BLOCK 4

DISASTER MANAGEMENT: CROSS-CUTTING ISSUES

UNIT 12 RELEVANCE OF INDIGENOUS KNOWLEDGE*

Structure

12.0 OBJECTIVES

After reading this Unit, you should be able to:

- Understand the concept of traditional knowledge;
- Relate indigenous knowledge with Disaster Risk Reduction (DRR); and
- Understand the coping strategies during cyclones.

12.1 INTRODUCTION

In recent times, there has been constant occurrence of natural disasters around the globe, mainly due to ill-conceived development efforts and unprecedented climate change. For instance, disasters such as unforeseen floods, heavy rain and drought are the results of climate change. Such climatic variations, not only lead to natural catastrophe, but also cause a huge impact on the lives of the local community. Though the occurrence of such disasters is sometime unavoidable, the repercussions of such disasters can be avoided when participation of community members is given due recognition in disaster reduction activities. Further, accomplishment of targeted goals and sustainability of risk reduction interventions also depend upon the involvement of local populace, their knowledge, culture and traditional practices. Thus, increasing the adaptive capacity of the communities helps in bringing back the resilience and also in reducing the levels of vulnerability. The adaptive capacity could be increased by laying emphasis on the traditional knowledge of the local communities. In this Unit, the discussion is on the concept of traditional knowledge and the interrelationship between traditional knowledge and disaster risk reduction. It also documents some of the existing traditional

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practices that were adopted in dealing with disaster situations like, cyclones and droughts.

12.2 UNDERSTANDING TRADITIONAL KNOWLEDGE

Traditional Knowledge is "the unique, traditional, local knowledge existing within and developed around the specific conditions of women and men, indigenous to a particular geographic area" (Grenier, 1998). The world 'traditional knowledge' is derived on the belief that the local communities have knowledge about the history of their locality based on the past experiences. Berkes (2007) defines traditional knowledge as "a body of cumulative knowledge, practice and belief, evolving by adoptive process, and handed down through generations by cultural transmission about the relationship of living being (including humans) with one another and the environment". The traditional knowledge can be also called as 'Indigenous Knowledge' or 'Local Knowledge'. UNESCO (2002) describes traditional knowledge as a "cumulative body of knowledge, know-how, practices and representation, maintained and developed by peoples with extended histories of interaction with the natural environment, while indigenous as attached to place and indigenous people".

As per the World Bank Report (2005), "Indigenous knowledge also referred to as traditional or local knowledge refers to the large body of knowledge and skill that has been developed outside the formal education system. Indigenous knowledge is embedded in culture and is unique to a given location or society. Indigenous knowledge is an important part of the lives of the poor. It is the basis for decision making of communities in food security, human and animal health, education and natural resource management". Flavier also states that the "traditional knowledge is the information base for a society, which facilitates communication and decision-making. Indigenous information systems are dynamic and are continually influenced by internal creativity and experimentation as well as by contact with external systems". Based on the above definitions on indigenous knowledge, it can be concluded that indigenous knowledge is not only about the past experiences of the community, but also helps a community to make a decision on what to do and what not to do. According to IIRR, indigenous knowledge is "the knowledge that people in a given community has developed over time, and continues to develop. It is based on experience, often tested over centuries of use, adapted to local culture and environment, dynamic and changing".

Rajib Shaw (2010) characterised indigenous knowledge as: "Locally bound, indigenous to a specific area and communities; culture and context specific; non-formal knowledge; orally transmitted, and generally not documented; Dynamic and based on innovation adaptation, and experimentation; and closely related to survival and subsistence for many people worldwide".

12.3 INDIGENOUS KNOWLEDGE AND DISASTER RISK REDUCTION

This section discusses how the traditional knowledge helps to reduce the disaster risk. It is always obvious that the local people know their land and environment thoroughly well. They have a unique ability, through traditional wisdom, to get and store the information on natural disasters that their land is exposed to. Hence, focus should be laid on the local people, to make their situation better. The Sendai

Framework for Disaster Risk Reduction (SFDRR) 2015-2030 stated that to achieve the disaster risk reduction at the global and regional level it "requires a multi-hazard approach and inclusive risk-informed decision-making based on the open exchange and dissemination of disaggregated data, including by sex, age and disability, as well as on easily accessible, up-to-date, comprehensible, science-based, non-sensitive risk information, complemented by traditional knowledge."

Combining the traditional knowledge with scientific expertise is more relevant in the current context. Knowing and documenting the traditional knowledge is not effective unless it is included in the disaster risk reduction activities. It is the entry point of people's participation at the grassroot levels. The SFDRR report suggests that to understand the disaster risk at national and local level, it is important to "ensure the use of traditional, indigenous and local knowledge and practices, as appropriate, to complement scientific knowledge in disaster risk assessment and the development and implementation of policies, strategies, plans and programmes of specific sectors, with a cross-sectoral approach, which should be tailored to localities and to the context."

To this effect, Pan American Health Organisation (2015) suggested the following points to be included in the Disaster Risk Reduction (DRR) planning:

- Securing the input of indigenous peoples and their cultural and environmental knowledge in the development and implementation of government disaster risk reduction plans;
- Integrating an indigenous perspective into government disaster plans that reflects how climate change is contributing to increased disaster risk;
- Considering how infrastructure development and climate change impact the disaster vulnerability of indigenous people;
- Collaborating indigenous people in the design and implementation of early warning systems in order to ensure their linguistic and cultural relevance;
- Encouraging indigenous groups to develop, with the participation of entire community, their own community-level preparedness and risk reduction plans and strategies that include actionable contingency plans to protect lives, livelihoods and critical infrastructure.

Types of Indigenous Knowledge

The indigenous knowledge can be divided into three types, that is, Technological Knowledge, Economic Knowledge and Environmental Knowledge.

1) **Technological Knowledge**

The indigenous people use their technical knowledge, gained over the years to address some of the concerns related to disaster risk reduction. For instance, the traditional practices of the community are still in existence; with respect to construction of house and infrastructure in the flood inundate areas, coastal regions and the mountain regions. For example, during the Uttarkashi earthquake of 1991, though the damage was visible, most of the traditional structured houses still could survive even after the disaster. Similarly, Kashmir region is also known for its earthquake resistant construction practices, that is, *Taq* System and *Dhajji Dewari* System. These types of houses could survive during 2005 Kashmir Earthquakes. Incorporating such local technical knowledge and encouraging participation of community members in the disaster preparedness improves the sustainability.

2) **Economic Knowledge**

The other type of indigenous knowledge is the economic knowledge used by the community at times of crisis. People come up with economic ideas to address the issues on a temporary basis. For instance, the construction of temporary/permanent shelter by the community with the locally available resources, in both 'during and post-disaster' phases is an apt example. Thus, low cost strategy is planned using local resources by the community. Similarly, the community also adapt themselves to alternative livelihood to overcome the crisis situation.

3) **Environmental Knowledge**

Environmental knowledge is something which is sensed by the community, even based on the minor or minute inference which they get from the environment or surrounding. For example, it is the knowledge which is based upon the experiences during cyclones or floods. On the basis of the colour of the water or clouds, people used to predict and warn the community members. It used to help the community members to take preparedness measure like storing food, firewood, saving drinking water and fodder for cattle.

Check Your Progress 1

Note: i) Use the space given below for your answers.

ii) Check your answers with those given at the end of the Unit.

1) Define Traditional Knowledge.

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2) Bring out the relationship between indigenous knowledge and Disaster Risk Reduction.

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3) Discuss the types of Indigenous Knowledge.

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12.4 INDIGENOUS KNOWLEDGE AND EARLY WARNING SYSTEM

To reduce risk and prepare for effective response, early warning system plays a major role in DRR. In olden times, people used to sense the cyclones through certain indicators. Precautionary measures were taken by the community based on the indications they receive from the nature through their traditional knowledge.

However, in recent times we tend to ignore native intelligence. Mostly, the indigenous early warning indicators prove to be true and paying heed to such warnings could save the community from great disasters. The following table indicates the indigenous early warning indicators of cyclones.

Indigenous early warning indicators of cyclone

Weather Patterns	Sky turns gloomy and overcast# Black rolls of cloud and change in colour of cloud – indication for flood $ Weather unusually hot and humid/hot spells after rain# Strong wind blows from the south/south-east # East wind blows in full noon – indication of cyclone If clouds move north wards, it is indication of flood $ Wind changing from east to south & gets cooler– indication of the change of direction of cyclone
Sea/River Patterns	Big waves/dark rolls of water '*Goroom goroom'* noise in the river Smokey or cloudy shapes in the sea Pond and river water becomes hot*
Animal Behaviour	Cattle become restless and stop eating grass***# Cattle/dogs wail continuously/at night***# Barking of dogs in day time – indication of cyclone $ Dogs scratch the ground continuously $ Ants climb trees with eggs on their backs# Bees move around in clusters *Kurpals* (type of gull) fly high and cry Flocking of large number of birds from north to south – indication of cyclone Birds fly without destination Increased number of flies and mosquitoes# Insects attack cattle** Fish jump in the rivers and ponds Crows/cockerels call/fly at night Frogs call constantly Foxes bark during the day Crabs come into the house and courtyard****
Other	Bending trees Water hyacinth in the canal Leaves of the mandar and cotton tree turn upside down New leaves of trees fall to the ground Muddy smell on the wind* Particular kind of fish catch by fishermen – indication of cyclone $
* - up to one day before; ** - 1-2 days before; # - most commonly mentioned across all four chars; *** - 3-7 days before; **** - 10-12 days before. Source: Adopted from Howel, 2003.	

12.5 INDIGENOUS KNOWLEDGE AND COPING STRATEGIES

12.5.1 Cyclones and Floods

Traditional knowledge of the community has always been the guiding force for the community members to develop their own coping mechanism for different disasters faced by them. For instance, people living in cyclone prone areas, areas of frequent earthquakes, landslides, etc., are used to such events as it happens on a regular basis. Based on the inference drawn from the nature, they resort to coping strategies. For example, people living in coastal areas are aware of the time of rising tides and hence avoid fishing in that season or go to high mounts in that time. Though useful and very intelligent strategies are evolved by the community members, there is hardly any documentation on the community's traditional knowledge, wisdom, and coping mechanism strategies. It is important to document such strategies, supplement the same with scientific facts and thus pass it on to larger community for adherence. Such documentation of the traditional knowledge and coping strategies of indigenous community can be beneficial, as it can help in minimising the loss of life or property, when a disaster strikes.

Some of the coping strategies that are adopted to deal with cyclones have been discussed here:

- People wrap all available seeds, rice and paddy and bury it under ground when they move for safer places.
- Some families wrap all their important papers, documents and other valuables and bury it under ground before leaving their houses.
- Houses are constructed on higher plinth whereby the water cannot enter the house.
- If the clouds move towards north, there is an indication that there will be floods in three or four days.
- Some people while looking at the colour of the clouds and their formation can predict about floods.
- People grow banana trees around the houses as the banana stems are used for floating. Something similar to a boat is made out of banana stems and is also used as barge.
- Banana leaves are used as fodder during cyclones and floods.
- People identify nearby villages and inform them before hand for their temporary migration and shelter in those villages in case of floods.
- People store foodstuff, dry food, coconut, pumpkins, etc. to be used immediately after the disaster.
- Beating of drums for dissemination of warning.
- Continuous blowing of wind from east indicates that the cyclone is approaching, more so if within two hours the wind starts becoming hot; indication is that the intensity of cyclone will be more.
- If the wind changes its direction from east to south and gets cooler, it indicates that the cyclone has changed its direction.

- Barking of village dogs without any provocation during the daytime is indicative of an unusual event like cyclone approaching in the immediate future.
- The dogs start scratching the ground.
- Fishermen get substantive catch of a particular fish prior to the cyclone which normally they are unable to get.
- The fishermen nets catch particular small plankton which they never get otherwise. This also indicates that a cyclone is approaching.
- A strange and rather thundering sound from sea for two-three days indicate that a cyclone is about to strike.
- If the clouds move fast from north to south, then there is a likelihood of cyclone.
- Birds in large quantity flock together and fly from north to south, give the indication to the community about an approaching cyclone.
- People don't plant big trees near their house so that these may not fall on them when the cyclone approaches.

12.5.2 Droughts

Droughts are not flood, earthquake, landslide and tsunami like disasters. But they create pressure on the society in the name of malnutrition, food shortages and ill-health. The reason behind drought is low rainfall and high soil moisture stress. Sometimes prolonged droughts will lead to famines and the situation gets worsened further. The recent intervention by government agencies in the maintenance and up gradation of water harvesting structures e.g. ponds, *taankas*, *naadis* and *khadeens* have also led to other avoidable complications. In this context, it is important to resort to indigenous measures taken by the community for managing situations like drought. Some of the indigenous measures adopted for dealing with drought have been discussed as below:

- The nomadic *Maldharis* of Gujarat construct 'Virdas', which serve as a means for water harvesting. They also dig shallow wells in low depressions, which are called 'Jheels' to collect water.
- The 'Kundis' of Rajasthan are unique structures that look like huge concrete sauces on the landscape. They are used for collecting rainwater to meet the needs of the local people and animals.
- The 'Kuis' were found in Bikaner and Jaisalmer. These were *kuchcha* structures dug near tanks to collect seepage and were usually covered with planks of wood.
- Rajasthan also had 'Rapats' and 'Tobas' which were effective water harvesting techniques.
- The Spiti area of Himachal Pradesh has been dependent on diversion channels called 'Khuls' for irrigation for a long time. They have carried water from glaciers to village.
- The 'Khasis' used to practice a 'Bamboo Drip' irrigation system. Maharashtra had a 'Phad' system and Bihar had 'Ahar' and 'Pynes'.
- 'Palliyals' or stream diversions were common in Kerala.

Check Your Progress 2

Note: i) Use the space given below for your answers.

ii) Check your answers with those given at the end of the Unit.

1) Bring out the indigenous early warning indicators during cyclones.

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2) Discuss the indigenous coping strategies.

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12.6 CONCLUSION

Indigenous knowledge or the traditional knowledge of a community is laden with rich values and information on a potential disaster which is about to happen. Indigenous knowledge, as discussed in this Unit, is the ability of the community to sense possible disasters for which the inference is drawn from nature through various indications, which is passed on to generations through experiences. Attention to the voices and experiences of indigenous community is very important, if we are to safeguard the people from disasters. Indigenous knowledge not only gives indications of early warnings about a disaster, but is also helpful to know the coping strategies adopted to deal with disaster situation. Accordingly, in this Unit, examples related to cyclones and droughts have been discussed.

12.7 GLOSSARY

Taq System : "In the Taq system, large pieces of wood or timber are used as horizontal runners embedded into the masonry walls. These runners are located at floor level and at the top of windows. These runners tie together all of the elements of the building or house and keep the entire structure in concert, thus preventing spreading and cracking of masonry. The runners are joined together with small pieces of timber, giving the shape of a ladder laid over a wall covering two exterior faces of the wall" (UNECSO, 2002).

Dhajji-Dewari System : "In the Dhajji-Dewari system, timber frames for confining masonry in small parcels are used. The timber frames, not only have vertical elements, but also have cross members, which divides the masonry infill into various small panels. The most important characteristic of this type of construction is the use of lean mud mortar. A common practice in the region is to use the Dhajji-Dewari system in the upper story walls, especially for the gable portion of the wall" (UNECSO, 2002).

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12.9 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1) Your answer should include the following points:

   - Traditional knowledge is not only about the past experiences of the community, but also helps a community to make a decision on what to do and what not to do.
   - It is a locally bound, indigenous to a specific area and communities; culture and context specific; non-formal knowledge; orally transmitted, and generally not documented; Dynamic and based on innovation adaptation, and experimentation; and closely related to survival and subsistence for many people worldwide.

2) Your answer should include the following points:

   - Integrating the traditional knowledge with scientific expertise is more relevant in the modern times. Knowing and documenting the traditional knowledge is not effective unless it is included in the disaster risk reduction activities.
   - SFDRR Framework.

3) Your answer should include the following points:

   - Technical Knowledge

- Environmental Knowledge
- Economic Knowledge

Check Your Progress 2

1) Your answer should include the following:

   - Weather patterns
   - Sea/River patterns
   - Animal behaviour and others

2) Your answer should include the following points:

   - Science time immemorial, traditional knowledge of the community has been guiding the community members to develop their own coping mechanism for the different disasters faced.
   - Documentation of the traditional knowledge and coping strategies of indigenous community can be beneficial to the people, as it can help in minimising the loss of life or property, when a disaster strikes.
   - Adopted coping strategies.

UNIT 13 COMMUNITY BASED DISASTER MANAGEMENT*

Structure

13.0 OBJECTIVES

After reading this Unit, you should be able to:

- Explain the concept of Community Based Disaster Management (CBDM);
- Discuss the issues related to Community Based Disaster Risk Assessment;
- Differentiate between the traditional approach and the CBDM approach;
- Describe the institutional framework of CBDM; and
- Discuss CBDM plans that are to be addressed in the pre, during and post disaster phases.

13.1 INTRODUCTION

Community Based Disaster Management (CBDM) is the bottom-up approach in dealing with a disaster situation. In the initial years, top down approach was resorted to, in dealing with a disaster situation, which mostly attempted 'command' and 'control' measures and neglected the participation of affected population both in policy making and implementation. Such approach made the disaster response

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and rehabilitation measures ineffective and unsustainable. However, in the last few decades, there has been the adoption of bottom-up approach, where a person at the ground level, that is, the community is regarded as the key player. Any effort that involves the community can help in achieving sustainability, particularly in disaster risk reduction activities. The concept of Community Based Disaster Management (CBDM) brings together the community and involves them in the various phases of disaster risk reduction activities, viz., prevention, preparedness, mitigation, response, recovery, rehabilitation and reconstruction. It creates opportunities for the community to appraise local conditions and situation through their past experiences. In this approach, local communities are part of making plans, arriving at decisions and implementing the same. It can thus be stated that the sustainability of any risk reduction programme completely depends upon the community involvement and their active participation.

In this Unit, you will be introduced to the concept of Community Based Disaster Management (CBDM) and community based risk assessment (CBRA), which covers aspects such as hazard, vulnerability, risk and capacity assessment. It also highlights the principles of CBDM and enumerates the differences between the traditional approach and the CBDM approach. The Unit also covers the institutional framework related to CBDM besides emphasising on the planning measures that are to be considered in the pre, during and post-disaster phase.

13.2 COMMUNITY BASED DISASTER MANAGEMENT (CBDM): KEY ASPECTS

13.2.1 Community and Community Based Organisations

As per Cambridge dictionary, a community is "the people living in one particular area or people who are considered as a unit because of their common interests, social groups or nationality". They are the group of individuals and households residing in a similar location. In the context of disaster risk reduction (DRR), community is a set of people who are exposed to the same hazard. Communities can identify their own vulnerability and they also make best decisions for their well-being. However, as observed by the United Nations International Strategy for Disaster Reduction (UNISDR), "in every community, knowledge, professional abilities, and experience fashioned from adversity can be found, but seldom are these resources called upon or fully utilised". Thus, community has a major role to play in managing the disasters and its role in disaster management becomes pertinent because of the following reasons:

- The community comprising the people at the local level are the direct sufferers of a disaster, irrespective of the fact that whether a disaster is severe or mild; when a disaster strikes, they are the main stakeholders and they have more to lose in the aftermath of a disaster;
- Community members are the first set of people to become vulnerable;
- The community has a lot to lose if they do not address their own vulnerability; At the same time, they gain the most by reducing the impact of disasters on their community.

In handling disasters, the community is thus put at the forefront, which has led to the emergence of community based disaster management. Community can handle a disaster situation in a better way, if they are organised as a group and they have

various advantages, when their efforts are mobilised together. Organised effort of a community is more beneficial because of various reasons, which include:

- Immense volunteering capacity of a community;
- Innate ability of the community to understand local needs;
- Increased awareness on the most vulnerable sections of their community;
- Built-in credibility with the local members;
- Access to remote social groups that generally do not have interaction with government officials;
- Power of persuasion and community influence; and
- Ability to make decision outside the government processes.

As a result of all these reasons, community based organisations are effective instruments to handle disaster situation. To put it in simple terms, Community Based Organisations (CBOs) are organisations that are created by the people within the local community which operates, monitors, and controls their own activities. These organisations work without the interference of the government and private institutions. It includes community members, elected *Panchayati Raj* representatives, village administrative/ development officer, women and youth collectives, *Gram Sewak*, *Anganwadi* workers and self-help group members. As discussed earlier, they have tremendous potential, not only in handling a disaster situation, but also in making disaster risk assessment, which is discussed later in this Unit.

13.2.2 Definitions of CBDM

Asian Disaster Preparedness Centre (2004) defines Community Based Disaster Management (CBDM), as an approach that "seeks to actively engage at-risk communities in the identification, analysis, implementation, monitoring and evacuation of disaster risks in order to reduce their vulnerabilities and enhance their capacities". In the Indian context, the National Disaster Management Authority (NDMA) (2014) states "where communities are equipped and prepared, disasters clearly have much lesser impact, especially in terms of the loss of lives". Further it regards CBDM as an approach to "build the capacity of communities to assess their vulnerability to both human induced and natural hazards and develop strategies and resources necessary to prevent and/or mitigate the impact of identified hazards as well as respond, rehabilitate, and reconstruct following its onset". The International Institute for Disaster Risk Management (IIDRM) views CBDM as "an approach that involves direct participation of the people most likely to be exposed to hazards, in planning, decision-making, and operational activities at all levels of disaster management responsibility".

The above definitions highlight the importance of communities in planning and implementation of disaster risk management. Apparently the definitions also clarify that it is important to enhance community capabilities, which will help in reducing the vulnerabilities at grass root level. The knowledge, skills and attitude towards a disaster situation at the local level will help the communities during disasters and also increase the preparedness level.

13.2.3 Principles of CBDM

The following are the basic principles of CBDM:

- *Active participation:* Active participation of the community is very important

for reducing disaster risk. When disaster risk reduction measures are community-centric, the local champions take ownership in planning, implementation and management of disaster reduction activities.

- *Use of local resources and capacities:* Interventions begin from locally available and accessible resources, capacities and networks/partnerships. Utilisation of all these aspects at the local level is an important principle to deal with a disaster.
- *Own choice and decision:* Community should consider their choices and decisions while engaging in disaster risk reduction.
- *Capacitating community:* DRR programmes should be community specific and focus on increasing the capacity of the local level people.
- *Attention to vulnerable groups:* Special focus should be given to vulnerable groups, so that their wellness and needs are taken care of in the pre, during and post-disaster phases.

13.2.4 Difference between Traditional and CBDM Approach

With the introduction of CBDM practices, disaster management activities have become effective, as the attention is towards people and addressing their vulnerabilities. The traditional approach was mostly insensitive to local needs and it did not help much in reducing disaster impacts. The following are the major differences between traditional and CBDM approach.

S.No	Traditional Approach	CBDM Approach
1	It's a victim or receiver oriented approach	It is an active participatory approach
2.	People are considered as helpless victims	People are active participants in rebuilding their lives and livelihoods.
3.	People are recipient and totally dependent on external aid	People's capacities are built and developed through their active participation. It maintains the sustainability of the development programmes.
4.	Need and damage assessment done by external people/experts	Need and damage assessment done with community participation. It provides the realistic picture of the assessment.
5.	It focuses on technical solution and material aid	It focuses on assisting communities to address their vulnerabilities so that the short-term aid get replaced by long-term development.
6.	Focus on individual household	Focuses on strengthening community and their structure. It enhances the sustainability of the DRR measures and also integrates the society and its resources
7.	Disaster management is considered as a relief provided to the community	Disaster management is considered as community awareness and sensitisation, community participation and mainstreaming DRR into socio-economic, political and development initiatives.

***Source*:** ADPC, 2014.

13.3 COMMUNITY BASED DISASTER RISK ASSESSMENT (CBDRA)

Community Based Disaster Risk Assessment (CBDRA) is a systematic way to identify and assess the hazard, vulnerability and capacity at the local level. According to ADPC, "community risk assessment is a participatory process of determining the nature, scope and magnitude of negative effects (due to hazards), which can be anticipated during a specified period and be reduced by employing local capacities". The nature of a disaster is unique and distinct and each disaster makes different impact on the society. For instance, earthquakes damage lives, houses and critical infrastructure; whereas cyclone affects houses, livelihood and other related matters. Hence, assessment of the hazard, risk, vulnerability and capacity (HRVC) of the village with the help of community will increase the coping capacity of the local people and also augment the local resources. In the following section, we will discuss about the key issues of community based disaster risk assessment.

13.3.1 Hazard Assessment

Hazard assessment makes an evaluation of the nature of the hazard at the community level. This analysis is done by the community members to identify potential risks and hazards in their villages and identify the appropriate measures to bring resilience to the society. In general, this kind of assessment tries to find answers to the following:

- What is the nature and intensity of hazards present in a specific area?
- What are the elements at risk?
- What can be the possible extent of loss caused by these hazards?
- What is the duration of these hazards and how can they interact with each other to pose compound threat?

The major tools of the hazard assessment are village hazard maps, historical profile of the place and the seasonal calendar. In this exercise, the communities assess the existing hazards, its nature and frequency in their area and identify the most vulnerable place or group in that village.

13.3.2 Vulnerability Assessment

Most of the hazards turn disastrous because of the vulnerability of the community and the unpreparedness of the community. Vulnerability assessment measures the extent to which people are or infrastructure is likely to get affected from hazards. In other words, it is "the analysis of the vulnerability of various sectors that are exposed to the natural hazards identified in the hazard analysis exercises. The sectors include social, livelihood, economic, physical assets, agriculture, political and administration" (DMTP, 1994). It is a process to determine what elements are at risk and analyse the factors behind why these elements are at risk? This assessment is not at all possible without the active participation of the people because they are the ones, who know their field very well. The following are the two stage consequence of vulnerability assessment to hazards (IGNOU, MPA 007):

1) Making inventory of what element is at risk:

Once the hazard is identified in the particular village it is necessary to find out the

possibility of damage that can be caused by the hazard. The data on the following elements are required during the vulnerability assessment.

- Population: Age, gender and health
- Livelihoods: Types and locations
- Local economy
- Agriculture and fishery
- Buildings and infrastructure
- Cultural assets (Library, museums and heritage buildings)
- Local institutions.

2) Assessing the vulnerability of elements at risk:

Once the required information has been collected, it is necessary to identify how the elements will be affected by hazards to make accurate assessments of the risk. The analysis of the socio-vulnerability factors will provide the coping mechanism to the community members.

13.3.3 Capacity Assessment

As per UNISDR, "Capacity is the combination of all the strengths and resources available within a community, society or organisation that can reduce the level of risk or the effects of a disaster". ADPC states that "Capacity assessment is the process to determine what people do in times of crisis to reduce the damaging effects of the hazard, and to secure the sustainability of their livelihood by: understanding people's previous experiences with hazards that enables them to develop coping strategies; analysing which resources are available and used by the community to reduce risk; and assessing who has access to these resources and who control them". The Capacity can be classified into the following categories: economic capacity, physical capacity, social capacity and natural and climatic resources.

13.3.4 Tools for Community Based Disaster Risk Assessment

Participatory Risk Assessment tools are used to collect information from the community about the existing risk status of the village. For such an assessment, it is not necessary to have a particular, technical expertise, but what is needed is only the local knowledge of the community. This approach helps to conduct the base line survey of the village, which would help in resolving the conflict resolution through more interaction. The following are the Participatory Risk Assessment (PRA) Tools:

- Historical profiling
- Risk mapping
- Seasonal calendar
- Transect walk
- Institutional analysis
- Gender mapping
- Livelihood and existing coping strategies
- Disaster ranking

Check Your Progress 1

Note: i) Use the space given below for your answers.

ii) Check your answers with those given at the end of the Unit.

1) Define Community and Community Based Organisations.

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2) List the major principles of Community Based Disaster Management.

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3) Discuss Community Based Disaster Risk Assessment.

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4) Bring out the difference between Traditional and CBDM Approaches.

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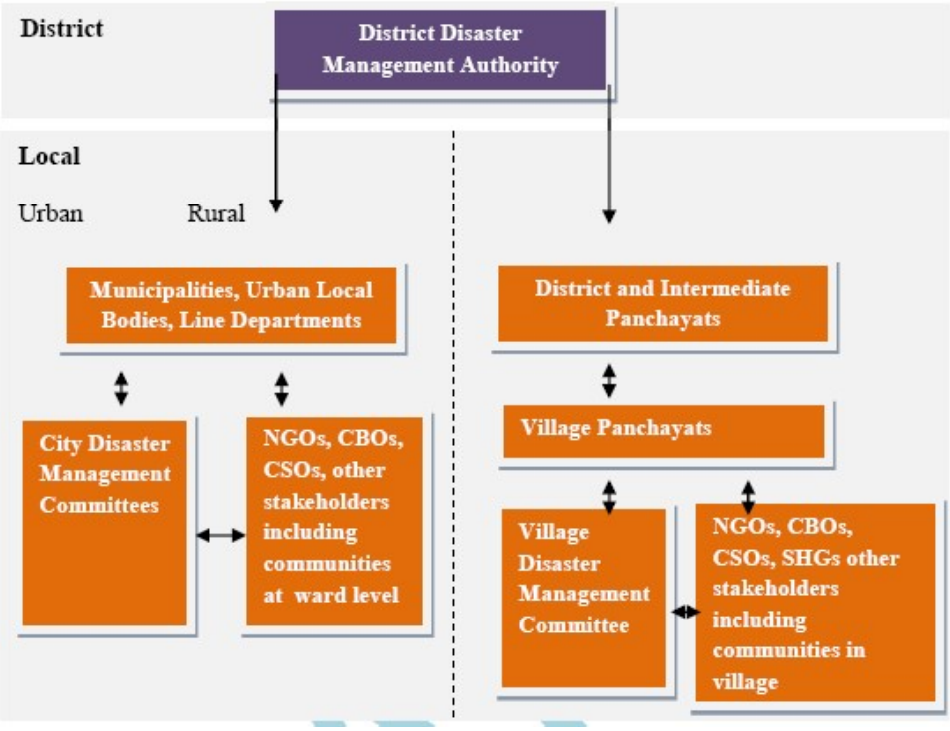
13.4 COMMUNITY BASED DISASTER MANAGEMENT: INSTITUTIONAL FRAMEWORK

Community involvement in disaster management has been stressed both by the Disaster Management Act and the National Disaster Management Authority, which state that only when community initiatives are integrated with the local institutions, state policies and practices, the CBDM measures can be effectively implemented. The NDMA in 2014 came up with the CBDM guidelines discussing the CBDM institutional framework. It observes that the institutional framework of CBDM should be grounded on the principles of participation, social inclusion, equity and decentralised governance. In general, CBDM institutional framework is important for various reasons:

- Firstly, the CBDM institutional framework helps in having clarity on the nature and forms of institutions that exist at the ground level;
- Secondly, it creates linkage between community and government institutions, which helps in better coordination and action;
- Thirdly, the framework would help the government and civil society to facilitate the formation and functioning of community organisations; and
- Finally, the framework serves as a mechanism to monitor and evaluate the functioning of community based institutions and processes.

The NDMA's CBDM guidelines also enumerated the principles of community based disaster management institutional framework, which are as follows:

- The CBDM institutional framework must consider the local communities as active actors, rather than passive victims;
- Community should be considered the centre of all disaster management activities, right from planning, disaster response, disaster mitigation, etc.;
- CBDM institutional framework should be sensitive to the needs of different communities viz., people belonging to different social groups, disabled, women, elderly and other marginalised, etc., as they are at greater risk;
- The CBDM institutional framework should analyse the local risk patterns and trends, as disaster is not an isolated event, but stems from the concerns related to development, environment management and human behaviour;
- The CBDM institutional framework has to work in coordination with external supportive and facilitative institutions without losing its autonomy and thus shall function on the spirit of voluntarism and collaboration.



Source: NDMA, 2014.

The CBDM institutional framework emphasises decentralised planning and management at the district, sub-district and village level and insists that there should be both horizontal and vertical links at all levels. Thus, disaster risk reduction strategies and issues could be mainstreamed in the development planning process, if there are proper linkages with all institutions at all levels, as depicted in the diagram, both at the rural and urban level.

13.5 COMMUNITY BASED DISASTER MANAGEMENT PLAN

It is important to plan well ahead for managing disasters, as it is helpful to prevent major losses in terms of life, livelihood, property, etc. Further, CBDM plans are also helpful as it contains details on the vulnerabilities, potential hazards that can hit a place, mechanism that are in place to deal with a disaster immediately. The following section discusses about the community based disaster management plan, which can be made in various phases of a disaster, viz., pre, during and post-disaster.

CBDM Plan in Pre-disaster Phase

The planning process in the pre-disaster phase can cover the following:

- *Community orientation:* The plan can have measures towards community orientation, wherein the community can be briefed on the nature and effect of a disaster and their vulnerabilities;
- *Stock-taking of resources:* Stock-taking of the resources within their village or locality is important in the pre-disaster phase. Such stock-taking of the condition of schools, health centres, cyclone shelters, communication facilities, conditions of roads and infrastructure, etc., can help the community to take quick decisions when a disaster actually strikes;
- *Risk and vulnerability assessment:* Assessing the risks and vulnerabilities of the community is another important aspect of planning in the pre-disaster phase. It is important to take stock of the elements at risk, viz., area, physical structures, economic assets, etc. and people at risk, viz., children, women, disabled, elderly, etc., so that preparedness measures are appropriately planned;
- *Formulation of preparedness plan:* Formulating preparedness plan at the community level is very crucial in the pre-disaster phase. This takes into cognisance the community needs; clarifies measures to be taken by the community before, during and after the disaster strikes; gives idea of resources available at various places; specifies the roles and responsibilities of concerned officials, departments, *Panchayati Raj* Institutions, NGOs, CBOs, etc. A properly prepared plan facilitates the community to effectively execute the plan.

During Disaster

Following measures are to be taken into consideration, while planning for this phase of disaster management:

- *Organising search, rescue and evacuation activities:* This includes identifying the disaster victims, bringing them to safer places, providing first-aid, distributing relief, adhering to evacuation plan, etc.
- *Providing shelter to people and livestock*: While the place of shelter for

people and livestock is pre-planned, plan should be made for other arrangements to be taken care of in the shelter, which include water supply, sanitation, kitchens, fodder for animals, medical services, first-aid, etc.

- *Debris clearance and dead body identification:* Clearing of debris from collapsed buildings, bridges, trees, other structures, etc., and disposing of dead humans and livestock is a major concern in the ' during disaster phase', which has be to planned appropriately, if the spread of disease and further health and environmental impact is to be contained.
- *Damage assessment:* Assessing damages immediately on the occurrence of disaster facilitates quick emergency relief. This is to be done with reference to the number of households, population, livestock, area affected, etc.

Post-disaster Phase

The CBDM plan in the post-disaster phase covers the following:

- *Detailed damage assessment:* Undertaking a detailed damage assessment is very important in the post disaster phase, as this is helpful to know the magnitude of loss both in terms of lives and other damages like infrastructure, damage to crops and the estimated value.
- *Preparation of rehabilitation plan:* Drawing up a comprehensive economic rehabilitation plan is necessary, which can include measures for restoration of agricultural activity through necessary inputs, rehabilitation of artisans, marginal, small scale and business people, those pursuing other occupations, replacement of cattle, agricultural and other equipment, boats, fishing nets etc.
- *Social rehabilitation:* The post-disaster plan should ensure social rehabilitation through strengthening of existing health centres, schools, *anganwadis*, community centres, vocational training centres, psychological counselling to the affected to enable them get back to their normal routine.
- *Monitoring of CBDM:* It is important to build an appropriate monitoring and evaluation mechanism in community-based disaster management programme. This is needed to facilitate proper utilisation and implementation of resources.

Check Your Progress 2

Note: i) Use the space given below for your answers.

ii) Check your answers with those given at the end of the Unit.

1) Discuss the Institutional Framework of CBDM.

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2) Write a short note on the Post-Disaster Phase of CBDM.

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13.6 CONCLUSION

In this Unit, we have covered an important topic, that is, community based disaster management. As discussed earlier, the role of the community is very vital especially in dealing with a disaster situation, as the community members are the first set of people, who would get affected when a disaster strikes and who is immediately available for help and whose help matters a lot in preventing huge loss of life and property. Understanding the importance of the critical role of the community, both at the national and international forum, CBDM has been highlighted as crucial measure to bring resilience in a community. The Unit also introduced the principles of CBDM, apart from highlighting the difference between the traditional and CBDM approach, where there was the shift from the top-down to the bottom up approach. Institutional framework and planning for CBDM was also covered in this Unit, which discussed the importance of integrating different stakeholders at the local level and the need to consider various disaster related aspects in the pre, during and post-disaster phase.

13.7 GLOSSARY

Disaster Risk : The UN defines it as "the conceptual framework of elements considered with the possibilities to minimise vulnerabilities and disaster risks throughout a society, to avoid (prevention), or to limit (mitigation and preparedness) the adverse impact of hazards, within the broad context of sustainable development.

Participatory Rural Appraisal (PRA) : PRA originally stood for Participatory Rural Appraisal, but its applications are in many other contexts besides rural and good practice is far more than just appraisal. It enables others to do their own appraisal, analysis, planning and action, to own the outcome and to share the knowledge. The target group could be local; rural or urban concerning people, women, men or old, or members of an organisation or group.

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13.9 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1) Your answer should include the following points:

- Community comprises of the people at the local level and they are the first set of people to become vulnerable;
- The community comprising of the people at the local level are the direct sufferers of a disaster, irrespective of the fact that whether a disaster is severe or mild. When a disaster strikes, they are the main stakeholders and they have more to lose in the aftermath of a disaster.
- Community Based Organisations are organisations that are created by the people within the local community which operates, monitors and controls their own activities.

- These organisations works without the interference of the government and private institutions. It includes community members, elected *Panchayati Raj* Representatives, village administrative/development officer, women and youth collectives, *gram sewak, anganwadi* workers and self help group members.

2) Your answer should include the following points:
   - Active participation
   - Use of local resources and capacities
   - Own choice and decision
   - Capacitating community
   - Attention to vulnerable groups

3) Your answer should include the following points:
   - Community Based Risk Assessment (CBRA) helps to collect the base line survey of the village, which would help in resolving the conflict resolution through more interaction.
   - Participatory Risk Assessment Tools: Historical Profiling ; Risk Mapping; Seasonal Calendar; Transect Walk; Institutional Analysis; Gender Mapping; Livelihood and existing coping strategies; and Disaster Ranking .

4) Your Answer should include the following points:
   - Traditional approach was mostly insensitive to local needs and it did not help much in reducing disaster impacts.
   - CBDM approach focuses on assisting communities to address their vulnerabilities. So that the short term aid replaced by long term development.

Check Your Progress 2

1) Your answer should include the following:
   - CBDM institutional framework helps in having clarity on the nature and forms of institutions that exist at the ground level.
   - Linkage of community with government institutions, which helps in better coordination and action.
   - It would help the government and civil society to facilitate the formation and functioning of community organisations; and
   - It serves as a mechanism to monitor and evaluate the functioning of community based institutions and processes.
   - NDMA's CBDM framework.

2) Your answer should include the following:
   - Detailed Damage Assessment
   - Preparing Rehabilitation Plan
   - Social rehabilitation
   - Monitoring of CBDM.

UNIT 14 DISASTER MANAGEMENT STRATEGIES*

Structure

14.0 OBJECTIVES

After reading this Unit, you should be able to:

- Discuss the problems involved in management of a disaster situation;
- Understand the scholarly perspectives of the disaster management strategies; and
- Explain the disaster management strategies adopted at the international and National levels.

14.1 INTRODUCTION

As discussed in the previous Units, disasters have been of wider repercussions on the society leading to huge losses and damages and this scenario is a global phenomenon. Across the borders, the disaster impact has been increasing day-by-day. Extreme weather conditions, population growth, unplanned urbanisation, demographic changes and increasing pressure on natural resources are the major factors for the disaster losses. As reported by the Centre for Research on the Epidemiology of Disasters (CRED) and the United Nations International Strategy for Disaster Reduction (UNISDR), the disaster losses in India has been enormous in the last 20 years, which is around 20 billion US dollars (CRED & UNISDR, 2018). In such a scenario, where the disasters are making huge setback on development, it is important to reflect on whether disasters can be avoided or

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not? With the adoption of the International Decade for Natural Disaster Reduction (IDNDR) convention since the 1990s, the way disaster has been looked at has changed worldwide. The relief-oriented approach changed into risk-reduction approach. With the change in approach, the focus was more towards adopting strategies that can help in disaster reduction. Thus, disaster management strategies focused on various components like improving the capacities of community, adopting prevention, preparedness and mitigation measures, etc.

While the previous Units acquainted you with the basic concepts and components of disaster management, this Unit introduces you to some of the international strategies and frameworks related to disaster management. Some of the key disaster management strategies discussed in this Unit include Yokohoma strategy, IDNDR framework and Sendai Framework for Disaster Risk Reduction 2015-2030. It also discusses the scholarly views on disaster management strategies besides elaborating the strategies for disaster management adopted in India.

14.2 EVOLVING DISASTER MANAGEMENT STRATEGIES: IDENTIFYING THE PROBLEMS

Before the disaster management strategies could be evolved, it is important to reflect on the problems that the strategies are trying to address. Thus, clarity is needed on the kind of challenges or problems that has to be addressed, as the disaster management measures cannot remain too confused, because it involves large number of lives and huge amount of property. Some of the challenges that are to be focused upon include the following:

- *Gaps in Policies and Practice:* Though disaster management strategies and measures are formulated by emergency managers or government, there exists a huge gap between the policy formulated and policy implemented. Hence, it is important to address policy failures. Guidelines should be formulated in a more realistic and responsible manner. Further, gaps that exist in implementation due to administrative failure should also be rectified, which would otherwise lead to negative effects in the mitigation of disasters. In addition, McConnell and Drennan (2006) identify the following tensions between the ideals and practices of disaster management:
    - High potential impact of crisis *vs.* the low priority of emergency management;
    - Need for planning and order *vs.* the chaotic uncertainty and the inherent disorder of crisis events;
    - Need for an integrated approach *vs.* the reality of institutional fragmentation; and
    - Need for active planning and genuine readiness *vs.* symbolic readiness.
- *Corrupt Practices:* One of the major problems faced in disaster management is the high level of corruption involved in the phase of relief and recovery, which needs to be addressed, while planning the strategies. As highlighted by Grist (2007), there is certain element in the community which always attempts to profit from the misfortune of others or the outpouring of assistance from relief organisations. Hence, the strategies for disaster management should also ensure that such corrupt practices are prevented.

- *Lack of Situational Awareness and Analysis:* Another major problem faced is the lack of situational awareness and analysis. Without having proper understanding of the implications of a particular disaster situation, different approaches are followed which lead to delay in the process of disaster resilience. Hence, the disaster strategies should be based on a thorough knowledge of disaster situation and suggest relevant measures for different disasters.

- *Centralised Approach:* One of the crucial problems is that the emergency management measures have become more response-oriented and less collaborative, besides being more centralised. Centralised decision processes cause delays in approving and dispatching disaster assistance and greatly complicate communication between and among various stakeholders in disaster management. This creates serious communication problems between and among local, state, and federal officials, apart from creating communication gap among the emergency responders (Waugh 2006). The disaster strategy, thus, has to adopt flexible measures in terms of having decentralised measures, wherever possible, apart from ensuring coordination among various levels.

- *Lack of Coordination:* Even if collaborative arrangements are established, there remains lack of coordination among the players and various governmental, non-governmental and local agencies. All these players become much rigid in their own perspective. Thus, the strategies adopted by them become piece-meal measures, rather than following an integrated approach. Grist (2007) suggests that the elected representatives of the community should be encouraged to assume the role of integrators and preservers of the vision of the common good.

All such problems referred to above are only the tip of the ice berg. Such understanding of the problems involved in disaster management helps in evolving effective strategies and arriving at a comprehensive mechanism for dealing with it.

14.3 SCHOLARLY PERSPECTIVES ON DISASTER MANAGEMENT STRATEGIES

In dealing with a disaster situation, different strategies are suggested by different scholars and at different forums at the international level. A comprehensive definition of disaster management has been given by the United Nations International Strategy for Disaster Reduction (UNISDR, 2009), by referring to *disaster risk management* as a "systematic process of using administrative decisions, organisation, operational skills, and capacities to implement policies, strategies, and coping capacities of the society and communities to lessen the impacts of natural hazards and related environmental and technological disasters". However, a comprehensive strategy at the global level may not be an umbrella framework suitable for all regions. The local knowledge and indigenous thoughts should be pooled in, to design a region specific disaster management strategy.

Canton's strategy in dealing with emergencies is the response methodology and presence of principal agent. Canton's formulation of crisis hierarchy model suggests usage of Multi-Agency Coordination System as a response methodology and State and local governments as Principal Agents (Canton, 2007).

According to Kapucu and Van Mart (2006), 'innovative problem solving, horizontal adaptation, collaboration, relationships based on trust, better public sector leadership, decentralised decision making and intensive human interaction are critical for the

success of disaster responses'. To this effect, it is of greater help to refer to the general strategies identified by Multidisciplinary Center for Earthquake Engineering Research (MCEER). It comprises four such general strategies that can be applied in handling any kind of disaster. These are (Kapucu, 2005):

i) Robustness – ability to withstand the forces generated by a hazard agent without loss or significant deterioration of function;

ii) Resourcefulness – capacity to apply material, information, and human resources to remedy disruptions when they occur;

iii) Redundancy – the extent to which elements, systems, or other units of analysis exist that are capable of satisfying the performance requirements of a social unit in the event of loss or disruption that threaten functionality; and

iv) Rapidity – the ability to contain losses and restore system or other units in a timely manner.

The Federal Emergency Management Agency (FEMA, 2003) of the United States has also identified few strategies in managing emergencies that include, concentrating on the core set of functions to be performed at the time of disasters; besides, other aspects in general to be taken care of. The set of core functions that is to be provided by emergency management personnel at the time of disasters includes the following:

- Direction and control;
- Communications;
- Warning;
- Emergency public information;
- Evacuation or in-place sheltering;
- Mass care;
- Health and medical; and
- Resource management.

Apart from this, FEMA has also provided a set of aspects that are required to be followed by emergency managers. These are: Hazard identification and risk assessment; Hazard mitigation; Resource management; Planning; Direction and control; Communication and warning; Operations and procedures; Logistics and facilities; Training; Exercises, evaluations, and corrective actions; Public education and information; and Finance and administration.

Kris Teutsch (2010) highlights the need for looking into the following capabilities and benefits, in planning disaster strategies:

- *Optimised Situational Awareness:* Real time communication, data management and data transmission helps in presenting a full picture of the disaster situation;
- *Interoperable, Collaborative Environment:* Information flow across all levels and all types of boundaries can help the responders to save more lives and deal with disasters in a better manner;
- *Support for Mobile and Web-based Access*: In a digital world, which is

driven by technology, all components and people are connected in fixed and field location though different digital devices. Hence, mobile and web-based access in handling disaster situation can help in handling disaster situation. For instance, during the Kerala floods of 2018, through the mobile and web-based access and portals, support was offered both in terms of mobilising fund for relief and also in identifying the victims who are in need of relief measures.

Thus, though the strategies to deal with disasters can have a comprehensive outlook, it should also have flexibility to make necessary changes based on the local context and challenges faced.

Check Your Progress 1

Note: i) Use the space given below for your answers.

ii) Check your answers with those given at the end of the Unit.

1) Highlight the problems involved in disaster management.

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2) Discuss the scholarly perspectives on disaster management strategies.

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14.4 INTERNATIONAL AND NATIONAL STRATEGIES FOR DISASTER MANAGEMENT

14.4.1 Disaster Management Strategies: International Measures

At the international level, various strategies and guidelines were given to deal with disaster situations. Some of the key strategies right from the IDNDR of the 1990s to the recently initiated Sendai framework have been discussed here.

14.4.1.1 International Decade for Natural Disaster Reduction (IDNDR)

To prevent the adverse effects and impacts of natural disasters, 1990s was declared as the 'International Decade for Natural Disaster Reduction', by the United Nations General Assembly on December 11, 1987. The United Nations adopted a resolution on 22nd day of December 1989 that stated "to reduce through concerted international

action, the loss of life and disruption caused by natural disasters". Thus, the United Nations set up a decade's goal with focus on improving the capacity of the developing countries to mitigate the effects of natural disasters. The resolution also sought the developing nations to design guidelines and strategies for applying existing scientific and technical knowledge (United Nations, 1989).

Some of the key strategies that were suggested by the IDNDR for the participating nations and member countries included the following:

- Planning and implementation of disaster management measures at the national level;
- Integration of disaster prevention policies with the development programmes;
- Laying emphasis on community preparedness by way of education and training on the significance of preparedness, prevention, relief and recovery;
- Emphasising the developing nations to pay substantial attention to the social and economic infrastructure and concentrate on providing human shelters and proper health care facilities to mitigate the vulnerabilities at the time of disasters (Ibid.).

14.4.1.2 Yokohama Strategy for Disaster Reduction

In order to undertake a mid-term review of the resolution of International Decade for Natural Disaster Reduction (IDNDR), a World Conference on Natural Disaster Reduction was held in May 1994, at Yokohama, Japan. In this conference, the Yokohama Strategy and Plan of Action for a Safer World was adopted. In general, this Strategy played a significant role in motivating the developing countries in changing its relief oriented approach to the one based on mitigation and prevention.

Each member country in the Conference agreed to work towards protecting its people, infrastructure, and other national assets from the impact of natural disasters. The member countries thus agreed to adhere to the principles or strategies enumerated by the conference, which included the following (UNISDR, 1994):

- come to an agreement that, Risk assessment is the major step for adoption of successful disaster reduction policies and measures and disaster prevention and preparedness are of primary importance in reducing the need for disaster relief;
- consider disaster preparedness and prevention as an integral aspect in planning the development policies at the international, national, regional, bilateral and multilateral levels;
- consider development and strengthening of capacity to prevent, reduce and mitigate disasters as a top priority;
- consider early warning of impending disasters and the dissemination of information using telecommunication and other broadcasting services as a key factor for successful disaster prevention and preparedness;
- promote participation at all levels, from the local, regional, national and international for the preventive measures and reduce vulnerability by the application of proper designs and planning by focusing on target groups by way of education and training;
- provide free access to necessary technology to prevent and mitigate disasters

and promote the acceptance of international community to use it in a timely manner as an integral part of technical cooperation;

- consider environmental protection in consistent with poverty alleviation as an important component in preventing and mitigating natural disasters.

Thus, through risk reduction strategies, the varying impact of disasters can be considerably reduced, if not eliminated. Though these were emphasised upon by the Yokohama Strategy, yet these could not be taken up as sufficient to cope up with the multiplying challenges of disasters. An analysis of the Yokohama Strategy reveals gaps and challenges in the domains of governance, risk identification, assessment and monitoring, knowledge management, reduction of risk factors and preparedness for effective response and recovery (UNISDR, 2005).

14.4.1.3 Hyogo Framework for Disaster Reduction

The gaps identified in the Yokohama Strategy were addressed in the World Conference on Disaster Reduction held in Kobe, Hyogo, Japan in 2005 (it is popularly referred to as Hyogo Framework for Disaster Reduction). It was held on the hypothesis that a more comprehensive approach is needed for proper management of disasters. The Hyogo Framework of Action and Hyogo Declaration set out a result-oriented plan of action or strategy for the next decade from 2005-2015, which included the following:

- Effective integration of disaster risk considerations into sustainable development policies, planning and programming at all levels with emphasis on disaster prevention, mitigation, preparedness and vulnerability reduction;
- Strengthening of institutions, and capacities at all levels, especially at the community level;
- In the context of increasing global interdependence, concerted international cooperation and an enabling international environment are required to stimulate and contribute to developing the knowledge, capacities and motivation needed for disaster risk reduction at all levels;
- A gender perspective should be integrated into all disaster risk management policies, plans and decision-making processes, including those related to risk assessment, early warning, information management, and education and training;
- Disaster-prone developing countries, especially least developed countries and small island developing States, should be given particular attention in view of their higher vulnerability and risk levels, which often greatly exceed their capacity to respond to and recover from disasters;
- There is also a need for proactive measures, bearing in mind that the phases of relief, rehabilitation and reconstruction following a disaster are windows of opportunity for the rebuilding of livelihoods and for the planning and reconstruction of physical and socio-economic structures, in a way that will build community resilience and reduce vulnerability to future disaster risks;
- An integrated, multi-hazard approach to disaster risk reduction should be factored into policies, planning and programming related to sustainable development, relief, rehabilitation, and recovery activities in post-disaster and post-conflict situations in disaster-prone countries (UNISDR, 2005).

Though the Hyogo Framework provided new measures to deal with disaster management, it lacked innovation in it. It seemed to be an old wine in a new bottle. Repeatedly the issues of prevention, preparedness, mitigation and recovery, occupy the central theme in all the three frameworks, viz., IDNDR, Yokohama Strategy and the Hyogo Framework. Nevertheless, the three frameworks are landmark initiatives at the international level, reinforcing the developing countries for favourable response, towards a disaster free world.

14.4.1.4 Sendai Framework for Disaster Risk Reduction

During the Third United Nations World Conference on Disaster Risk Reduction held in Sendai, Japan, in June 2015, the "Sendai Framework for Disaster Risk Reduction" was adopted. It was the first major agreement of the post-2015 development agenda, with four priorities of action and seven targets.

The four priorities for action under the Sendai Framework include:

Priority 1: Understanding disaster risk – Disaster risk management should be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment. Such knowledge can be used for risk assessment, prevention, mitigation, preparedness and response.

Priority 2: Strengthening disaster risk governance to manage disaster risk – Disaster risk governance at the national, regional and global levels is very important for prevention, mitigation, preparedness, response, recovery, and rehabilitation. It fosters collaboration and partnership.

Priority 3: Investing in Disaster Risk Reduction for resilience – Public and private investment in disaster risk prevention and reduction through structural and non-structural measures are essential to enhance the economic, social, health and cultural resilience of persons, communities, countries and their assets, as well as the environment.

Priority 4. Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction – The growth of disaster risk means there is a need to strengthen disaster preparedness for response, take action in anticipation of events, and ensure capacities are in place for effective response and recovery at all levels. The recovery, rehabilitation and reconstruction phase is a critical opportunity to build back better, including through integrating disaster risk reduction into development measures (UNISDR, 2015).

The strategy adopted by the Sendai Framework is to focus on the seven "global targets", which include:

1) Substantially reduce global disaster mortality by 2030, aiming to lower the average per 100,000 global mortality rate in the decade 2020–2030 compared to the period 2005– 2015;

2) Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 in the decade 2020–2030 compared to the period 2005–2015;

3) Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030;

4) Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030;

5) Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020;

6) Substantially enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of the present Framework by 2030;

7) Substantially increase the availability of and access to multi-hazard early warning system and disaster risk information and assessments to people by 2030 (ibid).

However, in spite of all such strategies, frameworks and their guidance, managing a disaster does not appear to be an easy task, because of multiple issues and complexities involved in it. Most of the time, the mismanagement of disaster is mainly due to the poor handling of disaster events by the disaster managers or the government or sometimes the victims themselves, who pay least attention to the warnings issued.

14.4.2 Disaster Management Strategies: Indian Context

Evolving disaster management strategies in the Indian context has been in practice since age old times, as disasters have been a regular phenomenon (For more details on Disaster Management in India, refer Unit-5). In earlier times, adoption of systematic strategy to deal with disasters, has been found in Arthashashtra written by Kautilya in the period of 321 to 296 BC. This treatise on Statecraft is a book of rules, which could be enforced by law by the king and along with other rules, rules for dealing with disaster situation have been specified.

In contemporary times, the strategy adopted by India to deal with disaster was mostly reactive rather than being proactive. In recent times, with repeated emphasis by International forums, the strategy of India has changed. Thus, there has been a widespread awareness about the impact of disasters and India has started taking proactive measures to mitigate disasters. The Declaration of International Decade for Natural Disaster Reduction in 1989, made the country to realise the importance of disaster management. However, the efforts of India towards disaster management were proceeding at a slow pace. With the Yokohama Strategy of 1994, the disaster management efforts picked up momentum and after the Hyogo framework of 2005, India has engaged in full-fledged measures to mitigate disaster.

Apart from such international efforts, the disasters that happened continuously at the national level since 1993; the Latur Earthquake (1993), Malpa Landslide (1994), the Orissa Super Cyclone (1999), Bhuj Earthquake (2001), Indian Ocean Tsunami (2004), Kosi Floods (2008), Uttrakhand Floods (2013), Cyclones and Floods in Chennai and Kerala (2018) etc., were responsible for the quick reaction of India. The High Powered Committee on Disaster Management was constituted in August 1999, under the chairmanship of Shri J.C.Pant, Secretary, Ministry of Agriculture, Government of India. This was a first attempt in India towards framing a systematic, comprehensive and holistic approach towards disasters. After that India had enacted the Disaster Management Act in 2005 and also established the National Disaster Management Authority in the same year, that is, 2005. In addition, the Disaster Management Policy was formulated in 2009. It was followed by the formulation

of the National Disaster Management Plan in 2016. The State Governments are also in the process of setting up State and District Disaster Management Authorities. The provisions of the Act relevant to the States/UTs have been brought into force with effect from 1st August 2007. Almost all States are reported to have constituted the State Disaster Management Authority (SDMA) (Kanal, 2013).

The National Disaster Management Plan 2016 has been created based on the goals and priorities set out by the Sendai framework. The vision of the document is to "*Make India disaster resilient, achieve substantial disaster risk reduction, and significantly decrease the losses of life, livelihoods, and assets – economic, physical, social, cultural, and environmental – by maximising the ability to cope with disasters at all levels of administration as well as among communities*" (Government of India, 2016).

Thus, in the Indian context, it can be stated that the strategy adopted mostly aims at setting the institutional structure and enumerating the provisions for dealing with disaster situation. However, in terms of implementation, India still needs to adopt firm strategies. However, it cannot be denied that the institutional structure of the disaster management in India has been strengthened. Further, the focus also has shifted to risk reduction and capacity enhancement.

Check Your Progress 2

Note: i) Use the space given below for your answers.

ii) Check your answers with those given at the end of the Unit.

1) Discuss various features of Yokohama Strategy and Hyogo Framework.

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2) List out the priorities and global targets of Sendai framework.

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14.5 CONCLUSION

On the whole, the attempt has been made in this Unit to sensitise you about the disaster management strategies. It summarised the challenges that are to be identified and acted upon even before framing the strategies. In addition, the Unit also brought forth the scholarly views on disaster management strategies as put forward by different scholars and also international forums. Various disaster management strategies, both at the international level and in the Indian context, have also been highlighted, whereby it can be observed that there has been shift in focus from managing disasters to dealing with disaster risks. Thus, the shift from reactive to proactive approach that was seen in various forums such as UNISDR, Yokohama strategy, Hyogo and Sendai Framework, etc., was discussed, besides referring to the strategies adopted in India.

14.6 GLOSSARY

Principal-Agent : The principal–agent problem, in political science and economics, occurs when one person or entity is able to make decisions and/or take actions on behalf of, or that impact, another person or entity: the "principal" (Wikipedia).

FEMA : It is called as a Federal Emergency Management Agency in USA. FEMA (Federal Emergency Management Agency) mission is to support the citizens and first responders to promote that as a nation we work together to build, sustain, and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all hazards (www.fema.gov).

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14.8 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1) Your answer should include the following points:
   - Gaps in Policies and Practice
   - Corrupt Practices
   - Lack of Situational Awareness and Analysis
   - Centralised Approach
   - Lack of Coordination

2) Your answer should include the following points:
   - Multi-agency coordinating system
   - Four general strategies
   - FEMA four core functions.

Check Your Progress 2

1) Your answer should include the following points:
   - Yokohama Strategy for Disaster Reduction
   - Hyogo Framework for Disaster Reduction

2) Your answer should include the following points:
   - Understanding disaster risk
   - Strengthening disaster risk governance to manage disaster risk
   - Investing in disaster risk reduction for resilience
   - Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction
   - Seven Global Targets

UNIT 15 DISASTER MANAGEMENT: CASE STUDIES*

Structure

15.0 OBJECTIVES

After reading this Unit, you should be able to:

- Discuss a few case studies related to disaster management in the Indian context;
- Understand the impact of Odisha Super Cyclone and the establishment of OSDMA thereafter;
- Explain the impact of Bhuj Earthquake;
- Discuss the impact of Indian Ocean Tsunami and the resultant measures in terms of enactment of disaster related legislation and policy; and
- Examine the situation of Uttarakhand Floods and Cyclone Phailin.

15.1 INTRODUCTION

Lura Tcuk, the World Bank Vice-President for Sustainable Development, pointed out that "with significantly increased levels of population, urbanisation and built infrastructure, our cities and communities are more exposed to disaster risk. Looking at past disasters helps us to plan for a more resilient future". Thus, as rightly pointed out by William Faulker, "the past is never dead. It's not even the past". Always the past disasters teach us on how to act and react to a disaster situation and in this context, case studies on past disasters serve as an important instrument to understand a disaster and also examine the measures taken in to deal with it and later reflect on the usefulness of such measures. Case studies of past disasters, thus, help us to learn from the past experiences and help us plan for a disaster resilient future (GFDRR, 2018).

* Contributed by Dr. A. Senthamizh Kanal, Consultant, Faculty of Public Administration, SOSS, IGNOU, New Delhi.

India has faced about 300 disasters which have claimed about 76,031 lives (Raj, 2017) in the last 17 years. Due to the geographical location of the country, India constantly gets hit by various disasters and it is a regular phenomenon. There was no proper institutional mechanism and policies for handling disasters. It was only after the Orissa cyclone in 1999 (since the name of Orissa has been changed to 'Odisha' in 2011, hereafter 'Orissa' is termed as 'Odisha'), Gujarat earthquake in 2001 and Indian Ocean tsunami in 2004, etc., significant measures in terms of policies and institution mechanisms were created in India for handling disasters. In this Unit, you are given insights on some of the landmark disaster events that had shaken India in the last two decades, which later helped India in framing useful legislation, policy, institutions and frameworks for disaster management.

15.2 ODISHA SUPER CYCLONE, 1999

Odisha is one of the most disaster prone states in India and disasters such as cyclones and floods are constant phenomena in this state. Odisha is divided into 30 districts, 314 blocks, 6799 Gram Panchayats and 50,972 revenue villages (http://odisha.gov.in/content/dist). It has 1,55,707 square kilometres total area. About 87 per cent of the people live in rural areas and they depend on agriculture for their livelihood. On 29th October, 1999, a severe cyclone struck the coastal districts of Odisha. The life span of the cyclone was around six days. It had a wind speed of 300km/hour, with the tidal waves reaching a height of 7-10 metres which came into inlands 0-15kms and there was incessant rain for 48 hours. It affected about 97 blocks, 12 districts, causing devastation in about 1,200 kilometres. The super cyclone severely affected life and property. About 14,000 villages/ wards and 16, 50,086 households were severely affected. More than 15 million people (about one third of state's population) got affected and it took a toll of 9,885 human lives and more than 0.4 million livestock and let another 7,507 persons injured. As per the estimate made by state government, about 7,000 lives were lost due to tidal surge; about 2,000 lives due to cyclonic flood and the rest falling objects and or being blown away due to high speed winds. Out of the human lives lost, 8,119 were from Jagatsinghpur district alone. A total of 3.7 million children were affected and 1,500 were orphaned (UNDMT, 1999).

The immediate response of the Odisha Government to the super cyclone was the provision of relief to the affected and prevention of epidemic in the affected area. The government began the urgent task of clearing the roads of debris so that the army, state government and NGOs could deliver relief material by trucks to thousands of affected villages. With corpses and animal carcasses laying all around and water sources being contaminated, the threat of diarrhea, dysentery and malarial fever was quite strong. Several NGOs and the army were engaged in the task of disposing the corpses and animal carcasses. They were also involved in the distribution of relief materials that included food, fresh drinking water and water purifying tablets, clothes and blankets, polythene rolls, medicine and first aid kits. The army also assisted in setting up community kitchens and rural hospitals, where medical personnel were brought in from national and international NGOs.

While there were measures taken immediately in the aftermath of the cyclone, there were also some long-term measures taken by the state. On one side, rehabilitation measures were taken to make the community return back to normalcy and on the other side, stringent measures were taken by the Odisha government by way of setting up the institutional structures so that future catastrophes can be handled in

an effective manner. One such measure was the constitution of the state disaster management authority.

Odisha State Disaster Management Authority (OSDMA)

The Government of Odisha constituted the Orissa State Disaster Mitigation Authority under the Societies Registration Act, 1860. OSDMA was a Government owned autonomous body established in 1999, to have a systematic and planned approach to disaster management in the state with the objective of making the people of the state more disaster resilient. OSDMA was the first state level disaster management authority that was established in India. Chief Secretary is the chairman of the OSDMA. Later in 2000, the name of the authority was changed from Orissa State Disaster Mitigation Authority to Orissa State Disaster Management Authority.

The major task of OSDMA is to concentrate on disaster preparedness, management and social issues related to disaster management such as capacity building, awareness raising and public education, apart from promoting inter-organisational coordination. During normal time, 90% of its activities go for preparedness and 10% of its activities go for reconstruction. But if any disaster occurs, 90% of its activities go for reconstruction. OSDMA, thus, coordinates various activities of disaster mitigation in the state including capacity building of the community and disaster managers and strengthening of infrastructure, improvement in communication system, etc.

15.3 BHUJ EARTHQUAKE, 2001

Gujarat is the one of the highly industrialised states in India. As per 2011 census, Gujarat has been divided into 33 districts and the actual population of the state is 60,383,628. Due to its geographic profile, the state is more vulnerable to all kinds of major disasters and it falls under Zone V. Gujarat witnessed a powerful earthquke with a magnitude of 6.9 on Ritcher Scale at Bhuj (Kutch Region) at 8.46 a.m. on 26th January, 2001. This earthquake was the most devastating in the past 50 years. Its impact was huge in terms of loss of lives and properties. Out of 33 districts, 21 districts got affected by this earthquake and around 16.04 million people suffered terrible loss. It made a large scale devastation in 18 towns, 182 talukas and 7,904 villages in the State. About 20,086 persons were killed and more than 20,717 were seriously injured. Majority people were killed due to the collapse of the buildings. Around 3, 70,000 houses were completely destroyed and over 1.2 million houses suffered extensive damage.

The earhtquake spread upto 300km from the epicentre. Kutch district was one of the worst affected districts. The sadest part was around 450 villages were totally devasted and destroyed. Eventually it affected the districts of Rajkot, Jamnagar, Surendranagar, Patan and Ahmedabad. Ganhidham, Morvi, Rajkot and Jamnagar witnessed a major devastation due to its major structures, infrastructures and industrial facilities. Not only industries, but majority of the public buildings also collapsed during the earthquake. These included hospitals, monuments and museums. Bridges, roads and railways also faced minor damages and structural changes. Due to the severity of the earthquake, the entire network of the telecommunications was affected. Power and water supply services also got severely affected.

After the disaster, immediately the Union Cabinet as well as the National Crisis Management Committee (NCMC) under the chairmanship of the Cabinet Secretary held urgent meetings on 26th January itself for relief measures. An Empowered

Group of Ministers (EGoM), under the chairmanship of the Home Minister, was set up and the EGoM along with NCMC started monitoring the situation round-the-clock.

Immediately the restoration of communication services was undertaken on a war-footing and satellite phones, hotlines, HAM radios and mobile phones were pressed into service. The Government of India also provided immediate assistance from the NCCF (National Calamity Contingency Fund) and the PM's Relief Fund. The state government started the rescue and relief operations with the help of armed and Para-military forces. Apart from rescue measures, the state also focused on providing immediate relief to the survivors. Teams of officials were sent to the severely affected areas for a quick assessment of the requirements and for coordinating arrangements for ensuring food, shelter and health related supplies. The presence of some well-organised NGOs, which began operating community kitchens, was of considerable assistance. Apart from the central government and the NGOs, the state also received support from the corporate organisations and the international community (Sharma, 2001).

In the aftermath of the severe earthquake, on 8th February, 2001, the state had established the Gujarat State Disaster Management Authority under the Societies Registration Act and the Bombay Public Trust Act. The initial mandate of this institution was to implement and coordinate the recovery, rehabilitation and reconstruction activities in the earthquake affected areas. It also acted as a nodal agency for pre-disaster preparedness and mitigation activities. At the national level, Gujarat was the first state to formulate the state level disaster management policy in September 2002.

Check Your Progress 1

Note: i) Use the space given below for your answers.

ii) Check your answers with those given at the end of the Unit.

1) Write a note on Odisha Super Cyclone and highlight the role of OSDMA.

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2) Discuss the immediate relief measures after Bhuj Earthquake.

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15.4 THE INDIAN OCEAN TSUNAMI (TAMIL NADU), 2004

On 26th December, 2004, India experienced the devastating effects of tsunami, caused by a series of earthquakes in the Bay of Bengal, which originated from the West Coast of Northern Sumatra in Indonesia. The magnitude and intensity of the huge and strongest marine earthquake was 9.0 on the Richter scale. First it was recorded around 6.29 AM IST in Indonesia and after three hours it attacked the west of Pulo Kunji Great Nicobar, India (7.3 on Richter scale). The earthquake set off giant tsunami tidal waves of 3 to 10 meters high that penetrated inland up to 3 kms (ADB, UN and WB, 2005). The Indian Ocean Tsunami of 2004 had caused devastating damages to the lives and property of many countries and it caused irreparable damages to the Indian coast as well. More than 20 countries experienced major causalities and damages and a total of about 2.2 million people got affected.

The Indian Ocean Tsunami had affected nearly 2,260 kilometres of the coastal areas, of India, which covered States namely Tamil Nadu, Kerala, Andhra Pradesh and the Union Territories of Puducherry, and the Andaman and Nicobar Islands. As per the Government of India Report, 12,405 people lost their lives; 6,913 people were injured and 6,47,59 people were displaced from their dwellings. About 100,000 houses were estimated to be damaged or destroyed. Approximately 2,000 kilometers of the Indian coastline was submerged up to a distance of two kilometers.

The Indian Ocean Tsunami had caused huge devastating impact on the 13 coastal districts of Tamil Nadu viz. Chennai, Tiruvallur, Kancheepuram, Villupuram, Cuddalore, Nagapattinam, Tiruvarur, Thanjavur, Pudukottai, Ramanathapuram, Thoothukudi, Tirunelveli and Kanyakumari. Three districts viz. Nagapattinam, Kanyakumari and Cuddalore were the worst affected of all districts, with a death toll of 6,065, 828 and 617 respectively (State Planning Commission, 2005). However, the response to the tsunami was swift and comprehensive and it included a combined effort of government bodies, non-governmental organisations (NGOs), and local community.

After the tsunami had struck, it was the local community members who came for immediate rescue, even before the government, NGOs and other players could provide response. Only in the subsequent phase of Tsunami, the Government and NGOs had rendered support. The Government provided relief material and coordinated the relief and rehabilitation programmes. The voluntary organisations and other NGOs were involved in the intervention programmes initiated, in the mitigation, response and recovery activities. In addition to this, even the global communities responded quickly to the tsunami by way of mobilising the resources, required in the disaster response efforts.

The relief measures were undertaken immediately which included search, rescue and evacuation; first aid; shelter; resumption of critical infrastructure; restoring transportation routes; communication lines and electricity; ensuring food and clean water distribution.

After the disaster, the Ministry of Home Affairs, Government of India, was nominated as the nodal agency at the national level for undertaking and co-ordinating relief measures in the affected states and the union territories. It was followed by the establishment of the National Crisis Management Committee (NCMC) in 2005 under the chairmanship of the Cabinet Secretary. The relief efforts were reviewed by the Cabinet Committee of Ministers under the chairmanship of the Prime Minister

together with secretaries of the relevant ministries/departments and chiefs of the armed forces. From the National Calamity Contingency Fund (NCCF), equivalent of US$112 million was allocated to the disaster affected states and union territories. The Planning Commission played an important role in the phases of recovery and rehabilitation and the State Governments took the responsibility for implementation of recovery programmes (UN Country Team, 2005).

The Government of Tamil Nadu announced a relief amount of Rs. 4,000/- to each tsunami-affected household, followed by monthly allowance of Rs. 1,000/- per household for three months. Besides, as per the provisions of Government Order, each household was provided 60 kgs of rice, edible oil, 3 litres of kerosene, spices, etc., worth Rs. 2,000/- per household, in addition to germicidal spray three times a day. A relief assistance of Rs.1,00,000/- was provided for every death caused by the tsunami by the Central Government and Rs. 1,00,000/- by the State Government.

The collapsed structures everywhere had created hindrances in the search, rescue and relief operations. The Public Works Department with the help of local people removed the debris of collapsed buildings, roads, bridges and other structures, as well as uprooted trees, hoardings, etc. The resource persons from Tamil Nadu Agricultural University visited the agricultural lands and cleared the sea water and started the land reclamation process.

Damage assessment is a pre-requisite for all disaster management practices. Rapid damage assessment is required for emergency relief measures. For this purpose, the NGOs initiated Village Information Centres (VICs) in order to make an assessment of the damages. VICs coordinated with the government officials and community members and collected the information like severity of disaster, likelihood of the damages, loss of life and property damages and it passed on the information to the block and district authorities and people also approached the VICs to register their complaints or grievances.

The NGOs started the community kitchen in the shelter area. Some of the International Non-Governmental Organisations (INGOs) started the mineral water plant for the victims to distribute drinking water. The sanitation was very poor and people resorted to open defecation. Later, the NGOs, with the support of UNICEF, installed Eco sanitation toilets.

Coordination was the vital and immediate component needed in the response phase. A number of agencies at the local, regional, national and international level mushroomed up in the villages to provide various services to the victims. However, coordination and cooperation of various agencies became a challenging task in the initial phase. Later, the district administration had established coordination centre among the various stakeholders.

After witnessing the impact of tsunami in 2004, the Disaster Management Act was enacted in 2005 and later the National Disaster Management Policy also was formulated in 2009 (Kanal, 2013).

15.5 UTTARAKHAND FLOODS, 2013

The state of Uttarakhand and the adjoining areas received heavy rainfall during 14th to 17th June, 2013, which was about 375 percent more than the benchmark rainfall in a normal monsoon. Out of 13 districts, 5 districts namely Bageshwar, Chamoli, Pithoragarh, Rudraprayag and Uttarkashi were affected badly due to

flash floods. The major reason for the flash flood was extreme rainfall, melting of Chorabari Glacier and eruption of the Mandakini River. As per the Indian Meteorological Department (IMD), the rainfall in the State between 15 June and 18 June, 2013, was measured at 385.1 mm, against the normal rainfall of 71.3 mm, which was in excess by 440 per cent. As per state government, a total of 169 people died and 4021 people were reported missing (presumed to be dead) (NIDM, 2014).

The heavy rains, flash floods and massive landslides on 16 June, 2013, due to over flow of Gandhi sarovar (also known as Chourabari lake) just above Kedarnath temple caused washing away of area around Kedarnath temple, pilgrims shelters there and enroute, foot tracks and entire villages and settlements of Gaurikund and Ram Bada; the transition points to Kedarnath. The market of small town of Sonprayag also suffered heavy damage and loss of lives. Pilgrimage centres in the regions of Gangotri, Yamunotri, Kedarnath and Badrinath, the holy Hindu Chardham (four sites), Hemkund Sahib a pilgrimage centre for the Sikh community and its roadhead transit point at the Govindghat gurudwara are visited by thousands of devotees during May to October every year. Hence, it was the peak time of pilgrimage, when disaster had struck. Over 125,000 people were stuck up in various regions because of damaged or blocked roads. National Highway 58, an important artery connecting the region, was washed away near Joshimath and many other places. For more than three days, stranded pilgrims and tourists were without rations or survived on little food. The roads were seriously damaged at more than 450 places, resulting in huge traffic jams. The floods caused washing away of many cars and other vehicles. On June 18, more than 12,000 pilgrims were stranded at Badrinath, the popular pilgrimage centre located on the banks of the river Alaknanda. Rescuers at Haridwar on the river Ganga recovered bodies of 40 victims washed down by the flooded rivers as of June 21, 2013. Bodies of people washed away in Uttarakhand were found at distant places like Bijnor, Allahabad and Bulandshahr in Uttar Pradesh. Search for bodies of those who lost their lives during the extreme natural fury of June in Kedar valley continued for several months. Even as late as September 2013, about 166 bodies were found in highly decomposed state during fourth round of search operation. In a massive evacuation-cum-rescue operation, the Indo-Tibetan Border Police (ITBP), Air Force, Army, NDRF, and state administration evacuated more than 125,000 people from the flood ravaged area. The ITBP was the first to respond and to launch rescue and relief operation immediately after the disaster. About 1600 ITBP personnel were involved in rescue and relief operations in Uttarakhand (Eapen, 2016).

The following are the “major lessons learnt from this disaster:

- The need to have strict implementation of the Flood Plain Zoning Act which can regulate the constructions within the flood plain of a river.
- For clearance of all hydro-power and other mega projects in ecologically sensitive regions like Uttarakhand, the Disaster Impact Assessment (DIA) should also be made compulsory besides Environmental Impact Assessment (EIA).
- Landslide risk zonation mapping be completed on priority. Development and enforcement of guidelines, regulations and codes for landslides is critical.
- Effective stabilisation of slopes in shear and weak zones be undertaken using scientific techniques available at national/international levels.

- Blasting for developmental activities be avoided as it may destabilise the weak rocks in mountainous regions.
- The existing emergency communication system be reviewed regularly to ensure last mile connectivity during disasters.
- Investments in infrastructure development related to weather, glacial lakes, river flow monitoring, etc. are fundamental for improving the accuracy of risk mapping, thereby allowing more lead-time for warnings provided by IMD, CWC, GSI, NRSC, etc.
- Tourism related development should not be allowed along the river banks.
- An effective pilgrim control and regulatory body should be constituted for control and management of pilgrims/tourists" (NIDM, 2014).

15.6 CYCLONE PHAILIN, 2013

As we already discussed in section 15.2, Odisha suffers frequent cyclones and floods. The Cyclone Phailin had crossed the coastline of Barhampur, Odisha, on 12th October, 2013. Due to the cyclone, the state faced continuous rainfall. Though the cyclone caused extensive damage on the infrastructure, fewer casualties were reported. As per Government of Odisha, the cyclone had affected the lives of 13 million people; 2,56,633 houses got damaged and extensively the crops also got severly affected. Surprisingly 45 people got killed. Here the significant factor is that compared to earlier cyclones, the loss of lives was very small.

During the period of cyclone, resources were deployed from Odisha Rapid Action Force (ODRAF), Andhra Pradesh State Disaster Response Force (APSDRF), National Disaster Response Force (NDRF), Indian Army, Indian Air Force, Fire Services and DG of Police for search and rescue operations. Mock drills were also conducted at the cyclone shelters to prepare the community in facing the situation. The Ministry of Home Affairs (MHA) and the National Disaster Management Authority (NDMA) were also requested to make necessary arrangements for deployment of the NDRF and IAF helicopters on short notice. The Government of Odisha was, thus, proactive and well prepared. The OSDMA had done a wide range of preparatory activities to face the furious cyclone with a zero casualty approach. Even the community members were equally prepared to face the disaster. Before the landfall of the cyclone, one million people were evacuated in 36 hours. It was one of the largest evacuation operations in the history of disaster management in India. It was possible because of the Odisha Disaster Rapid Action Force (ODRAF), National Disaster Response Force (NDRF), Central Reserve Police Force (CRPF), Odisha State Armed Police (OSAP) and the Indian Air Force (IAF). Proper coordination and the effective response action plan had reduced the human causalities (NIDM, 2014). Thus, cyclone Phailin was handled in an effective manner by almost all the stakeholders, including the community members, which contributed a great deal in reducing the vulnerability of people.

Check Your Progress 2

Note: i) Use the space given below for your answers.

ii) Check your answers with that given at the end of the Unit.

1) Discuss the post-disaster institutional measures after Indian Ocean Tsunami.

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2) Highlight the major lessons learnt from Uttarakhand floods and Cyclone Phailin.

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15.7 CONCLUSION

The Unit has discussed the case studies of some of the major disasters that made huge impacts in different parts of the country. There has been substantial loss of life and property in the last two decades. These disasters were also responsible for the creation of Disaster Management Act, National Disaster management Policy, institutional structure and framework, both at the national and state level. The case study of disasters such as Odisha Super Cyclone, 1999; Bhuj Earthquake, 2001; Indian Ocean Tsunami, 2004; Uttrakhand Floods, 2013; Cyclone Phailin, 2013; etc. have thus been briefly discussed in this Unit, to provide you a picture of how the disasters were handled in the during-disaster and post-disaster phases.

15.8 GLOSSARY

Richer Scale : The Richter magnitude scale was developed in 1935 by Charles F. Richter of the California Institute of Technology as a mathematical device to compare the size of earthquakes. The magnitude of an earthquake is determined from the logarithm of the amplitude of waves recorded by seismographs. Adjustments are included in the magnitude formula to compensate for the variation in the distance between the various seismographs and the epicentre of the earthquakes (https://pubs.usgs.gov).

Glacier : A slowly moving mass or river of ice formed by the accumulation and compaction of snow on mountains or near the poles (https://en.oxforddictionaries.com).

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15.10 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1) Your answer should include the following points:
   - Effects of Odisha super cyclone
   - Odisha State Disaster Management Authority

2) Your answer should include the following points:
   - National Crisis Management Committee
   - Empowered Group of Ministers
   - Various immediate relief measures

Check Your Progress 2

1) Your answer should include the following points:
   - National Crisis Management Committee
   - Cabinet Committee of Ministers
   - State Government Measures
   - NGOs and INGOs initiatives

2) Your answer should include the following points:

- Flood Plain Zoning Act
- Landslide risk zonation mapping
- Emergency communication system
- OSDMA measures

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