CHAPTER 2
REVIEW OF THE LITERATURE

2.1 INTRODUCTION
As part of review of literature, the researcher started browsing internet for secondary data, to first find out what had already been achieved in the field of Community Based Disaster Management (CBDM), both in India and abroad, so as not to reinvent the wheel. It was found that while some research in this field had been carried out in developed countries; in India not much work had been done. Even the Guidelines on the CBDM were yet to be issued by the National Disaster Management Authority (NDMA), Government of India. In any case no research on CBDM had been carried out in the East Delhi district. The researcher visited the libraries of NDMA, National Institute of Disaster Management (NIDM), Indian Institute of Public Administration (IIPA), Guru Govind Singh Indraprastha University, New Delhi, Manav Rachna International University (MRIU), Faridabad, Indian Red Cross, New Delhi and others and perused the books on CBDM and DM by eminent scholars, like Prof C Bose, Dr PK Dave, Prof VK Sharma, Dr Anu Kapur, Brig (Dr) BK Khanna, Anil Sinha, Dr R Shaw, to name a few. DM Act 2005, manuals/documents/periodicals issued by the Govt of India and Trainers Guide and Module on CBDM by ADPC, Bangkok were also studied. Papers on CBDM by Prof Loma, Victoria of Kobe, Japan and Dr Odon Morillo, were quite interesting. In addition, experts in the field of DM field at the national, state, training institutions and district levels were contacted.

After perusal of the literature and interaction with DM experts, a number of issues came to fore, which needed clear understanding before research could be undertaken. These were, concept of disasters, Disaster Management (DM) Cycle, various phases in DM Cycle and activities in each phase. Besides what is CBDM, what should be CBDM approach to managing disasters at micro level and whether any such approaches had been successful anywhere were other aspects which needed to be looked into. This chapter deals with such specific issues.

2.2 CONCEPT OF DISASTER
The term disaster is described as, “Any event (happening with or without warning) causing or threatening death, injury or disease damage to property, infrastructure or the environment which
exceeds the coping capability of the affected society” (Khanna & Khanna -2010). As per Section 2(d) of DM Act 2005, disaster means, “a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or man-made causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of, property, or damage to, or degradation of, environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area.”

WHO defines Disaster as "Any occurrence that causes damage, ecological disruption, loss of human life, deterioration of health and health services, on a scale sufficient to warrant an extraordinary response from outside the affected community or area”? The word derives from Middle French désastre and that from Italian, which in turn comes from the Greek . The root of the word disaster (“bad star” in Greek) comes from an astrological theme in which the ancients used to refer to the destruction or deconstruction of a star as ‘disaster’.

2.3 CLASSIFICATION OF DISASTERS
Disasters are basically divided into natural and human-induced. However, the High Powered Committee (HPC) constituted by the Government of India in August 1999, to review the state of preparedness against natural and man-made disasters and recommend suitable framework at district, state and national levels to combat perceived disasters, after due deliberations identified the disasters into the following categories (HPC Report – 2001):

a) Water and Climate Related Disasters.
b) Geological Related Disasters.
c) Chemical, Industrial & Nuclear Related Disasters.
d) Accident Related Disasters.
e) Biologically related Disasters.
f) Terrorist Related Disasters (Not mentioned by HPC but included by the research scholar).

2.3.1 WATER AND CLIMATE RELATED DISASTERS - These include meteorological, hydrological and climate phenomena that pose a threat to life, property and the environment. The disasters under this category include:

1. Floods.
2. Droughts.
3. Cyclones.
4. Tornadoes and Hurricanes.
5. Hail Storms.
7. Snow Avalanches.
10. Thunder & Lightning.

The spatial and temporal scales of these hazards vary widely from short lived violent phenomena of the limited extent to large systems. These events can subject regions to disastrous weather phenomena, like strong winds, heavy flood-producing rains, heavy snowfalls, blizzard conditions, freezing rains and extreme hot and cold temperature periods for several days. The application of meteorological, climatologically and hydrological knowledge in the area of disaster management has a very significant role to play in the assessment of risk, land-use planning and designing of structures which greatly contribute to disaster mitigation. The classical forecasting and warning role, the provisions of warning of impending severe weather, extreme temperatures, drought or floods, contribute to preparedness. Updated warnings, forecast, observations and consultations with emergency and relief agencies contribute to the response phase. Finally, special forecast and other advice assist recovery operations.

2.3.2 GEOLOGICAL DISASTERS - Geological disasters would include:

1. Earthquakes.
2. Landslides and Mudflows.
3. Tsunami.
4. Dam Failure/Dam Bursts.
5. Mine Fires.

58.6% of India lies in high to moderate (Zone III, IV & V) zones that could have damaging seismic intensity. 3% of Indian landmass is affected by landslides, covering J&K, Himachal Pradesh, Uttarakhand, all NE States and Western Ghats. While as earthquakes cannot be predicted, landslides and mudflows can be forecasted and the damage minimized, or even averted with proper and systematic studies and with adoption of remedial measures. The effect of earthquakes can also be minimized by taking certain preventive, mitigation and preparatory
measures. Measures for landslide control are proper surface drainage, sub-surface drainage, supporters, evacuation, and river structural work, vegetation, blasting and hardening. Dam-bursts take place due to release of large quantity of water, causing damage to downstream installations, disrupting socioeconomic activities, causing loss of life with adverse ecological and environmental impact. Mine fires are caused due to spontaneous heating of coal and carbonaceous matter in the rocks. In coal mines, the fires could be underground fires which may remain as such or become surface fires. Zoning of coal mine fire affected regions, modeling of potential land subsidence and related impacts, assessment of loss of property/energy, real time monitoring of coal fires for warning/prediction, pollution extent, ways to arrest fires, taking on board affected population, their general awareness should be visualized, analyzed and finalized as response plan.

2.3.3 CHEMICAL, INDUSTRIAL AND NUCLEAR DISASTERS - The disasters coming under this group include:

1. Chemical Disasters.
2. Industrial Disasters.

The chemical industrial disasters are in two categories viz. ‘on-site’ and ‘off-site’ emergencies. ‘On-site’ disaster includes managing the emergency, within the boundary of the industrial unit by utilizing integral resources, like search and rescue, fire and emergency services and medical response teams. Evacuation within the unit premises is also ordered and carried out by the industrial unit itself. When the emergency goes beyond the coping capabilities of the industrial unit and start affecting the nearby population and industrial units, the district collector himself takes over or nominates a senior district official to act as incident commander and manage the disaster through the concept of incident response system. All the stakeholders’ viz., police, fire services, medical services, civil defense, municipal corporation, all services, public relations officer, NGOs assist in managing the disaster. Managing the nuclear disaster within the nuclear facility is that of the unit itself. Atomic Energy Regulatory Board (AERB) monitors all nuclear accidents and coordinates its management. Outside the nuclear facility, the district administration is responsible & Collector himself takes over as Incident Commander in an emergency.
Approximately 16 km around the nuclear facility, no habitation is allowed to come up. NDRF teams are capable of managing NBC disasters.

**2.3.4 ACCIDENT RELATED DISASTERS** - The disasters which come under this group are:

1. Forest Fires.
2. Urban Fires.
5. Oil Spill.
6. Festival Related Disasters.
7. Electrical Disasters and fires.
8. Air, road and rail accidents
10. Village Fires.
11. Ship Wreck
12. Disasters connected to Metro Rails/Mono Rails.

There is a need for vulnerability analysis of each individual type of hazard. Chances of survival of victims depend upon the quick response. Broadly the actions would include a response from the unaffected and nearby community, police, fire services and other emergency services.

**2.3.5 BIOLOGICAL DISASTERS** - The disasters in this category include:

1. Epidemics and biological disasters.
2. Pest attacks.
3. Cattle Epidemics.
4. Food Poisoning.

Our responses to these disasters were almost forgotten till we had bird-flu and swine flu in 2008 & 2009, which shook the World. The ash disaster over Europe in 2010 also aroused fear of breath related diseases. The biological disasters are rare, but unless preparations are beforehand, these can have serious consequences. The communicable diseases in India are perhaps the highest in the World. Scarcity and poor water management across the country gives rise to...
various water borne infections and also provides a suitable environment for vectors of a large number of diseases.

2.3.6 TERRORIST RELATED DISASTERS - The disasters which can be included in this category are:

1. Serial Bomb Blast
2. Indiscriminate Firing and killing innocent people.
2 Taking Hostage.
3 Hijacking
4 Communal Riots.
5 Human Bomb
6 Hoax Bomb Calls.
7 Sniping at important leaders.

These are highly sensitive and secretive disasters, but get magnified due to their wide coverage and effect. At the central level, there is a National Crisis Management Committee headed by the Cabinet Secretary with Secretaries of concerned ministries, as members. They assemble after a national level crisis and control and coordinate the response. At the State level there is a State Crisis Group, headed by the Chief Secretary with concerned Secretaries of Ministries/departments as Members. They manage all state level crisis. At district level, the district collector is responsible for all types of crisis/disasters. Appropriate forces are employed to manage the crisis/emergencies. (Khanna & Khanna -2010).

2.4 TERMINOLOGIES

Disasters are not always caused by physical factors. Several other factors may act together to produce human, environmental and material losses. Some incidents are accidental others are purposeful and hence incidents which are accidental and causing death, injury or disease damage to property, infrastructure or the environment are called disaster. On the other hand almost all
accidents are incidents. In order to understand this process it is useful to develop ways with which to deal with disasters and put into place practical plans to manage these disasters if they should occur. Some important terminologies related to disaster are given below:

- **Hazards.** Hazards are threats to life, well being, material goods and the environment. Extreme natural process or technology causes them. When a hazard results in great suffering or collapse, it is usually termed as a disaster. Hazards cannot be prevented from happening, but by building the capacity of the community and responders, hazards can be prevented from becoming disasters.

- **Vulnerability.** One’s chance of experiencing a disaster is usually strongly linked to one’s vulnerability level. The more vulnerable a community is, the greater the physical economy & emotional costs of a disaster. Vulnerability thus is the degree to which an individual/ family/ community or region is at risk of experiencing misfortune following an extreme event.

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\text{Vulnerability x Hazards – Capacity = Disaster}
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- **Risk and Assessment of Risk.** Risk may be defined as the expected damage or loss caused by a hazard. Risk usually depends on a combination of two factors to increase.

  - How often and severe the hazard (e.g. floods and drought)
  - The vulnerability of the people exposed to these hazards.
People living on steep slopes on hillside or in areas prone to floods are particularly vulnerable during periods of intense rainfall.

Hazards, caused by extremes in natural processes (such as floods) or technology, (such as mining) are exacerbated if they occur in areas where the vulnerability and risk to such events is high.

When vulnerability is high and an extreme event occurs, then, depending on management and preparation for such an event, a disaster may result.
Disasters are not only the result of natural events. The level of development and management in a locality is strongly linked to disaster occurrence as well as its extent and impact. Poverty is the single greatest contributor to disasters in urban and rural areas. In urban areas, other causes of disasters may include rapid growth, inadequate planning, population density, ecological imbalances and faulty construction. Disasters are thus a mix of both physical factors (such as intense rainfall in a short period) and other social and economic factors (poverty, population). The causes of disasters and particularly the factors which often heighten the impact associated with them, have been identified as follows

1. Poverty
2. Rapid population growth
3. Unmanaged urbanization
4. Environmental degradation.
5. Civil strife.
7. Misuse or abuse of modern technology.

**2.5 CONCEPT OF DISASTER MANAGEMENT**

Disaster management should include administrative decisions and operational activities that involve prevention, mitigation, preparedness, response, rehabilitation and reconstruction at all levels of the Government machinery. Disaster Management does not only involve Govt. organizations, but Non-Government Organizations (NGOs) and community based organizations also who play a vital role. Disaster Management can thus be viewed in a number of ways. The more traditional approach has been to regard disaster management as a number of phased sequences after a disaster. In modern terms, disaster management occurs in stages which follow each other in sequence, that is to say prevention, mitigation and preparedness phases preceding the start of a disaster and response, rehabilitation and reconstruction phases after a disaster. The diagram at Figure 2.4 illustrates it.
Disaster management is the discipline of dealing with and avoiding risks. Thus, any disaster management is the continuous process by which all individuals/groups/communities manage hazards in an effort to avoid the impact of disaster resulting from hazards. (Khanna & Khanna – 2010)

2.6 ROLE OF RISK MANAGEMENT IN DM

Assessment is the process of determining the impact of disaster on the community. Assessment is a process undertaken in phases and involves on the spot surveys and the collection, evaluation and interpretation of data received from various sources. The damage assessment includes recommendations concerning the repairs, reconstruction or replacement of structures as well as restoration of normal activities.

2.6.1 OBJECTIVES OF ASSESSMENT DURING VARIOUS PHASES:

Warning Phase

- To determine the extent to which affected population is taking measures for its protection from expected hazards impact.
Emergency Phase
- Identify and quantify “population at risk”, due to perceived disaster/s.
- Identify local response capacity, including organizational, medical and logistic resources.

Recovery Phase
- Determine the damage to the resources and its implication for development programs.

Rehabilitation Phase
- Identify the priority of the affected people.
- Estimate the additional support required from national and international sources for relief and recovery.

2.7 PHASES OF DISASTER MANAGEMENT
The process of disaster management involves following phases:
- Pre-disaster phase
- Disaster /Impact phase
- Post disaster phase

2.7.1 PRE DISASTER PHASE - The pre-disaster phase includes following three components:
- Prevention
- Mitigation (structural & non-structural)
- Preparedness

2.7.2 DISASTER PREVENTION - In pre disaster phase, preventive actions as shown below are required to be planned and undertaken:
- Effective disaster management requires clear guidelines hence; preparing specifications for civil/ architectural/ structural/ land use planning etc. are formulated as a preventive measure.
- Before commencing preventive actions, it is important to identify and assess different types of risks.
- Preparing classification of the region/zones according to hazard potential and vulnerability.
- Updating and reviewing existing manuals i.e. Relief manual, flood manual, etc.
• Developing and updating repositories of information such as names, contact details of relevant authorities.
• To establish communication and technology network, which should enable timely collection of hazard related information and warnings.
• Developing an early warning mechanism to help relevant authorities for taking timely preventive measures.
• Setting up emergency response mechanism that mobilize and deploy trained recourses in a quick and efficient manner.

2.7.3 DISASTER MITIGATION - All actions taken prior to the occurrence of a disaster to reduce its impact are called disaster mitigation measures. This includes long term risk reduction and preparedness measures. Mitigation can be divided into structural and non-structural measures. More simply stated mitigation is risk reduction. The implementation of mitigation strategies can be considered as a part of the recovery process if applied after a disaster occurs. However, even if applied as part of recovery efforts, actions that reduce or eliminate risk over time are still considered mitigation efforts.

2.7.3.1 MENU OF MITIGATAION ACTIONS - The techniques that an authority might consider for disaster mitigation can be classified as under.

(a) **Engineering:** Engineering measures are those that result in strong structures that are more resistant to hazards.

(b) **Spatial Planning:** Many hazards are localized with their likely effect confined to specific known areas. i.e. Flood plain areas get flooded more often. Hence effects can be reduced by avoiding this area for creating permanent structures.

(c) **Economy:** Economic development is a key to disaster mitigation. In simple terms, if people have disposable income they will be able to build their residential and business houses as per the National Building Code.

(d) **Management and Institutionalization of Disaster Mitigation:** Education, training and development of professional expertise are important components of institutionalizing disaster mitigation.
(e) **Societal:** The mitigation of disasters will only come about when there is a consensus among the society to let the hazard not become a disaster. In many places, individual hazards do not result in disasters, especially if the community is well prepared for it. Mitigation planning should aim to develop a disaster ‘safety culture’, under which general public is fully aware about perceived hazards.

(f) **Conflict Reduction:** Conflict reduction actions start with identifying and addressing the root causes of the conflict. Normally negotiation is a primary tool to reduce conflict.

### 2.7.4 CLASSIFICATION OF MITIGATION MEASURES

Classification of Mitigation Measures is given below:

- **Active and Passive**
  To promote active measure incentives is offered, while for passive measures, i.e. to control undesired actions, penalties are imposed.

- **Structural and Non Structural**
  Structural mitigation involves physical measures, i.e. construction of dams to prevent floods. While non-structural measures involve making of policies, frame work, training, capacity development, general awareness, for reduction of disasters.

- **Short Term and Long Term**
  In short term measures, useful actions are taken immediately to mitigate disaster. i.e. sand bag reinforcement of a dyke. In long term measures include making of the dam and change of public attitude through education.

- **Restrictive and Incentive**
  Restrictive measures result in practices that promote safety by taking actions, while incentive measures provide advantages to promote activities which are useful in mitigation of disaster.

- **Sectoral Based Activities**
  These types of activities start from a sector such as Agriculture in which hazard resistant crops can be introduced.
  A precursor activity to the mitigation is the identification of risk. In risk assessment various hazards, i.e. earthquakes, riots, floods, cyclones in certain areas are identified. (Kapur, Anu – 2006)
2.8 COMPONENT OF RISK MITIGATION STRATEGIES

2.8.1 REDUCING STRUCTURAL VULNERABILITY

Ground shaking is the main cause of damages in most of the earthquakes. Therefore, much emphasis is usually placed on measures to reduce vulnerability for buildings as well as for infrastructure elements. Many techniques have been developed to improve performance ranging from simple measures to improve the earthquake resistance of mud houses to highly sophisticated and disaster resistant designs for large bridges.

Techniques for reducing the vulnerability of structures need to be translated into plans. This ranges from plans to improve existing settlements to guidance for future developments. Techniques for vulnerability reduction can also be applied to post earthquake repair programs.

2.8.1.1 STRENGTHENING OF BUILDINGS

Some common measures to reduce structural vulnerability of the building are given below.

- Building Configuration:
- Foundation
- Construction Quality
- Square Designs
- Parallel Walls

2.8.1.2 STRENGTHENING OF INFRASTRUCTURES

Strengthening of existing infrastructure elements requires high investment. However to reduce vulnerability it is an effective option. As a precautionary measure following actions are required to reduce vulnerability.

- Strengthening of life line buildings like schools, hospitals, community centres, railway stations, collector office, air traffic controller buildings, bridges, dams, etc.
- Flexibility of pipeline system for water and gas
- Regulation of land use as per approved plans.

2.8.2 DISASTER PREPAREDNESS

Objectives of disaster preparedness is to ensure that in times of disasters appropriate systems and resources are in place to help those affected by disasters. The aim of disaster preparedness is to minimize the adverse effect of a hazard through effective precautionary actions, and to ensure
appropriate and efficient organization and delivery of effective emergency response after the impact of a disaster. Disaster preparedness, on the contrary, must be seen as an active and continuing process. Both plans and strategies should be frequently reviewed, modified and updated.

2.8.2.1 COMPONENT OF DISASTER PREPAREDNESS

There are nine major components involved in disaster preparedness, which have been deliberated below (Bose C – 2002):

(I) **Assessing Vulnerability** - The disaster manager must know that a particular geographic region or community is susceptible to the impacts of sudden or slow onset hazards.

(II) **Planning** - The objective of all the activities designed to promote disaster preparedness, is to have plans in place that are implementable and for which commitment and resources are relatively assured.

(III) **Institutional Framework** - A coordinated disaster preparedness and response system is a prerequisite to any disaster preparedness plan. The framework should be designed as per the tradition of Governmental structure of the country i.e. horizontal coordination at the central Government level among ministries and other bodies while vertical coordination between central and local authorities.

(IV) **Information System** - The preparedness plan must have an information system appropriate to the disaster concerned. i.e. for slow onset disasters (for a region of famine) a formalized data collection process, early warning system, etc. For sudden onset disasters, prediction, warning, communication and evacuation, etc.

(V) **Resource Base** - Preparedness should be made as per perceived disaster. Such a requirement should cover all aspects of relief and recovery phase. The list shown below indicates major requirements of any disaster.

- Shelter
- Medicines
- Food/Supplementary food
- Communication system
- Logistic system
Building Disaster Resilient Community in Multi-hazard East Delhi

- Relief workers

(VI) **Warning Systems** - During rapid onset disasters, a warning system can save many a life, by giving notice to the vulnerable population so that they can escape the place or take precautionary measures to prevent the hazard from becoming a disaster. However, in the preparedness plan provision of alternate communication system should be made so that it can be utilized in the case of power line and receiving stations are destroyed or become non operational.

(VII) **Response Mechanism** - At a certain stage in the warning process, various responses will have to be mobilized. The staging of responses becomes an essential factor in designing a preparedness plan.

(VIII) **Public Education and Training** - The preparedness process will only be effective if those who are the ultimate beneficiaries know what to do at the time of disaster and hence education, related to disaster safety should be given.

(IX) **Rehearsals** - To check the efficiency of preparedness plan, a rehearsal (mock drill) should be arranged so that the gaps if any can be known.

2.8.3 **AFTER OCCURRENCE IMPACT PHASE**

This phase includes all steps taken immediately after the disaster. The speed and efficiency play an important role to save life and property. This phase includes components as given below:

(I) **Rescue, Immediate Relief and Initial Assessment of Damage** - The planning, organizing and management of rescue & relief work in the disaster must aim at timely attention to all or most of the problems faced during the disaster. It has been seen that very limited help is available to the affected communities during the initial stages of the disaster when it is needed most. Sometimes more than required relief efforts are put in by the Government, Semi Government, and voluntary organizations during post disaster stage in the affected area, which creates problems. It is therefore important that the role of relief organizations working in the particular area are well defined, planned, coordinated and controlled through a central agency. Immediate assessment of the damages must be known to the higher authorities, for taking follow up action by sending additional resources for rescue and relief.

(II) **Key Activities in Rescue and Relief Work. Deployment of Search and Rescue Teams** - The first priority after a disaster is to minimize loss by rescuing the affected people. People who are trapped under debris of buildings or isolated due to flood and cyclone need immediate rescue.
(III) Evacuation of People - This is a highly specialized task and should be entrusted to specially trained and equipped teams. These teams should be positioned at strategic places for deployment at a short notice in the event of a disaster. These teams may be grouped with the elements of rescue i.e. first aid, fire fighting, and communications. A team will generally consist of 8 to 10 members who generally operate from a ‘Rescue Base’ established near the calamity site. As rescue teams may be required to operate from rescue base, most of the rescue materials like ladders, stretchers, ropes, wire ropes, pick axes, spades, shovels, pulleys etc. should be kept in adequate quantity at the rescue base.

(iv) Recovery of Dead Bodies and their Disposal - Search and rescue teams should be supplemented by teams of specially trained dogs to detect and locate human causalities where search and recovery operations are hampered by building debris.

(v) Medical Care for the Injured - The essential medicines, dressings, splints, disinfectants, insecticides and vaccines required for treatment of common ailments, injuries and mass immunization should be stockpiled in nodal hospitals from where these can be rushed to the affected areas at short notice. Sufficient number of stretchers, blankets, plastic containers, jerry cans, canvas tanks, etc. should also be stockpiled at these nodal points.

(vi) Maintenance of Essential Services and Supplies - The roads may get blocked after a disaster like earthquake and floods and hence the routes may have to be simultaneously cleared on priority basis for induction of subsequent rescue teams and for the speedy evacuation of casualties. Similarly, other essential services like telephones, water supply, electric lines, etc. need to be restored on priority.

(vii) Maintenance of Law and Order - Normally during a disaster impact phase, some people could take advantage of the situation and resort to looting and other anti-social activities. Hence it is necessary that security agencies, like police be geared to prevent this and provide protection to the affected people and their property.

(viii) Sanitation, Health and Shelter - Disaster can disrupt food supply, water supply and sanitation mechanisms and as a result, force people to abandon their houses either temporarily or permanently. Hence in this situation, immediate need for shelter and protection against an incidence of epidemic is required.
(ix) **Reinforcement- Rest and Relief of Workers** - In a disaster the relief workers have to work under conditions of physical and mental stress and therefore proper rest is needed for them after the day’s work, but under prevailing situation the teams may have to work for over 14 to 16 hours a day. It will not be possible for any team to work efficiently for long periods. Hence there will be requirement for backup or replacement teams. While the ideal period for services for each team will vary according to local conditions, yet a 5 to 7 days period for first team and 7 to 10 days for subsequent teams will be desirable.

(x) **Communications** - The designed authority would communicate to the larger community about the impact of the disaster and subsequent activities are carried out or need to be undertaken to minimize the impact of disaster.

(xi) **Preliminary Damage Assessment** - Once a disaster strikes, the authority concerned shall carry out a preliminary need & loss assessment to get help from State Authority, Central sources, as the case may be. More over on these assessment higher authorities can get help from UN agencies, International organizations and other countries on a bilateral basis.

(xii) **Collection of Scientific Data** - To monitor the aftershocks, collections of scientific data from field observations as well as from instrumentation specially deployed in the affected area are important tasks.

(xiii) **Actions to Prevent Chain Reaction** - To prevent chain reaction from developing, immediate actions, such as release of water from reservoir behind a damaged dam, emptying of containers of toxic or inflammable liquids, etc. should be taken for preventing spread of disaster.

### 2.8.4 POST DISASTER PHASE

This phase includes two components shown below.

- Reconstruction
- Rehabilitation

The main task of this phase is a speedy return to the normal life and mitigation of long-terms consequences:

(a) **Rehabilitation** - Rehabilitation is the action taken after a disaster to resume functioning so as to enable basic services to resume functioning and assist victims and facilitate the revival of economic activities including agricultural. Rehabilitation focuses on enabling the affected
population to resume more or less normal, i.e. pre-disaster pattern of life. This rehabilitation is a transitional phase between immediate relief and more major long term reconstruction.

In this stage work is carried out by different agencies, hence it is highly desirable to monitor the work of these agencies. The strategy in rehabilitation and reconstruction should be to ‘build back better’ and also provide a better livelihood than the affected population was pursuing before the disaster.

(b) Reconstruction. Reconstruction is the permanent constructions or replacement of several damaged physical structures, full restoration of all services and local infrastructures and the revitalization of the economy including agriculture. The reconstruction must be fully integrated into ongoing, long term development plans, taking into account future disaster risks. As majority of people affected are the poor, following points should be kept in mind:

- Reduce the cost of reconstruction
- Create employment opportunities.
- Support and strengthen existing economic enterprises.

2.8.5 OTHER ACTIVITIES IN POST DISASTER PHASE: DAMAGE ASSESSMENT

Formulation of Policy to Restore Damaged Houses - For restoration of damaged houses, each state has a Relief Manual, according to which the appropriate relief is given.

2.9 COMMUNITY BASED DISASTER MANAGEMENT (CBDM) APPROACH

The aim of CBDM is to reduce vulnerability and strengthen people’s capacity to cope with hazards. (Odon Morillo – 2002). A thorough assessment of the community’s hazard exposure and analysis of the specifics of their vulnerabilities as well as capacities is the basis for activities, projects and programs to reduce disaster risks. Because the community is involved in the whole process, their felt and real needs as well as inherent resources are considered. There is more likelihood that the problems will be addressed with appropriate interventions. People’s participation is not only focussed on the process, but also in content. The community should be able to directly benefit from the gains of disaster risk management, which will contribute, to a progression towards safe conditions, security of livelihood and sustainable development. This stresses the point that the community is not only the main actor, but also the beneficiary in the
risk reduction and development process. Some authors differentiate between community participation and involvement. Community participation is generally taken to mean that the community takes responsibility for all stages of the program including planning and implementation. Community involvement is used to refer to a less ideal situation in which the community is asked to participate in a program that has already been designed by someone else. For the purpose of study, community involvement and community participation have been used interchangeably. The characteristics which have been highlighted in the implementation of CBDM in different countries are given below (ADPC – 2001):

a) Centrality of the Role of the Community Disaster Management. The focus of attention in disaster management is the local community.

b) Disaster Risk Reduction as the Foundation. The primary content of disaster management activities revolves around addressing vulnerable conditions and roots of vulnerabilities. The main strategy is through increasing the community’s capacities, their resources and coping strategies.

c) Linkage to Development Process. Disasters are viewed as unmanaged development risks and unresolved problems in the development process. CBDM should lead to a general improvement of the quality of life of the vast majority of poor people and the natural environment. CBDM contributes to people’s empowerment – to possess physical safety, to have more access and control of resources, to participate in decision making which affects their lives and to enjoy the benefits of a healthy environment.

d) Community as the Key Resource in Disaster Risk Reduction. The community is the key actor as well as the primary beneficiary of disaster risk reduction. Within the community, priority attention is given to the conditions of the most vulnerable as well as to their mobilization in the disaster risk reduction. The community participates in the whole process of disaster risk management from situational analysis to planning to implementation. (Draft NDMA Guidelines on CBDM – 2009).

Application of Multispectral and Multidisciplinary Approaches CBDM brings together the multitude of community stakeholders for disaster risk reduction to expand its resource base. The local community level links up with intermediate and national and even up to the international
level to address the complexity of vulnerability issues. A wide range of approaches to disaster risk reduction are employed. CBDM has emerged as a crucial and a priority area in disaster management in the context of paradigm shift which is taking place globally from a position of responding/salvage/reactive management to holistic continuum process approach which attaches immense importance to the preparation, mitigation and also to rehabilitation and recovery. Alongside there is another paradigm shift that is fast emerging viz., that of putting local communities at the heart of disaster management and strengthening their innate coping capacities resulting in higher levels of resilience.

CBDM by its very nature demands a decentralized, bottom-up approach with intensive cutting edge micro interventions at the local Panchayat/ward/village level. These interventions have to be sensitively planned with the intention of generating confidence, awareness and knowledge, partnership and ownership for planning and rolling out local disaster management plans across all levels of disaster management continuum. (UNCRD, Kobe - 2004). The term community has a wider range of usage and in the disaster management parlance; it may be defined as a group of people with a sense of togetherness living in a common place and share a disaster risk. The community assumes significance in disaster management because they are the worst affected and also the first to respond to any disaster situation. Secondly, the community also has knowledge and coping capacities and have remedial measures to reduce risks.

Disaster preparedness and preventive measures are most effective when there are participation of the community at all levels. There is thus a need to promote and strengthen human and institutional capacity building for coping with natural disasters. Involvement of the community in all phases of disaster management becomes imperative and therefore there is a need for a holistic approach to community based disaster preparedness. (Pradeep Sahni & Madhavi Ariyabandu – 1999). This can be achieved by strengthening the capabilities of communities through the three major stages of disaster management – pre-disaster stage, during disaster stage and post disaster stage. Understanding disasters and their effect, formulation of preparedness plans, promotion of mitigation measures, risk and vulnerability analysis, resource assessment/mapping and mobilization, implementation of insurance schemes should be taken up in the pre-disaster phase of the disaster cycle. Strengthening of capacities and training in search,
rescue and evacuation, shelter for victims, first aid, distribution of food, water, medicine and fodder, clearance of debris, movement of the injured to hospitals, disposal of dead humans and animals, assisting rescue teams, security of property, information dissemination and checking of rumours, damage assessment, filing of claims, ensure that response in the aftermath of a disaster is provided effectively.

Knowledge and sharing of experiences, preparedness and how to carry out damage assessment, economic rehabilitation, social rehabilitation, protection of women and children, protection of physically and mentally challenged personnel, reconstruction of houses, etc. help in ensuring restoration of livelihood among the affected communities.

CBDM envisages a process involving different sequential stages that can be operationalized to reduce disaster risks. Each of these stages is interlinked and together the sequence can build up a system for disaster risk reduction. Processes of CBDM are guided by principles of subsidiary (any activity that can be reasonably performed at a lower level should not be assigned to any higher level of governance), economics of scale (level at which a particular activity needs to be positioned and additionally bunching together some tasks yield more optimum outcome), equity (a particular activity can be undertaken efficiently at the local level externalities. But in the interest of equity, a uniform growth pattern across jurisdiction is desirable. Such activities need to be dealt with at a higher level), heterogeneity (the more heterogeneous an activity, the lower down it needs to be performed. For instance, the menu of midday meals varies across States, because of local food habits. Therefore, this activity is best performed at the lowest level of governance), public accountability (whenever the need for public accountability is high, it must be undertaken at the lowest level. Similarly, when an activity is transacted-intensive, it is again done best locally. On the other hand, if the implementation and performance of the activity have to be appraised on a technical level that is not available locally, its execution should be pushed up to a higher level)

As institutions of self governance, the three levels of Panchayati Raj will assess disaster risks, plan, implement and monitor the pre, during and post disaster management initiatives. The different stages in CBDM process are disaster risk assessment, disaster reduction planning,
implementation of disaster management plans and participatory monitoring and evaluation. (ADPC – 2002).

### 2.9.1 LESSONS ON CBDM FROM DEVELOPING COUNTRIES

Conventional approaches in development planning have not been successful in addressing the problems of poverty and inequity. On the alternative side, the bottom-up participatory approach puts people at the centre stage in the development process. Initially associated with economic growth with equity development model, participation and community based approaches are now integrated in many development programs in developing countries. It is premised on three practical considerations:

a) Nobody can understand local opportunities and constraints better than the local residents themselves.
b) Nobody is more interested in understanding local affairs than the community whose survival and well-being are at stake.
c) People are the country’s most abundant and valuable development resource, which should be harnessed and developed.

General element of the bottom-up approach surmises that local people are capable of initiating and sustaining their own community development.

### 2.9.2 CHARACTERISTIC OF CASE STUDY ON CBDM IN PERU

Case study on the implementation of the community based disaster mitigation in Peru has highlighted the following characteristics:

a) Principal responsibility and authority for the development of the program rested with the community based organization (CBOs).
b) Problems were correctly defined, responsive mitigation measures and strategies for recovery were worked out following a disaster since people could express their real needs and priorities to the CBOs.
c) The existence of CBOs allowed a rapid and effective response to emergencies.
d) The principal resource is the people themselves and their local knowledge and expertise; so programs had small financial inputs but produced large results.
Programs were multi-sectoral, combining different activities (housing, health and agriculture); hazards (floods and drought) and disaster phases (emergency and recovery).

**CBDM as an Evolving and Dynamic Framework** - Lessons learned from practice continue to build into the theory of CBDM. The sharing of experiences, methodologies and tools by communities and CBDM practitioners continues to enrich practice.