UNIT 1 HAZARD, RISK, VULNERABILITY AND CAPACITY ANALYSIS

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1.0 OBJECTIVES

India, with its vast territory, large population and unique geo-climatic conditions, has experienced many extreme hazardous events that have turned into disasters in the last few decades. Floods, droughts, cyclones, earthquakes and landslides are recurrent phenomena in the country. Susceptibility to such extreme natural events is compounded by frequent occurrences of human made disasters such as fire, epidemics, stampedes, chemical leakages etc. This Unit aims at providing you with a comprehensive understanding of terminology and concepts used in the management of disasters and their relationship with each other. You will also learn about the linkage of the process of disaster management with developmental planning. After reading this Unit, you should be able to:

- explain the meaning of hazard, risk, vulnerability and capacity with respect to disaster management;
- describe the relationship between hazard, vulnerability, risk and capacity;
- discuss various models of Disaster Management; and,
- illustrate the tools used in hazard, vulnerability, risk and capacity analysis.

1.1 INTRODUCTION

We live in a world where there are sources of potential harm or situations with a potential to cause loss all around us. We could be living close to a coastline that is prone to cyclones, tsunami or the mountainous regions vulnerable to earthquakes. On the other hand, we maybe living close to an industry which could be dangerous or there maybe communal tension prevailing in the area. Disasters have been mankind's constant companion since time immemorial. They strike unabated and leave a profound trail of deaths, injuries, damage to infrastructure and development and causing immense trauma to the affected community.

As far as India goes, about 60% of the landmass is prone to earthquakes of various intensities; over 40 million hectares is prone to floods; about 8% of the total area

is prone to cyclones and 68% of the area is susceptible to drought (BMTPC, 2006). In the decade 1990-2000, an average of about 4344 people lost their lives and about 30 million people are affected by disasters every year (World Disaster Report, 2004). As examples, the Orissa super cyclone in 1999 killed thousands and destroyed more than one million hectares of crops. The Gujarat earthquake in 2001 and Kashmir earthquake in 2005 claimed thousands of lives, left millions of people homeless and ruined public infrastructure worth hundreds of millions of dollars. Another major event that shook the Nation was the occurrence of Tsunami in 2004, which badly affected many coastal Indian states. Floods, droughts, cyclones and earthquakes are a recurrent phenomenon all across the globe. Susceptibility to disasters is compounded by frequent occurrences of manmade disasters such as fire, epidemics etc. Even though significant achievements have been made to reduce the loss of life resulting from natural hazards, their impacts remain considerable. Statistics published by the International Disaster Database (EM-DAT) (http://www.em-dat.net) and the International Federation of the Red Cross and Red Crescent Societies (IFRC) in the *World Disasters Report* (IFRC, 2002; 2003; 2004) reveal that the number of people killed during disasters is still high and that the number of people affected and associated economic losses have increased substantially since the 1970s. The geophysical setting along with unplanned and inadequate developmental activity is a cause for increased losses during disasters. In the case of India, the contribution of over-population to high population density has added to the cause resulting in escalating losses.

1.2 TERMINOLOGY

This section will explain the meaning of the following terms used in disaster management.

1) Hazard
2) Vulnerability
3) Capacity
4) Risk

Hazard

Hazards are defined as physical phenomena that pose a threat to the people, structures or economic assets and which may cause a disaster. Generally speaking, there are two types of hazards, namely:

- Natural - These are hazards caused by nature such as floods, droughts, earthquake cyclones, tsunami, landslides etc
- Human made - These are hazards that are caused by human beings either deliberately or by accident such as industrial and chemical accident, road and railway accidents, aviation disasters, fire, building collapse, communal violence, bomb blasts etc.

More and more, the distinction between natural and human made hazards is becoming harder to delineate. Some hazards are natural in nature but are exacerbated due to human activities such as flooding and drought. These can be caused due to deforestation, unplanned development, improper drainage system etc. For example, flooding may be increased through landfill, drainage or groundwater extraction; storm surge may be worsened by the destruction of mangroves.

However, the High Powered Committee on Disaster management that was constituted in August 1999 under the Chairmanship of Shri J.C. Pant identified

five major groups of hazards in its final report. This exhaustive classification of over thirty hazards is as follows:

Group 1: Water and Climate related Hazards

1) Floods and Drainage Management
2) Cyclones
3) Tornadoes and Hurricanes
4) Hailstorm
5) Cloud Burst
6) Heat Wave and Cold Wave
7) Snow Avalanches
8) Droughts
9) Sea Erosion
10) Thunder and Lightning

Group II: Geologically related Hazards

1) Landslides and Mudflows
2) Earthquakes
3) Dam Failures/Dam Bursts
4) Mine Fires

Group III: Chemical, Industrial and Nuclear Hazards

1) Chemical and Industrial Disasters
2) Nuclear Disasters

Group IV: Accident related Hazards

1) Forest Fires
2) Urban Fires
3) Mine Flooding
4) Oil Spill
5) Major Building Collapse
6) Serial Bomb Blasts
7) Festival related disasters
8) Electrical Disasters and Fires
9) Air, Road and Rail Accidents
10) Boat Capsizing
11) Village Fires

Group V: Biologically related Hazards

1) Biological Disasters and Epidemics

2) Pest Attacks

3) Cattle Epidemics

4) Food Poisoning

Vulnerability

It is the extent to which a community, structure, service or geographic area is likely to be damaged or disrupted by the impact of a particular hazard on account of its nature, construction, and proximity to hazardous terrain or a disaster prone area. It is the likely extent of damage due to a hazard.

In the face of a particular hazard, it is important to determine how each hazard interacts with each and every dimension of vulnerability. Therefore, a study of vulnerability is a study of what might happen to people or communities and while it is not certain that a crisis might occur; it definitely affects different populations in a different manner. Vulnerability represents the interface between exposure of any physical threats to human well-being and the capacity of people and communities to cope with those threats. Threats may arise from a combination of social and physical processes. Human vulnerability thus integrates many environmental concerns and may undermine the entire sustainable development process in developing countries.

Bhopal Gas Tragedy

If we look at the vulnerability of that incident, the people living in the vicinity of the factory were poor. They lacked education about the kind of hazard the factory posed to their lives. They did not have the skills or training to know how to cope with a gas leak. There was a high density of population and urbanization around the factory. The location was dangerous and the infrastructure was fragile in terms of maintenance and it led to a technological accident killing over 2000 people and another 700,000, who continue to be affected even today. So one can see how vulnerability can lead to a disaster of grave consequences.

The extent to which a population is affected by a calamity does not purely lie in the physical components of vulnerability, but is contextual also to the prevailing social and economic conditions and its consequential effect on human activities within a given society. Research in areas affected by earthquakes indicates that single parent families, women, handicapped people, children, aged and poor people are particularly vulnerable social groups. For example: coastal communities are more likely to experience cyclone induced flooding than communities in other parts. However, amongst the same coastal communities, some families have strong houses that can withstand the impact of floods better or are aware of upcoming floods so they can relocate temporarily. Others, after having their houses destroyed by floods, may be able to rebuild more quickly because of their savings, innovations, family or other external support but, the poorest tend to live in the most exposed places, have the weakest houses, and have least assets to rebuild and therefore, are likely to be the most vulnerable. It captures people's inadequate options or ability to protect them against possible damage or recover from the consequences of natural phenomena without outside help.

Vulnerability can be of varied types like:

1) **Physical vulnerability:** Depending on physical location of people and elements at risk and technical capacity of buildings, structures, and infrastructure. It varies according to construction techniques, materials used and location.

2) **Economic vulnerability:** Poor people are considered to be more vulnerable as their houses are built of weak material and in dangerous areas. They do not have the essential safety nets to recover as the affluent population. Their loose the essential tools and equipments of their livelihood as well.

3) **Social Vulnerability:** Some sections of the population are more vulnerable than the others like women, children, elderly, physically and mentally challenged and those dependent on critical facilities.

4) **Other types of vulnerability:** Some other types of vulnerability have also been identified like Environmental vulnerability, Cultural vulnerability, Educational vulnerability, Attitudinal vulnerability and Political vulnerability.

Disaster

As per the Disaster Management Act, 2004 disaster is defined as a catastrophe, mishap, calamity or a grave occurrence in any area arising out of natural or man made causes, or by accident or negligence, which results in substantial loss of life and human suffering or damage to, or destruction of, or degradation of environment, and is of such a nature, or magnitude as to be beyond, the coping capacity of the affected community of the affected area. The term Disaster Management is a collective term referring to all aspects of planning and responding to disasters, including both pre and post disaster activities. It may refer to the management of both the risks and consequences of disasters.

When a hazard is not managed properly, it turns into a disaster. So, while hazards can be considered natural, disasters are generally human made. Earthquakes, cyclones, etc are all natural hazards and we can prevent them from becoming disasters.

Relationship between hazard, vulnerability and disaster

A disaster happens when a hazard impacts on a vulnerable population and causes damage, casualities and disruption. An earthquake in an uninhabited desert cannot be considered a disaster, no matter how strong the intensity might be. An earthquake is disastrous when it affects people, infrastructure and activities.

- *hazard × vulnerability = disaster*

When extent of hazard and vulnerability is low, the resulting disaster will also be of small magnitude.

- *HAZARD × vulnerability = disaster*

When extent of hazard is high but vulnerability is low then the disaster will be of small magnitude.

- *Hazard × VULNERABILITY = disaster*

When vulnerability is high but extent of hazard is small then the resulting disaster will also be of small magnitude.

- *HAZARD × VULNERABILITY = DISASTER*

When extent of hazard is very high and the vulnerability is also high then it will result in a huge disaster.

Capacity

Vulnerability is one side of a coin; the other side representing the resources people have to resist, cope with, or recover from a hazard, or “capacities”. Vulnerability is about “not having” while capacities are about “having”. Capacity is knowledge, skills, resources, abilities and strength, present in individuals, households and the

communities, which enable them to prevent, prepare for, stand against, survive and recover from a disaster.

People's capacities are also highlighted by what are known as "coping strategies". These are responses linked to capacities (or resources) which, in the face of a hazard determine how vulnerable or resilient an individual or household becomes.

Some examples of capacity are:

- Permanent houses
- Adequate food and income sources
- Fire stations
- Developed health infrastructure,
- Good Community Networks for support
- Local knowledge
- Strong community leadership and organizations

Capacity =1/Vulnerability

Risk

Risks have always been part of daily life for humans. However, both the level of acceptance and the perception of risk vary from one individual to another. Perception also varies between regions, societies and cultures and therefore, there is no universally valid definition of risk. Risk is the expected damage or loss due to the combination of vulnerability and hazards. People are considered at 'risk' when they are unable to cope with a hazard. A disaster occurs when a significant number of vulnerable people experience a hazard and suffer from severe damage and/or disruption of their livelihood system in such a way that recovery is unlikely without external assistance.

Risk is the *probability* of harmful consequences or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted or environment damaged) resulting from interaction between natural or human-induced hazards and vulnerable conditions (HPC Report, 2001).

As far as disaster risk is concerned, it refers to the probability of the occurrence of a disaster. It is a subject to the extent of hazard, vulnerability and capacity. In relation to disasters, Kotze and Holloway (1996) define risk as the expected losses (lives lost, persons injured, damage to property and disruption of economic activity or livelihood) caused by a particular phenomena.

Risk is a function of hazard occurrence and the projected losses. A societal element is said to be 'at risk' or vulnerable when it is exposed to hazards and is likely to be adversely affected by the impact of those hazards if and when they occur, especially in situations of limited capacity.

It can be best explained by

$$Disaster\ Risk = \frac{Hazard \times Vulnerability}{Capacity}$$

The relationship between these four components, indicate that each of the three variables that define risk - the hazard, the elements exposed and their vulnerability - are of equal value. Reducing any one or more of the three contributing variables will lessen the risk to a community. In reality, however, there is little opportunity to reduce the hazard component, therefore, only the vulnerability and the elements

at risk will vary. When hazard and vulnerability are high, it will cause disaster but when capacity is present, it will decrease the impact. Hence, to reduce the risk of a disaster,

1) Decrease the vulnerability of the community; and

2) Increase the capacity of the community.

Check Your Progress I

Note: Use the space provided for your answer

1) List the major natural hazards affecting your region and describe in what way these hazards can affect your city/region/country?

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2) What are the various types of vulnerability?

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3) Describe the relationship between hazard, risk, vulnerability and capacity.

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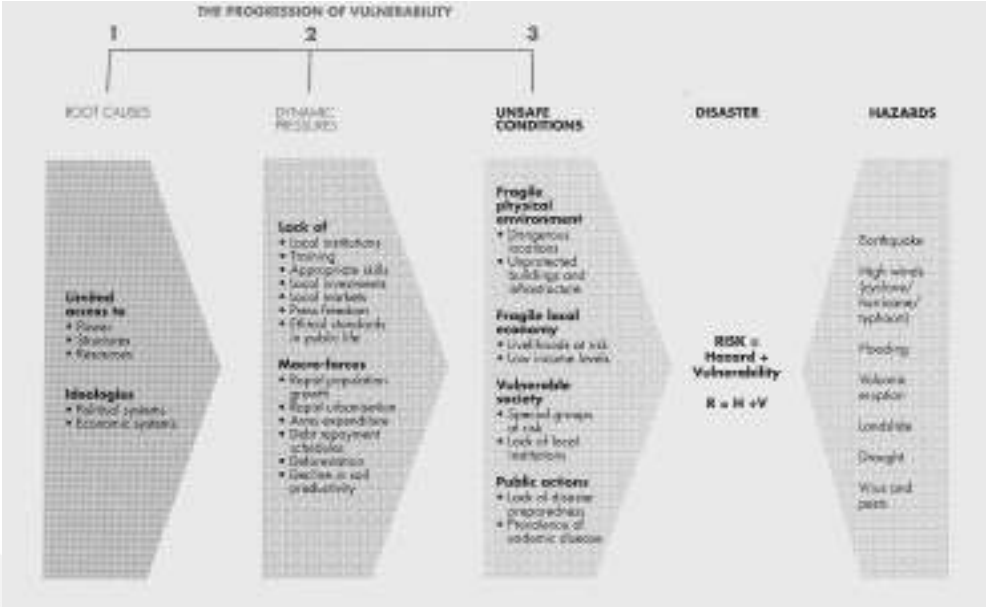
1.3 DISASTER CRUNCH MODEL

The "Disaster Crunch Model" (Blaikie et al, 1994) is a pressure and release model which shows that vulnerability (pressure) which is rooted in socio-economic and political processes has to be addressed (released) for disaster risk reduction. The progression of vulnerability helps us in understanding the complexity of vulnerability, especially its underlying conditions and root causes that may be quite remote from the disaster itself.

The model proceeds from the assumption that a disaster happens when, a hazard affects a vulnerable community. A natural phenomena by itself is not a disaster. Similarly, a population may be vulnerable to a disaster for many years, yet without a trigger event, there is no disaster. A disaster happens when these two come together.



A hazard is the ***'trigger event'*** which causes a disaster. It could be an earthquake, landslide, floods, communal violence etc. The ***'unsafe conditions'*** are the vulnerable context where people and property are exposed to the risk of disaster. Vulnerable physical environment and unstable economy are some of the factors influencing these conditions.

The ***'dynamic pressures'*** within the society are the immediate cases of 'Unsafe Conditions'. They are the processes and activities that have translated the effects of root causes into unsafe conditions. They answer the question of how unsafe or dangerous conditions have arisen.

Beneath the dynamic pressure are the ***'underlying causes'*** which make the community and structure to be unsafe and vulnerable. They are the basic fundamentals or ideologies on which society is built. Vulnerability develops from a progression of underlying conditions to dynamic pressures and finally creating unsafe conditions. The underlying causes answer the question as to why the unsafe conditions persist. The fundamental causes of disaster risk have to be addressed so that the disaster does not repeat itself.

1.4 DISASTER PRESSURE AND RELEASE MODEL

Disaster Crunch Model helps us to understand how vulnerability is built up whereas the Disaster Release Model helps us to understand how the risk of disaster can be reduced.

The first stage is to examine the disaster event itself. Natural phenomena cannot be prevented but their risk of getting out of control and causing damage and loss of life can be reduced. Measures can be undertaken to modify or reduce the hazards. For example, to reduce the risk of river flooding, protective dikes or bunds can be built and the system of river control can be linked to flood warning systems. If 'unsafe conditions' are to be turned into 'safe conditions', then it is necessary to adopt activities, which will lessen the 'dynamic pressures'. For Example, Mitigation measure for an earthquake prone area can include providing incentives to encourage

the community to strengthen their homes, to vacate particularly dangerous house locations or to build new houses in a safe manner to resist local hazards.

The next step is to reduce pressures that directly or indirectly contribute to the growth of vulnerability. For an earthquake prone area, the basic developmental activities can be undertaken to significantly reduce lives lost or damage to property for future disasters.

Introduction of disaster preparedness plans:

- Building or strengthening of local institutions.
- Education of local builders and masons
- Initiation of income generating activities

Check Your Progress II

Note: Use the space provided for your answer.

1) Explain 'Disaster Crunch Model'.

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2) What are the 'unsafe conditions' and 'dynamic pressures' operating in your area?

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3) Explain 'Disaster Release Model'.

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1.5 HAZARD ASSESSMENT

A hazard is measured and defined by its nature (type of hazard), location and extent, scope and intensity (damage potential) and its probability of occurrence, duration and frequency (repetition cycles). Hazard analysis refers to prioritizing disasters based on its frequency and analysis of the estimated losses. This can be carried out by taking the help of elderly people of the village. The community can

analyze the losses that they had incurred during various disasters and learn the best practices carried out. This is an important activity as it forms the basis for preparedness and mitigation plans.

The community can be asked to *review and analyze* the occurrence of past disasters and hazards. Group discussions along with the elderly population, teachers and children can be held focusing on the disasters and hazards faced by the community for the past one year to past fifteen years, kind and nature of disasters and hazards faced, experience in the last hazard faced, warning issued, damage caused, response to the disaster, relief and rehabilitation process, traditional methods of coping of the community, gaps in management of the hazard, lessons learnt. It can be useful in understanding the nature, intensity and behavior of the past disasters and hazards. The elderly population can share vital information and experience about the past while the presence of children in the *group discussion* can ensure that the experience is passed on to the next generation.

The community can identify both natural as well as human made hazards to which there area is prone to. Natural hazards may include floods, drought, earthquake, cyclone, sandstorm, cloudburst etc. Human made hazards for the community may include industrial and chemical accidents, road and railway accidents, fire, epidemic, building collapse, communal/caste violence etc.

Tools for Hazard Analysis

Some of the tools that can be used for hazard analysis are as follows:

1) ***Hazard Mapping:*** It is a visual representation of the village by the community. It is a rough spatial overview and sketch of the area and specific locations, which are vulnerable to various hazards. The main feature of hazard mapping is to facilitate discussion on issues pertinent to hazards. It is made by men and women, who know the area and are willing to share their experiences on large sheets.

2) ***Historical Profile or Timeline:*** This tool is used to gather information about what happened in the past. It helps in getting an insight in past hazards, changes in their nature, intensity and behaviour. It helps to understand the present situation in the community and establish the link between hazards and vulnerabilities. The community may also become aware of the changes that have taken place over the past through historical profile or timeline.

3) ***Seasonal Calendar:*** It involves making a calendar showing different events primarily the time of occurrence of hazards throughout the annual cycle. It helps to identify the periods of stress and prepare for the specific stress in normal times before the threat of hazard looms large on the community. The facilitator can arrange sessions for the community members focusing on the issue.

Hazard	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Flood												
Drought												
Epidemic												
Any Other												

4) ***Hazard Matrix:*** This tool aims at gathering comphrensive information about the past hazards. It helps in having an insight about the future hazards on the basis of gaps and lacunae in the management of past hazards and disasters.

Hazard	Intensity	Early Warning Given or not	Warning sign	Speed of onset	Frequency	Time	Duration	Impact
Flood								
Earthquake								
Drought								
Industrial Hazard								
Epidemic								
Any Other								

1.6 VULNERABILITY AND CAPACITY ASSESSMENT (VCA)

VCA is very crucial for disaster preparedness and mitigation measures as it gives an insight about the means people employ to cope, and this is the firmest basis on which we can build appropriate and cost-effective actions for preparedness and mitigation. Finally, and very importantly, the process of a VCA, if properly conducted, confers advantages to vulnerable people in terms of raising public awareness, sensitizes a community and empowers them by giving the community knowledge of risks and capacities. A vulnerability and capacity assessment should be an ongoing process which must address risk and those long term factors which make people more vulnerable to a hazard. It can be carried out at "pre-disaster" stage as a technique of disaster preparedness and made an integral element in the wider process of risk assessment.

The process of vulnerability assessment would involve asking the community two major questions namely;

1) Who is vulnerable?

2) What is vulnerable?

The community would be asked to identify the more vulnerable population, identify the location of women, (pregnant, lactating, widows, single), children, old aged, physically challenged, mentally challenged, those dependent on life support systems and medicines, poor people living by the sea or kutcha houses, livestock and cattle etc. The community would also be asked to identify the vulnerable infrastructure like buildings, low lying areas, areas near the water bodies such as the sea and river and direction of wind, livelihood assets such as boats and nets, documents, weak structures, drinking water resources, communication lines, roads, telephone lines etc.

Tools for Vulnerability Assessment

The various tools for vulnerability analysis are as follows:

1) **Transect Walk:** The process involves taking a systematic Walk with key informants through the community to explore spatial differences, land use zones by observing, asking, listening, informal interviews and producing a transect diagram.

2) **Problem Tree:** The tool involves drawing a tree which shows relationship between different aspects of vulnerability. It involves identifying major problems and vulnerabilities as well as root causes and their effects. The trunk

represents the problems, the root depict the causes while the leaves signify the effects.

3) **Livelihood Analysis:** The tool focuses on the studying the vulnerability of the livelihood of the community to various disasters. The tool analyzes the various livelihood activities that are spread over the year and the impact of hazards on the livelihood activities. It also focuses on understanding livelihood strategies, behaviour, decisions and perceptions of risk, capacities and vulnerabilities from different socio-economic background.

4) **Vulnerability Assessment:** The vulnerability assessment would focus on the vulnerable community and the vulnerable infrastructure. It assesses and maps the more vulnerable population and the assets of the community.

More Vulnerable Population
• Women
• Elderly
• Children
• Physically handicapped
• Mentally challenged
• Dependent on life support systems, medicines
• Poor people living by the sea, kutcha houses etc.

Vulnerable Infrastructure
• Kutcha houses
• Low lying areas
• Livelihood assets such as boats, nets,etc
• Documents,
• Houses and weak structure
• Crops and horticulture
• Drinking water resources
• Communication lines, road, telephone lines

Capacity Assessment focuses on identifying locally available assets and resources that can be utilized for building the capacities of the community during and after disasters. The local community has a lot of inbuilt strength and capacity for handling the disasters. It is important to capture the capacity and strength of the community in resource analysis. Apart from infrastructure and funds, it could be individuals with specific skills, local institutions and people's knowledge as all these have the capacity to create awareness and bring about changes in the community. Capacity Assessment, is therefore, not limited to a map depicting the available resources but also plotting of the distribution, access and its use by taking into consideration prevailing sensitiveness within the community .Thus assessment of resources would involve two components:

1) Human Resource Assessment

2) Material Resource Assessment

The process would involve identifying safe houses and buildings for shelter, strong buildings, elevated uplands and structures, safe evacuation routes, health, medical and sanitation facilities, swimmers, doctors, nurses, sources of funds to carry out preparedness activities, volunteers for task force etc

Tool for Capacity Assessment

One of the tools that can be used for capacity assessment is as follows:

1) **Social and Institutional Analysis:** The tool focuses on identifying various government, non-government and private organizations working in the field of disaster management in the local as well as neighbouring area. Various other aspects can also be studied such as the role played by the institutions,

their area of interest, their importance in the management of disasters, capabilities of such institutions and the perceptions people have about them.

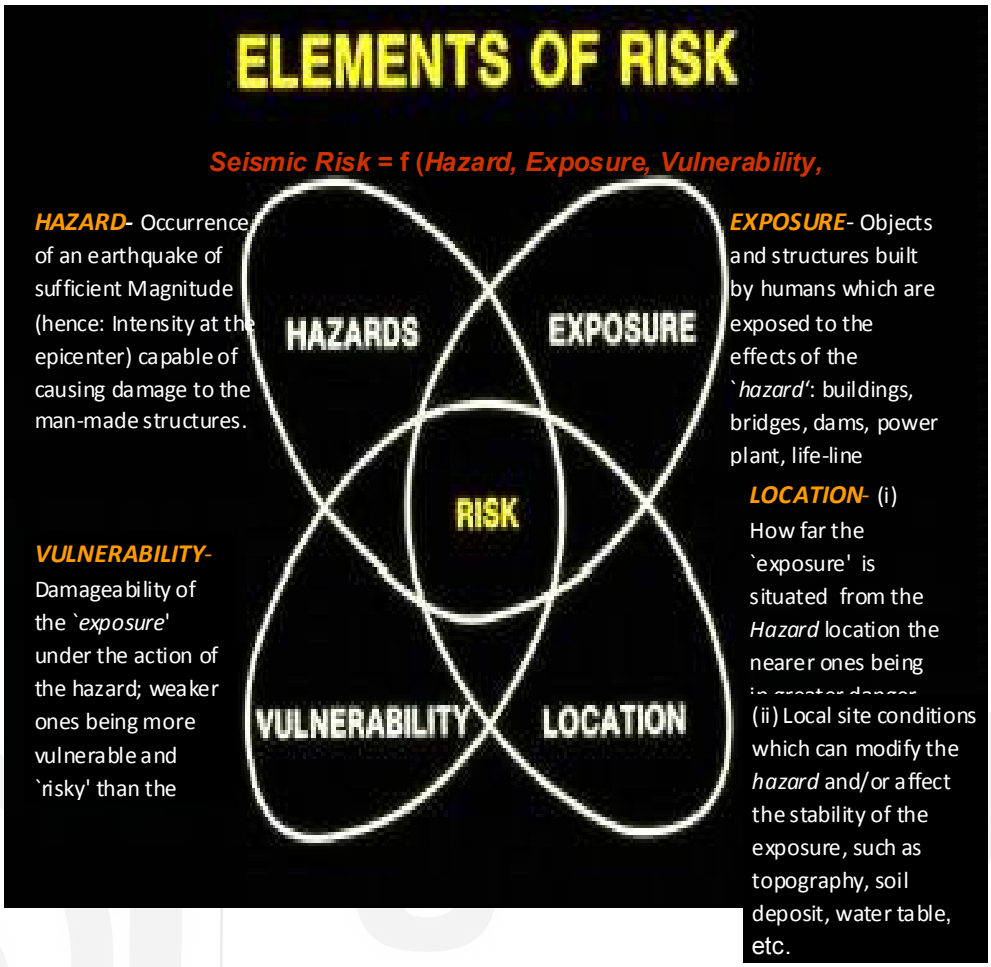
List of Organizations	Ranking	Scope	Interest	Capability
Government				
Non-Government				
Private				

1.7 RISK ASSESSMENT

Risk assessment is necessary so as to determine the nature and extent of risk by analyzing potential hazards and evaluating existing conditions of vulnerability that could pose a potential threat or harm to people, property, livelihoods and the environment on which they depend. A risk assessment provides the factual basis for activities proposed in any strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards. Risk assessment is a necessary first step for any serious consideration of disaster reduction strategies. Its relevance for planning and development of disaster risk reduction strategies was explicitly addressed during the International Decade for Natural Disaster Reduction.

Risk Identification: This includes activities like hazard data collection and mapping to determine the frequency, magnitude and location of any hazard event; vulnerability assessment of the populations and the assets exposed and risk assessment to determine the probability of expected losses.

Risk Reduction/Mitigation: Consists of measures taken to reduce the physical, social and environmental vulnerability and have been achieved through a number of ongoing schemes on resource conservation and management like Integrated Wasteland Development Program (IWDP), Drought Prone Area Program (DPP), Flood Control Programs, National A-forestation and Eco Development Program (NA and ED), Accelerated Rural Water Supply Program (ARWSP), Crop Insurance, and Mahatma Gandhi National Rural Employment Guarantee Yojana (MGNREGY) etc. Mitigation measures may include structural and non-structural measures like construction of cyclone/temporary shelters; plantation of mangroves and coastal forests along the coast line as these fall under the non-structural mitigation measures; construction of location specific sea walls and coral reefs in consultation



with experts; development of break waters along the coast to provide necessary cushion against cyclone and tsunami hazards; development of tsunami, cyclone detection, forecasting and warning dissemination centers etc.

Risk Transfer: Policies that govern the relief expenditure are based on the recommendations of successive financial commissions. The Calamity Relief Fund (CRF) and the National Calamity Contingency Fund (NCCF) were two main sources for meeting the relief expenses. Added to these are funds from international or multilateral donor agencies like World Bank, USAID and International and National/ Local NGOs for relief and rehabilitation measures apart from government policies on risk insurance and micro-finance and micro-credit schemes.

Early Warning and Forecasting: There are two distinct types of tsunami warning system - the International tsunami warning systems, and Regional warning systems to detect hazards like cyclones and tsunamis and to issue warning to reduce the loss of life and property.

Tool for Risk Assessment

One of the tools that can be used for risk analysis is as follows:

1) **Risk Analysis:** The tool is based on determining the risk by analyzing the vulnerabilities and capacities of the community related to each hazard. On the basis of analysis the risk is determined for a particular hazard in a ranking order. While conducting the risk assessment one should keep the following points in mind:

   - Determine the risk by ranking
   - Ask the community about the hazard which poses the highest risk.
   - Explore the reasons due to which a particular hazard poses the risk.

Check Your Progress III

Note: Use the space provided for your answer

1) Explain various tools that can be used for hazard analysis.

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2) How will you assess the vulnerability of your area?

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3) Which tool will you use to analyze the risk of your area?

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1.8 LET US SUM UP

India, with its vast territory, large population and unique geo-climatic conditions, has experienced many extreme hazardous events that have turned into disasters in the last few decades. While hazards are defined as physical phenomena that pose a threat to the people, structures or economic assets which may cause a disaster, vulnerability is referred to as the extent to which a community, structure, service or geographic area is likely to be damaged or disrupted by the impact of a particular hazard on account of its nature, construction, and proximity to hazardous terrain or a disaster prone area. When a hazard is not managed properly, it turns into a disaster. So, while hazards can be considered natural, disasters are generally human made. Earthquakes, cyclones, etc are all natural hazards and we can prevent them from becoming disasters. Capacity is knowledge, skills, resources, abilities and strength, present in individuals, households and the communities, which enable them to prevent, prepare for, stand against, survive and recover from a disaster. Risk refers to the probability of the occurrence of a disaster. Risk to any disaster can be reduced by decreasing the vulnerability of the community and increasing

the capacity of the community. There are varied tools for carrying out hazard, risk, vulnerability and capacity assessment. Hazard analysis can be done through hazard mapping, historical profile, seasonal calendar and developing a hazard matrix for review of past disasters. Vulnerability assessment can be done by taking a transect walk, making a problem tree, conducting a livelihood analysis, and making an assessment about who and what is vulnerable in the community. Social and Institutional analysis is one of the tools for capacity assessment while risk can be determined by ranking the various hazards according to their risk on the basis of vulnerability and capacity assessment.

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