well-laid plan to deal with the problem arising out of floods in the Assam Relief Manual. To effectively coordinate the efforts of various authorities in the State and District level definite work elements have been identified. Firstly, the Divisional Commissioners will coordinate the work of the concerned heads of departments. Whereas, the Deputy Commissioner will coordinate the activities at district level subject to the general supervision of the Divisional Commissioner.

The DC will plan his programme of action and ensure that all preparations as per scheme has been made so that they are able to deal with any situation arising out of floods; covering the periods -- before, during and after floods.

The administration of Relief is vested with the Revenue Department. The broad functions of the Department with regard to any emergency situations have been identified as under:

1. general control of relief operations;
2. co-ordination of relief activities among different Secretariat Department;
3. review of the emergency situation arising out of floods or other natural calamities or any other causes from time to time and apprising the Council of Ministers;
4. with regard to relief activities –
  - (i) policy matters;
  - (ii) issue of general instructions;
  - (iii) implementation of recommendations on natural calamities of the Administrative Coordination Committee;
  - (iv) provision of funds and general control of expenditure;
  - (v) central re-imburement.

## 5.1 Flood Warnings

In order to keep all concerned informed about time to time flood situation in the State a Flood Warning System has been formulated as under:

The Central Flood Forecasting Circle of CWC at Guwahati sends the message indicating the water levels twice daily to the Flood Control Room Department at Guwahati. The forecast report is being sent from 15th May to 15<sup>th</sup> October, for the main rivers. However, the actual forecast is made when the water level is one metre below the "Danger Level". For the river Brahmaputra the following forecast stations will indicate the advance intimation of the water level based on the observation stations in the upper reaches:

1. Dibrugarh with 12 hours advance intimation
2. Neamatighat (Jorhat) with 24 hours advance intimation
3. Tezpur with 24hours
4. Guwahati with 24 hours
5. Goalpara with 24 hours
6. Dhubri with 15 hours advance intimation.

Similar advance intimation is given for the river Barak and other important tributaries of the Brahmaputra river. Immediately on receipt of intimation the DC will communicate the warning to all the districts officers by telegram, police wireless, or by any quick methods. The DC will also communicate the warning to the local revenue and police officers.

## 6. Draught

The land Assam is known also as a land of paradox as even though it is most humid state in India it suffers from draught in certain months of the year. During the period when rain most wanted for cultivation an excessive pour showers in certain parts may cause flooding simultaneously a dry draught at other part is not too uncommon happenings. It is not uncommon that when with all hopes and expectations of cultivators beautiful seedling grow up, a sudden draught or flood wash away their hopes.

## 7. Landslides Occurrences

The whole of northeastern region is located in an earthquake prone and heavy rainfall zone. As stated above it has a history of facing probably the worst earthquake impact in 1897 and 1950. These earthquakes were



accompanied by extensive landslides in hills which latter upset the regime of the Brahmaputra basin.

Landslides and urban floods are two most pervasive natural hazards that undermine the urban development of the Guwahati as well as other towns in NE region. In the recent past Guwahati has witnessed a number of devastating landslides in its hilly belt. Fragile eco-system of the hilly areas due to poor communication, bad road, indiscriminate, gross misuse of land and forest, economic conditions of the inhabitants create serious administrative problems. The loss of life and property have become a matter of concern. The hill slope failure and soil erosion associated with siltation, flashfloods and water logging in the low lying areas also create immense problems in the city drainage and sewerage system. Heavy and continuous rainfall during monsoon aggravate the process of slope failure.

## **8. Cyclonic storm**

Occasional cyclones do occur in the region, particularly in western Assam their severity is more during monsoon.

## **9. Performance Problem : Lessons learn from Gujrat Earthquake**

During any disaster an abnormal situation suddenly appears sending the whole administration out of gear and government machinery get paralysed. The experience in the past has shown that very limited help is available to the effected community at the initial stage of disaster when it is needed most though all efforts are made by Government and other agencies. Thus at times it creates confusion and disruption to the planned relief work.

The recent earthquake in Gujarat on 26<sup>th</sup> January 2001 is an example how the entire government machinery collapsed for over two to three days. The initial relief came from the Army and Air Force only. The public also preferred army for distribution of relief, lest relief meant for them will lose its way in the maze of govt. machinery.

With relief supplies constantly pouring in, there are veritable hillocks of foodstuffs. The tragedy is that all this is gradually perishing due to laggard distribution system. The problem is not so much the Ministry dealing with the subject, but that every executive function of the government is under the

stranglehold of a generalist bureaucracy. The government and NGOs as well as the people were completely unprepared for this destructive event. There was no major plan to cope with the disaster in Gujrat. In that context, Assam is not an exception, either. Little efforts being made are inadequate to face catastrophic event like the Gujrat one. Complacent attitude of the community and to some extent of the government is prevailing even today. As a result a large majority of our people continue to be in a state of unpreparedness to face such dangers which are likely to strike and without warning.

Participation of the community in disaster mitigation process has been increasingly emphasized in disaster management. The experience of calamity - management in India often shows that communities tend to stand by and even become onlookers, while government organisations are involved in disaster management.

Another problem that arose during the Latur earthquake was the onrush of villagers/ visitors from neighbouring places to the affected sites. It created law and order situation. It had severely hampered in relief and rescue operations. At the most pilferage of valuables from the damaged houses was a serious problem.

The storage and distribution of relief material is another aspect that needs serious consideration. Lack of proper distribution plan led to loss and pilferage. Of course with massive in-flow of aid, it was noted that warehouses in disaster areas were filled to capacity. We have seen stockpiling of foodstuffs in haphazard way, rather in open spaces. Truckloads of relief materials jostle at the entrance of the **Bochasanwasi Akshar Purushottom Swamminarayan Samstha**, the largest NGO in Bhuj, kept in the open air. Another example can be drawn from the Armenian earthquake (M -6.9) on 7<sup>th</sup> December, 1988. The magnitude of the relief supplies donated was such, that much of the effort had to go just towards the unloading and storing. It then became extremely difficult to devote appropriate time and staff resources to distribution and, at the same time, ensure smooth handling of aid pouring in.

Local communication problems existed and were serious. Lack of communication in the immediate hours after the disaster, when call on to take key decisions, was the most difficult problem had to be faced. Second, communications among relief workers operating in disaster areas remained difficult for long time. A French team, "Telecom without borders", setup satellite communication to assist in coordination of relief.

Local surface communications also gets badly disrupted, delays due to shortage of vehicles and with all sorts of transport bottlenecks. For example, Bhuj Airport is littered with packets of relief materials unloaded from incoming aircraft. But there were no trucks to carry these to the villages where no aid has

reached. Apart from the shortage of vehicles to move the materials there is also an acute shortage of personnel as loaders on day wages, have also been affected. This results in high transportation cost. Theft and pilferage on the way may be at times become a serious problem.

Nowadays NGOs play crucial role in disaster management efforts. Therefore, genuine NGOs should be brought under Administrative umbrella through registration.

Drinking water problem becomes acute during flood disaster. A suitable solution of the problem is a gigantic task.

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**CENTRE FOR NATURAL DISASTER MANAGEMENT  
ASSAM ADMINISTRATIVE STAFF COLLEGE  
JAWAHARNAGAR : KHANAPARA : GUWAHATI -22.**