

Disaster Management in the North-east

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Disaster is a sudden adverse or unfortunate extreme event which causes great damage to human beings as well as plants and animals. Disasters occur rapidly, instantaneously and indiscriminately, and wipe out years of development in a matter of hours. What do we do then? Repeated experiences have shown that the people, the community, the society, the government can reduce the risk by preparedness. But it is not enough. Preparedness is only a part of the broader risk reduction agenda. And reducing the risk posed by disasters is not an optional extra – it is central to the very success of development itself.

Flood is the main natural disaster which is mainly caused by the Brahmaputra and its tributaries. There are instances of cyclonic storms causing disasters in areas bordering Bangladesh and inland North-East. Considering the regular periodicity and gravity of such disasters like floods, landslides, cyclonic storms and earthquakes in North-East, appropriate measures need to be adopted and continually refined for management and mitigation of the consequences. It is important to note that, "It is a man and his responses to disaster that is at the heart of disaster management." The management of natural disaster involves disaster research and disaster predictions. This has not been done in extensive way to help manage and mitigate natural disasters in the North-East.

Professor Samudra Dev Phukan deals with some of these issues in his informative and well-prepared article. His name is not unfamiliar to readers of Ishani. He has contributed interesting articles on various subjects in the earlier issues of Ishani also. He is an eminent educationist and a technocrat with long experience. Though a civil engineer by discipline, he is a keen student of history and culture of Assam. We record our sense of gratitude for his present article and we expect more contributions from him on different subjects on a regular basis.



Author

Development and welfare of human beings is intimately related to the natural environment. Normally, environment is a source of livelihood but at times due to intensive human intervention and hazards like earthquake, flood, landslide, etc., these hazard events turn into disasters causing losses of life and property. These hazards can be minimized by using modern scientific and technological advancements. The catastrophes result from collapse and damage of buildings, lifeline structures like schools, hospitals, roads and bridges and infrastructure components.

India is highly vulnerable to the catastrophes mainly due to the fact that it supports about a sixth of the world population with only 2 per cent of the world's land mass. The country with its own resources is unable to attend to the expenditure involved in disaster management. Recent disasters have caused India to lose at least 2 per cent GDP. Considering risk and vulnerability, the Govt. of India has enacted the Disaster Management Act of 2005. In this, the policy has shifted from relief centric approach to proactive, holistic and integrated approach. It aims at inculcating a culture of preparedness, promoting innovative strategies of mitigation, emergency response, etc. It also aims at bringing to a common platform the stakeholders of construction sector, policy and decision makers, scientists, technologists, representatives of industry, etc., in order to evolve strategies to combat and mitigate impact of future events of catastrophic nature. It will also facilitate interaction among professionals engaged in education, training, R&D, planning, design and construction.

The vulnerability profile of entire N.E. region with reference to earthquake, floods and high wind velocities is very high. The seven states as detailed below lie in Seismic Zone V, Sikkim lies in Zone IV. This poses serious threat to life and property.

Sl. No.	State	District & Zone
1.	Arunachal Pradesh	13 districts are in Seismic Zone V
2.	Assam	23 ,, ,, ,, ,,
3.	Manipur	9 ,, ,, ,, ,,
4.	Meghalaya	7 ,, ,, ,, ,,
5.	Mizoram	8 ,, ,, ,, ,,
6.	Nagaland	8 ,, ,, ,, ,,
7.	Sikkim	4 ,, ,, ,, Zone IV
8.	Tripura	4 ,, ,, ,, Zone V

Source: Seminar held at IIT, Mumbai.

(Since the Modified Mercalli (MM) scale did not take into account local variations in soil type and geology, as per the recent categorization only four seismic zones have been identified in the revised Indian Seismic Zone Map, 2002, viz., Zones II, III, IV and V, which club an area in a particular zone based on similarities in soil type, structure and strength. The national Seismic Zone Map presents a large-scale view of the seismic zones in the country. Local variations in soil type and geology cannot be represented at that scale. Therefore, for important projects, such as a major dam or a nuclear power plant, the seismic hazard is evaluated specifically for that site. Also, for the purposes of urban planning, metropolitan areas are microzoned. Seismic microzonation accounts for local variations in geology, local social profile, etc.)

As per guidelines of NDMA, all the capital cities of the eight states have been included in the first level of priority for seismic strengthening and retro filling. The National Disaster Management Authority identified the following cities of the North-east for seismic strengthening and retro filling. These are Agartala, Aizawl, Gangtok, Guwahati, Imphal, Itanagar, Kohima, and Shillong.

Here we must realize that Earthquake is not the only element responsible for disaster. Flood is another major element causing disaster. Due to increase in population and encroachment of the riverine areas causing deforestation, floods tend to occur in the two major rivers of the region, the Brahmaputra and the Barak. Increased flood discharge, flash floods accompanying sedimentation, erosion, and landslides cause disaster. Though there are many established ways of combating the catastrophes as dams, embankments, etc., the story of the North-east is different. Most of the areas have to follow long-term processes like soil and water conservation and general afforestation. Short-term methods can also be applicable in North-eastern situations like flash floods or landslides.

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The United Nations declared the last decade (1990-1999) as the International Decade for Natural Disaster Reduction (IDNDR). The main effort in this decade was to reduce, through concerted international actions, especially in the developing countries, loss of life, damage to property and social and economic disruption caused by natural disasters. The Yokohama Strategy, adopted in May 1994, called upon all countries to unequivocally give political commitment to reduce their vulnerability through appropriate means. The strategy contributed to shifting focus from disaster response to prevention and mitigation.

Government of India is observing the current decade as the "National Decade for Disaster Reduction" (NDDR) realizing the need to continue the momentum developed during the IDNDR. It has decided to observe October 29th as NDDR (National Day for Disaster Reduction) every year to commemorate the day a super cyclone had hit Orissa in 1999. The basic objective of NDDR is to create public awareness and educate the people about the impact of natural disasters and importance of disaster preparedness and mitigation.

With regard to North-East, it can be stressed that floods and landslides cause colossal loss to human life and property and its management takes the centre stage in this part of the country. In fact, flood is an attribute of physical environment but it is important to note that floods are also aggravated by human activity like deforestation in the catchment areas. Large scale deforestation in upper catchments is perhaps the most important anthropogenic factor of the cause of flood and landslides in the North-East.

Increasing urbanization has also helped in increasing the surface runoff and therefore dimensions and magnitude of floods because extension in the *pucca* ground cover through the construction of building, courtyards, roads, pavements, etc., reduces infiltration of rainwater significantly and increases surface runoff, thereby increasing the volume and discharge of urban drains to the river. *(Extracted from the World Wide Web)*

We may allow the disaster to happen and try to combat it. This can be done by constructing earth platforms with shelters at a higher elevation or using similar methods. There are some direct deterrents to floods. These are dams, weirs, barrages and similar massive structures. Very often, objections are raised by environmentalists who advocate that the environment is affected by massive structures and therefore such structures may affect the environment and are not suitable. Geologists also feel that massive structures and water body may influence the geological structure and should be avoided.

Today, we must take care of another aspect, which may lead to disaster. Water level rise due to global warming may cause floods. Approved scientific precautionary measures must be taken to prevent the disaster by treating it at the micro level, thus eliminating the causes which may lead the flood to acquire the proportion of a disaster.

Water level rises above ground level in case of water logging, which is developing into a regular episode in case of the North-east. This contaminates the water with harmful bacteria, which may in turn pollute the groundwater. Anti-bacterial treatment at the recharge level may provide a solution.

Due to scarcity and contamination of water at the surface level, non-availability of drinking water from the normal sources may cause a crisis-like situation. It, therefore, has become necessary to adopt methods of rainwater harvesting. The Centre for Science and Environment, New Delhi has already provided certain devices for this purpose.

Another hazard has a tendency to develop into catastrophe. That is landslide, which creates havoc mainly in the state of Mizoram. The major factors contributing to landslides are reduced soil friction, and improper drainage. Effects of these can be reduced by standard methods. In France and Sweden, etc., another device of reinforced earth was originally designed by French engineer Henri Vidal. Earth mass with possibility of slide was reinforced by steel rods by Henri Vidal. These rods can be replaced by bamboo in the North-east and it is worth trying.

In addition to the direct methods, the National Disaster Management Authority suggests extra fittings to lifeline structures which may help in mitigating disasters, particularly earthquakes.

Requirement of zoning is that buildings and other lifeline structures are to be of certain specific standard. All such structures do not have the same amount of strength at the time of earthquake.

Such structures are to be strengthened upto the required standard by adding some extra fitting say an extra beam, an inclined support, sharing provision, etc. These are expressed by an architectural term called Retrofittings.

Construction Industry Development Council (CIDC), has outlined the modalities of operation of retrofitting clinic.

Countries like Japan and China have already developed the concept of information umbrella and action strategies in case any disaster strikes. It is high time that each of the States of the North-east develops similar methods.

The Retrofitting Clinic:

In order to cope up with the framework laid down by the disaster management authority and also with the paradigm shift in the National Policy, CIDC has been establishing a national network of Retrofitting Clinics. These clinics provide institutional and technology transfer mechanisms for capacity building of related professionals at different levels enabling them to undertake different assessments of the health of the structure, etc., and deliver the services to asset owners.

The main objectives and functions of Retrofitting Clinics are

Diagnostic assessment of Building and Structure.

Advising vulnerability levels.

Ascertaining retrofitting levels.

Designing retrofitting measures.

Training programme of disaster resistant construction.

Disaster mitigation sensitization.

Engineering services for safe construction.

Developing houseowner's manual for rapid visual inspection.

Developing data base materials for safe construction.

Promote PPP in disaster management activities of the region.

Media sensitization for disaster management.

People/institutions who/which can set up retrofitting clinics.

- Academic institutions of Engineering and Architecture.
- Government organizations.
- Urban local bodies.
- Construction companies.
- Consulting organizations.
- Building centre.
- R&D technologies transfer unit.
- NGOs.

CIDC has outlined the modalities of operation of the clinics and also the list of equipment necessary for the clinics.

Unfortunately for the North-east, there is an only one Retrofitting clinic at IIT, Guwahati. We should, in fact, make it a mandatory requirement for each State of the North-east.

Reference:

- *Curtain raiser for International conference on earthquake risk by NEDFI.*
- *CIDC manual.*
- *Seminar proceedings at IIT, Mumbai*
- *Earthquake Tip 4 of IIT Kanpur and BMTPC, New Delhi.*