DISASTER AND DISASTER MANAGEMENT

(B)

What is a Disaster

Disaster is an undesirable occurrence resulting from forces that are largely outside human control, strikes quickly with little or no warning, which causes or threatens serious disruption of life and property including death and injury to a large number of people, and requires therefore, mobilisation of efforts in excess of that which are normally provided by statutory emergency services.

Definition for Indian official purposes: 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

Disaster is assessed on the basis of the following features:

- Disruption to normal pattern of life. Such disruption is usually severe and may also be sudden, unexpected and widespread.
- Human effects such as loss of life, livelihood and property, injury, hardship and adverse effects on health
- Effects on Social Structure such as destruction of or damage to infrastructure, buildings, communications and other essential services.
- Community needs such as shelter, food, clothing, medical assistance and social care.

AGGRAVATING FACTORS OF DISASTERS

Poverty

All disaster studies show that the wealthy among the population are less affected and also able to recover quickly. However, poverty generally makes people more vulnerable to all the impacts of disasters. It is only due to poverty that poor people are forced to live in more vulnerable areas such as flood plains of rivers.

Population Growth

If there are more people and structures where a disaster strikes, there will be more impact. Increasing number of people will compete for limited resources (e.g., employment opportunities) which can lead to crisis-induced migration. This aggravates the disasters in developing countries.

Rapid Urbanisation

Rapid and unplanned urbanisations make the poor people to live at unsafe places and with least resources at their disposal. Many of the landslides or flood disasters are closely linked to rapid and unchecked urbanisation which forces low-income families to settle on the slopes of steep hillsides or banks of rivers.

Transitions in Social Practices

All societies are under a continual state of transition which is often disruptive and uneven, leaving gaps in social coping mechanisms and available technology. These transitions include nomadic population that become sedentary, rural people who move to urban areas, and both rural and urban people who move from one economic level to another.

Environmental Degradation

Many disasters are either caused or aggravated by environmental degradation. Deforestation leads to rapid rain runoff, which contributes to soil erosion and flooding.

Lack of Awareness and Information

Lack of awareness and proper information usually converts a hazard into a Disaster. This ignorance may not necessary be due to poverty, but due to a lack of awareness of what measures can be taken to build safe structures on safe locations.

War and Civil Strife

War and civil strife are regarded as hazards, that is, extreme events that produce disasters. The causal factors of war and civil strife include competition for scarce resources, religious to ethnic intolerance and ideological difference.

KEY DISASTERS IN INDIA

Earthquake

Earthquakes are considered to be one of the most dangerous and destructive natural hazards. The impact of this phenomenon is sudden with little or no warning, making it just impossible to predict it. Therefore, the best strategy is to make preparations against damages and collapses of building and other man-made structures, About 50-60% of total area of the country is vulnerable to seismic activity of varying damage potential. Most of the vulnerable areas are generally located in Himalayan and sub-Himalayan regions extending from Kashmir to Arunachal Pradesh, Kutch and in Andaman and Nicobar Islands.

Suggestions: In our present state of knowledge, earthquakes can neither be prevented nor predicted in terms of their magnitude, or place and time of occurrence. Therefore, the most effective measures of risk reduction are pre-disaster mitigation, preparedness and preventive measures for reducing the vulnerability of the built environment combined with expeditious and effective rescue and relief actions immediately after the occurrence of the earthquake.

Floods

Floods occur when large volume of water from heavy rainfall and/or river spill is not able to drain off quickly through normal channels. India is the second most flood affected country where flood is a common natural disaster especially during the later part of the monsoon period. In India the most affected states due to floods are Bihar, Uttar Pradesh, North-Eastern states, Odisha & West Bengal etc.

The effects of flood on the affected population are manifested in the form of inundation marooning, drowning, loss of habitat roads, communications, destruction of crops, industrial shutdown, loss of wages, diarrhoea diseases, respiratory infections etc.

Causes of Floods

- Inadequate capacity within the banks or the river to contain high flows,
- River bank erosion and silting of river beds,
- Landslides leading to obstruction of flow and change of the river course,
- Synchronization of floods in the main and tributary rivers,
- Retardation of flow due to tidal and backwater effects,
- Poor natural drainage,
- Cyclones and storm surge,
- Cloud burst and flash floods.

Suggestions

- There should be a master plan for flood control and management for each flood prone basin.
- Adequate flood-cushion should be provided in water storage projects, wherever feasible, to facilitate better flood management. In highly flood prone areas, flood control should be given overriding consideration in reservoir regulation policy even at the cost of sacrificing some irrigation or power benefits.
- While physical flood protection works like embankments and dykes will continue to be necessary, increased emphasis should be laid on non-structural measures such as flood forecasting and warning, flood plain zoning and flood proofing for the minimisation of losses and to reduce the recurring expenditure on flood relief.
- There should be strict regulation of settlements and economic activity in the flood plain zones along with flood proofing, to minimise the loss of life and property on account of floods.
- The flood forecasting activities should be modernised, value added and extended to other uncovered areas. Inflow forecasting to reservoirs should be instituted for their effective regulation

Drought

Drought is widespread in India. It is primarily a deficiency in rainfall but over exploitation of ground water aggravates the situation. Large evaporation resulting from poor water retention capacity of soil adds to the problem. It is also the result of poor water management strategy, deforestation and indiscriminate industrial exploitation of water resources. Human or social factors often aggravate the effects of drought. Depletion of forest, overgrazing, soil erosion, extension of cultivation to marginal lands and lowering of water level etc. directly contribute to and aggravate the ill effects of drought.

When the monsoon rainfall deficit for the country as a whole is 10% below normal or worse, and 20% or more area of the country, suffers from rail1 deficit, it is reckoned as a "drought year" for the country as a whole.

Cyclone

Cyclones are characterized by very strong winds, torrential rains and associated floods which cause extensive damage to human lives and property in the coastal areas. India has a very long coastline of 7517 km, a major portion of which is exposed to tropical cyclones arising in the Bay of Bengal and Arabian Sea. In India cyclones occur usually between April and May, and between October and December.

Suggestions: An effective cyclone disaster prevention and mitigation plan requires:

- efficient cyclone forecast - and warning services;
- rapid dissemination of warnings to the government agencies, particularly marine interests like ports, fisheries and shipping and to the general public and
- construction of cyclone shelters in vulnerable areas, a ready machinery for evacuation of people to safer areas and community preparedness at all levels to meet the exigencies.

Landslide

Among the natural hazards that strike the mountainous areas almost perennially, landslips occupy a position of major concern. The Himalayan range constitutes a young and therefore a fragile mountain system. The Himalayas in general are fragile in nature due to tectonically displaced and folded as well as crumpled rock formation and due to periodic earth tremors ill this belt.

Causes of Landslides

A slope may yield a wide variety of mass movements. Slope failures are normally due to sheer stresses which increase with the inclination and height of & slope and occur when sheer stress exceeds the sheer strength. When the forces of equilibrium alter marginally the landslide is slow and if the disturbing forces undergo significant change, the movement of mass is fast. The rock fall, and debris flow in Himalayas are caused due to heavy precipitation and saturation during rainy season and consequent development of hydrostatic.

Suggestions:

These can be classified into structural and non-structural measures:

Structural measures:

- Planting (Avalanche Prevention Forest)
- Stepped Terraces
- Avalanche Control Piles
- Avalanche Control Fence
- Suspended Fences
- Snow Cornice Control Structures
- Protection structures such as stopping, deflecting and retarding structures.

Non-structural measures - removing snow deposits on slopes by blasting, predicting avalanches and evacuating people from vulnerable areas.

Tsunami

Tsunamis are large waves generated by sudden movements of the ocean floor that displace a large volume of water. Although usually associated with earthquakes, tsunamis can also be triggered by other phenomena like submarine or terrestrial landslides, volcanic eruptions, explosions or even bolide (e.g. asteroid, meteor and comet) impacts. Tsunamis have the potential to strip beaches, uproot plantations, and inundate large inland tracts and extensively damage life and property in coastal areas. The Indian coastal belt had not recorded many tsunamis in the past.

The phenomenon of tsunami that usually occurs near seismically active spots in the Pacific Ocean was uncommon in India till it hit the east and west coast in December 2004. The waves damaged the life and property in the coastal areas of Andhra Pradesh, Tamil Nadu, Pondicherry, Kerala and Andaman and Nicobar Islands as never before.

Industrial Disaster

Among the man-made disasters, probably the most devastating (after wars) are industrial disasters. These disasters may be caused by chemical, mechanical, civil, electrical or other process failures in an industrial plant due to accident or negligence, which may cause widespread damage within and/or outside the plant. The worst example globally was the Methyl Isocyanate gas leak in 1984 from the Union Carbide Factory in Bhopal which has so far claimed more than 20,000 lives and injured several lakh persons besides stunting the growth of a generation born from the affected population.

Disaster Response Mechanism in India

- Field level response on behalf of the government in rural areas is by the nearest police station and the revenue functionary (patwari/patel/talati/karnam etc.); in urban areas the response is articulated by agencies like the civic authorities, the fire brigade and the local police station. At present, Panchayats do not have the capacity to react institutionally in any effective manner to such situations and it is the district administration, which retains the basic responsibility of handling crises situations with the Collector playing a pivotal role.
- The District Magistrate/Collector has the responsibility for the overall management of disasters in the district. The District Collector also enjoys the authority to request for assistance from the Armed Forces if circumstances so demand. NGOs have also been effective in providing relief, rescue and rehabilitation in recent times.

Role of State Government

- In India the basic responsibility to undertake rescue, relief and rehabilitation measures in the event of natural disasters rests with the State Governments.
- Every state has a Crisis Management Committee under the chairpersonship of the Chief Secretary, consisting of secretaries in charge of concerned departments, which reviews crisis situations on a day-to-day basis at the time of crisis, coordinates the activities of all departments and provides decision support system to the district administration.

Role of Union Government

- Although the State Government concerned has the primary responsibility for crisis management, the Union Government plays a key supportive role in terms of physical and financial resources and providing complementary measures such as early warning and co-ordination of efforts of all Union ministries, departments and organizations. At the apex level, a Cabinet Committee on Natural Calamities reviews the crisis situations.
- The Cabinet Secretary, as the highest executive officer, heads the National Crisis Management Committee (NCMC).
- The Central Relief Commissioner in the Ministry of Home Affairs is the Chairman of the Crisis Management Group (CMG) consisting of nodal officers from various concerned ministries. The CMG's functions are to review annual contingency plans formulated by various ministries, departments and organizations in their respective sectors, measures required for dealing with a natural disaster, coordinate the activities of the

Union Ministries and State Governments in relation to disaster preparedness and relief, and to obtain information from the nodal officers on all these issues.

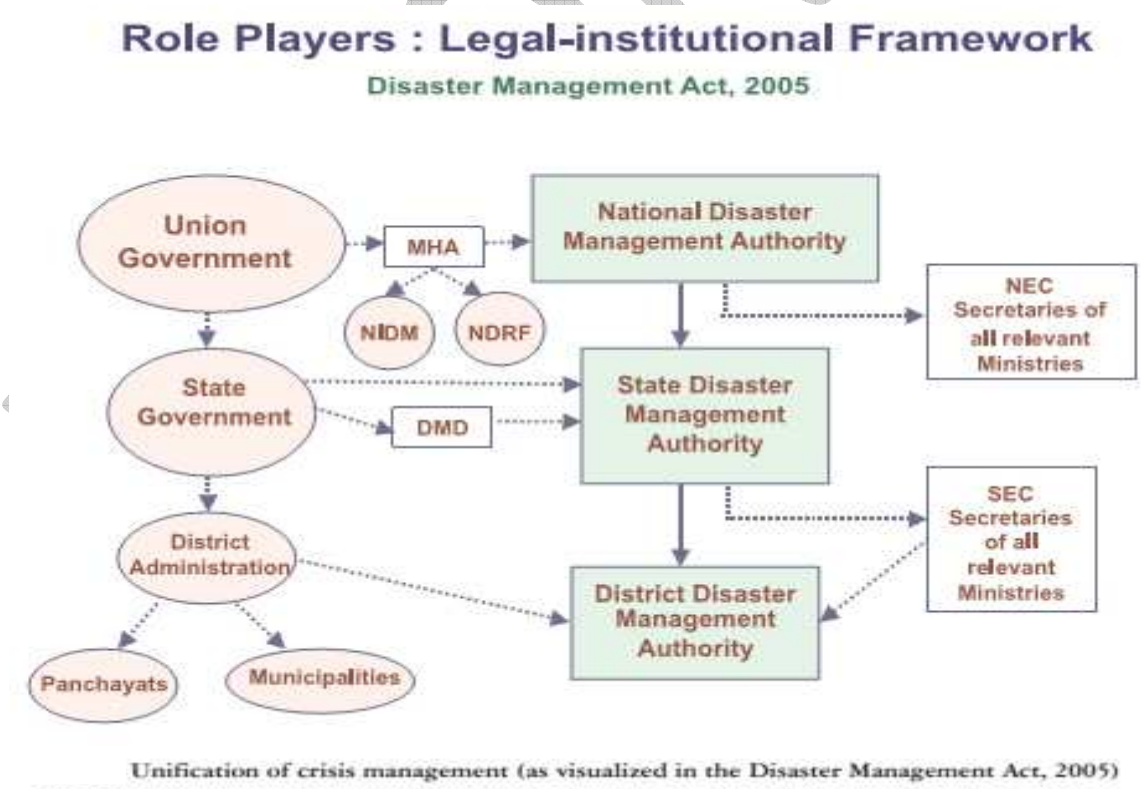
- The Armed Forces, in view of their ability to organize action in adverse ground circumstances, their speed of operational response and also the resources and capabilities at their disposal play a major role in assisting the civil administration.

The Disaster Management Act, 2005

This Act provides for the effective management of disaster and for matters connected there with or incidental thereto. It provides institutional mechanisms for drawing up and monitoring the implementation of the disaster management. The Act also ensures measures by the various wings of the Government for prevention and mitigation of disasters and prompt response to any disaster situation.

The Act provides for setting up of a National Disaster Management Authority (NDMA) under the Chairmanship of the Prime Minister, State Disaster Management Authorities (SDMAs) under the Chairmanship of the Chief Ministers, District Disaster Management Authorities (DDMAs) under the Chairmanship of Collectors/District Magistrates/Deputy Commissioners. The Act further provides for the constitution of different Executive Committee at national and state levels. Under its aegis, the National Institute of Disaster Management (NIDM) for capacity building and National Disaster Response Force (NDRF) for response purpose have been set up. It also mandates the concerned Ministries and Departments to draw up their own plans in accordance with the National Plan. The Act further contains the provisions for financial mechanisms such as creation of funds for response, National Disaster Mitigation Fund and similar funds at the state and district levels for the purpose of disaster management. The Act also provides specific roles to local bodies in disaster management.

Further the enactment of 73rd and 74th Amendments to the constitution and emergence of local self- government, both rural and urban, as important tiers of governance, the role of local authorities becomes very important. The DM Act, 2005 also envisages specific roles to be played by the local bodies in disaster management.



Unification of crisis management (as visualized in the Disaster Management Act, 2005)

National Level Institutions

National Disaster Management Authority (NDMA)

Details of responsibilities are as follows:

- Lay down policies on disaster management
- Approve the National Plan and plans prepared by the Ministries or Departments of the Government of India in accordance with the National Plan
- Lay down guidelines to be followed by the State Authorities in drawing up the State Plan
- Lay down guidelines to be followed by the different Ministries or Departments of the Government of India for the purpose of integrating the measures for prevention of disaster or the mitigation of its effects in their development plans and projects
- Coordinate the enforcement and implementation of the policy and plan for disaster management
- Recommend provision of funds for the purpose of mitigation
- Provide such support to other countries affected by major disasters as may be determined by the Central Government
- Take other measures for the prevention of disaster, or the mitigation, or preparedness and capacity building for dealing with the threatening disaster situation or disasters
- Lay down broad policies and guidelines for the functioning of the National Institute of Disaster Management.

National Executive Committee (NEC)

A National Executive Committee is constituted under Section 8 of DM Act, 2005 to assist the National Authority in the performance of its functions. NEC consists of Home Secretary as its ex-officio Chairperson, with other Secretaries to the Government of India as members.

NEC may as and when it considers necessary constitute one or more sub-committees for the efficient discharge of its functions. NEC has been given the responsibility to act as the coordinating and monitoring body for disaster management, to prepare a National Plan, monitor the implementation of National Policy etc.

The same authorities as above two are also established at state level (SDMA and SEC) and while DDMA at district level.

National Institute of Disaster Management (NIDM)

Disaster Management Act, 2005 entrusts the institute with numerous responsibilities:

- to develop training modules
- undertake research and documentation in disaster management
- organise training programmes
- undertake and organise study courses, conferences, lectures and seminars to promote and institutionalize disaster management.

National Disaster Response Force (NDRF)

The National Disaster Response Force (NDRF) has been constituted under the DM Act, 2005 by up-gradation/ conversion of **eight** standard battalions of Central Para Military Forces i.e. **two battalions each** from Border Security Force (BSF), Indo-Tibetan Border Police (ITBP), Central Industrial Security Force (CISF) and Central Reserve Police Force (CRPF) to build them up as a specialist force to respond to disaster or disaster like situations.

Civil Defence

The Civil Defence Act 1968 defines CD and provides for the powers of Central Government to make rules for CD, spelling out various actions to be taken for CD measures. It further stipulates for constitution of CD corps, appointment of members and officers, functions of members etc. The Act has since been amended in 2010 to cater to

the needs of disaster management so as to utilise the services of Civil Defence volunteers effectively for enhancement of public participation in disaster management related activities in the country. The concept of CD over the years has shifted from management of damage against conventional weapons to also include threat perceptions against nuclear weapons, biological and chemical warfare and environmental disasters.

Policy and Guidelines

National Policy on Disaster Management (NPDM) 2009

- The policy envisages a safe and disaster resilient India by developing a holistic, proactive, multi-disaster oriented and technology driven strategy through a culture of prevention, mitigation, preparedness and response.
- The policy covers all aspects of disaster management including institutional and legal arrangements, financial arrangements, disaster prevention, mitigation and preparedness, techno-legal regime, response, relief and rehabilitation, reconstruction and recovery, capacity development, knowledge management, research and development.
- It focuses on the areas where action is needed and the institutional mechanism through which such action can be channelized.
- The NPDM addresses the concerns of all the sections of the society including differently abled persons, women, children and other disadvantaged groups in terms of granting relief and formulating measures for rehabilitation of the persons affected by disasters.
- It aims to bring in transparency and accountability in all aspects of disaster management through involvement of community, community based organisations, Panchayati Raj Institutions (PRIs), local bodies and civil society.

National Plan on Disaster Management

An institutional mechanism for preparation of the National Plan has been put in place, which is under preparation in three parts namely:-

- National Response Plan,
- National Mitigation Plan and
- National Capacity Building Plan.

Prevention and Mitigation

Mainstreaming of Disaster Risk Reduction in Developmental Strategy

The Government of India has adopted mitigation and prevention as essential components of their development strategy. Accordingly, the Tenth Five Year Plan document had a detailed chapter on disaster management.

Mainstreaming has three purposes:

- To make certain that all the development programmes and projects are designed with evident consideration for potential disaster risks and to resist hazard impact,
- To make certain that all the development programmes and projects do not inadvertently increase vulnerability to disaster in all sectors: social, physical, economic and environment,
- To make certain that all the disaster relief and rehabilitation programmes and projects are designed to contribute to developmental aims and to reduce future disaster risk.

Mainstreaming DRR into the developmental plans is an important mandate of the Disaster Management Act 2005. Integration of disaster risk reduction measures into on-going flagship programmes of Government of India is being

used as an entry point for mainstreaming DRR in development plans. Steps for ensuring the incorporation of DRR into various on-going programmes/plans are as follows:

- Identification of key programme/projects of Government of India,
- Identification of entry points within the programme for integration of DRR (structural, non-structural and other mitigation measures) at various levels viz. national, state and district levels,
- Close coordination with concerned departments such as State Planning Commission and Finance Department for promoting DRR measures into development plans and policies,
- Advocacy for allocation of dedicated budget for DRR within the departmental plans,
- Preparation of guidelines for integration of disaster risk reduction measures into development plans of various departments at the district and sub-district levels.

Disaster Management Act 2005 also provides for constitution of National Disaster Mitigation Fund.

Measures taken for Prevention and Mitigation of Hazards

Risk of destruction and casualties associated with different disasters can substantially be reduced by introduction of prevention and mitigation measures. Mitigation is generally categorised into two main types of activities i.e. **structural and non-structural**.

- Structural mitigation refers to any physical construction to reduce or avoid possible impacts of hazards, which include engineering measures and construction of hazard-resistant protective structures and infrastructure.
- Non-structural mitigation refers to policies, awareness, knowledge development, public commitment, and methods and operating practices, including participatory mechanisms and the provision of information, which can reduce risk with related impacts.

Some of the initiatives are described below.

Earthquakes

1. **National Earthquake Risk Mitigation Project (NERMP):**The proposed project aims at strengthening the structural and non-structural earthquake mitigation efforts and reducing the vulnerability in the high risk districts prone to earthquakes. NDMA, tasked with this project has prepared a Detailed Project Report (DPR) which is under consultation with all the stakeholders. The proposed components of the project include techno-legal regime, institutional strengthening, capacity building and public awareness etc.
2. **National Building Code (NBC):**The National Building Code of India (NBC), a comprehensive building code, is a national instrument providing guidelines for regulating the building construction activities across the country. The salient features of the revised NBC include meeting the challenges posed by natural calamities and reflecting the state-of-the-art and contemporary applicable international practices.
3. **Efforts by Building Materials & Technology Promotion Council (BMTPC):**The BMTPC undertook projects for retrofitting of life-line structures for generating awareness among the people as well as various government agencies about the need and techniques of retrofitting. The Council has initiated retrofitting of MCD school buildings in Delhi.
4. **Initiative by Ministry of Panchayati Raj**: It releases funds under Backward Regions Grant Fund (BRGF) for meeting critical infrastructural gaps and other developmental requirements. The ministry has financed several district plans under the BRGF for construction of panchayat buildings, anganwadi centres, school buildings, class rooms, roads, bridges, culverts etc.

Such mitigation steps specific to the other disasters like Cyclones, Floods and Landslides etc. have also been taken.

Institutional Arrangements

Forecasting about climate change as a pre requisite for taking preparedness measure to respond to the disaster is the most important element of disaster management. Government of India has designated the offices as given in the Box 5.1 as the nodal agencies for early warning of different natural hazards:

Disaster wise nodal agencies for Forecast

Disasters	Agencies
Cyclone	Indian Meteorological Department
Tsunami	Indian National Centre for Oceanic Information Services
Floods	Central Water Commission
Landslides	Geological Survey of India
Avalanches	Snow and Avalanche Study Establishment
Heat & Cold Waves	Indian Meteorological Department

India Meteorological Department (IMD)

Forecasting and Warning of Cyclones: IMD is the nodal agency in the country to monitor and predict the cyclonic disturbances and issue the warning and advisory bulletins.

The cyclone warnings are issued to State Government officials in four stages.

- pre-cyclone watch issued 72 hours in advance,
- cyclone alert issued at least 48 hours in advance ,
- cyclone warning issued at least 24 hours in advance, and
- as post landfall outlook issued at least 12 hours in advance of expected time of landfall.

Central Water Commission

Flood Forecasting Network of the CWC covers the entire major flood prone inter State basins in the country. The flood forecasting involves the following four main activities:

- observation and collection of hydrological and hydro meteorological data,
- transmission of Data to forecasting centres,
- analysis of data and formulation of forecast, and
- Dissemination of forecast

Indian National Centre for Oceanic Information System (INCOIS)

INCOIS gives information to all responders about the origin, time, location of the epicentre, magnitude and depth of an earthquake inside the ocean and accordingly issues bulletins. **Tsunami Early Warning System (TEWS)** at INCOIS is capable of detecting all earthquake events of more than 6 Magnitude occurring in the Indian Ocean in less than 20 minutes of occurrence and first report on the occurrence of an earthquake in India and the Indian Ocean region is sent to MHA within 25-30 minutes indicating the location and magnitude of the earthquake.

Geological Survey of India (GSI)

The GSI was designated as nodal agency for coordinating geological studies, landslides hazard zonation, monitoring landslides, avalanches, studying the factors responsible and suggesting precautionary and preventive measure.

Disaster Management Support (DMS) – Indian Space Research Organization (ISRO)

The Disaster Management Support (DMS) Programme of ISRO, provides timely support and services from aero-space systems, both imaging and communications, towards efficient management of disasters in the country. The DMS programme addresses disasters such as flood, cyclone, drought, forest fire, landslide and Earthquake. These include

- creation of digital data base for facilitating hazard zonation, damage assessment etc.,
- monitoring of major natural disasters using satellite and aerial data,
- development of appropriate techniques and tools for decision support,
- establishing satellite based reliable communication network,
- deployment of emergency communication equipments and
- R&D towards early warning of disasters.

Preparedness

- An annual Conference of Relief Commissioners, Secretaries, to the Department of Disaster Management of States and UTs is organized before the onset of south west monsoon to review the status of preparedness for ensuing Monsoon and to discuss other disaster management related issues.
- Necessary guidelines in the form of checklist, for taking necessary preparatory measures, are issued to the State for their guidance and appropriate action. Instructions are also issued for creating reserves of essential items required during rescue and relief phase.
- Trigger Mechanism has been developed to activate the disaster response system automatically after receiving warning signals of a disaster happening or likely to happen or on receipt of information about the incident.
- Crisis Management Plan comprises of two parts - Part-I deals with aspects, which are common to all contingencies situations and Part-II about the individual Standard Operating Procedures (SOPs) for dealing with specific crisis situation.
- At the Centre, under the Chairmanship of the Cabinet Secretary the National Crisis Management Committee(NCMC) has been constituted in the Cabinet Secretariat. The NCMC gives direction to the Crisis Management Group as deemed necessary.
- Crisis Management Group (CMG)/National Executive Committee is a group under the Chairmanship of the Home Secretary comprising the senior officers from the various ministries and other concerned departments. CMG's function is to review contingency plans every year formulated by the Central Ministries/ Departments and the measures required for dealing with a natural disaster; co-ordinate the activities of the Central Ministries and the State Governments in relation to disaster preparedness and relief; and to obtain information from the nodal officers on measures relating to the above.

Recovery, Reconstruction and Rehabilitation

Guiding Principles for Post- Recovery

- Mainstreaming disaster risk reduction in recovery and development process,
- Improving coordination,
- Promoting participatory approaches and decentralising planning and programming for recovery,
- Enhancing safety standards and integrating risk reduction in reconstruction and development,
- Improving the living conditions of the affected communities and sectors,
- Building local and national capacities for increased resilience, risk management and sustainable development,
- Taking advantage of ongoing initiatives,
- Gender sensibility,
- Demonstrative effects,
- Monitoring, evaluation and learning.

Assessment

The first step after stabilizing the situation by providing sufficient relief is to assess the damage. A meticulously executed assessment exercise would provide an ideal base for the rehabilitation efforts. This exercise is best carried out through multi-disciplinary teams which go into all aspects of damage (social, economic, psychological) in participation with the local community. Based on the assessment of the damage and the needs, a recovery strategy has to be formulated. The strategy should include all interventions - economic, social, political and psychological. The resources should be identified and the roles and responsibilities of all concerned should be defined.

Co-ordination

Following any major disaster, a number of players arrive on the scene and as already stated, ensuring proper coordination amongst them thus becomes very important. Recovery activities are taken up by government agencies, local bodies, international agencies, voluntary organisations and others, through separate, overlapping and uncoordinated interventions. This leads to imbalances in the scale of operations, duplication of efforts in some areas, gaps in others and leakage and misuse of resources. Therefore establishing a framework for coordination is necessary for effective recovery.

The administration is also required to set up a voluntary organisations' coordination centre to coordinate the relief and rehabilitation activities of the multiple organisations so that they are not concentrated in a few pockets. The role of voluntary organisations including international ones like the Red Cross is extremely useful for mitigating the impact of disaster.

Shelter

Shelter is one of the most visible and immediate needs in post-crisis settings. Relief efforts are often focused on providing shelter quickly, without taking into account the impact of short-term shelter strategies. Long-term shelter strategies help not only to focus on determination and implementation of realistic and permanent reconstruction plans for the affected communities, but are also concerned with rebuilding community confidence and support structure for civic responsibility and urban governance, through participatory planning of reconstruction. The development of disaster resistant housing is a major factor in reducing vulnerability to disasters. However, shelter issues in mitigation go beyond the structural aspects. Rights to ownership and security of tenure make an enormous difference to the maintenance, management and development of shelter, particularly in urban areas.

Sustainability in Recovery Process

It is often observed that post-disaster recovery efforts tend to focus on rapid and visible solutions to restore normalcy at the cost of sustainable development. The post-disaster recovery phase provides a 'window of opportunity' for disaster risk reduction. Risk reduction aspects should therefore be built into the redevelopment process.

Normally, it is also seen that the recovery efforts have a tendency of tapering off with the passage of time. The Bureau for Crisis Prevention and Recovery of the UNDP has also observed "the general experience is that once the initial flurry of activities of providing rescue and relief is over, the attention received by the recovery efforts goes on declining steadily over a period of time and 'business as usual' sets in". The sustainability component in recovery process therefore is important. This could be achieved by capability building of the community and awareness generation and preparing local crisis management plans.

Accountability

A system of accountability needs to be evolved during the relief and rehabilitation phase. This system should ensure that the relief material reaches the target groups and that the funds are being utilised efficiently and optimally. A grievance redressal mechanism should also be put in place.

Evaluation

After the recovery phase, it is necessary to conduct a detailed evaluation of all aspects of crisis management. This should bring out the strengths and weaknesses of the disaster management machinery and also provide the basis for future improvements. Such an evaluation should be carried out by an independent professional agency, like the NIDM, in all major disasters. This assessment should also include a quick audit of the expenditure incurred.

Capacity Development

Effective disaster management requires trained manpower to deal with complex situations effectively and speedily to reduce the impact of disaster on human life and property. UNDP describes 'capacity building' as the creation of an enabling environment with appropriate policy and legal frameworks, institutional development, including community participation (of women in particular), human resource development and strengthening of managerial systems. It adds that capacity building is a long-term, continuing process, in which all stakeholders participate

Capacity building is much more than training and includes the following:

- Human resource development: the process of equipping individuals with the understanding, skills and access to information, knowledge and training that enables them to perform effectively,
- Organisational development: the elaboration of management structures, processes and procedures, not only within organisations but also the management of relationships between the different organisations and sectors (public, private and community),
- Institutional and legal framework development: making legal and regulatory changes to enable organisations, institutions and agencies at all levels and in all sectors to enhance their capacities.

Following are considered as vital components of the capacity development:

Training: It is a learning process that involves the acquisition of knowledge, sharpening of skills, concepts, rules, or change of attitude and behaviour to enhance the performance of individuals associated with different departments and institutions.

Education: Amidst changes of the past decades in school education sector, the most discussed topic of national importance is planning for more contextual, practical and application oriented curriculum for students at different levels of schooling.

Research: Research is an organised and systematic way of finding answers to questions. Systematic because there are certain things in the research process which are always done in order to get most accurate result.

Awareness: Awareness is generally defined as knowledge created through interaction between an agent and its environment. It cannot be simply referred to as "knowing what is going on." This concept of awareness involves state of knowledge as well as dynamic processes of perception and action.

The National Policy on Disaster Management (NPDM) describes its approach to capacity development. A strategic approach to capacity development can be addressed effectively only with the active and enthusiastic participation of the stakeholders. This process comprises of awareness generation, education, training, research and development (R&D) etc. It further addresses to put in place an appropriate institutional framework, management systems and allocation of resources for efficient prevention and handling of disasters. The approach to capacity development includes-

- According priority to training for developing community based DM systems for their specific needs in view of the regional diversities and multi-hazard vulnerabilities,
- Conceptualisation of community based DM systems at the national level through a consultative process involving the States and other stakeholders with the state and local level authorities in charge of implementation,
- Identification of knowledge-based institutions with proven performance,
- Promotion of International and Regional cooperation,
- Adoption of traditional and global best practices and technologies,
- Laying emphasis on table-top exercises, simulations, mock drills and development of skills to test the plans,
- Capacity analysis of different disaster responder groups at State, District, and local levels.

NPDM has further elaborated on national priorities, institutional capacity development, training of communities, professional technical education, DM education in schools, training of artisans, training of other groups and licensing and certification. Besides NPDM guidelines issued by NDMA also lay emphasis on capacity development.

Capacity development in India: A realistic National Capacity Development Programme, commensurate with the intensity and extent of the hazard in India needs to be evolved and implemented, keeping in view the available resources. This programme of resource enhancement should encompass all institutions, organizations and individuals that have a role in any part of the disaster management cycle.

Capacity gaps in disaster management: To mitigate the impact of disasters, there is a need to work collectively through multidimensional channels combining the efforts, resources and expertise of the government, non-governmental organisations and civil societies. Managing such incidents holistically is a highly specialised and skilled job which cannot be approached in an ad hoc manner. Disaster Management comprises of multi sectoral issues and accordingly calls for all sectors that play pivotal role in managing exigencies to develop their human resource capacity accordingly. There seems to exist a wide gap in the knowledge, skill, and attitude of the disaster managers for efficiently managing emergency situations particularly at local and state level where according to one study made by NIDM, Capacity-Risk ratio is remarkably low. To bridge this gap, it is important to have specific capacity development plans and strategies.

Target group: In the field of capacity development, priority is to be given to training of DM officials, functionaries, trainers and elected representatives and community representatives. Due importance requires to be given to DM training and orientation of professionals like doctors, engineers and architects apart from those engaged in response and relief. Capacity Development require to be included in curricula of educational institutions at all levels of schooling and should include practical instructions as well.

Realizing the importance of Capacity Development of stakeholders in Disaster Management, NIDM has been given the task of preparing National Human Resource and Capacity Development plan, which is at the advanced stage of its formulation. The first draft has been prepared and presented before the MHA. NIDM is finalizing the plan after holding the discussion with MHA on its first draft.

Financial Arrangements

Financial assistance in the wake of natural calamities is provided in accordance with the schemes of relief funds. These schemes are based on the recommendations of the successive Finance Commissions. The present scheme of State Disaster Response Fund (SDRF) and National Disaster Response Fund (NDRF) are based on the recommendations of the 13th Finance Commission.

State Disaster Response Fund: Disaster Management Act 2005 provides for constitution of State Disaster Response Fund (SDRF) by the state Governments. The Ministry of Home Affairs has issued the guidelines to the state for operation of SDRF. Allocations to the State Relief Funds have been made based on the recommendations of the successive Finance Commissions.

National Disaster Response Fund (NDRF)

DM Act 2005 provides for constitution of NDRF for meeting any threatening disaster management situation or disaster. Accordingly, DM Division issued notification for the constitution of NDRF. The Finance Ministry has also issued guidelines to the state for operation of NDRF. The Government of India raised this Fund by levying the "National Calamity Contingency Duty" on imported petrol and products, crude oil, motor cars, imported multi utility vehicles, two wheelers, mobile phones, pan masala and certain specific tobacco products.

Additional Financial Assistance: Over and above the provisions of the SDRF, funding is provided from the NDRF in the wake of calamities of severe nature.

Disaster Response Reserve

In the context of disaster relief, the 13th Finance Commission has observed that procurement of relief materials on short notice is often associated with premium in pricing and could adversely impact quality. The Commission also felt that a national inventory of equipment and material should be maintained for providing immediate relief. It is advisable to keep an inventory of items such as life-saving equipment and tents etc. with the NDRF. The Commission has accordingly recommended an initial grant of 250 crores in the form of a revolving fund to be

provided to the NDRF for this purpose. Whenever these items are used for responding to a calamity, the cost (or rent for those items that can be reused) should be booked to the overall cost of relief operations incurred by the state government and the inventory replenished on a regular basis. A proposal to constitute this fund along with guidelines for its operations is under consideration of the government.

Capacity Building Grant

On the recommendation of the 13th Finance Commission, 525 crore has been allocated to the states for taking up activities for building capacity in the administrative machinery. The guidelines provide for preparation of an action plan for the entire period of 2010-15 as well as action plans for each financial year. These plans would inter alia include items for training and capacity building of stakeholders and functionaries in states, preparation of disaster management plans based on hazard, risk and vulnerability analysis and setting up and strengthening of emergency operations centres in states.

Environmental Relief Fund

In exercise of the powers conferred by Public Liability Insurance Act, 1991, the Central Government has established the Environment Relief Fund Scheme in 2008.

International Cooperation

Hyogo Framework of Action 2005-2015

Three Strategic Goals:

- The more effective integration of disaster risk reduction into sustainable development policies, planning and programming at all levels, with a special emphasis on disaster prevention, mitigation, preparedness and vulnerability reduction.
- The development and strengthening of institutions, mechanisms and capacities at all levels in particular at the community level that can systematically contribute to building resilience to hazards.
- The systematic incorporation of risk reduction approaches into the design and implementation of emergency preparedness, response and recovery programmes in the reconstruction of the affected communities.

Five Priority Action Areas:

1. Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation,
2. Identify, assess and monitor disaster risks and enhance early warning,
3. Use knowledge, innovation and education to build a culture of safety and resilience at all levels,
4. Reduce the underlying risk factors,
5. Strengthen disaster preparedness for effective response at all levels.

Key Activities:

- Promote socio-economic development practices,
- Land-use planning and other technical measures, Disaster Management in India
- Strengthening of institutional and technical capacities,
- Review and implement preparedness and contingency plans,
- Promote voluntarism and community participation,
- Creation of provision of emergency funds,
- Dialogue, coordination and exchange of information between disaster managers and development sectors.

SAARC Disaster Management Centre (SDMC)

SAARC Disaster Management Centre (SDMC) was set up in October 2006 at the premises of National Institute of Disaster Management in New Delhi.

The Centre has the mandate to serve all eight Member Countries of South Asia Association of Regional Cooperation (SAARC) - by providing policy advice and facilitating capacity building services including strategic learning, research, training, system development and exchange of information for effective disaster risk reduction (DRR) and management in South Asia. The Centre has developed its network with various organisations and institutions in the South Asian countries for research, documentation training and capacity building. and to promote better cooperation and understanding amongst the countries for holistic management of disasters.

The Way Forward

Recent Initiatives: The 11th five year plan document of Government of India gave impetus to mainstreaming disaster risk reduction as one of the priority programmes in the development planning process and disaster management. "Building Back Better" has become the underlining principle in any post disaster reconstruction and rehabilitation programme implemented by Government of India. As mentioned in the report of the working group on Disaster Management for the 11th plan and also in the various initiatives towards this effort, the way forward can be divided in the following major areas –

- Policy guidelines at the macro level that would inform and guide the preparation and implementation of disaster management and development plans across sectors,
- Building in a culture of preparedness and mitigation,
- Operational guidelines of integrating disaster management practices into development, and specific developmental schemes for prevention and mitigation of disasters,
- Having robust early warning systems coupled with effective response plans at district, state and national levels.
- Building capacity of all stakeholders,
- Involving the community, NGOs, CSOs and the media at all stages of DM,
- Addressing gender issues in disaster management planning and developing a strategy for inclusive approach addressing the disadvantaged sections of the society towards disaster risk reduction, and
- Addressing climate risk management through adaptation and mitigation.

Suggested Steps

To achieve results in these key identified areas, the following suggested steps should be integral to all stages of DM:

- developing a culture of prevention by introducing disaster management in school curricula
- professional courses and enhancing the capacity of disaster managers by strengthening training facilities for disaster management
- creating mass awareness by disseminating knowledge about the hazards and risks and promoting coping capacities of the communities through community based disaster risk management for better preparedness
- fostering social and gender equality in disaster risk reduction by planning and focusing on the needs of the disadvantaged sections of the society.

The summarised list of actions that needs to be taken is as follows:

Developing a Centralised Database

In collaboration with the Central Statistical Organization (CSO) an integrated Centralised Disaster database requires to be developed. Data collection on standardised format should be the responsibility of the concerned state government. Such database would facilitate researchers and decision makers to undertake range of analyses to better understand the linkages between disaster management and other sectors that would help in taking up informed risk reduction activities as well as to understand the impact of disasters on economy.

Early Warning Systems and Communication and Connectivity upto the Last Mile

Early warning systems vary for the different types of disasters. Due to recent unprecedented devastation unleashed by tsunami, often early warning gets linked with tsunami only, masking the importance of early warning against other forms of disasters. Hazard- specific efficient 'early warning systems' is the need of the hour and it has to be put in place permanently, so that useful information flows throughout the year and is easily understood by the local community. There is scope for improvement in flood, cyclone and storm surge warnings. Such projects need further encouragement and newer projects should be accorded high priority. Even with the best of early warning systems, the impact may still be catastrophic if early warning signals are not properly interpreted and communities are not educated and trained to respond to the early warning signals in real time. Therefore, the technology to early warning, on the one hand and, community response to early warning to the other are urgently required. This needs to be coupled with the National Emergency Communication Plan to ensure real time dissemination of early warnings and information to the 'at risk' community and the local authorities.

Emergency Operations Centres (EOCs)

EOCs in the country could play a critical role in coordinating emergency activities as well as in providing information to various stakeholders. Effective functioning of these EOCs during emergencies continues to be a major challenge. "State of the art" EOCs at state and district levels with access to satellite based imageries need to be planned and established.

Mitigation Plans and Mainstreaming Disaster Management into the Development Planning Process

Three committees constituted by Government of India are working towards preparing the National Response Plan, National Human Resource and Capacity Development Plan and National Mitigation Plan in respective ministries that have been designated as nodal agencies for various disasters. The draft National Response Plan and National Human Resource and Capacity Development Plan are ready. Certain rectifications and modifications are underway before it is presented to the National Executive Committee for its finalisation.

It is expected that National Response Plan will be put in place once it is adopted by Government of India. It will pave the way for institutionalising the response plan in three tiers as envisaged in the Disaster Management Act.

Similarly, the Capacity Development Plan, once it is approved and adopted will provide the roadmap for undertaking the capacity building of persons engaged in different facets of disaster management and enhancing the capacities both at the individual and organizational levels.

Strengthening the Preparedness Phase

Urban Planning and Zoning **-**There is a need to enhance the efforts for integrating disaster risk reduction elements in settlement planning and land use zoning to mitigate flood and earthquake risks. Planned urban settlements and housing is the need of the day for disaster risk management that leads to sustainable development, particularly in ecologically sensitive regions, high risk locations and high population density pockets.

Building Codes and Enforcement: Building codes are adhered to only in engineered structures and not in the huge majority of houses across rural and urban India. The building codes have to be continually upgraded with the advent of new information and technology. The greatest challenge, however, is in respect to enforcement of the building codes.

Housing Design and Finance: It has been difficult to ensure compliance to disaster resistant technology at individual house level. There is need to find alternative ways to encourage and facilitate individual home builders to use disaster-resilient designs, materials and techniques in the construction of their homes. Publicity and audience friendly information emphasising appropriate designs and the cost differences will go a long way in creating awareness among people for their adoption. Some financial incentives or tool may motivate people, particularly poor people or first-time house owners, to incorporate safety features in their houses.

Flood Proofing: This is an approach adopted in parts of Bihar, Uttar Pradesh and few other flood prone states of the country for reducing flood vulnerability. Flood proofing involves constructing earthen mounds to raise entire homesteads—the house, the vegetable garden, livestock pen, grain stores, toilets and water wells above the flood

level. Encouraging such good practices in other flood prone parts of the country, would go a long way to reduce the risk in such area.

Promoting development of new financial tools: There is need to work for the development of new financial tools such as catastrophic risk financing, risk insurance, catastrophic bonds, microfinance etc. Risk transfer and risk insurance mechanisms would be needed for infrastructure, crops and other assets. Making risk insurance mandatory at least in highly hazard prone states in the country needs to be encouraged. Insurance distributes disaster risk among the broader society and makes great sense when risk has been reduced to some acceptable level. (See the Box 10.1).

Agriculture and Aquaculture: These projects should be assessed from the perspective of the flood hazards. Much of the flooding that affects large rural habitats and agricultural lands is because of reduced drainage as a result of the expansion of agricultural activities into wetland areas that previously served an important drainage function. Such development of agriculture practices should have compensatory drainage factored into agricultural expansion plans.

Transfer mechanisms-Insurance as a financial tool for Disaster Management

For decades, the financing of disasters has relied on a reactive approach consisting of the diversion of funds from the domestic budgets. Such "ex post" funding approaches are inefficient, often poorly targeted and insufficient. Moreover, they provide no incentive for proactive risk reduction measures such as improved urban planning, higher construction standards, etc.

Reactive approaches to risk financing are becoming increasingly unsustainable as vulnerability is increasing and emerging economies grow and accumulate more assets. The funding gaps between available donor resources and post-disaster funding will grow if disaster prone countries do not engage in risk reduction and pre-disaster risk financing.

Insurance markets in the majority of developing countries are underdeveloped. Where hazard coverage exists, it is usually limited to major industrial and commercial properties and some wealthier households.

For a number of years, efforts are on to promote a more proactive approach to risk financing. A number of examples come from World Bank led efforts, including the provisions of technical support to Mexico in issuing a cat bond; contingency financing arrangements in Cambodia, the Caribbean Catastrophe Risk Insurance Facilities (CCRIF - the first regional institution which allows the eighteen participating countries to pool their risk and save on individual premium payments), the Turkish Catastrophe Insurance Pool (TCIP - a mandatory earthquake insurance pool for homeowners). These initiatives provide much needed, immediate liquidity after a disaster for more effective government response.

Micro disaster Insurance: It has great potential, but faces several challenges before it becomes a sustainable mechanism for effective risk management for the poor. The study by ProVention Consortium and the International Institute of Applied System Analysis found that micro Insurance holds great potential to protect the poor from disaster shocks.

Financial Viability: Disaster Insurance should be based on sound estimates of low-probability, high-consequence risks so that the premium can be priced and the requisite capital reserve or reinsurance can be assured. Where there is a high degree of ambiguity with the risk estimates of extreme events, international donors may need to provide incentives for the private sector involvement in such schemes.

Affordability: Micro insurance needs to be affordable to low income-clients. Disaster insurance premiums include the costs of handling many small contracts, distributing the product often to remote areas, as well as assuring sufficient capital to cover dependant claims. There are several ways to reduce disaster insurance premiums. The most obvious is subsidies from the public authorities, international donors or those at lower risk in the insurance pool (cross subsidies in insurance systems). The Hungarian government is providing subsidies to poor households as part of a recently legislated flood insurance pool. In the UK, extensive cross subsidies in the private flood insurance systems make it affordable to low income households. In developing countries, transaction costs can be minimised by offering policies to groups or communities through established microfinance institutes. The high costs of capital reserves and reinsurance can be lowered through government or donor provision of reinsurance. An example is the Turkish Catastrophe Insurance Pool, where the World Bank reinsures a layer of risk for the pool.

Roads and Infrastructure: Standards are generally set to protect roads, railways, power and communication infrastructure from being damaged or destroyed by a 10 or 20 or 50 year flood level. Any new infrastructure project should conduct a disaster impact analysis and ensure that construction does not impede water flow and cause deeper or prolonged floods. Designing the roads to the higher standards requires factoring of not only the vulnerability of the roads to floods but also their contribution to hazard.

Logging activities: These activities in the hilly areas destabilise slopes, cause landslides and increase mudflow and silting in the nearby rivers. The revenue generated by logging is far lesser than the losses incurred due to the serious problems of landslides, silting and ecological disturbance caused. There should be a plan for afforestation in the logging area before or just after the logging.

Design and construction of critical infrastructure and lifeline facilities (hospitals/ schools etc.):It has been observed in the past disasters that schools and hospitals are badly affected. Therefore, construction of all new schools and hospital needs to be brought under the regime of disaster resistant technology. Medical Preparedness for recovery of affected person in any kind of disaster is of paramount importance. There exits huge gap between demand and supply of medical care, particularly in the area of trauma care. This needs to be strengthened and capacity augmented at every level from primary to referral level. The capacity of doctors and Paramedical staff also needs to be strengthened and to be geared to meet the challenges of post-disaster recovery.

Capacity Building Plan

- In addition to development of National Human Resource Plan, a training calendar of Disaster Management institutes and agencies at the international, national and sub-national levels needs to be compiled and publicised so that the stakeholders could avail of the opportunities to build capacities.
- Concerted efforts are required to work closely with UN agencies, bilateral agencies and NGOs for DRR. Bilateral and Multilateral Cooperation with countries prone to hazard and those having developed expertise in management of different disasters and international institutions for DRR would facilitate and encourage participation of professionals and officials in national and international events in enhancing their capacities.
- International collaboration in the field of disaster management should be strengthened. The NDMA and NIDM have to play a key role in awareness generation and engage with print, electronic and folk media to carry forward programmes for public awareness. There is also a great need to develop the capacity and sensitise the media to comprehend disaster awareness and reporting, so that it plays a positive role in creating awareness and in handling disaster information and news during emergencies.
- In order to address the issue of structural safety against multi-hazards, steps that lead to improvement of construction on the ground need to be initiated. This would entail enhancing community awareness, capacity building of architects and masons, strengthening of enforcement, etc.
- Inter-state sharing of resources has been very effective in the past. Such sharing should be facilitated by encouraging states to enter into mutual agreements with each other on possible nature and type of resources that can be shared and set up administrative mechanisms for implementing these effectively.

National, State and District Level Response Plans

The recent Japanese earthquake and tsunami, followed by fire and the nuclear energy crisis is a pointer to the fact that despite best preparedness and mitigation and capacity building plans being in place, response and crisis management plans continue to be relevant. To put things in place an effective response plans at the National, States, Districts and the Sub-districts level should therefore, be encouraged to strengthen review and update the existing capacity for response and crisis management.

Corporate Social Responsibility

Business entities are expected to shoulder responsibilities for the impact of their activities on the consumers, employees and community as a whole. Efforts are therefore needed to engage corporate bodies in undertaking disaster risk reduction activities as a part of their corporate social responsibilities. NDMA and NIDM have to actively engage with the corporate sector in mainstreaming DRR within their CSR framework.

Integrating Climate Change and Disaster Risk Reduction

The current trends of climate change are expected to increase the frequency and intensity of existing hazards, an increased probability of extreme events, spur the emergence of new hazards and vulnerabilities with differential

spatial and socio-economic impacts. This is likely to further degrade the resilience and coping capacities of poor and vulnerable communities, who make up from a quarter to half of the population of most Indian cities Vulnerability has typically contributed more to overall risk in India than hazard exposure. The efforts for integrating climate change and DRR measures needs to be further strengthened and institutionalised and community be sensitised to take up such adaptive measures, which reduces their vulnerability.

Conclusion

The above mentioned initiatives are only an indicative list of actions requiring attention. Every stakeholder involved needs to contribute his bit in order to ensure that the increasing hazards and risks and the vulnerabilities get addressed in a planned and systematic manner, thereby increasing the coping capacities of the communities at large and making them resilient to the impacts of disasters. The Government is committed to structure and convert these requirements into actionable format to place them on a roadmap and source the funding for their implementation.

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