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DISASTER RISK REDUCTION (DRR)

M.A./M.Sc. 2nd Semester

DEPARTMENT OF GEOGRAPHY AND NATURAL RESOURCE MANAGEMENT
SCHOOL OF EARTH AND ENVIRONMENTAL SCIENCE
UTTARAKHAND OPEN UNIVERSITY

(Teenpani Bypass, Behind Transport Nagar Haldwani (Nainital), Uttarakhand)

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CONTENTS

BLOCK 1- FUNDAMENTALS OF DISASTER MANAGEMENT

UNIT 1 - DISASTER MANAGEMENT- CONCEPT & PHILOSOPHY

1.1 OBJECTIVES

After reading this unit, students should be able to understand the following objectives:

- To understand the concept of disaster management.
- Know about the Philosophy of disaster management.

1.2 INTRODUCTION

Disasters strike when we least expect them, often leaving a trail of destruction and despair in their wake. From natural calamities like earthquakes and hurricanes to human-made catastrophes such as industrial accidents and conflicts, the impact of disasters can be devastating. In the face of such adversity, communities and nations around the world rely on the principles of disaster management to mitigate risks, respond effectively, and rebuild resiliently. At its core, disaster management is a comprehensive approach to reducing the harm caused by disasters and promoting sustainable recovery. It encompasses a range of activities, including preparedness, response, recovery, and mitigation, all aimed at minimizing the loss of life, property and livelihoods.

Disaster management begins long before disaster strikes, with proactive measures to identify risks, assess vulnerabilities and develop strategies to address them. This involves understanding the hazards that communities face, whether they are natural, like floods or wildfires, or human-induced, such as industrial accidents or pandemics. By conducting risk assessments and developing contingency plans, authorities can better prepare for emergencies and minimize their impact.

At the heart of disaster management lies a philosophy rooted in compassion, collaboration, and resilience. It recognizes that disasters are complex events that require a multi-dimensional response involving government agencies, non-governmental organizations, community groups and individuals. Moreover, disaster management emphasizes the importance of a proactive approach, focusing not only on responding to emergencies but also on preventing them and building resilience in communities. This involves investing in infrastructure, early warning systems, and capacity-building initiatives to empower communities to withstand and recover from disasters more effectively. Disaster management is more than just a set of protocols and procedures—it is a philosophy that guides our collective response to adversity. By embracing the principles of preparedness, response,

recovery, and mitigation, we can better protect lives, safeguard livelihoods, and build a more resilient future for generations to come.

1.3 CONCEPT & PHILOSOPHY OF DISASTER MANAGEMENT

The concept of disaster management involves reducing the risk and impact of hazards. It used to mean providing fast and effective help to areas affected by disasters. Now, it also includes planning ahead to prevent disasters in areas at risk, whether they are caused by humans or nature. According to the International Federation of Red Cross, disaster management is about organizing and managing resources and responsibilities to handle all parts of emergencies, especially preparation, response, and recovery, to minimize the impact of disasters.

To grasp the concept of disaster management, it is important to grasp the concept of vulnerability, risk, hazard, and disaster, which are all part of disaster management. A brief description of these concepts is presented in the following paragraphs.

Vulnerability

Vulnerability in the context of disaster refers to the susceptibility of a community or an area to the impacts of hazards. It is a multifaceted concept that encompasses a range of factors including physical, social, economic, and environmental elements. Physical vulnerability pertains to the infrastructure and buildings that might be damaged or destroyed by disasters. Social vulnerability considers the demographic aspects, such as age, health, income levels, and education, which can affect a community's ability to prepare for, respond to, and recover from disasters. Economic vulnerability involves the financial stability of individuals and communities, influencing their capacity to mitigate risks and invest in recovery. Environmental vulnerability includes the degradation of ecosystems that can either exacerbate the impact of hazards or reduce the natural protection they provide. Effective disaster management requires understanding these diverse dimensions of vulnerability to implement strategies that enhance resilience, reduce exposure to risks, and ensure equitable recovery for all affected populations. This comprehensive approach helps in identifying the root causes of vulnerability and addressing them through tailored interventions aimed at strengthening the overall adaptive capacity of communities. Vulnerability is the chance of experiencing loss (Cutter, 1996). In the past, it mostly referred to physical risks. Now, the idea includes not just physical risks but also the likelihood of facing danger, exposure, ability to deal with and adapt to problems, social inequalities, and weaknesses in systems.

Disaster Risk

Disaster risk refers to the potential for loss of life, injury, or destruction of property and livelihoods due to hazardous events. It combines three factors: hazard, exposure, and vulnerability. Hazards are natural or man-made events such as earthquakes, floods, hurricanes, or industrial accidents that have the potential to cause harm. Exposure refers to the presence of people, property, and essential systems in areas where hazards might occur. Vulnerability is the susceptibility of these exposed elements to suffer harm. Effective disaster risk management involves understanding and addressing these factors to reduce potential damage. This can include improving infrastructure, enforcing building codes, educating communities, and creating early warning systems. By assessing and mitigating these risks, communities can enhance their resilience and reduce the likelihood of disaster-related losses.

Risk measures the potential losses, such as deaths, injuries, property damage, and economic impact, that might happen if a certain hazard occurs in a specific area within a set time frame. When a community is vulnerable to potential hazards, it faces the risk of being adversely affected by them. Therefore, disaster risk is best understood as a combination of the hazard itself, the exposure of people and property to the hazard, and human vulnerability.

Hazards

Hazards are events or conditions that have the potential to cause harm to people, property, or the environment. Hazards are all around us and can strike without warning, causing damage and disruption. They come in many forms, from natural disasters to technological accidents. Understanding hazards is important because it helps us prepare and reduce the risks they pose. By knowing what hazards we might face, we can take steps to protect ourselves, our homes, and our communities. Hazards can be divided into two parts: Natural Hazards and Man-made Hazards.

Natural hazards are events caused by natural processes of the Earth that can lead to significant damage and loss. These include phenomena like earthquakes, which are sudden ground shaking due to tectonic movements; floods, which result from excessive rainfall or river overflow; hurricanes, which are powerful tropical storms with strong winds and heavy rain; and wildfires, which can start due to lightning strikes or prolonged dry conditions. Natural hazards often occur with little warning and can have devastating effects on communities and the environment.

On the other hand, man-made hazards, also known as anthropogenic hazards, are events caused by human activities that pose risks to health, property, and the environment. Examples of man-made hazards include industrial accidents, such as chemical spills or explosions in factories; pollution,

which can contaminate air, water, and soil; and infrastructure failures, like dam collapses or building fires. These hazards are often a result of negligence, lack of proper maintenance, or insufficient safety measures. While some man-made hazards can be prevented or mitigated through better planning and regulations, they remain a significant threat to human safety and environmental health.

Disasters

A disaster is a sudden, catastrophic event that causes significant disruption and harm to communities, ecosystems, and infrastructures. It can result from natural phenomena such as earthquakes, floods, hurricanes, and wildfires, or be human-made, like industrial accidents, chemical spills, and terrorist attacks. Disasters can lead to loss of life, severe injuries, displacement of populations, and extensive property damage. They often overwhelm local capacities, necessitating external assistance and resources. The impact of a disaster is determined by the vulnerability of the affected area, which includes factors like population density, infrastructure robustness, and preparedness levels. Effective disaster management aims to mitigate these vulnerabilities through preparedness, early warning systems, and robust response and recovery plans, emphasizing resilience and the ability to rebuild and adapt after such events. Understanding the concept of disaster is crucial for developing strategies to reduce their occurrence and impact, ensuring safer, more resilient communities.

Disaster management involves a comprehensive approach that includes actions taken before, during, and after a disaster to minimize its impact and facilitate recovery. Pre-disaster activities focus on preparedness and mitigation. This includes identifying potential hazards, conducting risk assessments, and implementing measures to reduce vulnerabilities, such as strengthening buildings, creating evacuation plans, and educating the public about disaster risks and safety procedures. Effective pre-disaster planning aims to reduce the severity of a disaster's impact and ensure that communities are better equipped to handle emergencies.

During a disaster, the emphasis shifts to response efforts. This phase involves activating emergency plans, providing immediate assistance, and ensuring the safety and well-being of affected populations. Key activities include search and rescue operations, delivering medical care, distributing essential supplies like food and water, and maintaining communication and coordination among emergency services. The goal during this phase is to save lives, reduce suffering, and prevent further damage.

Post-disaster activities focus on recovery and reconstruction. This phase involves assessing the damage, restoring essential services, and rebuilding infrastructure. It also

includes providing support to affected individuals and communities through financial aid, counselling, and other resources to help them recover and rebuild their lives. Long-term recovery efforts may also involve revising and improving disaster management plans based on lessons learned to enhance future resilience. The post-disaster phase is crucial for helping communities return to normalcy and reducing the long-term impact of the disaster.

1.4 SUMMARY

Disaster management is about being ready for bad things that might happen and knowing what to do when they do. It starts by understanding that some things can cause big problems, like floods or fires. These are called hazards. People and places can be more likely to get hurt by these hazards, and that is called vulnerability. Disaster risk is like the chance of something bad happening because of a hazard. So, disaster management is about being prepared before something bad happens, like making plans and building strong buildings. During the bad thing, we have to respond quickly to help people and keep them safe. Afterward, we work on fixing things and helping everyone get back to normal as soon as possible. It is all about making sure we are ready, knowing what to do, and helping each other when things become unfavourable.

1.5 GLOSSARY

Community Engagement: Involving local residents and stakeholders in disaster planning, response, and recovery efforts to ensure their needs and concerns are addressed.

Disaster Risk: The likelihood of a hazard causing harm to people, property, or the environment, taking into account vulnerability and exposure.

Evacuation: The organized movement of people from a dangerous area to a safer location in anticipation of a disaster.

Hazard: Any event or situation that could potentially cause harm, such as earthquakes, floods, or fires.

Mitigation: Efforts to reduce or prevent the impact of hazards by implementing measures like building codes, land use planning, and environmental protection.

Preparedness: Actions taken in advance to be ready for disasters, including planning, training, and resource allocation.

Recovery: The process of rebuilding and restoring affected areas and communities in the aftermath of a disaster, including physical, economic, and social recovery.

Resilience: The ability of individuals, communities, and systems to adapt and recover from disasters, often through social support networks and adaptive strategies.

Response: Immediate actions taken during and after a disaster to save lives, reduce suffering, and protect property.

Risk Assessment: The process of evaluating potential hazards, vulnerabilities, and impacts to determine the level of risk and inform decision-making.

Shelter: Temporary accommodations provided to displaced individuals or families during and after disasters, often operated by government agencies or humanitarian organizations.

Vulnerability: The susceptibility of people, communities, or systems to be harmed by hazards due to various factors like location, infrastructure, or socio-economic conditions.

1.6 ANSWER TO CHECK YOUR PROGRESS

- Regularly assess the effectiveness of disaster management plans and procedures to ensure they meet current needs and address emerging challenges.
- Monitor the implementation of mitigation measures to gauge their impact on reducing vulnerability and disaster risk in communities.
- Evaluate the level of preparedness among individuals, organizations, and government agencies through drills, exercises, and simulations.
- Review past disaster response efforts to identify strengths, weaknesses, and areas for improvement in coordination, communication, and resource allocation.
- Measure the resilience of communities by assessing their ability to recover and adapt following disasters, including socio-economic recovery indicators.
- Analyze risk assessments to identify new hazards, changes in vulnerability, or evolving threats that may require adjustments to disaster management strategies.
- Track the progress of recovery and reconstruction efforts to ensure timely and equitable distribution of resources and support to affected populations.
- Assess the accessibility and effectiveness of emergency services and communication channels, particularly for vulnerable groups such as the elderly or people with disabilities.

- Monitor public awareness and education campaigns to promote disaster preparedness, response, and recovery among community members.
- Evaluate the effectiveness of interagency cooperation and coordination mechanisms in facilitating a unified response to disasters.
- Conduct surveys and interviews to gather feedback from stakeholders and community members on their experiences with disaster management efforts.
- Measure the impact of capacity-building initiatives and training programs on enhancing the skills and knowledge of emergency responders and volunteers.
- Monitor the implementation of land use planning and building codes to ensure they promote resilience and reduce exposure to hazards.
- Assess the integration of technology and innovation into disaster management practices to enhance early warning systems, decision support tools, and information sharing.
- Regularly update and revise disaster management policies and guidelines based on lessons learned and best practices to adapt to evolving threats and challenges.

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1.8 TERMINAL QUESTIONS

Long Questions

1. Discuss the role of community engagement in disaster management, including the importance of local knowledge, participation, and empowerment in building resilience.
2. Explain the concept of disaster risk reduction and the various approaches and techniques used to mitigate hazards and enhance preparedness at individual, community, and institutional levels.

Short Questions

1. What is the primary goal of disaster management?
2. Define the term "hazard" in the context of disaster management.
3. What factors contribute to vulnerability in disaster-prone areas?
4. Describe the difference between natural hazards and man-made hazards.
5. Why is it important to conduct risk assessments before a disaster occurs?
6. How does early warning technology contribute to disaster management?
7. What is the role of government agencies in disaster response and recovery?
8. How can communities support each other during the recovery phase after a disaster?

Multiple Choice Questions

1. What is the primary goal of disaster management?

a) Minimize the occurrence of hazards

b) Prevent all disasters from happening

c) Reduce the impact of disasters and facilitate recovery

d) Ignore disasters until they happen

2. What does vulnerability refer to in the context of disaster management?

a) The likelihood of a hazard occurring

b) The ability of a community to withstand disasters

c) The susceptibility of people or systems to harm from hazards

d) The speed at which disasters occur

3. Which of the following is an example of a natural hazard?

a) Industrial accidents

b) Chemical spills

c) Building collapses

d) Earthquakes

4. What does the term "mitigation" mean in disaster management?

a) Efforts to reduce or prevent the impact of hazards

b) The immediate response to a disaster

c) The process of preparing for a disaster

d) The recovery and rebuilding phase after a disaster

5. What is resilience in the context of disaster management?

a) The ability to predict disasters accurately

b) The ability to adapt and recover from disasters

c) The speed at which emergency responders arrive at the scene

d) The amount of funding allocated for disaster relief

6. What is the purpose of conducting risk assessments in disaster management?

a) To determine the likelihood of specific hazards occurring

b) To identify vulnerabilities and potential impacts of disasters

c) To predict the exact timing of future disasters

d) To allocate resources for disaster response

7. What does the term "evacuation" mean in disaster management?

a) The process of assessing damage after a disaster

b) The immediate response to a hazardous event

c) The organized movement of people from a dangerous area to a safer location

d) The rebuilding of infrastructure after a disaster

8. What is the role of community engagement in disaster management?

a) To increase the severity of disasters

b) To decrease public awareness of disaster risks

c) To involve local residents and stakeholders in planning and response efforts

d) To ignore the needs of vulnerable populations

9. Which phase of disaster management focuses on rebuilding and restoring affected areas?

a) Recovery

b) Response

c) Preparedness

d) Mitigation

10. What is the primary objective of conducting drills and exercises in disaster management?

a) To assess the impact of hazards on communities

b) To allocate resources for disaster relief

c) To evaluate the effectiveness of emergency response plans

d) To ignore the importance of preparedness

11. What is the purpose of monitoring public awareness and education campaigns in disaster management?

a) To decrease public knowledge about disaster risks

b) To assess the effectiveness of preparedness efforts

c) To discourage community involvement in disaster planning

d) To increase vulnerability to disasters

12. What is the purpose of regularly updating disaster management policies and guidelines?

a) To ensure that disaster management plans are outdated

b) To limit community involvement in disaster planning

c) To adapt to evolving threats and challenges

d) To discourage innovation and adaptation

Answers

QN.	Answer	QN.	Answer
1	C	7	C
2	C	8	C
3	D	9	A
4	A	10	C
5	B	11	B
6	B	12	C

UNIT 2 - SIGNIFICANCE OF DISASTER AND DISASTER THREAT

2.1 OBJECTIVES

After reading this unit, you will be able to:

- Understand the significance of Disaster management.
- Learn about the disaster threat.
- Gain knowledge about disaster threat management.

2.2 INTRODUCTION

Disaster can be defined as a serious disruption in the functioning of the community or a society, causing widespread material, economic, social, or environmental losses that exceed the ability of the affected society to cope with using its resources. A disaster is a result of the combination of hazard, vulnerability, and insufficient capacity or measures to reduce the potential changes of risk. A disaster occurs when a hazard such as an earthquake, flood, or wind storm coincides with a vulnerable situation, which may include communities, cities, or villages. A disaster happens when a hazard is imposed on a vulnerable population and causes damage, casualties and disruption. Without vulnerability or hazard, there is no disaster. A disaster occurs when hazards and vulnerability meet. Hazard, thus may be termed as a dangerous condition or event that threatens or has the potential for causing injury to life or damage to property or the environment.

The importance of disaster in today's world is sometimes doubted. Why should we be so concerned? After all, disasters have been a part of human history for a long time. Generations have faced disasters, suffered the consequences, recovered, and life has gone on. While this is true, we need to consider certain factors related to the modern challenges of disaster management.

There has not been very much reduction in what might be called the traditional disaster threat. Most of the old problems remain, as threatening as ever. Natural phenomena such as earthquakes, cyclones, volcanic eruptions, tsunamis, wildfires, floods, landslides, and drought persist. So do their basic man-made counterparts such as major accidents. These disasters continue to cause grievous human casualties, economic and social loss, and damage to the

environment. It is certainly true that we have learned to cope with these problems to some extent. But we have neither eliminated nor contained them. So while we may have modified their effects in various ways, they continue to inflict unacceptable pressure on a world population that, in terms of total subsistence, is already finding it difficult to make ends meet.

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Disasters

Disaster risk can be determined by the presence of three variables: hazards (natural or anthropogenic); vulnerability to a hazard; and coping capacity linked to the reduction, mitigation and resilience to the vulnerability of a community associated with the hazard in question. For example, let's assume we are dealing with a poor African community (i.e. an informal settlement situated in the 1/50 year floodline). Certain socio-economic and political dynamics in the country force poor communities to settle in unsafe conditions (e.g. distance from employment opportunities, urbanization, poor land use planning etc.). Along comes a natural hazard such as a significant flood, and the community settled in the flood line is exposed to the point of experiencing a disaster. However, this should not be seen as a natural disaster. Although a natural hazard was the trigger for the disaster, it was human-made. If proper settlement planning, land use planning, building codes, community awareness, economic policies, and the like had been in place, then this "natural disaster" would have been mitigated. Almost all exposure to natural hazards and vulnerability can be reduced. Thus, human actions lead to natural hazards becoming natural disasters. One should be mindful that we as humans do not have absolute capacity and have sustained and will sustain significant losses due to natural hazards in the

future. We need to realize that we can make the right decisions, implement the right measures, and engage in intelligent development planning to reduce the risk of disasters. Reducing the risk of disasters requires a broad, multi-sectoral and multidisciplinary focus. This means that professionals from various fields, including structural engineers, politicians, social workers, agricultural extension workers, and even kindergarten teachers, all have equally important roles in ensuring that natural hazards do not turn into disasters.

2.3 SIGNIFICANCE OF DISASTER MANAGEMENT

To avert a disaster: Disaster management teams can help to avert a disaster before it occurs. The Disaster management team may examine the possible causes of Disaster and may take appropriate measures to avert a disaster. For instance, forest Fires, or even terrorist bombings can be averted through effective planning and pre-emptive action.

To Undertake rescue operations: Disaster management personnel can Undertake rescue operations effectively. Trained disaster management personnel can Rescue people effectively in time of floods, major fires, building collapses, and so on.

Fig. 2.1 Undertake Rescue Operations (Source: Google Image).

To provide relief measures: The disaster management team is responsible for providing relief measures to the victims. For instance, the team can arrange food, Clothing, relief camps, medicines and so on. Such measures would reduce the Misery of the disaster victims.

To undertake rehabilitation programs– The disaster management team can work effectively to undertake rehabilitation programs in the affected areas. In earthquake-affected areas, rehabilitation programs involve building homes and using schools as disaster shelters.

To undertake liaison work: The disaster management team undertakes liaison Work relating to the disaster. The liaison work is required with various agencies Private and government (including hospitals) to obtain funds donations, And other resources or services to manage and overcome the disaster.

To reduce trauma and tension: The Disaster management team can help to reduce the trauma and tension before and after the disaster. For instance, before a Disaster, the team can properly guide the people to face or handle the disaster such as Floods. Also, after the disaster, the team can provide not only material or financial Support but also psychological support to overcome the traumatic effect of the disaster

To protect the Environment: The disaster management team can help to protect and preserve the environment. For example, a disaster management team can plan Pre-emptive action to avert forest fires. Etc.

To minimize losses: -Disaster management teams can help to minimize loss of Life and property. This is because; the Disaster management team can take pre-emptive actions to avert a Disaster.

Fig. 2.2: Protect the Environment (Source: Google Image).

2.3 THE DISASTER THREAT

There can be variations in the process by which disaster management authorities and associated scientific and technical agencies define the threat from any particular form of disaster. Also, the capability to define disaster threats accurately is likely to vary between different countries. This depends on the standards of disaster management and other disaster-related activities, including study and research.

Identifying Hazards

A hazard can be generally described as a threatening event. It may take the form of a natural phenomenon, such as a possible cyclone, or it may be artificial, such as the accidental release of a hazardous substance from an industrial complex. The process of identifying hazards involves carefully surveying the country or region concerned. This survey may require inputs from a variety of specialist agencies and authorities, including information on past disaster-related events. Usually, this identification process includes hazard mapping, which establishes geographically where natural and artificial hazards may occur. The relationship of these hazards

to human settlements and institutions then provides a valuable indication of the risks that may be involved.

Assessing Vulnerability

For the foregoing identification of hazards, it becomes possible to identify—with reasonable accuracy—those settlements, communities, and assets that are especially vulnerable to disaster-caused damage or destruction

Evaluating Risk

Risk has two dimensions, frequency and magnitude/intensity. Evaluating risk is done by relating a natural or artificial hazard to the primary characteristics (e.g., population distribution and development aspects) and vulnerability of the area concerned. This process particularly identifies high-risk areas and is the basis for producing risk maps. For example, risk mapping of a bushfire-prone area would indicate the likelihood of fires occurring and the degree to which those fires would affect communities within the area. Similarly, for a flood-prone area, risk mapping would show the likely levels of inundation for various flood intensities.

Use of Disaster Threat Information

The hazard, vulnerability, and risk information in paragraphs 19–23 above is, of course, only an outline of what is a detailed and extensive procedure. However, it serves to illustrate the value of disaster threat information, as applied to practical disaster management. For instance, it is suggested that the information in this chapter should be used and, indeed, is essential for the following:

- The formulation of disaster plans, especially the measures within such plans that deal with preparedness, response, and recovery
- The formulation of relevant programs for disaster-related training and public awareness;
- The definition and application of measures that can reduce vulnerability in specific cases/areas; and
- Formulation and use of long-term programs of mitigation and prevention.

Disaster threat management

Disaster threat management involves a comprehensive approach to identifying, mitigating, preparing for, responding to, and recovering from various types of disasters. It encompasses a range of activities and strategies aimed at reducing the impact of disasters on communities, infrastructure, and the environment. Here's an overview of the key components of disaster threat management:

Risk Assessment and Planning: This process involves evaluating the possible risks and vulnerabilities experienced by a community or region. Risk assessment includes identifying hazards such as natural disasters (earthquakes, floods, hurricanes, etc.), technological disasters (industrial accidents, chemical spills, etc.), and human-made disasters (terrorism, conflict, etc.). Based on this assessment, disaster management plans are developed to outline strategies for prevention, preparedness, response, and recovery.

Prevention and Mitigation: Prevention and mitigation measures aim to reduce the likelihood and severity of disasters. This includes implementing building codes and land-use regulations to minimize vulnerability to natural hazards, such as earthquakes and floods. Mitigation efforts also involve infrastructure improvements, such as constructing flood barriers, strengthening buildings, and establishing early warning systems.

Preparedness: Preparedness activities focus on enhancing the capacity of individuals, communities, and organizations to effectively respond to disasters. This includes developing emergency response plans, conducting training and drills, stockpiling essential supplies, and establishing communication systems for disseminating warnings and coordinating response efforts.

Response: When a disaster occurs, response efforts aim to save lives, protect property, and meet the immediate needs of affected populations. This involves deploying emergency services, conducting search and rescue operations, providing medical care, and shelter, and distributing food and water to survivors.

Recovery and Rehabilitation: Recovery efforts focus on restoring affected communities to a state of normalcy and rebuilding infrastructure, livelihoods, and social systems. This includes

providing assistance to individuals and businesses to recover from losses, restoring essential services, and implementing long-term reconstruction plans.

2.4 SUMMARY

The significance of disaster management cannot be overstated in today's world, where communities face an increasing array of natural and human-induced hazards. Disaster management encompasses a range of activities aimed at mitigating, preparing for, responding to, and recovering from disasters. These disasters can take many forms, including earthquakes, floods, hurricanes, pandemics, terrorist attacks, and technological accidents. The importance of effective disaster management lies in its ability to save lives, protect property, and preserve the environment.

One of the key aspects of disaster management is preparedness. This involves activities such as risk assessment, planning, training, and public education. By understanding the potential hazards that threaten a community and developing strategies to address them, disaster managers can reduce vulnerability and enhance resilience. For example, earthquake-prone regions can implement building codes and retrofitting measures to make structures more resistant to seismic activity, while coastal areas can establish early warning systems and evacuation routes to mitigate the impacts of tsunamis and hurricanes.

Moreover, effective disaster management requires a coordinated response involving multiple stakeholders, including government agencies, non-governmental organizations, businesses, and community groups. Collaboration and communication among these entities are essential for mobilizing resources, sharing information, and delivering assistance to those in need. By fostering partnerships and fostering a culture of preparedness, communities can better withstand and recover from disasters. In conclusion, the significance of disaster management lies in its ability to protect lives, safeguard property, and promote resilience in the face of adversity. By investing in preparedness, response, and recovery efforts, societies can reduce the human and economic toll of disasters and build a safer, more sustainable future.

2.5 GLOSSARY

- **Disaster Management:** The organization and coordination of efforts aimed at mitigating, preparing for, responding to, and recovering from disasters.
- **Preparedness:** Activities and measures undertaken in advance to enhance readiness for potential disasters, including planning, training, and public education.
- **Resilience:** The ability of individuals, communities, and systems to withstand and recover from the impacts of disasters.
- **Hazard:** Any natural or human-induced event that poses a threat to human life, property, or the environment.
- **Vulnerability:** The susceptibility of individuals, communities, or systems to the impacts of disasters, influenced by factors such as socio-economic status, geography, and infrastructure.
- **Mitigation:** Actions taken to reduce or eliminate the long-term risk and impact of disasters, including land-use planning, building codes, and ecosystem restoration.
- **Response:** The immediate actions taken to address the needs of affected populations during and after a disaster, including search and rescue, medical assistance, and shelter provision.
- **Recovery:** The process of rebuilding and restoring affected communities and infrastructure in the aftermath of a disaster, including economic recovery, social support, and infrastructure repair.
- **Risk Assessment:** The systematic evaluation of potential hazards, vulnerabilities, and risks to inform decision-making and resource allocation in disaster management.
- **Community Engagement:** The involvement of residents, organizations, and leaders in disaster preparedness, response, and recovery efforts to ensure inclusivity and effectiveness.

2.6 ANSWER TO CHECK YOUR PROGRESS

- Regularly reviewing emergency response plans helps ensure we are prepared for the significance of potential disaster threats.

- Conducting annual drills allows us to assess our readiness and make necessary improvements to handle disasters effectively.
- Updating risk assessments frequently ensures we are aware of new or increasing disaster threats.
- Monitoring weather patterns and geological activity helps us predict and prepare for significant natural disasters.
- Evaluating the effectiveness of mitigation measures lets us determine if they sufficiently reduce disaster threats.
- Community feedback is crucial in checking progress on disaster preparedness and addressing any concerns or gaps.
- Investing in advanced technology for early warning systems can significantly enhance our response to imminent disaster threats.
- Regular training sessions for emergency personnel ensure they are well-equipped to manage disaster situations.
- Tracking the speed and efficiency of evacuation procedures helps us understand their effectiveness during disaster threats.
- Assessing the resilience of critical infrastructure allows us to gauge our ability to withstand and recover from disasters.
- Reviewing past disaster responses provides insights into what worked well and what needs improvement.
- Partnering with local organizations and agencies ensures a coordinated approach to managing disaster threats.

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2.8 TERMINAL QUESTIONS

Long Answer Questions

1. How does collaboration among stakeholders enhance disaster management efforts?
2. How does effective disaster management contribute to sustainable development?

Short Answer Questions

1. What are the primary phases of disaster management?
2. Name two examples of natural disasters.
3. Define vulnerability in the context of disaster management.
4. What is the purpose of risk assessment in disaster management?
5. List three elements of disaster preparedness.
6. What is the goal of mitigation efforts in disaster management?
7. Describe the role of community engagement in disaster management.
8. Explain the concept of resilience in the context of disaster management.

9. What are the key components of disaster response?
10. Define hazard as it relates to disaster management.

Multiple Choice Questions

1. What does disaster management encompass?

a) Only response efforts during disasters

b) Only recovery efforts after disasters

c) Mitigation, preparedness, response, and recovery efforts

d) None of the above

2. What is the primary goal of disaster management?

a) Eliminate all hazards

b) Minimize the impact of disasters

c) Predict the exact timing of disasters

d) None of the above

3. Which of the following is a key aspect of disaster preparedness?

a) Risk assessment

b) Recovery efforts

c) Building new infrastructure

d) Ignoring warning signs

4. What is resilience in the context of disaster management?

a) The ability to predict disasters accurately

b) The ability to withstand and recover from disaster impacts

c) The ability to prevent disasters entirely

d) None of the above

5. What are hazards in the context of disaster management?

a) Events that pose a threat to human life, property, or the environment

b) Predictable outcomes of disasters

c) Unavoidable consequences of human actions

d) None of the above

6. What is a vulnerability in the context of disaster management?

a) The likelihood of a disaster occurring

b) The susceptibility of individuals, communities, or systems to the impacts of disasters

c) The speed at which a disaster strikes

d) None of the above

7. What do mitigation efforts aim to achieve?

a) Responding quickly to disasters

b) Reducing or eliminating the long-term risk and impact of disasters

c) Ignoring the existence of hazards

d) None of the above

8. What is the primary focus of response efforts in disaster management?

a) Rebuilding infrastructure

b) Providing immediate assistance to affected populations

c) Conducting risk assessments

d) None of the above

9. What does recovery involve in disaster management?

a) Rebuilding and restoring affected communities and infrastructure

b) Preparing for future disasters

c) Identifying potential hazards

d) None of the above

10. Why is community engagement important in disaster management?

a) It helps to increase bureaucracy

b) It fosters inclusivity and effectiveness in preparedness, response, and recovery efforts

c) It delays response efforts

d) None of the above

Answers:

1-c, 2-b, 3-a, 4-b, 5-a, 6-b, 7-b, 8-b, 9-a, 10-b.

UNIT 3 - DISASTER MANAGEMENT CYCLE

3.1 OBJECTIVES

After reading this unit you should be able to:

- Explain the Disaster Management Cycle
- Understand the combination of main functions under the cycle
- Use of chakra in actual disaster management

3.2 INTRODUCTION

The disaster management cycle can and often is presented in different forms. Additionally, alternative terminology is also used for different stages of the cycle. The most important element of the disaster management cycle is that its form should represent disaster and its management as a continuous cycle of interrelated events/actions. These works should not start and end independently with the occurrence of disaster.

3.3 DISASTER MANAGEMENT CYCLE

Basic form

The disaster management cycle encompasses various stages: mitigation, preparedness, response, recovery, and development. It begins with mitigation, involving measures to reduce disaster risks, followed by preparedness, where plans and training are established to handle potential emergencies. When a disaster occurs, the response phase focuses on immediate actions to ensure safety and provide essential services. Recovery follows, aiming to restore normalcy through rebuilding and rehabilitation efforts. Lastly, the development phase seeks to improve infrastructure and resilience, integrating lessons learned to better mitigate future risks. This cyclical process ensures a comprehensive approach to managing disasters and enhancing community resilience. The basic form of the disaster management cycle is used in Figure 1.

Alternative format

An alternative form, which is sometimes used, presents the main parts as verb clauses as shown in Figure 2. It should be noted here that if the outer sections of preparation, defence and retrieval are superimposed on Figure 2, then they are related to the same sections of Figure 1.The form given in Figure 2 can be used to clarify two main arguments. First, this form is only a blueprint and it cannot and does not in any way show the relative importance of the various components or their time. For example, the actual recovery period may be different for different

disasters or disaster prevention may be given less importance, priority, and resources than pre-preparation or others according to specific circumstances.

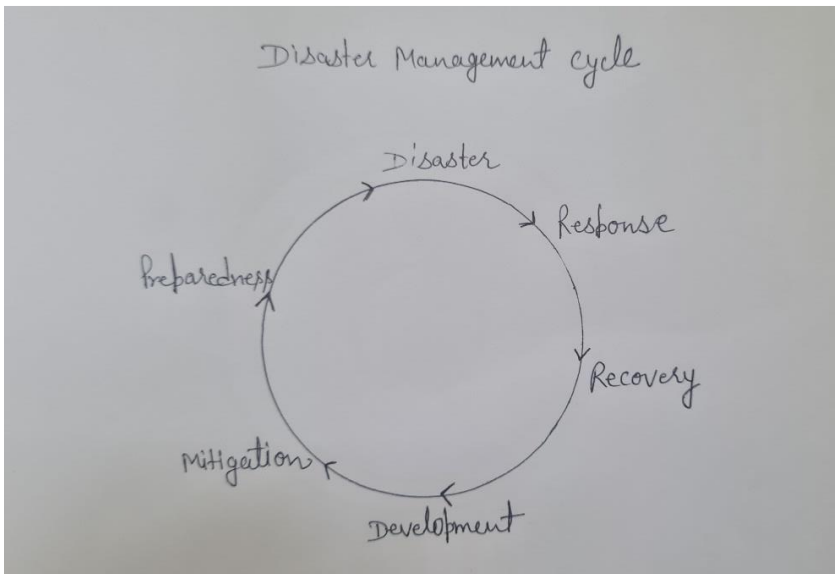

Figure 1. Disaster management Cycle *(Source: Handbook of Disaster Management, Disaster Mitigation and Management Center, Dehradun (Prepared by author)*

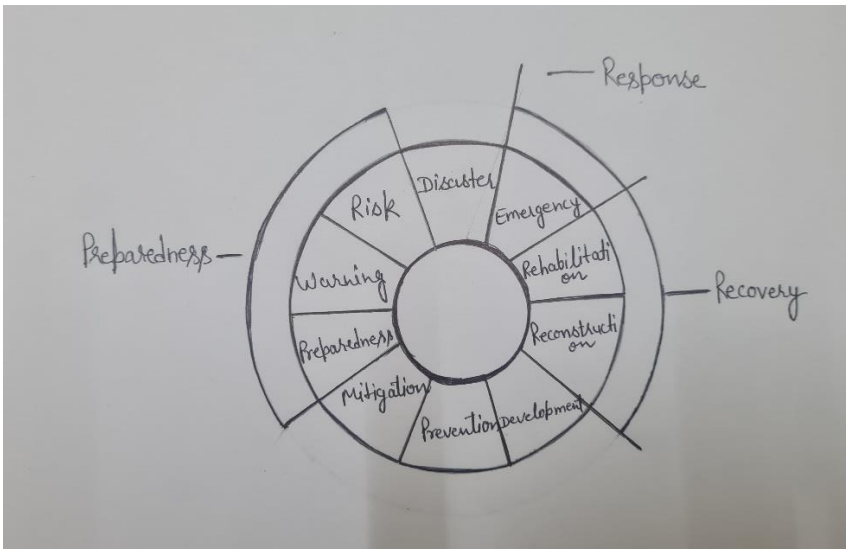

Figure 2. Alternative Disaster Management Cycle *(Source: Handbook of Disaster Management, Disaster Mitigation and Management Center, Dehradun (Prepared by author).*

Secondly, this type of format should not be allowed to create the impression that each work section is clearly and different from its adjacent one. On the contrary, it is important to understand that generally these sections merge with each other or overlap each other. For example, some work related to countermeasures may have to be done in the pre-preparation

period, before the disaster. These actions may include relocating people and communities at risk to safe places before the cyclone hits as a precautionary measure. Similarly, work related to recovery often starts during the emergency response itself: for example, immediately after the disaster, the technical advisory team starts collecting information and this information is useful for both response and recovery. This point is important from the perspective of implementing the works related to disaster management.

In this context, it is important to keep in mind that the responsibility for initiating tasks in some or all these parts depends on two main factors, both of which can affect the balance between the priority of individual tasks:

Post-disaster review

It should be ensured that post-disaster review is conducted as soon as possible during the recovery period after the disaster occurs. This review will highlight shortcomings in the plans as well as indicate whether certain actions, such as pre-preparedness measures or counterinsurgency arrangements, need to be strengthened.

Results of exercises

If the exercises are properly evaluated and appropriate lessons are learned from them, they can also prove to be as useful as post-disaster review. Exercises may prove more effective in some circumstances because they can be used to test a specific part of the disaster management cycle (such as coordination and resource utilization): and the lessons learned can often be repeated post-disaster. can be better defined through a review (due to the pressure created by the disaster, there is often a possibility of important information being missed at that time). Another point for effective day-to-day disaster management (such as under the National Disaster Management Committee or National Disaster Management Office) is that necessary action should be taken only after observing all the relevant aspects of the action.

Prevention

The purpose of the various works done under this is to create obstacles in the occurrence of a catastrophic event or to eliminate the possibility of this event having adverse effects on society or major establishments. The following can generally be defined as preventive measures:

- Construction of dams or embankments to control flood waters so that people, structures and other establishments, livestock, subsistence and production systems and others are not adversely affected.
- Controlled burning in fire-sensitive areas before the high-risk season. This action can eliminate the possibility of a fire occurring by eliminating potential fuel or may prevent a fire from reaching a dangerous state if it does occur.
- Some ordinances/regulations can also be seen as preventive; Such as land use regulation to ensure that settlement does not occur in areas vulnerable to disasters, for example in low-lying areas along river banks that are vulnerable to floods.
- It would be important to note here that some countries use the terminology prevention/mitigation to define actions that fall under both.

Reduction

The works under this part are often implemented in the form of specific programs (whose objective is to reduce the impact of disasters on the society or nation). For example, some countries define the development and implementation of building construction rules (which reduce damage in case of earthquake or cyclone) under the category of mitigation. Other nations may consider this type of building regulations preventive; The current technological development in the field of earthquake safe building construction has certainly justified this ideology.

According to general terminology, mitigation means that it may be possible to prevent some effects of disasters, but other effects will exist but it is possible to reduce them through appropriate efforts. The above points indicate that in some circumstances, it may be more appropriate for some countries to have mitigation and prevention under a unified definition of mitigation/prevention rather than defining them as two separate concepts and actions. The following programs and activities can generally be included under mitigation:

- Compliance with building regulations
- land use rules
- Ordinances to control multi-storey buildings, dangerous objects, safety rules to control water, land, and air traffic.
- Agricultural programs designed to reduce the impact of disasters on crops

- Arrangements for security of main and critical installations, such as power generation plants and communication systems.
- Development of infrastructure such as establishing new highways away from disaster-prone areas

Pre-Preparation

Pre-preparedness generally includes all those measures which enable the government, institutions, societies, and individuals to respond quickly and effectively in the event of a disaster. Some examples of preparedness measures are as follows:

- Development and maintenance of updated and upgraded disaster management plans to ensure implementation as per requirement.
- Special arrangements for emergency actions; such as population evacuation and transfers
- Administration of warning system
- Public education and awareness
- Training programme: including assessment and practice

Personal and/or family pre-preparation is one such dimension which does not get the required priority under pre-preparation. In circumstances of limited government resources and emergency services, this type of personal and family preparation can prove important for survival. Many times, preparedness in the disaster management cycle is divided into the following ways:

- **Warning:** The period between the occurrence of a disaster in a specific area and the identification of its danger (e.g. a cyclone has formed but is still away from the coast).
- **Threat:** The time when a disaster has been identified and is estimated to affect a specific area (e.g. a cyclone is headed towards the area).
- **Precaution:** Actions taken after receiving a warning to limit the effects. This type of work may include the following:

- closure of schools, offices
- Ensuring emergency power supply arrangement
- Cutting crops to protect them from rain and strong winds
- ensure transportation
- Household precautions like storage of drinking water

Dividing pre-preparation into sub-parts in this way helps in determining the sequence of actions to be taken before a disaster occurs.

Disaster response

This section is self-defining, and marks the point in the disaster management cycle when the disaster occurs; Such as when a cyclone affects a particular country or region. However, its inclusion serves as a reminder of the fact that the impact may be different for different disasters; Such as:

- An earthquake may not give any kind of warning and even though the duration of the earthquake may be very short, it may cause severe devastation.
- Warning of a cyclone can be received much in advance and its impact period (the period during which it can cause destruction and damage) can also be quite long. This can happen especially in circumstances when the cyclone passes directly over a particular area or starts moving back, as can sometimes happen.

Counterargument

The response generally includes all those measures which are taken just before or after the disaster is resolved. However, for simplicity of illustration, the response part has been shown immediately after the disaster and most of the response measures are implemented during this period.

The main objective of these measures is to save human life, prevent damage to property and deal with immediate disruption, damage and other effects arising from the disaster. Some ideal solutions are as follows:

- implement plans
- stimulating disaster response
- search and rescue
- Arrangements of emergency food, shelter, medical and other
- survey and evaluation
- withdrawal and transfer system

To make it clear that this arrangement is for a very short period (like two or three weeks after the disaster), it is sometimes also called emergency response. This is the period when

emergency arrangements are required to cope with the immediate effects of the disaster and this period can also be formally declared by the government as a state of emergency or disaster.

Here it is important to consider the aspect that after the disaster occurs, all the tasks related to the disaster are sometimes defined under response (including relief, rehabilitation, recovery, and reconstruction measures). However, from the point of view of utility, it is more convenient and more justified from the experimental point of view to define counteraction separately from retrieval.

Retrieval

Recovery is the process by which the country and society are helped to achieve normal levels of functioning after a disaster. The recovery process can be extremely long term and may take 5 to 10 years or more. The tasks covered under recovery can be divided into the following three parts:

- Reestablishment
- Rehabilitation
- Reconstruction

Ideal tasks could be as follows:

- Restoration of essential services
- Restoration of buildings and other structures beyond repair
- alternative accommodation arrangements
- For physical and psychological rehabilitation of people affected by disasters.
- Long-term planning for reconstruction, including replacement of buildings and infrastructure damaged by disasters.

The post-disaster review should include evaluation within the recovery process and ensure that it is done as soon as possible after the disaster.

Development

The development part of the disaster management cycle connects disaster-related activities with national development. The main objective of including it in the disaster management cycle is to ensure that the consequences of the disaster are reflected in the future policies for the development of the nation; Such as achieving the best possible results by:

- Implementation of advanced and modern building construction systems and programs
- Best and effective use of international disaster assistance
- Incorporation of disaster experiences into future research and development programs and implementation of other appropriate measures as per the circumstances.

At the same time, during this period, it should also be ensured that national development does not give rise to any kind of disaster in the future or increase the present difficulties.

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- Incorporation of disaster experiences into future research and development programs
- Implementation of other appropriate measures as per the circumstances

At the same time, during this period, it should also be ensured that national development does not give rise to any kind of disaster in the future or increase the present difficulties.

Use in practical disaster management

Different countries are suggested to select the most appropriate disaster management cycle as per their needs. Apart from providing a special perspective to the people doing research in the field of disaster and the officials associated with disaster management, the disaster management cycle can have many practical uses, such as the following:

Training program

These programs generally focus on various aspects of pre-preparation, response, and recovery. While the use of a disaster management cycle makes it easier to understand the interrelationships of these three important parts, it also makes it easier to understand the relationship of these components with other activities related to disaster management. The disaster management cycle may also have other relevance in the context of training; As in exercises, cycles can be used to specify the time and conditions to which the exercise refers.

Public Awareness and Education Program

Cycles can be used in these programs in the same way as in training programs. This will be particularly useful for:

- Disaster education in schools; And
- In pointing out specific situations through public awareness before the most sensitive season (through audio-visual means); Such as cyclone or flood season.

Daily disaster management activities

The Chakra can be used as an important date sheet and reference to report the progress of various disaster management works at different levels of the government; Such as the development of plans, progress in implementation of pre-preparedness measures, review of the National Disaster Committee and others.

Ensuring government incentives for disaster management

The Disaster Management Cycle can be used as an important tool to effectively showcase various facts and requirements during the meetings of the Cabinet or the concerned important Ministers or Council of Ministers bearing the responsibility of disaster management; Especially to remove the shortcomings in the system.

3.4SUMMARY

The Disaster refers to the real-time event of a hazard occurring and affecting the 'elements at risk.' The duration of the disaster will depend on the type of threat. Weaker sections of society, viz. women, children, aged and handicapped, mentally infirm, etc., suffer a lot more than their stronger counterparts. Disaster Response must tackle all aforesaid challenges. Disaster response entails restoring physical facilities, rehabilitation of affected populations, restoration of lost livelihoods and reconstruction efforts to restore the infrastructure lost or damaged. The recovery phase involves the implementation of actions to promote sustainable redevelopment (reconstruction, rehabilitation) following a disaster. It covers long-term measures like, rebuilding of houses, assets, infrastructure, school buildings, hospital buildings, and other public buildings. Rehabilitation implies activities that are undertaken to support the victims' return to of temporary housing and public utilities as interim measures to assist longer-term recovery through permanent housing and infrastructure.Reconstruction attempts to return

communities to improved pre-disaster functioning. It includes the replacement of buildings, infrastructure, and lifeline facilities such as roads, bridges, and communication links so that long term development prospects are enhanced rather than reproducing the same conditions which made an area or a population vulnerable in the first place. Development The inclusion of development as a phase in the disaster cycle is intended to ensure the natural disaster, societies factor hazard and vulnerability considerations into their development policies and plans in the interest of overall progress. The rationale behind the use of the expression 'disaster management cycle' is that disaster and its management is a continuum of interlinked activities.

3.5 GLOSSARY

- Disaster- an event that causes a lot of harm or damage.
- Disaster Management- a process of effectively preparing for and responding to disasters.
- Recovery- return to a normal state after a difficult period.
- Response- the action taken directly before, during or in the immediate aftermath of disaster.
- Reconstruction- involves partial or complete relocation and rebuilding the essential physical infrastructure and shelter so that vulnerability levels are reduced and families can get back to their feet.

3.6 ANSWER TO CHECK YOUR PROGRESS

1. Prevention is aimed at trying to prevent future disasters from occurring, such as building dykes or a dam to control flooding.
2. Mitigation is aimed at trying to mitigate the impact of a disaster if prevention is not possible, such as building schools to be more earthquake-resistant.
3. Preparedness is aimed at trying to prepare communities for a disaster, such as emergency drills or pre-stocking relief items in logistic hubs.
4. Disaster is an event that causes significant damage to people, property, and infrastructure.
5. Response aimed at understanding needs and responding to them, including rapid assessments, provision of food and non-food items, provision of water, sanitation and hygiene services, and health and shelter interventions. In the immediate hours and

days after a disaster, when search-and-rescue activities are critical, it is most often local actors who are first to respond. Information is often patchy and confused, there can be significant damage to infrastructure, and large movements of people.

6. Recovery is aimed at trying to return communities to normal life, such as livelihood development or formal education. Recovery activities can start when the disaster has stabilized, and the affected population has access to food and water and some form of transitional shelter. This stage is sometimes divided into two: early recovery and medium-term recovery.
7. Reconstruction aimed at rebuilding infrastructure and housing. This can often take years and many activities may also blend back into mitigation, such as retrofitting schools to make them more earthquake-resistant.

3.7 REFERENCES

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3.8 TERMINAL QUESTIONS

Long Questions

1. How does the integration of community-based approaches in the preparedness and mitigation phases of the disaster management cycle enhance resilience and effectiveness in disaster-prone areas?
2. In the context of the disaster management cycle, how can technological advancements be leveraged to improve each phase, from mitigation to development?

Short Questions

1. What is the disaster management cycle answer?
2. What do you understand by reconstruction?
3. Explain recovery process in disaster management.
4. Write mitigation in detail.
5. Why do we need preparedness in disaster?

6. Explain the development process.

Multiple Choice Questions

1. Which phase of the disaster management cycle focuses on reducing the risk of disasters before they occur?

a) Preparedness
b) Response
c) Mitigation
d) Recovery

2. During which phase are emergency plans and training activities established?

a) Mitigation
b) Recovery
c) Preparedness
d) Development

3. What is the primary goal of the response phase in disaster management?

a) To develop new infrastructure
b) To provide immediate safety and essential services
c) To assess long-term recovery needs
d) To reduce disaster risks

4. Which phase involves rebuilding and rehabilitation efforts after a disaster?

a) Preparedness
b) Response
c) Recovery
d) Mitigation

5. How does the development phase contribute to the disaster management cycle?

a) By immediately addressing safety concerns
b) By improving infrastructure and resilience
c) By training emergency responders
d) By providing temporary shelters

Answers:

1-c, 2-c, 3-b, 4-c, 5-b

BLOCK 2 - LONG TERM MEASURES

UNIT 4 – PREVENTION AND MITIGATION

4.2 OBJECTIVES

The objectives of this unit are to outline the following major considerations which apply to disaster prevention and mitigation:

- The need to consider disaster prevention and mitigation;
- Problem areas in disaster prevention and mitigation;
- Positive approaches toward prevention;
- Resources required for disaster prevention and mitigation; and
- National and international framework for prevention and mitigation of disasters.

4.1 INTRODUCTION

Disasters are events that can cause a lot of harm, like natural disasters such as earthquakes, floods, hurricanes, and also human-made ones like fires or industrial accidents. In this unit, we learn how we can prevent and mitigate the damage caused by these disasters. Learning about disaster prevention and mitigation is crucial because it helps keep us safe. If we know how to prepare for disasters and what to do during one, we can protect ourselves, our families, and our communities. It's all about being ready and knowing what to do before and after an emergency strikes.

As discussed in earlier paragraph disasters are events that can cause a lot of harm and disruption to people's lives. They can come in many forms, such as natural disasters like earthquakes, floods, hurricanes, and wildfires, or human-made ones like industrial accidents or nuclear incidents. These disasters can be devastating, causing injuries, damage to property, and sometimes even loss of life. However, there's something we can do to reduce the impact of these disasters on our lives and our communities. That's where disaster prevention comes in. Disaster prevention is all about taking steps to stop disasters from happening in the first place or minimizing their effects when they do occur. It's like taking precautions to avoid getting sick, such as washing your hands to prevent illness. In the same way, disaster prevention involves planning, preparing, and taking actions to keep ourselves and our communities safe. Throughout this study of disaster prevention, you'll learn about different types of disasters, what causes them, and most importantly, how we can work together to prevent them or reduce their impact. By

understanding and practicing disaster prevention, you'll not only protect yourself but also play a crucial role in safeguarding your community and making it more resilient in the face of adversity.

Imagine that a disaster, like a flood or an earthquake, is like a big, powerful wave coming towards us. Disaster mitigation is like building a strong wall to block or weaken that wave, so it does not cause as much damage when it hits. In simpler terms, disaster mitigation is all about taking steps in advance to reduce the impact of disasters. It's like preparing for a storm by securing your home, so it doesn't get damaged too badly, or planting trees to help prevent soil erosion in case of a flood. Throughout this study, you will explore various strategies and techniques used in disaster mitigation. You'll learn how communities can become more resilient and better prepared to face these challenges.

So, get ready to dive into the world of disaster prevention and mitigation, where you will learn different ways to protect lives, property, and the environment when disasters strike.

4.3 PREVENTION AND MITIGATION

4.3.1 Disaster Prevention

Disaster prevention means doing things to stop bad things from happening or making them less harmful. It's like trying to avoid accidents or problems before they happen. This can include planning, making safe choices, and being ready to deal with emergencies so that we stay safe and protect our homes and communities from harm.

Disasters, both natural and human-made, can strike at any moment, often leaving a trail of destruction and heartache in their wake. They can take many forms, from earthquakes and floods to wildfires and industrial accidents, and their impact can be devastating. However, there is hope. By focusing on disaster prevention, we can significantly reduce the risks and protect our lives and communities from the worst consequences. Thus, disaster prevention is all about taking proactive steps to reduce the likelihood of disasters happening and minimizing their impact when they do occur. Instead of simply reacting to emergencies, we work to stop them from happening in the first place. This approach not only saves lives but also preserves resources, infrastructure, and the environment.

Imagine living in a place where there are no plans or actions to prevent disasters. When a big storm or earthquake hits, it can lead to lots of damage and even loss of lives. But if we take steps to prevent disasters, we can make our communities more resilient. This means that when something bad happens, we can bounce back more quickly and with less damage. Disaster prevention is like wearing a seatbelt in a car. We wear seatbelts to keep us safe in case of an accident. Likewise, we work on disaster prevention to keep our communities safe when a disaster strikes.

4.3.1.1 Resources Needed for Disaster Prevention

Disaster prevention is important to keep our communities safe. But to make it work, we need resources. Resources are like tools and things we use to help us get the job done. Here are some important resources needed for disaster prevention:

- **People:** People are one of the most important resources. We all have a role to play in disaster prevention. We can learn what to do in a disaster and help others stay safe.
- **Money:** Money is needed to buy things like emergency supplies, build safe buildings, and pay for the people who work on disaster prevention.
- **Knowledge:** Knowing what disasters can happen in our area and how to stay safe is really important. This knowledge helps us make good plans.
- **Equipment:** This includes things like fire trucks, ambulances, and tools for rescuers. They help in case of disasters.
- **Communication:** Having ways to talk to each other is crucial. Phones, radios, and the internet are important tools to share information in a disaster.
- **Technology:** Modern technology like satellites and weather sensors can help predict disasters, like storms or floods, and give us early warnings.
- **Plans/Policy:** Having good plans in place is like having a map to follow. These plans tell us what to do and where to go when a disaster happens.
- **Shelter:** Safe places to go during a disaster, like evacuation centers or strong buildings, are vital to protect people.
- **Education:** Teaching people what to do in a disaster is a powerful resource. Knowing what to do can save lives.

- **Volunteers:** People who give their time and help during disasters are valuable resources. They can assist with rescues, provide food, and comfort those in need.

4.3.1.2 Challenges in Disaster Prevention

Making our communities safe from disasters is really important, but there are some challenges that can make it harder. Let's talk about a few of these challenges.

- **Traditional Outlooks:** Some people and communities have old ways of thinking about disasters. They might believe that "it won't happen to us" or that they can handle it without any plans. This old thinking can be a big problem because it makes us less prepared.
- **Costs:** Preventing disasters can cost money. Building strong homes and warning systems, training people, and getting supplies all need money. Sometimes, there's a belief that spending on disaster prevention is too expensive. But in the long run, it can save money by preventing big damage and loss of life.
- **Political Aspects:** Sometimes, politics can get in the way of disaster prevention. This means that politicians might not make it a priority or they might argue about what to do. When politics gets in the way, it can slow down important actions.
- **Other National Priorities:** Countries have many important things to focus on, like healthcare, education, and jobs. Sometimes, disaster prevention isn't seen as a top priority, and this can make it hard to get things done.
- **Public Apathy:** Apathy means not caring much about something. Sometimes, people don't pay much attention to disaster prevention because they think it's not a big deal. This can be a problem because when people don't care, they don't push for changes and improvements.
- **Predicting Nature's Mood:** Sometimes, nature can be unpredictable. We can't always know when a big storm, earthquake, or flood is going to happen. So, it's hard to prepare for something when we don't know when it will strike.
- **Limitation of Technology:** We rely on technology for early warnings and communication during disasters. But sometimes, technology can fail or be damaged during a disaster, making it hard to get help.

4.3.1.3 Positive Approaches Towards Disaster Prevention

Positive approaches towards disaster prevention involve various strategies to protect people and their communities from natural or man-made disasters. Some important positive approaches are discussed below:

- **National Policy:** Countries create rules and plans that guide how they handle disasters. They decide what to do before, during, and after a disaster. This helps coordinate actions and resources.
- **Legislation:** Laws are made to make sure people and organizations follow safety rules. For example, building codes can ensure that buildings are strong enough to withstand disasters.
- **Assessment and Monitoring:** Experts keep an eye on the environment and weather. They use tools to predict when a disaster might happen, like a hurricane or a flood. This helps people prepare in advance.
- **Planning and Organization:** In the national development plan, we need to carefully think about all aspects of disasters. This includes looking at the immediate and long-term costs and benefits of doing something to prevent disasters or not doing anything. To help with this, we should have a special part or center that always keeps an eye on disaster management. This way, they can tell the government when we need to take steps to prevent disasters. It's also their job to tell the government what's most important in disaster prevention.

  After a big disaster, the disaster management part or center should make sure there's a thorough review of what happened. They should then tell the government whether we need to do more to prevent similar disasters in the future.

- **Public Awareness and Education:** People need to know what to do in case of a disaster. Schools and public campaigns teach people about safety measures and how to prepare for emergencies.
- **International Assistance:** Sometimes, a disaster is too big for one country to handle alone. Countries help each other by providing resources, like food, money, or experts, to support the affected nation.

4.3.2 Disaster Mitigation

Disaster mitigation is the set of actions, strategies, and measures taken to proactively reduce or prevent the impact of disasters, such as natural calamities or human-made crises. It involves planning, preparedness, and the implementation of various measures to minimize the damage, save lives, protect property, and enhance the overall resilience of communities and individuals when faced with adverse events.

Disaster mitigation is all about making plans and taking actions to reduce the damage and harm caused by disasters. It's like getting ready in advance to stay safe when bad things like floods, earthquakes, or storms happen.

4.3.2.1 Major Mitigation Components

Major disaster mitigation involves several essential components that work together to reduce the impact of disasters and protect people, property, and the environment. These components include:

- **Risk Assessment:** Identifying and assessing potential hazards, vulnerabilities, and exposure to risks is the first step. This involves understanding what types of disasters (e.g., earthquakes, floods, and hurricane) are likely to occur in a given area and how they might affect the community.
- **Preparedness and Planning:** Developing comprehensive disaster preparedness plans that outline how a community will respond to disasters. This includes creating evacuation plans, establishing emergency shelters, and ensuring that emergency services are well-coordinated.
- **Public Education and Awareness:** Educating the public about the potential risks and how to prepare for disasters is crucial. This includes conducting public awareness campaigns, teaching individuals what to do during emergencies, and providing information on available resources.
- **Infrastructure Resilience:** Building and retrofitting infrastructure to make it more resistant to disasters. This includes constructing earthquake-resistant buildings, flood levees, and firebreaks to protect critical infrastructure.

- **Early Warning Systems:** Developing and maintaining early warning systems to provide timely alerts about impending disasters. This can include weather forecasting, earthquake early warning, and flood monitoring systems.
- **Community Engagement:** Involving the local community in disaster mitigation efforts is vital. This includes fostering a sense of shared responsibility and encouraging community members to participate in planning and response activities.
- **Environmental Protection:** Preserving and protecting natural environments can help reduce the impact of certain disasters. Wetlands, for example, can act as natural buffers against flooding.
- **Insurance and Risk Transfer:** Encouraging individuals and businesses to obtain insurance for disaster-related losses can help them recover more quickly after a disaster. Risk transfer mechanisms, such as insurance, can reduce the financial burden on communities and governments.
- **Government Policy and Regulations:** Governments should establish and enforce regulations related to land use, building codes, and safety standards to ensure that construction and development activities minimize disaster risks.
- **Research and Innovation:** Continuous research and innovation in disaster mitigation techniques and technologies can lead to more effective and cost-efficient strategies.
- **International Cooperation:** Disasters often transcend national boundaries, so international cooperation and coordination are essential. Sharing knowledge, resources, and expertise with neighboring countries can enhance disaster mitigation efforts.
- **Monitoring and Evaluation:** Regularly assessing the effectiveness of disaster mitigation measures and adapting them based on lessons learned and changing risk factors is important to ensure ongoing improvement.

4.3.2.2 Problems in Disaster Mitigation

Disaster mitigation is a critical component of disaster management, but it faces several challenges and problems that can hinder its effectiveness. Some of the key problems in disaster mitigation include:

- **Limited Resources:** Many regions, especially in developing countries, have limited financial and technical resources to invest in comprehensive mitigation efforts. This can make it difficult to implement long-term mitigation projects.
- **Inadequate Infrastructure:** Aging or poorly designed infrastructure can be vulnerable to disasters. Upgrading or retrofitting infrastructure can be costly and time-consuming.
- **Environmental Degradation:** Environmental degradation, such as deforestation and land degradation can increase the risk of disasters, making mitigation more complex.
- **Climate Change:** Climate change has led to an increase in the frequency and severity of many natural disasters, making it harder to predict and mitigate their impacts.
- **Lack of Public Awareness:** Inadequate public awareness and understanding of the risks associated with disasters can lead to a lack of community engagement in mitigation efforts.
- **Political and Institutional Challenges:** Bureaucratic inefficiencies, corruption, and political conflicts can hinder the development and implementation of effective mitigation policies and programs.
- **Limited Research and Literature:** Incomplete or outdated data on hazards and vulnerabilities can make it challenging to assess and plan for mitigation measures.
- **Interconnected Risks:** Some disasters have cascading effects, where one event triggers another. Mitigating such interconnected risks is complex and requires a holistic approach.

4.3.2.3 Positive Approaches Towards Disaster Mitigation

Positive approaches towards disaster mitigation involve proactive strategies and actions aimed at reducing the impact of disasters on communities and individuals. These approaches emphasize preparedness, risk reduction, and resilience-building. Here are some key elements of positive approaches to disaster mitigation:

Risk Assessment: Understanding the specific risks and vulnerabilities in a region is crucial. This involves identifying potential hazards like earthquakes, floods, hurricanes, or wildfires and assessing how they might affect the community. This knowledge forms the basis for mitigation planning.

Early Warning Systems: Implementing early warning systems, such as weather alerts or earthquake monitors, can provide timely information to communities, allowing them to take preventive actions before a disaster strikes.

Building Codes and Regulations: Enforcing and improving building codes and land-use regulations ensures that new constructions are designed to withstand disasters. Retrofitting older buildings to meet these standards can also be a part of mitigation efforts.

Infrastructure and Ecosystem Resilience: Developing and maintaining infrastructure, like flood control systems or forest management practices, can help minimize disaster risks. Preserving natural ecosystems, such as wetlands and mangroves, can act as natural buffers against some disasters.

Public Education and Training: Informing and educating the public about disaster risks, evacuation plans, and safety measures is crucial. Training community members in first aid, search and rescue, and disaster response can save lives.

Community Engagement: Involving the community in disaster planning and decision-making helps create a sense of ownership and responsibility. Local knowledge and experiences are valuable assets in mitigation efforts.

Insurance and Financial Preparedness: Encouraging individuals and businesses to have insurance coverage for disasters can help with recovery. Governments can also set up financial reserves for disaster response and recovery.

Government Policies and Funding: Governments play a significant role in disaster mitigation through policies, funding, and coordination of efforts. Allocating resources to mitigation projects and promoting research and development in this field are vital.

International Cooperation: Disasters can cross borders, so international collaboration is essential. Sharing knowledge, resources, and technology can enhance disaster mitigation efforts globally.

4.3.3 International Collaborations

The international collaboration is very crucial for successful management of disaster. There are various international conventions have been done on disaster mitigation. Some of the important convention on disaster mitigation is presented below:

Sendai Framework for Disaster Risk Reduction (2015-2030): This global agreement, adopted by United Nations member states, sets out a comprehensive approach to disaster risk reduction. It emphasizes understanding and managing disaster risks, enhancing preparedness, and building resilience.

Hyogo Framework for Action (2005-2015): This framework preceded the Sendai Framework and aimed to build the resilience of nations and communities to disasters. It highlighted the importance of disaster risk reduction in sustainable development.

UN International Strategy for Disaster Reduction (UNISDR): UNISDR works to promote a culture of disaster prevention and resilience worldwide. It coordinates international efforts to reduce disaster risks and support the implementation of disaster risk reduction measures.

4.3.3 Difference between Disaster Prevention and Mitigation

Disaster prevention and disaster mitigation are two related but distinct approaches to dealing with disasters. Here are the key differences between them in detail:

	Disaster Prevention	Disaster Mitigation
1.	Prevention focuses on stopping a disaster from occurring or completely avoiding its occurrence. It aims to eliminate or reduce the risk factors that could lead to disasters.	Mitigation, on the other hand, concentrates on reducing the impact of an inevitable disaster. It aims to minimize the damage, loss of life, and economic disruption that a disaster can cause.
2.	Prevention measures are taken before a disaster is even a possibility. They aim to address the root causes of disasters, such as by improving building codes, land-use	Mitigation measures are taken in anticipation of or in response to a disaster. They work to lessen the impact and damage caused by a disaster that cannot be

	planning, or climate change mitigation.	entirely prevented.
3.	Prevention primarily focuses on reducing the likelihood of a disaster occurrence. This includes measures like early warning systems, hazard identification, and reducing vulnerability factors.	Mitigation centers on reducing the severity and consequences of a disaster that is likely to occur. It involves actions like strengthening infrastructure, emergency preparedness, and creating disaster response plans.
4.	Examples include enforcing building codes to ensure structures can withstand earthquakes or floods, implementing policies to reduce greenhouse gas emissions to prevent climate change-related disasters, and creating buffer zones in wildfire-prone areas to prevent the spread of fires.	Examples involve reinforcing existing buildings to withstand earthquakes, developing evacuation plans and shelters for hurricanes, conducting disaster drills, stockpiling emergency supplies, and setting up early warning systems for tsunamis or floods.
5.	Successful prevention means that the disaster does not occur or is less likely to happen. It focuses on long-term risk reduction.	Successful mitigation means that even if a disaster occurs, its impact is minimized, and people are better prepared to handle it. It focuses on reducing the short-term effects.
6.	The government plays a significant role in setting policies and regulations to prevent disasters, such as zoning laws and environmental regulations.	The government plays a critical role in disaster response and recovery, including the allocation of resources, relief efforts, and providing aid to affected communities.

4.4 SUMMARY

Disaster prevention and mitigation are essential strategies aimed at reducing the impact of natural or man-made disasters on people and their communities. Prevention involves measures

taken to avoid or minimize the occurrence of disasters, while mitigation focuses on reducing their severity and consequences.

In disaster prevention, efforts are made to anticipate and prevent disasters by implementing policies, laws, and regulations. This includes creating building codes, land-use planning, and environmental management practices to reduce vulnerability to hazards. The goal is to stop disasters from happening or reduce their frequency.

Disaster mitigation, on the other hand, concentrates on lessening the impact of disasters that cannot be entirely prevented. This involves actions such as strengthening infrastructure, implementing early warning systems, and developing emergency response plans. Mitigation aims to make communities more resilient, ensuring that when disasters occur, they cause less harm and are easier to recover from.

Both disaster prevention and mitigation strategies are crucial in safeguarding lives and property, reducing economic losses, and promoting community resilience. By implementing these approaches, societies can better prepare for, respond to, and recover from disasters, ultimately saving lives and reducing the long-term impact of catastrophic events.

4.5 GLOSSARY

Community Engagement: Involving local residents and organizations in disaster planning and decision-making processes.

Disaster Prevention: The proactive measures and strategies put in place to reduce the risk of disasters occurring.

Early Warning System: A network of monitoring and communication tools to provide advance notice of impending disasters.

Emergency Management: The coordination of resources, plans, and actions to prepare for, respond to, and recover from disasters.

Evacuation: The organized and safe removal of people from areas at risk of a disaster.

Hazard: A threat or source of danger that could lead to a disaster, such as earthquakes, floods, or hurricanes.

International Aid: Assistance provided by one country or organization to another during or after a disaster to help with relief and recovery efforts.

Mitigation: Actions and plans to lessen the impact of disasters and make communities more resilient to their effects.

Preparedness: The state of being ready to respond effectively to a disaster, often involving emergency plans, supplies, and training.

Recovery: The process of rebuilding and restoring affected areas and communities in the aftermath of a disaster.

Rescue and Relief: Immediate actions taken to save lives and provide essential aid to disaster-affected individuals and communities.

Resilience: The ability of a community or system to withstand, adapt to, and quickly recover from a disaster.

Response: Actions taken during and immediately after a disaster to save lives, protect property, and meet basic needs.

Risk Assessment: The process of evaluating potential hazards and determining their likelihood and potential consequences.

Vulnerability: The susceptibility of a community, infrastructure, or population to damage or harm from a disaster.

4.6 ANSWER TO CHECK YOUR PROGRESS

- Disaster prevention means taking steps to stop disasters from happening.
- Mitigation is about reducing the impact of disasters when they occur.
- Having a plan for what to do in a disaster is crucial for safety.
- Educating people about disaster preparedness is essential.
- Early warning systems can give us a heads-up before a disaster strikes.
- Building strong and safe structures can minimize damage during disasters.
- Protecting the environment helps prevent some disasters, like floods.
- Communities need to work together to stay safe during disasters.

- Communities should have emergency supplies, like food and water.
- Public awareness campaigns can help people understand the importance of disaster prevention.
- Man-made disasters, like industrial accidents, can be prevented with safety measures.
- Climate change can increase the risk of some natural disasters, making prevention even more critical.
- Investing in disaster prevention is an investment in the safety and well-being of our communities.

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4.8 TERMINAL QUESTIONS

4.8.1 Long Questions

1. Define disaster prevention and mitigation. What is the difference between disaster prevention and mitigation? Explain.
2. What are the key challenges in disaster prevention and mitigation measures in regions with limited resources?
3. What is disaster prevention? Give a detailed account of resources needed for disaster prevention.

4. What is disaster mitigation? Provide a detailed account of disaster mitigation components.

4.8.2 Short Questions

1. What is the primary goal of disaster prevention and mitigation?
2. How can early warning systems help in disaster preparedness?
3. What are some key steps individuals can take to prepare for disasters?
4. Why is community involvement essential in disaster risk reduction?
5. What role does government play in disaster prevention and mitigation?
6. What are the economic benefits of investing in disaster preparedness?
7. How can we mitigate the environmental impact of disasters?
8. What is the Sendai Framework, and why is it significant in disaster risk reduction?
9. How can technology and innovation contribute to better disaster prevention and mitigation strategies?

4.8.3 Multiple Choice Questions

1. What is the primary goal of disaster prevention and mitigation?

A) Responding to disasters after they occur
B) Minimizing the impact of disasters and preventing them
C) Rebuilding communities after a disaster
D) Providing relief to disaster-affected individuals

2. Which of the following is an example of disaster mitigation?

A) Evacuating a coastal town in preparation for a hurricane
B) Providing medical assistance after an earthquake
C) Retrofitting buildings to withstand earthquakes
D) Distributing food and water to disaster survivors

3. The Sendai Framework for Disaster Risk Reduction is a global agreement that focuses on:

A) Disaster response and relief efforts

B) Disaster prevention and mitigation strategies

C) Post-disaster recovery and reconstruction

D) International humanitarian aid coordination

4. What is a key benefit of early warning systems in disaster prevention?

A) Reducing the frequency of disasters

B) Predicting the exact time and location of a disaster

C) Providing advance notice to take protective actions

D) Eliminating the need for disaster preparedness

5. Why is community involvement important in disaster prevention and mitigation?

A) Communities can demand financial compensation after a disaster.

B) Communities can develop their own disaster response teams.

C) Local knowledge and participation can enhance preparedness and resilience.

D) Communities can provide humanitarian aid to neighboring regions.

6. The primary goal of disaster _____ is to reduce the impact of disasters on people, property, and the environment.

7. One key element of disaster _____ is having a plan in place to ensure people's safety and minimize damage during an emergency.

8. _____ systems can provide early warnings and help communities prepare for imminent disasters.

9. Reducing deforestation and promoting sustainable land use practices can help in preventing _____-related disasters like floods and landslides.

10. In disaster _____, communities work together to build resilience, share knowledge, and respond effectively when a disaster occurs.

11. Disaster prevention focuses solely on responding to emergencies after they occur (True/False).

12. Early warning systems are crucial for disaster mitigation efforts (True/False).

13. Climate change does not influence the occurrence of natural disasters (True/False).

14. Disaster mitigation primarily involves providing immediate relief to affected communities (True/False).

15. Disaster prevention efforts are solely the responsibility of government agencies (True/False).

Answers

QN.	Answer	QN.	Answer
1	A	9	Environment
2	C	10	Management
3	B	11	False
4	C	12	True
5	C	13	False
6	Mitigation	14	False
7	Preparedness	15	False
8	Early Warning		

UNIT 7: DISASTER PREPAREDNESS

7.2 OBJECTIVES

After studying this unit, you should be able to:

- Understand the meaning, importance, and general principles of disaster preparedness
- Elements and activities of disaster preparedness
- Role of local community in disaster preparedness and risk reduction
- Activities and Strategies for People-Centric Disaster Management

7.1 INTRODUCTION

In previous chapters, you have learned about the meaning of disaster, the types of disasters and their impacts. You have understood that India is vulnerable to disasters and has witnessed a large number of disasters in recent decades. According to the Internal Displacement Monitoring Center in 2016, about 2.4 million people were internally displaced due to disasters, mostly linked to monsoon season floods and in states like Bihar that led to more than 1.6 million displacements between mid-July and October.

Hence, disaster preparedness plays a pivotal role in disaster risk management. In the present unit, we will study the concept of disaster preparedness, general principles, elements and activities for disaster preparedness, the importance and role of the local community, and activities for disaster preparedness. Two case studies are also presented on successful community participation in disaster preparedness.

Disaster Preparedness- Concept and Significance

In 2005 with the enactment of the Disaster Management Act by the Parliament of India, there came a paradigm shift from an erstwhile relief-centric response to a proactive mitigation and preparedness-driven approach towards disasters. The Disaster Management Act 2005 defines "Disaster as a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or manmade causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of, property, or damage to, or degradation of, environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area."

The same act defines 'disaster management' as a "A continuous and integrated process of planning, organizing, coordinating and implementing measures which are necessary or expedient" for the following:

1) Prevention of threat to any disaster

2) Mitigation of disaster risk or consequences

3) Capacity-building measures

4) Preparedness to deal with any disaster

5) Prompt response to any disaster situation

6) Assessing the magnitude of effects of any disaster

7) Evacuation, rescue and relief, and

8) Rehabilitation and reconstruction

The Disaster Management Act 2005 specifically stresses disaster preparedness and its strategies. Disaster preparedness involves a continuous and integrated process to adopt measures taken to prepare for and reduce the effects of disasters. According to the United Nations International Strategy for Disaster Reduction, Disaster Preparedness includes contingency planning, stockpiling of equipment and supplies, emergency services and stand-by arrangements, communications, information management and coordination arrangements, personnel training, community drills and exercises, and public education. It must be supported by formal institutional, legal and budgetary capacities (ISDR 2008).

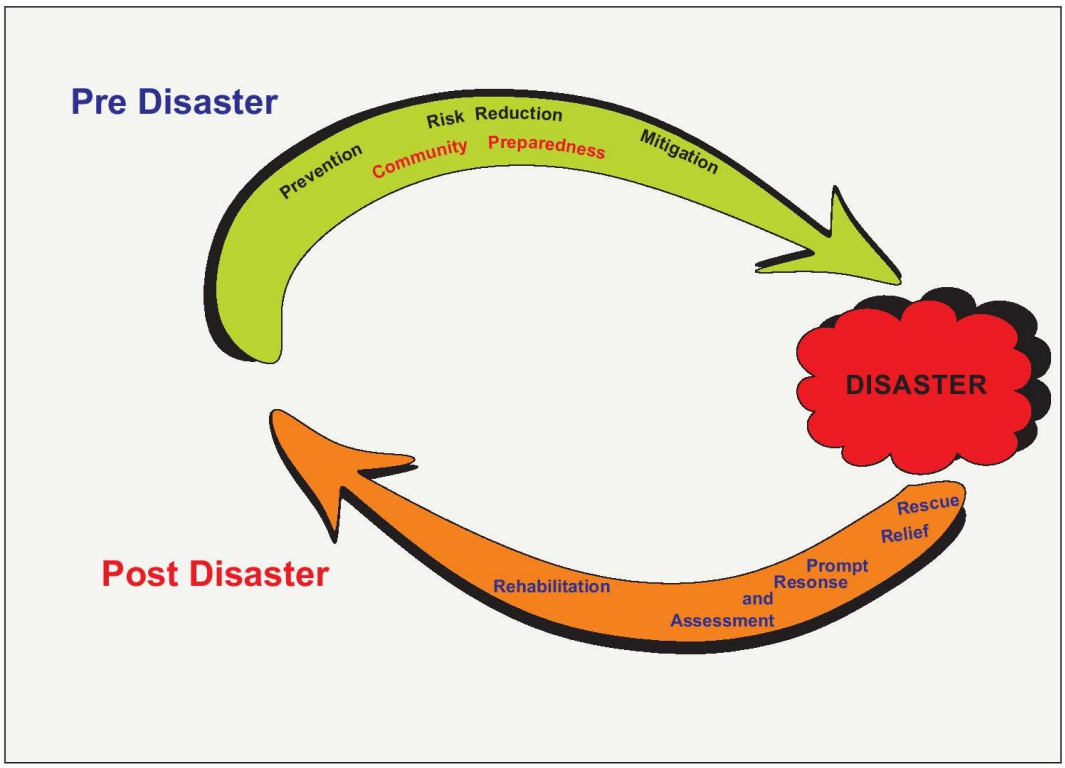

Fig. 7.1: Disaster Management Cycle.

Figure 1: Disaster Management Cycle

The disaster management cycle in figure 1 explains the pre disaster and post disaster scenarios. Prevention, risk reduction and mitigation are important before the disaster occurs. Here, the community preparedness plays a pivotal role. After the disaster, rescue and relief through prompt response is required. The assessment of the damage by disaster is conducted and rehabilitation of the victims is an important priority for the authorities.

In 2018, the Ministry of Home Affairs, Government of India prepared a National Disaster Risk Index mapping hazards and vulnerabilities of 640 districts of India. The index was based on the performance of states and union territories on measures of disaster risk reduction and brought to the fore that we are still in a primitive stage and the level of resilience to the disasters is very low.

You must know that after the Indian Ocean earthquake and Tsunami of 2004, the Hyogo Framework of Action (2005-2015) was implemented. Hyogo Framework outlined five areas of action:

i) Priority to disaster risk reduction

ii) Improving early warning and risk information

iii) Building a culture of safety and resilience

iv) Reducing risks in key sectors

v) Strengthening disaster preparedness

Hyogo Framework stressed upon disaster preparedness that can play an important role in saving lives, property and livelihood when integrated into the overall disaster risk reduction approach. The Sendai Framework for Disaster Risk Reduction 2015-2030 specifically targets developing community resilience by 2030. The Sendai document calls for public and private investment in disaster risk prevention and reduction through structural and non-structural measures which are essential to enhance the economic, social, health and cultural resilience of persons, communities, countries and their assets.

Every year, India has been witnessing a large number of disasters like landslides and floods, which cause many casualties and losses. This makes evident that our journey to achieve the goals of disaster risk management enshrined in the Disaster Management Act 2005 is very slow and far from completion.

Plate-7.1: Land and property submerged in flood waters Location: Along State Highway 50, Darbhanga- Samastipur Road Photo Courtesy: Dr. Gaurav Sikka.

General Principles of Preparedness

You have learned by now the concept and significance of disaster preparedness. The scholars (Dynes, et al., 1972) researching on disaster preparedness have enumerated certain general principles of preparedness that are relevant for households, communities, offices etc. Moreover, these principles are generalized in nature and applicable to all types of hazards.

The following principles are fundamental to your understanding of preparing for a disaster:

1. **A formal written disaster plan is just the beginning**.

   It is stated that "To assume that planning is complete when a written disaster plan is produced is to court yourself in trouble" (Dynes et al., 1972). Preparing a formal comprehensive disaster plan marks an auspicious beginning to a long daunting task. The plans have to be implemented through trainings, practice and capacity building.

   In fact, no plan is a perfect plan. There should be a mechanism for continuously improving the plans by learning lessons from the disasters, experiences from other communities and inputs from international platforms.

2. **A disaster plan is incomplete without other elements of preparedness.**

   Disaster plans become nothing more than a 'paper tiger', if resources do not exist for carrying out the planned activities and stakeholders are not aware of what to do when the disasters strike. Often, it is observed that the disaster plans are far from ground reality. Therefore, many scholars claim a disaster plan to be a 'fantasy document' that is designed to give assurance to all stakeholders that all their potential problems are solved.

3. **Preparedness is a means to an end, not an end in itself.**

   Preparedness for a disaster is a long-term process. Just preparing a disaster kit, retrofitting a building and consulting with disaster experts on potential hazards does not mean that the ultimate aim of preparedness is achieved. Effective action can only be taken when all related agencies and stakeholders are continuously involved in formulating plans and undertaking activities for implementing the plans. Engagement among partners is required to gather prior knowledge of capabilities and resources available during the disasters. This prior knowledge is very useful for effective response during disasters.

The process of preparedness also involves identifying and addressing the gaps in preparedness and capability of stakeholders and partners.

4. **Preparedness is a collaborative effort.**

   Collaboration and cooperation are two mantras for disaster preparedness. A feeling of 'ownership' of the planning process should be encouraged by including the inputs of the people. Only a top-down direction will not be suitable in a disaster process. A shift is required from a compliance oriented mindset to a collaborative mindset among the authorities responsible for planning for disasters. Central government should work in collaboration with state governments for disaster preparedness. Community-based disaster management process has become indispensable. Moreover, there is much-required need for preparedness plans based on place-specific hazards; also, the vulnerability analyses should be consistent with the needs of local communities and households.

5. **Preparedness Plans must be realistic and not 'borrowed'**

   Plans should be realistic based on happenings in a disaster, rather than on myths about disaster behavior. There is a tendency to 'borrow' plans from other states or hire a consultant or planning firms to prepare a disaster plan. However, it needs to be discouraged because in the process of disaster planning, there are no shortcuts for effective disaster preparedness. The best method of preparing for disasters would be to involve all those who will be involved in responding during the disasters.

6. **Best Practices should be adopted**

   It should be understood that the best practices which are good and useful in the backdrop of the local conditions and requirements should be adopted. These best practices can be adopted from other state's disaster plans or even from abroad, but can be altered as per our conditions. The role of consultants can be that of a facilitator in a process that is owned by the stakeholders implementing those plans in times of disaster.

7. **Multi-organizational participation is the key to success**

   Effective disaster response requires multi-organizational coordination and action. Therefore, the process of disaster preparedness shall involve representations from medical services, police, fire, urban local bodies, citizens, civil society, schools, business community, hospitals and other sectors to create a network of organizations that can

provide essential functions during disasters. The preparedness strategies should be kept broad by having a vertically and horizontally integrated approach across the community organizations, administrative tiers and sectors. Disaster planning spanned across different organizations and sectors should have a common vision of community resilience in the times of the disaster.

8. **Disaster Preparedness is a 'policy without public'**

   The advocates of disaster preparedness must overcome limitations, opposition, ignorance and other constraints. The planners might face apathy and resistance. The reasons for this can be- resistance to think about disasters, false assumption of safety from disasters and disaster planning at least priority for budget allocations. Generally speaking, disaster related issues always compete with other concerns that are considered equally important. Expenditure on disaster risk reduction is weighed to investments in other sectors that can yield more immediate returns. In fact, if no disaster occurs over a period of time, the public, households, authorities and community become less vigilant. Therefore, preparedness efforts are quite difficult to sustain and the tempo is lost.

   Therefore, a strong advocacy can sustain disaster preparedness efforts. Academics, disaster management experts, activists, engineers, civil society and authorities should stay at the forefront and be advocates for disaster reduction. A welfare state should keep disaster preparedness at par with other public issues.

9. **Preparedness should have an 'all hazards' focus**

   A disaster preparedness plan should have an 'all hazards' focus however, also incorporating the special considerations related to individual hazards. There are some generic challenges and issues of all the disasters. It is important because all stakeholders are required to respond in similar ways. For instance, regardless of any disaster, a community has to provide food, shelter, first-aid, and critical medical care to the victims, resuming essential services, removing blockades and establishing connections for seeking help. The authorities should develop a standard operating procedure for prompt response, rescue and relief in all disasters.

10. Preparedness should be based on long-term vulnerability assessments

Apart from the local concerns, preparedness activities should be guided by the scientifically-based assessments of events that are likely to occur in a territory or area. The fact is that history of disasters can predict the future ones. For instance, our country is zoned based on the magnitude of earthquake risk and the history of earthquakes in the subcontinent has made this zoning possible. The efforts to assess long-term vulnerability will serve as an effective basis for mitigation and preparing the community. These efforts will also address all potential disaster events rather than just preparing for the last disaster. A new floodplain map could indicate where future floods will occur in a severe form and will assist communities in preparing accordingly. Based on the geographical location, a household should have an evacuation plan ready for all the range of disasters.

11. Preparedness efforts must have a scope to adapt, improvise and innovate

Improvisation and innovation is very necessary for a disaster preparedness plan. Adherence to the bureaucratic rules slows down the response efforts and discourages decision-makers from seeking creative solutions. Therefore, it is required that the disaster management plans should have scope to innovate and improvise depending upon the disaster situations. The 2013, Uttarakhand floods clearly depicted the benefits of making creative changes at ground zero.

The ability to adapt to an unfolding situation requires both flexibility within plans and broad permission to respond creatively to the unfolding of events that do not 'fit' well within existing planning frameworks (McEntire 2006).

Elements and Activities of Disaster Preparedness

Scholars working on disaster have identified several elements and dimensions of disaster preparedness. Table 1 shows a variety of elements of disaster preparedness and associated activities. The activities are concrete actions that need to be taken for achieving a disaster prepared society.

Table 1: Elements and Activities of Disaster Preparedness.

S.No.	Elements of Disaster Preparedness	Activities
1.	Pre-Knowledge of Hazards	Understanding hazard, conducting hazard impact

		assessment; using census data to understand the potential impacts on infrastructure, life and property; providing hazard information to all stakeholders
2.	Management, Direction and Co-ordination	Managing preparatory exercises and response process; assigning responsibilities for response related roles; formation of preparedness committees and networks, adoption of recommended management procedures.
3.	Formal and Informal Response Plans	Developing disaster plans, evacuation and exit plans, mutual aid agreements, collaborative partnerships, resource sharing; establishing broader and more general planning arrangements like neighborhood and community preparedness groups; preparing district and State Level Disaster Mitigation plans
4.	Supportive Resources	Acquiring equipments and developing logistical capability for supporting response activities; recruitment of staff; identifying potential resources.
5.	Life Safety Protection	Training family members, staff, employees and others to take immediate actions to prevent death and injury, First-Aid training, awareness of 'safe spaces' within the structure and easy exit and evacuation; preventing secondary threats like fire following earthquakes.
6.	Property Protection	Swift action to prevent damage to property; securing essential records and inventories; ensuring that critical functions can be maintained during disasters, containing secondary threats

7.	Emergency Coping	Developing the ability to self-sustain during the disasters; ensuring the restoration of critical services; awareness on early recovery measures
8.	Recovery and rehabilitation	Preparing rehabilitation plans; Putting legal measures in place after the disasters; insurance mechanism; identifying sources of recovery and rehabilitation aid

Source: Adapted from Sutton, J. and Tierney, K., 2006

Preparedness across Households as a unit of analysis

In the preceding section, we have identified eight common elements of preparedness and associated activities under each dimension. Against this backdrop, in this sub-section, we shall discuss the preparedness measures related to households- as a unit of analysis. You know that household preparedness has a direct impact on our lives in the disaster. It is important to mention that we are taking an all-hazard approach and describing measures based on the elements and dimensions of preparedness.

Household is the smallest and most basic of assessment for preparedness. A household may consist of an individual, a family with two or more members, an extended family, a single parent with child/children and persons who are co-residing in a single residential unit. Census of India defined 'household' as the total number of persons who used the same *chulha/ cookstove.*

You must be aware that 'all disasters are local', therefore, preparedness begins from the home by following some simple steps for protection of life, property and coping from hazardous events. Moreover, all households are not a homogenous entity. The vulnerability of household depends upon the income, education, social status, caste and language. Six of the elements as discussed earlier, will be relevant for the household preparedness- Pre-Knowledge of Hazards, Formal and Informal Response Plans, Supportive Resources, Life Safety Protection, Property Protection, and Recovery and Rehabilitation.

Important measures suggested for household preparedness are as follows:

Pre-Knowledge of Hazards

Households should be made aware about the type of disasters which are most likely to happen, informed about the hazards most common and frequent to them and learning about the disaster plans at places where they stay maximum time. Special training is required for key members of the household for the special needs of the family and livestock management after disaster. Staying updated is an important resource for households. For this, keeping oneself updated on disaster warning through radio and other public broadcasting measures is important.

Formal and Informal Response Plans

It is encouraged to talk among the family members of households about the potential disasters, and process of action during and after the disaster like evacuation and exit. Also, households should identify family friends outside the potential disaster prone area who would serve as a point of contact for family members to reconnect.

Supportive Resources

Disaster Management Act, 2005 stipulates that every household should possess a disaster kit. A disaster kit must include the following: flashlight with extra batteries; radio; first aid kit; prescribed medicines and prescription copy; water (at least one gallon per person); ready to eat food that do not require cooking and refrigeration; clothes for each member; sleeping bag or bedroll; adequate cash, chequebook and credit card; special items for infants and elderly members of the household; map of the area; identification cards; phone numbers and sanitation items. Important papers like academic certificates, property certificates, wills, deeds and other inventory should be laminated and kept safely. Additionally, tools like wrench, tape, compass, whistle, and matchbox, plastic sheets and masks are also suggested. It is expected that the household will maintain and update the kit on regular intervals.

Life Safety and Property Protection

There are many activities required for preparing households for life safety and property protection. These includes- identification of safe spots, shelters and evacuation routes, learning

the handling of fire extinguishers, training at first aid and Cardiopulmonary Resuscitation (CPR) and stocking of exigency supplies.

Though these are general measures, but the life safety protection measures vary depending upon the hazards. In earthquake high prone areas, bolting and bracing the refrigerator, almirah, gas stove and other heavy appliances. The households in flood-prone areas built their house structures at a certain height and keep most of the items on an elevated platform in house. Households, which have high risk from hurricanes and tornadoes, built an underground safe room to get protected from high winds and projectile objects.

Recovery and Rehabilitation

Insurance coverage for self and, movable and immovable assets of one's household is an important point. Government and authorities provides monetary compensation which can be used to post-disaster recovery of household. Rehabilitation is a long-term process. State intervention is necessary for rehabilitation, particularly in disaster prone areas.

Role of Local Community in Disaster Preparedness

You should understand that the term 'community' refers to a group of people that live in a defined geographical area. It is also a group of people who share a common culture, values and norms and have common interests (Figure 2). A community is arranged following a social structure that has evolved over time.

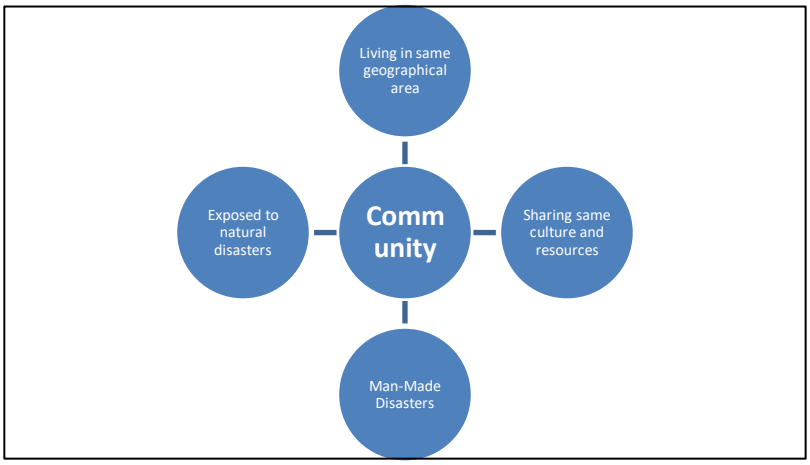

Fig. 7.1: Role of community in disaster preparedness.

Local communities are on the frontlines of both the immediate impact of a disaster and the initial emergency response, which, experience has shown, is crucial for saving the most lives. It is therefore altogether important that we focus our energies on improving local communities' resilience to natural hazards. Communities are complex and dynamic which makes them vulnerable to natural challenges. Many factors influence community resilience viz., physical, human, natural and social aspects of life. These factors are interconnected and need to be considered holistically in totality by taking into account how one factor influences the other.

Disaster risk managers need to listen and learn from the grassroots up – not vice versa – so that we can build upon examples of risk reduction that have been tried and tested through local experiences. Moreover, community resilience practice across diverse social groups should be considered as a 'resource' – its utilization can contribute in reducing the existing disaster risks and also manage emerging risks. Prof. Zimmermann (1951) has rightly stated that resources are not, they become, so the community resilience knowledge and skills can become an effective resource for disaster risk reduction. Therefore, developing community-resilient practices based on indigenous knowledge is the need of the hour for successful disaster risk management. There is a critical importance of making the affected community more resilient to disasters, living more sustainable and dignified lives, and assert their rights and entitlements. In-depth assessments of hazards, vulnerabilities, changing dynamics of disasters, resilient practices and capacity-building measures at district and village level must be undertaken. This will also help in curtailing forced migration caused due to natural disasters. The elements and activities of disaster preparedness mentioned in Table 1 would be highly useful for developing community preparedness. Having said this, it is important to highlight certain activities and strategies that can be useful in capacity building of the vulnerable activities to achieve people-centric and sustainable disaster management.

Fig. 7.2: Activities for People-Centric Disaster Management.

Establishment of Self Help Groups

Self Help Groups (SHGs) are informal association or group of people who voluntarily come together for a common purpose. First activity is the formation of Self-help groups (SHGs) in the target villages, specifically to address the issue of disaster risk reduction. The SHGs shall conduct monthly meetings focusing first on the rationale for disaster preparedness and subsequently on practical measures the groups could implement, such as encouraging each family to put together a safety kit containing essential items such as food rations, valuables, documents, flashlight, rope, etc. In addition, capacity-building sessions should be held for SHG representatives to teach them how to take advantage of available government social welfare schemes, notably the Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA).

Village Disaster Management Committees (VDMCs)

A village disaster management committee (VDMC) comprising 10 to 15 members should be established in each village. In addition to SHG members and other activists, each VDMC should contain one teacher, one Anganwadi worker, one Accredited Social Health Activist (ASHA), one Auxiliary Nurse Midwife (ANM), one Panchayat Raj Institution (PRI) member, and one rural medical practitioner (RMP). The VDMCs should conduct focus group discussions and social and resource mapping to determine community needs and existing resources, such as safe storage areas. Contingency planning sessions can be developed to develop an action plan for

use in the next flood. All VDMCs should be provided with training in first aid. Experimenting with medicinal plants to treat diseases can be a good idea.

Rescue teams

Rescue teams of four to five people should be established in each village. Each team should comprise of three to four swimmers and one first aid provider. All teams shall undergo special training and mock drills. Teams should be provided with life jackets and public address systems, as well as elementary first aid kits.

Grain bank

A community-supported grain bank should be established in a suitable location in each village. SHG can collect grains for this bank. Grain purchased using funds collected for this purpose at SHG meetings.

Checklist

People should be made familiar with existing checklists and guidelines for action before and after the disasters. Each different type of disaster requires specific things for disaster preparedness, however, a general overview of what one should do to be prepared for any disaster is listed here.

Before the disaster hits:

- Keep non-perishable food on hand for at least three days
- Make sure you store some of the water in bottles for drinking purposes and the rest in larger containers for food preparation and sanitation
- Keep drugs and medicines for minor ailments and pains
- For sanitation, keep toilet paper, soap, Alcoholic-based hand sanitizing gels, feminine supplies, personal hygiene items, garbage bag and plastic bucket.
- Tools and supplies like flashlights, map of the area, whistle, cash, battery operated radio and mess kits, plates and utensils.
- Clothing and sleeping bags

- Family documents, special requirements for family members and keep records in waterproof container

After the disaster has hit:

- Listen to radio for instructions
- Use emergency helpline for seeking assistance
- Help the needy, trapped and vulnerable
- Swift action on reducing further damage and rescue
- Sanitation and hygiene to prevent outbreak of any disease
- Eat regularly and drink ample fluids

Success Case Study of Muzaffarpur and Kullu

This section presents two case studies of successful community involvement in disaster management exercises. The Integrated Development Foundation initiated a research project, Patna on people-centric disaster management activities targeting 3,000 households in 10 villages in the Katra block of the Muzaffarpur district in north Bihar. The region is surrounded by the Baghmati and Lakhandevi rivers which seriously affect life in the region during the monsoon months of June to November. The flood-prone rural communities of North Bihar are considered very vulnerable. The goal of this project was to build capacity within Dalit communities to reduce their vulnerability to disasters and hazards, live more sustainable and dignified lives.

Following is a selected list of outcomes of the interventions: 20 SHGs, drawn mainly from the Dalit population, were formed in the target villages for the primary purpose of focusing on disaster risk reduction; VDMCs were formed in all 10 target villages; a disaster management resource bank was created containing a wealth of relevant information and guidelines; the rescue kit provided at the village level was put to effective use during the flood period, specifically the emergency childbirth kit ensuring safe delivery for women.

The second case study is based on 'Pathways to Resilience', a film by Dr. Richard Johnston and hosted on Kullu District Disaster Management Agency showing a story of 1994 flood disaster in Kullu, Himachal Pradesh. Kullu district in Himalayas (Himachal Pradesh) has high levels of risk to environmental hazards (Gardner, 2002), particularly, floods of high-

frequency and magnitude, which result in damage, disruption and casualty (Ballesteros-Canovas et al., 2017). Kullu region is also undergoing rapid transformation due to population growth, increasing tourism and construction of hydropower plants. Having said this, the increased vulnerability and risk, manifested in continuing disaster loss, has made it very important to implement an effective disaster management plan in this region.

The film displayed the lessons learned by the community to reduce future damage. The community stopped building houses near the water streams / *nalas*. Though this has been a long-standing practice among the mountain communities, however, now they have become more conscious and careful while constructing new houses. Also, these houses should be on traditional housing techniques of using wood and stones rather than concrete. The houses built by adopting traditional techniques are earthquake-resistant and useful in disaster risk mitigation. Another important lesson was the use of mobile phones to contact the administration in times of disaster and communicating with others for help.

Plate-7.2: Mountain Village Workshop (Phojal, Kullu District): Film screening in the local community. (**Source: University of Bath Spa, United Kingdom).**

A very important step taken by the Kullu administration was setting up village-level Disaster Management Committees (VDMC), which was explained in the preceding section. These committees had two aims; firstly, to increase awareness among people on disaster issues and, secondly, in times of disaster providing rapid response. These committees had well-trained persons and should rescue people in times of disaster. The authorities revised the district disaster management plan by incorporating the inputs of village disaster committees. The Mountain Village workshop (Photo 2) was organized regularly and communities were made aware through the screening of the documentary. The major accomplishment of these two case studies was the success in reframing Disaster Risk Reduction (DRR) as a fundamental issue of rights and inclusion, rather than a problem to be solved through just mechanical measures. It also reflected that community participation plays an essential role in effective disaster management.

7.4 SUMMARY

You have learned the concept and significance of disaster preparedness. There are eleven general principles for disaster preparedness. These principles are generalized in nature and applicable to all types of hazards. Scholars working on disaster have identified several elements and activities of disaster preparedness. The activities are concrete actions that need to be taken for achieving a disaster prepared society. The eight key elements are as: Pre-Knowledge of Hazards; Management, Direction and Co-ordination; Formal and Informal Response Plans; Supportive Resources; Life Safety Protection; Property Protection; Emergency Coping; and Recovery and Rehabilitation. Household is the smallest and most basic of assessment for preparedness. You must be aware that 'all disasters are local', therefore, preparedness begins from the home by following some simple steps for the protection of life, and property and coping with hazardous events.

Local communities are on the frontlines of both the immediate impact of a disaster and the initial emergency response, which, experience has shown, is crucial for saving the most lives. It is therefore altogether important that we focus our energies on improving local communities' resilience to natural hazards. People-centric disaster management has the following components: Establishment of Self-Help Groups; Village Disaster Management Committees; Rescue Teams;

Grain Banks; and a Checklist. The two case studies of Muzaffarpur and Kullu reflected that community participation plays an essential role in effective disaster management.

7.5 GLOSSARY

Disaster Epidemiology is a new field of study that epidemiologically investigates disaster forecasting, emergency responses, and the short and long-term health effects of disasters on the population.

HVA- Hazard Vulnerability Assessment evaluates the damage caused by a potential disaster, the severity of the impact and availability of resources during a disaster. It also analyses the vulnerability of the population and its coping capacity with disasters.

Preparedness- It shows how to be prepared, trained and skilled is the population for all the range of disasters. This is an important step in a pre-disaster scenario.

Rehabilitation- Long-term support provided to the people affected by the disaster such as reconstructing homes in the need of the hour.

Relief- Following a disaster, immediate aid and support are provided to the affected population to help them cope better with the situation.

Vulnerability- It represents the susceptibility of a given population to adverse impacts of a hazard. It is important for disaster preparedness and response.

4.6 ANSWER TO CHECK YOUR PROGRESS

1. Disaster Management Act was implemented in which year?
    a. 2000
    b. 2002
    c. 2005
    d. 2010
2. Who prepared National Disaster Risk Index mapping hazards and vulnerabilities of 640 districts of India?
3. The main agenda for Sendai Framework is:
    a. Disaster avoidance

b. Disaster Risk Reduction
c. Desertification
d. Displacement

4. Which of the following elements and activities of disaster preparedness are NOT correctly matched:
   a. Pre knowledge of hazards: Hazard Impact Assessment
   b. Formal and Informal Response Plans: Developing disaster plans
   c. Life safety protection: Training family members
   d. Property protection: Understanding hazard
5. List the components of a people-centric disaster management.

Answers: Q.1 (c), Q.2 Ministry of Home Affairs, Government of India, Q.3 (b), Q.4 (d)

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4.8 TERMINAL QUESTIONS

1. What is the importance of disaster preparedness?
2. Explain the general principles of disaster preparedness.
3. Enlist the measures required for household preparedness for disasters.
4. Discuss the role of the community in disaster preparedness.
5. Community resilience practices are considered a resource. Elaborate.

UNIT 6 – DISASTER AND DEVELOPMENT

6.1 OBJECTIVES

After having gone through this unit, the learner should be able to understand that:

1. how the disaster effect the developmental activates;
2. how the development causes for disaster sustainability and safety form disaster; and
3. the interrelationship between disaster and development in both the way, i.e., positive and negative.

6.2 INTRODUCTION

Disasters have been a recurring, often devastating, facet of human existence throughout history. From natural catastrophes like earthquakes, floods, and hurricanes to man-made crises such as industrial accidents or armed conflicts, disasters have the power to disrupt communities, cripple economies, and, in the worst cases, claim lives. The impact of these events has brought into sharp focus the critical relationship between disaster and development.

Disasters and development are two concepts that, at first glance, may seem unrelated, but they are intricately connected. The relationship between them is both complex and vital to our understanding of how societies progress and safeguard themselves in an increasingly uncertain world. In recent years, it has become increasingly evident that the relationship between disaster and development is intertwined and dynamic. This realization has given rise to the concept of disaster risk reduction (DRR) and the integration of disaster risk reduction into development planning. This approach recognizes that disasters can significantly hinder development efforts and that vulnerability to disasters is often rooted in broader development challenges, such as poverty, inequality, and inadequate infrastructure.

Disasters can undo years of development progress in a matter of moments. For example, a single earthquake or flood can destroy homes, schools, and healthcare facilities, disrupt agricultural production, and erode the livelihoods of communities, setting back development goals and causing long-term suffering. Additionally, the burden of disaster often falls disproportionately on vulnerable and marginalized populations, exacerbating existing disparities.

On the other hand, development choices, such as urban planning, infrastructure development, and environmental management, can influence a community's susceptibility to disasters. Building in high-risk areas, deforestation, or inadequate construction practices can increase the impact of disasters, making it imperative to consider these factors in development initiatives.

The disaster and development are interrelated with each other very significantly. Disaster losses developmental infrastructure while developments prevent or reduce disaster risks through different proactive steps. A detailed account of how disaster and development is interrelated? is presented in this unit.

6.3 DISASTER AND DEVELOPMENT

There's an old saying that means it's better to stop a problem before it happens emphasizing the significance of incorporating prevention and mitigation measures into the development planning process. Natural disasters, such as floods, cyclones, droughts, earthquakes, fires, landslide and others, have multifaceted impacts on development. These incidents inflict harm on infrastructure, essential services, and critical facilities, leading to human, financial, and environmental losses. To better understand the interplay between disasters and development, it is advantageous to differentiate between the economic and social aspects of development. Both social and economic development can directly or indirectly influence the mitigation or exacerbation of disaster risks. Table-6.1 reveals that there are three types of inter-relationships between disaster and socio-economic development. These are:

1. Disasters limits development,
2. Development causes disaster risk, and
3. Development reduces disaster risk.

A detailed description of these inter-relationships between disaster and socio-economic development is presented in the following paragraphs.

Table-6.1: Relationship between disaster and socio-economic development.

Disaster and Development		
	Economic development	Social development
Disaster limits development	1. Destruction of tangible assets. 2. Impairment of transport and communication system. 3. Damage of other infrastructure. 4. Damage of livelihood means.	1. Destruction of health and educational infrastructure. 2. Death of people. 3. Migration of people from disaster affected area.
Development causes disaster risk	1. Unsustainable developmental activities cause disaster risk. For example, construction of roads using heavy machines results in landslide disaster.	1. Disaster causes for the separation of people from their family, society and culture.
Development reduces disaster risk	1. Investment in research and development reduces disaster risks. For example, establishment of early warning station.	1. Development of disaster resilience infrastructure such as buildings, roads etc as per the vulnerability of disaster.

6.3.1 Disasters Limits Development

Disasters significantly limit social and economic development. Natural disasters, such as earthquakes, hurricanes, floods, and wildfires, can cause extensive damage to infrastructure, disrupt essential services, displace populations, and result in economic setbacks. Disasters have the capacity to erase the progress made in economic and social development over many years. For instance, in 1982, Hurricane Isaac devastated 22% of the housing in the Togan archipelago. The reconstruction efforts to repair damage to water and sanitation, energy, telecommunications, as well as roads and railway infrastructure due to the flooding in Mozambique in 2000 amounted to a total cost of $165.3 million.

Hurricane Katrina was a devastating natural disaster that struck the Gulf Coast of the United States in August 2005. It was one of the deadliest and costliest hurricanes in U.S. history. The hurricane originated in the Atlantic Ocean, gaining strength as it moved towards the Gulf of Mexico. When it made landfall, it brought powerful winds and torrential rainfall, resulting in widespread flooding and destruction (Fig. 6.1A). New Orleans, Louisiana, was particularly hard hit as its system of levees and flood walls failed, leading to catastrophic flooding. The city's low-lying geography made it especially vulnerable to the storm surge. Tens of thousands of residents were stranded in flooded homes and on rooftops, leading to a humanitarian crisis. Hurricane Katrina caused massive economic losses and also resulted in over hundreds of deaths and caused extensive property damage including infrastructure, including housing, roads and ports, displacing hundreds of thousands of people.

The Haiti earthquake, which occurred on 12 January, 2010, was a catastrophic natural disaster with devastating consequences. It was a magnitude 7.0 earthquake that struck the capital city of Port-au-Prince and its surrounding areas. The earthquake resulted in widespread destruction (Fig. 6.1B), with buildings and infrastructure collapsing, leading to the loss of thousands of lives and leaving many more injured and homeless. This disaster had a profound impact on Haiti's social, economic, and political stability. It overwhelmed the country's already fragile healthcare and emergency response systems, making it challenging to provide immediate assistance to the affected population.

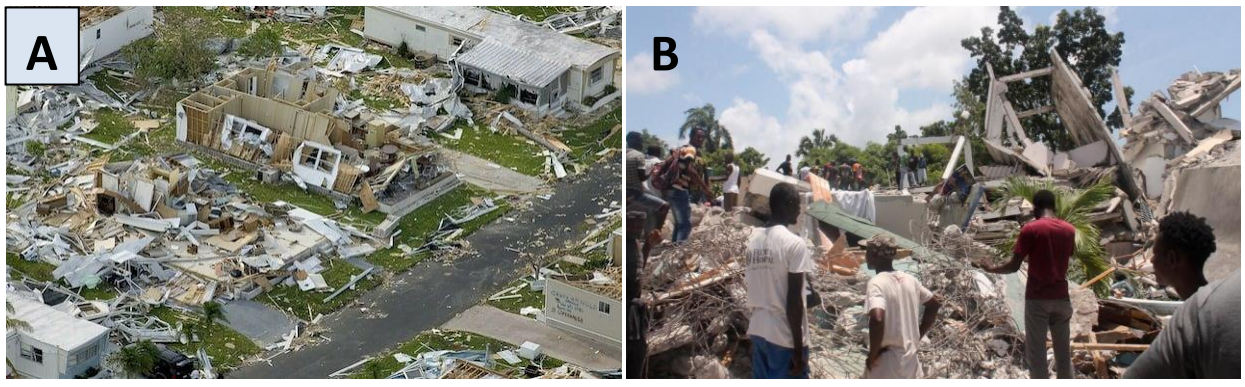

Fig. 6.1: Destruction of infrastructure by (A) Hurricane Katrina and (B) Haiti earthquake.

The Indian Ocean tsunami of 2004 was one of the deadliest natural disasters in recorded history. On December 26, 2004, a massive undersea earthquake with a magnitude of 9.1-9.3 off

the west coast of northern Sumatra, Indonesia, triggered a series of powerful tsunamis that radiated across the Indian Ocean. The tsunamis struck the coasts of 14 countries, causing widespread devastation and loss of life. The impact was catastrophic (Fig. 6.2A), with massive waves reaching heights of up to 100 feet in some areas. Entire communities were inundated, and the destructive force of the waves damaged infrastructure, homes, and livelihoods. The disaster resulted in the deaths of an estimated 230,000 to 280,000 people and displaced millions more. The affected countries, including Indonesia, Sri Lanka, India, Thailand, and others, faced immense challenges in providing relief, rebuilding, and supporting the survivors.

The Chernobyl nuclear disaster, which occurred on 26 April, 1986, is one of the most catastrophic nuclear accidents in history (Fig. 6.2B). It took place at the Chernobyl Nuclear Power Plant in Pripyat, Ukraine, then part of the Soviet Union. The disaster resulted from a combination of reactor design flaws and operator errors during a late-night safety test. The explosion and subsequent fires released a massive amount of radioactive materials into the atmosphere, affecting not only the immediate vicinity but also spreading contamination across Europe. The disaster had devastating consequences, leading to the loss of lives, long-term health issues, and the displacement of thousands of people from the affected areas.

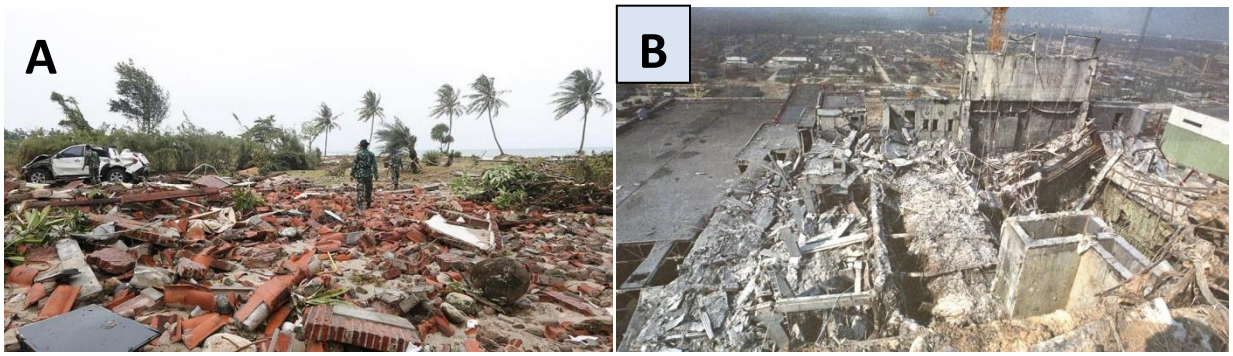

Fig. 6.2: Massive destruction of infrastructure by (A) Indian Ocean Tsunami and (B) most catastrophic Chernobyl nuclear accident.

COVID-19, short for Corona Virus Disease 2019, is a highly contagious respiratory illness caused by the novel coronavirus SARS-CoV-2. It emerged in late 2019 in Wuhan, China, and rapidly spread to become a global pandemic. The virus primarily spreads through respiratory droplets, leading to symptoms like fever, cough, and difficulty breathing, which can range from

mild to severe. COVID-19 pandemic, while not a traditional disaster, the pandemic had profound social and human development impacts. Lockdowns, social isolation, and the loss of educational opportunities for many children disrupted social networks and contributed to mental health issues. The pandemic also exacerbated inequalities, affecting vulnerable populations more severely. Due to this pandemic, thousands of people lost their life (Fig. 6.3A).

The Amazon rainforest fires, often referred to as the "lungs of the Earth," have garnered global attention due to their devastating impact on one of the world's most vital ecosystems. They not only release vast amounts of carbon dioxide into the atmosphere but also destroy critical biodiversity and disrupt the water cycle. The consequences of these fires (Fig. 6.3B) extend far beyond the Amazon region, contributing to climate change and affecting global weather patterns.

Fig. 6.3: Loss of life due to (A) COVID-19 pandemic and (B) forest fire incident in Amazon rainforest of Brazil.

Industrial fires can have a profound and detrimental impact on development. These fires not only pose immediate risks to human lives and safety but can also result in extensive damage to infrastructure, economic losses, and environmental harm. The destruction of factories and production facilities can disrupt the supply chain, leading to unemployment, reduced productivity, and economic setbacks in the affected region. Moreover, the release of toxic substances and pollutants from industrial fires can have long-term consequences for public health and the environment, further impeding development efforts.

Natural disasters always have a profound impact on poverty by exacerbating the vulnerabilities of low-income communities. When disasters strike, they often destroy homes, livelihoods, and critical infrastructure, pushing already marginalized populations further into poverty. The loss of assets, income, and employment opportunities can trap individuals and families in a cycle of poverty. Additionally, post-disaster recovery efforts often divert resources away from long-term development projects, further hindering poverty reduction.

Disasters can have a significant impact on social progress, often causing setbacks in various aspects of development. For instance, when a natural disaster like a hurricane strikes, it can lead to the destruction of homes, infrastructure, and vital services. This results in the displacement of communities, disruption of education, and reduced access to healthcare and clean water.

The above discussion illustrates how disasters can cause multi-faceted losses in development, affecting economies, societies, and the environment. They include immediate impacts on human life, housing, infrastructure, and agriculture, as well as long-term economic setbacks, increased poverty, and social disruption. To mitigate the impact of disaster on poverty it is crucial for governments and organizations to prioritize disaster preparedness, invest in resilience-building measures, and ensure that disaster response efforts are designed to support the most vulnerable populations in their recovery and development aspirations. Therefore, preventing and mitigating disasters are crucial for sustaining development and ensuring the well-being of communities.

6.3.2 Development Causes Disaster Risk

Development is an essential aspect of societal progress, often associated with improved living standards, infrastructure, and economic growth. However, it is crucial to recognize that development can also give rise to disaster risks, potentially jeopardizing the well-being of communities. This exploration delves into the causes of disaster risk induced by development, shedding light on the intricate relationship between progress and vulnerability.

One primary cause of heightened disaster risk is rapid urbanization and infrastructure development. As populations gravitate towards urban centers, cities expand and demand

increased infrastructure. While this surge in construction enhances connectivity and accessibility, it simultaneously leads to environmental alterations, such as deforestation and changes in land use. Urban areas, due to their concentrated nature, become more susceptible to natural disasters like floods, landslides, and earthquakes. Cities like Miami, Florida, face escalating risks due to a combination of urbanization and climate change, exposing them to more intense hurricanes and storm surges.

The quest for economic development frequently involves large-scale deforestation to make way for agriculture, infrastructure, or logging. In other words, factor contributing to disaster risk is deforestation, a consequence of developmental activities such as agriculture, logging, and urban expansion. Trees play a vital role in stabilizing soil, preventing erosion, and mitigating the impact of natural disasters. Deforestation weakens these natural defenses, making areas more susceptible disasters. Additionally, altered ecosystems can disrupt the balance of nature, leading to increased vulnerability to extreme weather events.

The process of industrialization, integral to development, contributes significantly to climate change. Greenhouse gas emissions from industries and increased energy consumption lead to global warming, resulting in more frequent and intense weather events. The heightened frequency of hurricanes, droughts, and heat waves poses a direct threat to communities, especially those located in low-lying coastal areas. The climate change is increasing vulnerability to disaster risks. The Bhopal gas tragedy in 1984 is a stark illustration of the dangers associated with industrial development. The release of toxic gas from a pesticide plant led to thousands of deaths and long-term health consequences for the affected population.

In the pursuit of rapid development, cities often expand without sufficient planning and consideration for disaster resilience. Unregulated urbanization can lead to the construction of buildings in high-risk zones, inadequate drainage systems, and poor waste management. These factors amplify the impact of natural disasters, putting the lives and livelihoods of the population at risk. The lack of proper urban planning exacerbates the vulnerability of communities to disasters triggered by both natural and human-induced factors.

Although, development is crucial for societal progress, it is essential to approach it with a comprehensive understanding of its potential consequences on disaster risk. Striking a balance

between progress and environmental sustainability, implementing resilient infrastructure, and fostering community awareness are the key to mitigating the adverse impacts of development on disaster vulnerability. Through wise planning and sustainable practices, societies can aspire to achieve progress while minimizing the risks associated with natural disasters.

6.3.2 Development Reduces Disaster Risk

Development is not just about economic progress; when approached strategically, it becomes a powerful tool for reducing disaster risk. As societies evolve and advance, it is imperative to integrate measures that enhance resilience and mitigate the impact of natural disasters. In this section we will discuss how various facets of development contribute to disaster risk reduction.

One of the most tangible ways development reduces disaster risk is through the construction of resilient infrastructure. For instance, earthquake-prone Japan has invested significantly in engineering innovations. The Tokyo Skytree, designed to withstand seismic activity, stands as a testament to how advanced infrastructure can protect lives and property during earthquakes. Similarly, the Netherlands' sophisticated system of dikes and sea barriers showcases how strategic development can mitigate the risk of flooding in low-lying regions.

Development plays a pivotal role in establishing effective early warning systems, a critical component of disaster risk reduction. Japan's meteorological agency, renowned for its advanced technology and swift response, provides timely and accurate information about earthquakes and tsunamis. The result is a population that is well-prepared and can evacuate promptly, significantly reducing casualties. This example underscores the symbiotic relationship between technological development and disaster resilience.

Development that incorporates education is a powerful tool in reducing vulnerability to disasters. In the aftermath of the devastating 2004 Indian Ocean tsunami, Thailand initiated the Tsunami Early Warning System. Simultaneously, educational programs were implemented to educate coastal communities about evacuation procedures and the signs of an impending tsunami. This integrated approach not only saved lives during subsequent events but empowered communities to actively participate in their own safety.

Sustainable development practices contribute to disaster risk reduction by mitigating environmental degradation. Costa Rica, a pioneer in sustainable development, has not only preserved its rich biodiversity but has also reduced vulnerability to landslides and floods. By maintaining extensive forest cover and adopting eco-friendly agricultural practices, the country has built a natural buffer against the adverse effects of extreme weather events.

Effective disaster risk reduction involves addressing socio-economic vulnerabilities. Kerala, a state in India prone to annual monsoon flooding, has integrated social safety nets into its development strategy. The government provides financial assistance and relief measures to vulnerable populations, ensuring that the impact of disasters on marginalized communities is minimized. This approach reflects the understanding that development must prioritize inclusivity to be truly effective in reducing disaster risk.

In conclusion, the relation between development and disaster risk reduction is dynamic and multifaceted. Through the strategic construction of resilient infrastructure, implementation of early warning systems, educational initiatives, sustainable environmental practices, and the establishment of social safety nets, societies can significantly enhance their resilience to natural disasters. By learning from successful examples worldwide, we can further refine our approach to development, ensuring that progress goes hand in hand with disaster resilience for a safer and more sustainable future.

6.4 SUMMARY

Natural disasters, from earthquakes to floods, have the potential to severely impede the trajectory of development. The destruction of infrastructure, loss of lives, and economic setbacks resulting from these events create formidable challenges for communities striving for progress. Rebuilding efforts often divert resources that could otherwise be allocated to long-term development projects, perpetuating a cycle of vulnerability and impeding overall societal advancement.

Paradoxically, certain aspects of development can inadvertently contribute to the occurrence and severity of disasters. Urbanization and inadequate land-use planning, for instance, may lead to increased vulnerability to floods and other climate-related events.

Unchecked industrialization may result in environmental degradation, exacerbating the impact of natural disasters. Striking a balance between progress and environmental sustainability is essential to prevent development from becoming a catalyst for disasters.

On a more optimistic note, intentional and strategic development can significantly reduce the risk and impact of disasters. Investing in resilient infrastructure, implementing advanced early warning systems, and integrating sustainable environmental practices can fortify communities against the destructive forces of nature. Education and social safety nets further empower populations, ensuring that the benefits of development extend to the most vulnerable, creating a more resilient foundation for sustained progress. Recognizing the interdependence of disaster and development is crucial in fostering a holistic approach that not only mitigates risks but also promotes sustainable and inclusive growth.

6.5 GLOSSARY

Community Engagement: Involving and empowering community members in decision-making processes and development initiatives to ensure their needs and perspectives are considered.

Development: The process of improving the economic, social, and environmental well-being of a community, often involving growth, progress, and positive change.

Disaster: A sudden and severe event, often caused by natural forces such as earthquakes, floods, or hurricanes, that results in significant harm to people, property, and the environment.

Early Warning System: A system that uses technology and communication to provide timely alerts and information about impending disasters.

Infrastructure: The basic physical and organizational structures and facilities needed for the operation of a society, such as buildings, roads, and utilities.

Resilience: The ability of a community or system to withstand, adapts to, and recovers from the effects of a disaster, minimizing damage and facilitating a swift

return to normalcy.

Risk: The likelihood of a disaster occurring and the potential consequences associated with it.

Social Safety Nets: Programs and policies designed to provide financial assistance and support to vulnerable populations during times of need, such as after a disaster, to prevent further hardships.

Sustainability: Meeting the needs of the present without compromising the ability of future generations to meet their own needs.

Vulnerability: The degree to which a community or individual is susceptible to the negative impacts of a disaster.

6.6 ANSWER TO CHECK YOUR PROGRESS

- Building strong and safe houses helps us be ready for disasters.
- Early warning systems give us time to prepare before a disaster happens.
- Learning about what to do in emergencies is important for everyone.
- Planting trees and taking care of the environment can protect us from some disasters.
- Making sure everyone has clean water and enough food is part of getting ready for disasters.
- Fixing roads and bridges helps us recover faster after disasters.
- Helping each other during hard times is part of being a strong community.
- Making schools and hospitals safe is important for everyone's well-being.
- Saving money for emergencies is a good idea to be ready for unexpected events.
- Stopping pollution helps prevent disasters caused by environmental damage.
- Knowing where to go and what to do during a disaster keeps us safe.
- Planning for how to stay connected with family and friends is part of disaster readiness.
- Listening to weather forecasts and being aware of changing conditions helps us prepare for disaster.
- Being kind and supportive to each other creates a sense of community resilience.

- Natural disasters, like floods and earthquakes, can slow down or stop the progress of building new things in a community.
- Rebuilding after a disaster takes time and money, which could have been used for other important things like education and healthcare.
- The damage from a disaster can create a setback, making it harder for people to improve their lives and the place they live in.
- Disasters not only hurt people and their homes but can also limit the development and growth of a community.

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6.8 TERMINAL QUESTIONS

Long Questions

1. How does the construction of strong buildings and infrastructure contribute to reducing the impact of disasters and in what ways is this aspect integrated into development initiatives?
2. Can you elaborate on the role of education in disaster risk reduction as part of development efforts, and how does it empower communities to respond effectively to emergencies?
3. In what ways do early warning systems, a component of development, enhance the ability of communities to prepare for and respond to natural disasters?
4. How does the promotion of sustainable environmental practices through development contribute to minimizing the severity of disasters? and can you highlight some examples?

Short Questions

1. How does development contribute to the resilience of infrastructure in the face of natural disasters?
2. Can you provide examples of early warning systems implemented as part of development strategies to mitigate disaster risks?
3. In what ways does education play a role in reducing vulnerability to disasters and enhancing community preparedness?
4. How can sustainable environmental practices, integrated into development, help mitigate the impact of disasters?
5. What are some social safety nets implemented in development initiatives to support vulnerable populations during disasters?
6. How do natural disasters pose challenges to economic development and long-term progress?
7. Can you describe the impact of disasters on infrastructure and access to essential services like education and healthcare, hindering societal well-being?
8. In what ways does the displacement of communities and loss of livelihoods due to disasters contribute to prolonged poverty?
9. How can the psychological impact of disasters on affected populations hinder human capital development and resilience?

10. What measures can be taken in the development process to ensure that progress is achieved in a way that reduces rather than increases disaster risks?

Multiple Choice Questions

1. What is the primary aim of development in the context of disaster resilience?

A) To increase the frequency of natural disasters.

B) To create vulnerabilities in communities.

C) To enhance resilience and reduce the impact of disasters.

D) To ignore the connection between development and disasters.

Answer: C

2. How can disasters impede development progress?

A) By fostering economic growth.

B) By diverting resources and causing economic setbacks.

C) By promoting infrastructure stability.

D) By accelerating educational advancements.

Answer: B

3. Which of the following is a potential risk associated with rapid and unsustainable development?

A) Increased disaster resilience.

B) Enhanced community preparedness.

C) Environmental degradation and heightened disaster risk.

D) Improved social safety nets.

Answer: C

4. How does the construction of resilient infrastructure contribute to disaster risk reduction?

A) By increasing vulnerability to disasters.

B) By diverting resources from disaster preparedness.

C) By providing protection and minimizing the impact of disasters.

D) By encouraging unsafe building practices.

Answer: C

5. What role does education play in the context of disaster and development?

A) It has no impact on disaster preparedness.

B) It empowers communities to respond effectively and minimizes risks.

C) It increases vulnerability to disasters.

D) It is irrelevant to the development process.

Answer: B

6. In what way can disasters affect access to essential services during development?

A) By improving accessibility to services.

B) By causing widespread infrastructure disruption.

C) By promoting educational advancements.

D) By accelerating economic growth.

Answer: B

7. How can sustainable environmental practices contribute to disaster risk reduction?

A) By exacerbating environmental degradation.

B) By preserving natural buffers like forests.

C) By increasing vulnerability to climate change.

D) By encouraging deforestation.

Answer: B

8. What is the purpose of social safety nets in the context of disaster and development?

A) To increase vulnerability.

B) To divert resources from disaster response.

C) To ensure vulnerable communities receive support during and after disasters.

D) To promote unsafe living conditions.

Answer: C

9. How does early warning systems contribute to disaster risk reduction?

A) By causing panic and chaos in communities.

B) By providing inaccurate information during disasters.

C) By offering timely alerts, allowing for effective evacuation.

D) By ignoring the importance of communication.

Answer: C

10. What is the cyclical effect that disasters can create in relation to development?

A) Accelerating economic growth.

B) Exacerbating poverty through displacement and loss of livelihoods.

C) Fostering environmental sustainability.

D) Promoting human capital development.

Answer: B

11. Where did the devastating 2010 earthquake with a magnitude of 7.0 occur?

A. Japan

B. Haiti

C. Indonesia

D. Nepal

Answer: B

12. Which region experienced the infamous 2004 Indian Ocean tsunami?

A. South America

B. East Africa

C. Southeast Asia

D. Europe

Answer: C

13. In 2011, a triple disaster involving an earthquake, tsunami, and nuclear meltdown struck which country?

A. China

B. Chile

C. Japan

D. Mexico

Answer: C

14. Where did Hurricane Katrina, one of the costliest natural disasters in U.S. history, make landfall in 2005?

A. Florida

B. Louisiana

C. Texas

D. California

Answer: B

15. Which area was severely affected by the 2013 Typhoon Haiyan, one of the strongest tropical cyclones ever recorded?

A. Philippines

B. Australia

C. India

D. Vietnam

Answer: A

UNIT 7 – DISASTER MANAGEMENT PLANS

7.1 OBJECTIVES

After reading this unit, the learner should be able to:

1. elaborate the meaning and definition of disaster management,
2. the need of counter-disaster management plan, and
3. explain the different level disaster management plans.

7.2 INTRODUCTION

Disasters can strike at any moment, often leaving communities in chaos and individuals in distress. From natural calamities like earthquakes, floods, and hurricanes to human-made crises such as industrial accidents and pandemics, the unpredictability of these events underscores the importance of having a robust Disaster Management Plan in place. This comprehensive plan serves as a roadmap for communities to combat disasters.

Disasters come in various forms, and their impacts can be devastating, affecting homes, livelihoods, and the overall stability of a region. The Disaster Management Plan aims to minimize these impacts by establishing clear protocols and strategies that address the unique challenges posed by different types of disasters. By fostering a culture of preparedness, communities can reduce vulnerabilities and enhance their ability to withstand and recover from unforeseen events.

At the heart of any effective Disaster Management Plan is the concept of community resilience. This involves empowering individuals, neighborhoods, and local organizations to work together proactively. Through education and awareness programs, communities can equip themselves with the knowledge and skills needed to respond swiftly and effectively when disaster strikes. Collaboration between residents, emergency services, and local authorities is key to building a resilient community capable of weathering the storm, both figuratively and literally.

The Disaster Management Plan comprises several crucial components, each serving a specific purpose in the preparedness and response process. These include risk assessments to

identify potential hazards, emergency response procedures to guide actions during a crisis, evacuation plans to ensure the safe relocation of residents, and communication strategies to disseminate critical information. Additionally, the plan outlines mechanisms for resource allocation, ensuring that essential services, medical assistance, and humanitarian aid reach those in need promptly.

Advancements in technology play a pivotal role in modern disaster management. From early warning systems that provide timely alerts to the use of drones for rapid assessments of affected areas, integrating technology into the Disaster Management Plan enhances its effectiveness. Moreover, innovative approaches such as community-based participatory planning and social media engagement contribute to a more dynamic and responsive disaster management strategy.

While technology and plans are crucial, the human resource remains at the core of effective disaster management. Training programs, community drills, and outreach efforts ensure that individuals are not only aware of the plan but also capable of implementing it when needed. Empathy, solidarity, and a collective sense of responsibility are vital in fostering a community that can support each other during challenging times.

In brief, a well-crafted Disaster Management Plan is essential for communities to navigate the uncertainties posed by disasters. By fostering resilience, leveraging technology, and recognizing the importance of community involvement, we can build a safer and more prepared society ready to face whatever challenges come our way. Through collective efforts, we can turn the tide against the impact of disasters, emerging stronger and more united in the face of adversity. In this unit, we will study i) the importance of disaster management plan and ii) disaster management plan in detailed.

7.3 DISASTER MANAGEMENT PLANS

What is Disaster Management Plan?

Dear learners, when we think about disaster management plan (DMP), a question arise in our mind that what is disaster management plan? So, at first, let's understand this thing. A

Disaster Management Plan is like a guide that helps a community get ready to respond disasters. Disasters can be natural, like earthquakes or floods, or human-made, like accidents or pandemics. The plan lays out steps and strategies to keep people safe and reduce the damage caused by these events. It includes things like figuring out the risks, making plans for emergencies, deciding where people should go if they need to leave their homes, and making sure everyone knows what to do. The goal is to make the community strong and prepared so that when a disaster happens, people can work together to stay safe and bounce back quickly.

Need of Disaster Management Plan

The need of counter disaster plans have been proved internationally during different disasters. Having a Disaster Management Plan is like having a guidebook to help us when unexpected and tough situations, like floods, earthquakes, or other emergencies, happen. It's important because it helps communities prepare for these events so that everyone can stay safe and bounce back quickly. Think of it like this: if you know a storm is coming, you would make sure you have everything you need at home, right? Disaster management is similar; it helps communities point out what they need to do to protect themselves from a disaster. This plan includes things like where to go for safety, how to communicate with each other, what the government is doing to us, and how to make sure everyone gets the help they need.

The crucial purpose of Disaster Management Planning is to foreseeing future scenarios and needs, guaranteeing the implementation of well-coordinated and effective countermeasures. This definition proves particularly valuable for disaster management officials, as it highlights the broad scope and diverse requirements like prevention, mitigation, response, and recovery measures inherent in counter-disaster planning.

Levels of Disaster Management Plan

Disaster management plans operate across different levels to ensure a comprehensive and coordinated response to emergencies. These plans are typically structured or semi-structured at the national, regional, and local levels, each playing a crucial role in safeguarding communities and minimizing the impact of disasters. A brief description of different level plans is presented in the following paragraphs.

1. National Level: At the national level, overarching disaster management plans are formulated to address large-scale disasters that may transcend state or regional boundaries. National plans establish policies, frameworks, and guidelines to guide disaster response and recovery efforts. They often involve collaboration between government agencies, non-governmental organizations (NGOs), and other stakeholders. National plans focus on deployment of resources, coordination of federal agencies, and the deployment of specialized teams and assets to support affected regions.

In the case of a small country where the intricacies of government affairs can be efficiently handled at the national level, the primary operational blueprint is likely to be the national disaster plan. Consequently, this plan should encompass a wide range of aspects, addressing both overarching policy considerations and specific action requirements.

2. Regional Level: Regional disaster management plans are tailored to address the specific vulnerabilities and risks within a particular state or geographic region. These plans complement the national framework but take into account local nuances. They involve regional-level agencies, emergency services, and authorities in developing strategies for disaster preparedness, response, and recovery. Regional plans ensure a more localized and immediate response to disasters, with a focus on efficient coordination and communication among various agencies.

3. Local Level: At the local level, plans generally encompass a variety of detailed precautionary measures. A key aspect of the local plan is to effectively organize the efforts of different existing services, such as the police, fire brigade, ambulance service, and voluntary organizations. Additionally, the plan should encourage the involvement of self-help groups and community members, particularly when it promotes the utilization of traditional knowledge, skills, and past experiences related to disasters. Notably, international experiences, both in developing and developed countries, emphasize the essential requirement and tremendous value of well-suited plans and procedures at the local level.

Effectiveness in disaster management relies on seamless collaboration and coordination among these three levels. National plans provide the overarching framework and resources, regional plans customize strategies to regional needs, and local plans ensure the immediate response and recovery at the community level. Regular drills, training programs, and

communication protocols are vital to ensuring that all levels are well-prepared and can work together efficiently during a disaster.

Characteristics of Disaster Management Plan

A well-crafted disaster management plan possesses several key characteristics that contribute to its effectiveness. First and foremost, the plan should have a clear aim, outlining specific objectives and goals to be achieved during a disaster. This clarity ensures that everyone involved understands the purpose and direction of the plan. The plan should be grounded in practical considerations and feasible actions, taking into account the actual risks and resources available. A good disaster management plan should possess the following characteristics:

Clear Communication: The plan should have easy-to-understand instructions that everyone can follow. This helps in spreading important information quickly.

Prevention Strategies: The plan should include ways to prevent disasters or reduce their impact. For example, building houses in a way that can withstand earthquakes. The plan's components must cover diverse aspects, including evacuation procedures, resource allocation, communication strategies, and post-disaster recovery.

Emergency Response Plan: There should be a well-thought-out strategy for how to respond when a disaster happens. This includes steps to ensure people's safety and provide necessary help.

Evacuation Routes: Clearly marked routes for people to leave the area quickly and safely in case of an emergency.

Resource Management: The plan should detail how resources like food, water, and medical supplies will be managed and distributed during and after a disaster.

Training and Drills: Regular practice sessions to make sure that people know what to do in case of a disaster. This helps in avoiding panic and confusion during an actual emergency. Training is a fundamental element, ensuring that all personnel are well-prepared and proficient in executing their roles.

Community Involvement: Involving the community in the planning process ensures that everyone is aware of the plan and understands their role. Community involvement is a cornerstone, engaging the local population in the planning process, raising awareness, and fostering a sense of shared responsibility.

Flexibility: The plan should be adaptable to different types of disasters. What works for a flood may not work for a wildfire, so the plan should be flexible enough to handle various situations. Flexibility is essential, allowing for adaptability to different scenarios and unforeseen challenges.

Coordination with Authorities: Cooperation with local authorities, emergency services, and government agencies is crucial. This ensures a unified and efficient response. Coordination is emphasizing the need for seamless collaboration among various agencies and stakeholders, ensuring a unified and effective response.

Regular Updates: The plan should be reviewed and updated regularly to incorporate new information, technologies, and lessons learned from past incidents.

7.4 SUMMARY

A good disaster management plan is like a well-thought-out guide to deal with unexpected events. It should have a clear purpose, stating what needs to be achieved during a disaster. The plan must be realistic, taking into account the actual risks and resources available. It should operate on different levels, covering various aspects of disaster response, and be flexible enough to adapt to different situations. Coordination among different groups involved is crucial for a smooth and effective response. Responsibilities should be clearly defined so that everyone knows what they need to do. The plan should include detailed components like evacuation procedures, resource allocation, and communication strategies. Clear communication is vital, both within response teams and to the public. Regular training ensures that everyone is well-prepared. Importantly, involving the local community in the planning process creates a sense of shared responsibility, making the plan more resilient and effective overall. In short, a good disaster management plan combines clarity, realism, coordination, and community involvement to create a reliable framework for dealing with unexpected events.

7.5 GLOSSARY

Disaster Management Plan: A comprehensive document outlining strategies, procedures, and guidelines to mitigate, respond to, and recover from disasters.

Clarity of Aim: The explicit and understandable purpose or objective of the disaster management plan, defining what needs to be achieved during a crisis.

Level of Plans: Different tiers of planning within the disaster management framework, including strategic, tactical, and operational levels, each addressing specific aspects of disaster response.

Flexibility: The ability of the plan to adapt to various scenarios and unforeseen challenges, ensuring its relevance and effectiveness in dynamic situations.

Coordination: The seamless collaboration and communication among various agencies, organizations, and stakeholders involved in disaster response to ensure a unified and efficient effort.

Definition of Responsibility: Clearly outlining the roles and responsibilities of each entity involved in the disaster management plan, preventing confusion and ensuring effective execution.

Plan Components: Detailed elements of the disaster management plan, such as evacuation procedures, resource allocation strategies, communication plans and post-disaster recovery initiatives.

Clear Communication: Timely and accurate sharing of information, both within response teams and to the public, to facilitate a coordinated and informed response during a disaster.

Training: Ongoing educational programs and exercises to ensure that personnel are well-prepared and proficient in their roles outlined in the disaster management plan.

Community Involvement: Engaging the local population in the planning process, raising awareness, and fostering a sense of shared responsibility for disaster preparedness, response, and recovery.

7.6 ANSWER TO CHECK YOUR PROGRESS

- A disaster management plan is like a guide for dealing with unexpected events.
- It should have a clear purpose, stating what needs to be achieved during a disaster.
- Realism is important, considering the actual risks and available resources.
- The plan should operate on different levels, covering various aspects of disaster response.
- Flexibility is crucial, allowing for adaptation to different situations.
- Coordination among different groups involved is essential for an effective response.
- Responsibilities should be clearly defined so that everyone knows their role.
- Components like evacuation procedures and communication strategies should be detailed.
- Clear communication is vital, both within response teams and to the public.
- Regular training ensures that everyone is well-prepared for a disaster.
- Involving the local community in the planning process creates a sense of shared responsibility.
- The plan should be comprehensive, covering different aspects of disaster management.
- It should be realistic, considering the actual risks and resources available.
- The plan's success depends on effective coordination among different groups.
- Overall, a well-crafted disaster management plan combines clarity, realism, coordination, and community involvement for an effective response.

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7.8 TERMINAL QUESTIONS

Long Questions

1. Can you elaborate on the significance of clear communication within a disaster management plan, both internally among response teams and externally to the public, and how does effective communication contribute to the overall success of the plan?
2. In the context of disaster management planning, how is the coordination among different agencies and stakeholders emphasized, and what measures are taken to ensure seamless collaboration to achieve a unified and efficient response to a disaster?

Short Questions

1. What is the primary purpose of a disaster management plan?
2. Why disaster management plan is crucial for dealing unexpected crisis?
3. How does a plan's flexibility contribute to effective disaster response?
4. Why is coordination among various groups essential during a disaster?
5. What role does clear communication play in a disaster management plan?
6. How can responsibilities be effectively defined in a disaster management plan?
7. What are some key components that should be included in a disaster management plan?
8. Why is it important for a plan to operate on different levels of response?
9. How does community involvement enhance the effectiveness of a disaster management plan?
10. Why is regular training a fundamental aspect of disaster preparedness?

Multiple Choice Questions

1. What is a disaster management plan?

a) A historical document

b) A guide for dealing with unexpected events

c) A financial report

d) A marketing strategy

2. Why is realism important in a disaster management plan?

a) To make it more interesting

b) To consider actual risks and available resources

c) To attract media attention

d) To create fictional scenarios

3. What is a key characteristic of a good disaster management plan?

a) Complexity

b) Lack of flexibility

c) Clarity of purpose

d) Inadequate coordination

4. Why is flexibility crucial in a disaster management plan?

a) To make it more challenging

b) To adapt to different situations

c) To increase response time

d) To limit the options available

5. What does coordination among different groups ensure in a disaster management plan?

a) A smooth and effective response

b) Increased confusion

c) Delayed communication

d) Unnecessary competition

6. What should be clearly defined in a disaster management plan?

a) Fictional scenarios

b) Ambiguous responsibilities

c) Responsibilities of each entity involved

d) None of the above

7. Which components should a disaster management plan include?

a) Only evacuation procedures

b) Only communication strategies

c) Only resource allocation

d) Multiple aspects like evacuation procedures, resource allocation, and communication strategies

8. Why is clear communication vital in a disaster management plan?

a) To create confusion

b) To avoid transparency

c) To ensure accurate and timely information dissemination

d) To limit information sharing

9. What does regular training ensure in a disaster management plan?

a) Lack of preparedness

b) Effective response

c) Increased confusion

d) Isolation of response teams

10. Why is community involvement important in a disaster management plan?

a) To increase isolation

b) To create confusion

c) To foster a sense of shared responsibility

d) To limit public awareness

Answers

QN.	Answer	QN.	Answer
1	B	6	C
2	B	7	D
3	C	8	C
4	B	9	B
5	A	10	C

BLOCK 3 – RESPONSE TO DISASTER IMPACT

UNIT-8 RESPONSE & SEARCH

8.1 OBJECTIVES

- Understanding the role of response in disaster impact
- Know the role of international and national organizations in disaster management
- Know the human factors in response
- Under the role of Technologies in Response and search

8.2 INTRODUCTION

In the world of disaster management, "response" and "search" are like the heroes that spring into action when trouble strikes. Imagine a disaster, like a big storm or an earthquake, causing chaos and putting people in danger. That's when the response phase steps in. It's like the cavalry arriving to help save the day. This phase focuses on quickly saving lives, providing immediate help, and making things better as fast as possible. But that's not all. Inside the response phase, there's another superhero called "search." When people are trapped or missing in a disaster, search teams rush in to find them. It's like a giant game of hide and seek, but with real-life consequences. In this chapter, we'll explore the important roles of response and search in the disaster management cycle, learning how they work together to keep people safe during tough times. So, let's dive into their exciting world and discover how they make a big difference when disaster strikes!

8.3 DEFINITION

Disaster response refers to the actions and efforts taken immediately before, during, or right after a disaster or emergency occurs. The main purpose of disaster response is to save lives, protect people's health and safety, and provide essential support to those affected by the disaster. It includes a wide range of activities such as search and rescue operations, medical care for the injured, setting up emergency shelters, distributing food and water, restoring critical services, and coordinating resources and personnel to address the immediate needs of disaster-affected communities. Disaster response plays a crucial role in mitigating the impact of disasters and helping communities recover from the initial shock. It is one of the key phases in the disaster management cycle, **which typically includes the following stages: mitigation, preparedness, response, and recovery.**

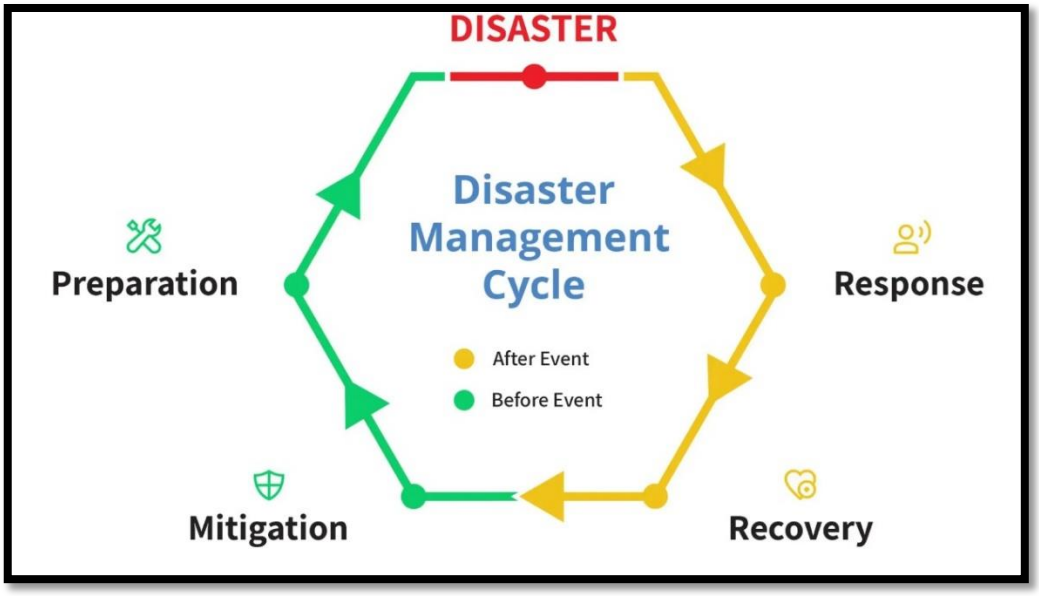

Fig 8.1: Disaster Management Cycle, Source: Google

The response to a disaster usually involves a lot of work and depends a lot on being well-prepared. How well the response goes also affects what needs to be done later for recovery. In simpler terms, when a disaster happens, it takes a lot of effort to respond effectively, and being ready beforehand is important. How well we respond also affects what we need to do to recover afterward.

According to Harlod Cater, "Response measures are those which are taken immediately prior to and following a disaster. Such measures are directed towards saving life and protecting property and to dealing with the immediate damage caused by the disaster".

According to Wikipedia "Disaster **response** refers to the actions taken directly before, during, or in the immediate aftermath of a disaster. The objective is to save lives, ensure health and safety and to meet the subsistence needs of the people affected"

Responding to emergencies often happens in chaotic and sometimes upsetting situations. It can be tough to carry out these operations, and they require a lot from the people, equipment, and resources involved. So, if there isn't a good plan, organization, and training in place, the response operations are unlikely to be as successful as they could be.

Important Characteristics of Response

Response in disaster management involves a set of important characteristics and principles to ensure an effective and efficient response to emergencies. These characteristics include:

1. **Timeliness:** Response actions must be swift and immediate to save lives and minimize damage. Delays can lead to increased casualties and greater harm.
2. **Coordination:** A well-coordinated effort involving various agencies, organizations, and stakeholders is crucial to avoid duplication of efforts and maximize resources.
3. **Scalability:** Response efforts should be flexible and scalable to adapt to the scale and nature of the disaster. The response should grow or shrink as needed.
4. **Sustainability:** Long-term sustainability should be considered, especially in the allocation of resources and the development of recovery plans.
5. **Community Involvement:** Engaging the affected community in decision-making and response activities fosters a sense of ownership and resilience.
6. **Communication:** Effective communication among responders, the public, and affected communities is essential for sharing information, issuing warnings, and maintaining public trust.
7. **Safety:** Prioritizing the safety of responders and affected populations is paramount. Adequate training, protective gear, and risk assessments are critical.
8. **Resource Management:** Efficient use of resources, including personnel, equipment, and supplies, is vital to ensure that they are available when and where they are needed most.
9. **Needs Assessment:** Continuous assessment of the evolving needs of affected populations guides response actions and resource allocation.
10. **Flexibility**: Response plans should be adaptable to changing circumstances and new information.
11. **Prioritization:** Identifying and addressing the most critical needs and vulnerabilities first is key to efficient response operations.
12. **Accountability:** Clear roles and responsibilities should be assigned to responders and organizations, and mechanisms for tracking and reporting progress should be in place.
13. **Cultural Sensitivity:** Acknowledging and respecting cultural differences and norms is important to ensure that response efforts are culturally appropriate.

14. **Humanitarian Principles:** Response activities should be guided by humanitarian principles, including impartiality, neutrality, and the protection of human dignity.
15. **Information Management:** Effective data collection, analysis, and sharing of information are essential for informed decision-making and resource allocation.
16. **Adherence to Laws and Regulations:** Response operations should comply with relevant laws, regulations, and ethical standards.
17. **Continuous Learning**: After-action reviews and evaluations help identify areas for improvement and enhance future response efforts.

These characteristics collectively contribute to a well-rounded and effective disaster response that aims to save lives, alleviate suffering, and support affected communities on their path to recovery.

Some Problem areas in response and search

While response and rescue operations during disaster impacts are essential, they can encounter several problem areas that can hinder their effectiveness. These challenges can vary depending on the type of disaster and the specific circumstances, but some common problem areas include:

1. **Resource Constraints:** Insufficient resources, such as trained personnel, specialized equipment, and supplies, can limit the ability to respond adequately to large-scale disasters.
2. **Communication Breakdowns:** Poor communication between responding agencies, organizations, and affected communities can lead to confusion and coordination issues, hampering response efforts.
3. **Access and Transportation:** Damage to infrastructure, blocked roads, and limited access to affected areas can delay response teams and hinder the timely delivery of aid and support.
4. **Safety Risks**: Responders face various safety risks, including unstable structures, hazardous materials, and adverse weather conditions, which can jeopardize their well-being.
5. **Lack of Preparedness:** Inadequate preparedness and training can result in response teams being ill-equipped to handle the specific challenges posed by the disaster.

6. **Overlapping Efforts:** Lack of coordination and information sharing can lead to multiple agencies or organizations responding to the same location, causing inefficiencies and resource wastage.
7. **Logistical Challenges:** Managing the flow of resources, including transportation, distribution, and storage of supplies, can be logistically complex during disaster response.
8. **Psychosocial Impact:** The emotional toll on both survivors and responders can be significant, potentially leading to burnout, trauma, and mental health issues.
9. **Security Concerns:** In some disaster scenarios, there may be security risks, including looting, violence, or interference with response efforts, which can impede rescue operations.
10. **Language and Cultural Barriers:** Responders may encounter language barriers and cultural differences that can hinder effective communication and understanding of community needs.
11. **Vulnerable Populations:** Special attention is required for vulnerable populations, such as the elderly, children, and individuals with disabilities, who may have unique needs during response and rescue operations.
12. **Information Overload:** Excessive information flow and rumors can complicate decision-making and response coordination.
13. **Environmental Concerns**: Disasters can lead to environmental hazards, such as pollution, which can impact public health and require specialized response efforts.
14. **Political and Bureaucratic Challenges**: Political considerations and bureaucratic red tape can slow down the deployment of resources and hinder response efforts.
15. **Public Expectations**: High public expectations for immediate relief and recovery can create pressure on responders, especially when resources are limited.
16. **Long-Term Recovery:** While response efforts are critical, they should also be linked to long-term recovery and reconstruction plans to ensure sustainable rehabilitation.

Addressing these problem areas requires careful planning, training, coordination, and ongoing evaluation of response and rescue operations. Learning from past disasters and continually improving preparedness measures can help mitigate these challenges and enhance the effectiveness of disaster response efforts.

Main Aspects of Disaster Response And Search

Disaster response and search operations in the aftermath of a disaster impact involve several main aspects that are crucial for effectively managing the situation and saving lives. These aspects encompass a wide range of activities and considerations. Here are the main aspects of disaster response and search:

Assessment and Situational Awareness: Conduct a rapid assessment to understand the extent of the disaster's impact, the number of casualties, and the level of damage to infrastructure and communities.

Maintain situational awareness through ongoing monitoring of changing conditions.

1. **Search and Rescue Operations:**

- Prioritize and conduct systematic search and rescue operations to locate and extricate survivors who may be trapped in collapsed buildings, debris, or other dangerous situations.
- Employ trained search and rescue teams, including urban search and rescue (USAR) teams, K-9 units, and technical rescue specialists.

2. **Medical Care and Triage:**

- Establish medical triage areas near the disaster site to assess and prioritize medical care for survivors.
- Provide immediate medical attention to the injured and transport them to medical facilities as needed.

3. **Temporary Shelter and Basic Needs:**

- Set up temporary shelters for displaced individuals and families, ensuring they have access to safe and clean accommodation.
- Distribute food, water, clothing, and essential supplies to meet immediate needs.

4. **Communication and Information Sharing:**

- Establish clear and reliable communication channels among response teams, incident command, and emergency services.
- Disseminate critical information to the public, including safety guidelines, evacuation instructions, and updates on response efforts.

5. **Coordination and Incident Command:**

- Establish a unified incident command structure to coordinate response efforts among various agencies and organizations.
- Ensure effective coordination to avoid duplication and maximize resources.

6. Logistics and Resource Management:

- Manage the logistical flow of resources, including personnel, equipment, and supplies, to ensure timely and efficient response operations.
- Arrange transportation and support for responders and resources.

7. Psychosocial Support:

- Provide psychological first aid and counseling services to survivors and responders experiencing trauma, stress, and emotional distress.
- Address the mental health needs of affected communities.

8. Documentation and Record Keeping:

- Maintain detailed records of search and rescue activities, including locations searched, individuals found, and medical treatments provided.
- Prepare reports for government agencies, donors, and the public.

9. Security and Safety Measures:

- Implement safety protocols to protect responders and the public from hazards, including unstable structures and hazardous materials.
- Address security concerns and maintain order in affected areas.

10. Public Awareness and Education:

- Promote disaster preparedness and resilience within communities through public awareness campaigns and educational initiatives.
- Educate the public about the risks associated with different types of disasters.

11. International Collaboration:

- Collaborate with non-governmental organizations (NGOs), international agencies, and neighboring countries to access additional resources and expertise if necessary.
- Facilitate international humanitarian assistance and cooperation.

12. Recovery Planning:

- Begin planning for long-term recovery and rehabilitation efforts, including rebuilding communities and infrastructure, as well as addressing ongoing needs.

13. Continuous Assessment and Adaptation:

- Continuously assess the effectiveness of response efforts and adapt strategies based on changing circumstances and feedback.

These aspects of disaster response and search operations require careful planning, coordination, and the involvement of multiple stakeholders to save lives, alleviate suffering, and support affected communities in their journey to recovery and resilience.

Requirements For Effective Response

Effective response in disaster management requires a well-coordinated and prepared approach that involves various stakeholders. Here are the key requirements for an effective disaster response:

1. **Preparedness**: A well-prepared and practiced disaster response plan is essential. This includes developing response protocols, identifying roles and responsibilities, and conducting regular drills and exercises.
2. **Early Warning Systems:** Timely and accurate early warning systems help alert authorities and the public to impending disasters, enabling them to take proactive measures.
3. **Communication:** Establish clear and reliable communication systems among response agencies, organizations, and affected communities. Effective communication ensures that critical information is shared promptly and accurately.
4. **Coordination:** Coordinate response efforts among government agencies, non-governmental organizations (NGOs), international partners, and community groups. Effective coordination minimizes duplication of efforts and maximizes resource utilization.
5. **Resource Allocation:** Ensure that necessary resources, including trained personnel, equipment, and supplies, are readily available and deployable to disaster-affected areas.
6. **Trained Personnel:** Well-trained responders with expertise in various aspects of disaster response, including search and rescue, medical care, logistics, and psychological support, are crucial.
7. **Community Engagement:** Engage affected communities in decision-making, response planning, and implementation. Local knowledge and participation are vital for effective response.
8. **Risk Assessment:** Continuously assess and monitor disaster risks, vulnerabilities, and potential impacts to inform response strategies and resource allocation.

9. **Flexibility:** Response plans should be adaptable to changing circumstances and evolving disaster scenarios. Flexibility allows for effective response in dynamic situations.
10. **Safety Protocols:** Prioritize the safety of responders and affected populations. Develop safety protocols, provide necessary protective equipment, and conduct risk assessments.
11. **Logistics and Supply Chain Management:** Efficiently manage the flow of resources, including transportation, distribution, and storage of supplies, to ensure they reach those in need.
12. **Medical Care:** Establish medical triage and treatment centers, and ensure access to medical supplies, including medicines and equipment, to care for the injured and ill.
13. **Psychosocial Support:** Provide psychological first aid and counseling services to survivors and responders experiencing trauma and emotional distress.
14. **Security Measures:** Address security concerns, including the safety of responders and the protection of resources and facilities, especially in complex emergencies.
15. **Information Management:** Establish systems for data collection, analysis, and sharing to support informed decision-making and response coordination.
16. **Public Information:** Maintain transparent and timely communication with the public, including issuing warnings, sharing safety guidelines, and providing updates on response efforts.
17. **Accountability:** Clearly define roles and responsibilities among response agencies and organizations. Ensure accountability mechanisms are in place.
18. **Monitoring and Evaluation:** Continuously assess the effectiveness of response operations through after-action reviews and evaluations to identify areas for improvement.
19. **International Collaboration:** Collaborate with international organizations and neighboring countries when needed to access additional resources and expertise.
20. **Recovery Planning:** Link response efforts to long-term recovery and rehabilitation plans to promote sustainable rehabilitation and reconstruction.

Effective disaster response is a dynamic and evolving process that requires ongoing training, collaboration, and adaptation to ensure the best possible outcomes in the face of disasters.

Human Factors In Response And Search

Human factors play a crucial role in response and rescue operations during disaster management. These factors encompass the actions, behaviors, and psychological aspects of individuals and teams involved in these critical activities. Understanding and addressing human factors are essential for optimizing the effectiveness and safety of response and rescue efforts. Here are some key human factors to consider:

1. **Training and Competence:** The level of training, skills, and competence of responders significantly impacts their ability to perform effectively during rescue operations.
2. Adequate training ensures that responders can carry out their roles efficiently and safely, reducing the risk of accidents and errors.
3. **Decision-Making:** Decision-making under high-stress situations is a critical human factor. Responders must make rapid, well-informed decisions to save lives and minimize harm. Stress management, clear decision-making protocols, and access to accurate information are essential for effective decision-making.
4. **Communication:** Effective communication is crucial for coordination among response teams, agencies, and the affected population. Communication breakdowns can lead to confusion, duplication of efforts, and safety risks. Training in effective communication techniques is essential.
5. **Leadership and Team Dynamics:** Leadership skills are vital in managing response teams and maintaining order during chaotic situations.
6. Effective team dynamics, including clear roles and responsibilities, trust, and cooperation, are essential for a well-coordinated response.
7. **Stress and Mental Health:** Responders often face high levels of stress, trauma, and emotional challenges during disaster response.
8. Mental health support, counseling, and stress management programs are critical to maintaining the well-being of responders.
9. **Fatigue and Workload:** Long hours and demanding workloads can lead to fatigue, reducing the effectiveness of responders and increasing the risk of accidents. Adequate rest periods, rotation of personnel, and workload management are necessary to combat fatigue.

10. **Safety Awareness:** Responders must have a strong awareness of safety protocols and potential hazards in disaster-affected areas. Safety training, hazard assessments, and the use of personal protective equipment (PPE) are essential for minimizing risks.
11. **Cultural Sensitivity:** Understanding and respecting cultural norms and sensitivities is vital when working with diverse populations affected by disasters. Cultural competence helps responders build trust and effectively communicate with affected communities**.**
12. **Community Engagement:** Engaging with the affected community and involving them in decision-making and response efforts helps build trust and ensures that response activities align with community needs and priorities.
13. **Adaptability and Flexibility:** Responders must be adaptable and able to adjust their strategies and tactics as situations evolve. Flexibility in response plans and the ability to think creatively can be valuable during dynamic and complex disasters**.**
14. **Documentation and Reporting:** Accurate record-keeping and reporting are essential for accountability, learning from experiences, and ensuring transparency in response and rescue operations.
15. **Ethical Considerations:** Upholding ethical principles, including impartiality, neutrality, and the protection of human rights, is fundamental in response and rescue operations.
16. **Public Relations and Trust:** Maintaining good public relations with affected communities and the public at large helps build trust and ensures cooperation in response efforts.

Addressing human factors requires a combination of training, ongoing support, clear protocols, and a commitment to the well-being of responders and the affected population. Recognizing the critical role that human factors play in disaster response is key to enhancing the overall effectiveness and safety of these operations.

ORGANISATIONS WORK IN DISASTER RESPONSE AND RESCUE

Responding to and searching for survivors in the aftermath of a disaster is a critical and time-sensitive task. The response efforts may involve various agencies, organizations, and individuals working together to save lives. Here are some international and national organizations that work to help/aid in disaster response and rescue.

Organizations involved in disaster response and rescue play a critical role in providing immediate assistance and relief during and after natural or man-made disasters. These organizations are often

composed of professionals, volunteers, and specialized teams who are trained to respond swiftly and effectively to mitigate the impact of disasters, save lives, and provide aid to affected communities. Here are some key types of organizations involved in disaster response and rescue:

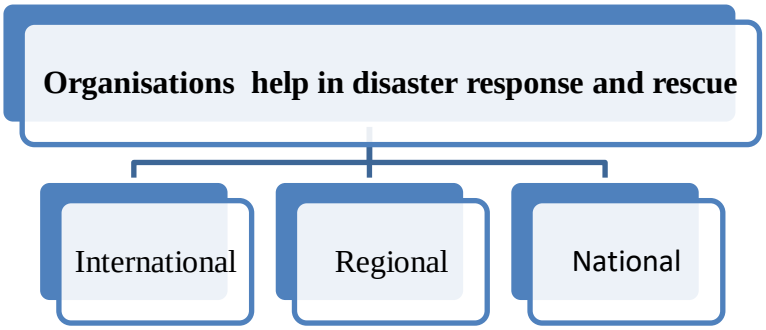

Fig 8. 2: Organisation in Work in Response and Rescue

International Organization

International organizations play a crucial role in disaster response and search operations as part of global disaster management efforts. These organizations provide expertise, resources, and support to countries affected by disasters, often working in collaboration with national and local authorities. Here are some prominent international organizations that assist in disaster response and search operations:

1. United Nations Office for the Coordination of Humanitarian Affairs (OCHA): OCHA coordinates international humanitarian response efforts during disasters. It helps mobilize resources, coordinate assistance, and ensure effective communication among humanitarian organizations.

2. International Federation of Red Cross and Red Crescent Societies (IFRC): IFRC works closely with national Red Cross and Red Crescent societies to provide disaster response and search and rescue services. They have trained teams and volunteers ready to deploy to disaster-affected areas.

3. World Food Programme (WFP): WFP specializes in providing food assistance during and after disasters. They ensure that affected populations have access to adequate nutrition.

4. United Nations Children's Fund (UNICEF): UNICEF focuses on the needs of children and families during disasters, providing access to clean water, sanitation, education, and health services.

5. World Health Organization (WHO): WHO is involved in public health response during disasters, including disease control, medical care, and the provision of essential medicines and supplies.

6. United Nations High Commissioner for Refugees (UNHCR): UNHCR assists with the protection and shelter needs of displaced populations in the aftermath of disasters, including search and rescue efforts.

7. International Search and Rescue Advisory Group (INSARAG): INSARAG is a network of countries and organizations that collaborate in urban search and rescue operations during disasters. They help coordinate and standardize search and rescue efforts globally.

8. International Organization for Migration (IOM): IOM assists with the displacement and movement of affected populations, providing shelter, essential services, and support to migrants and displaced persons.

9. United Nations Development Programme (UNDP): UNDP focuses on disaster recovery and long-term development in disaster-affected areas, helping communities rebuild and become more resilient.

10. Non-Governmental Organizations (NGOs): Many international NGOs, such as Médecins Sans Frontières (Doctors Without Borders), CARE, and Save the Children, are actively involved in disaster response and search operations, providing medical care, shelter, and humanitarian assistance.

11. World Bank and International Monetary Fund (IMF): These financial institutions provide financial support and expertise for disaster recovery and reconstruction efforts in affected countries.

Regional Organizations:

Regional organizations like the European Civil Protection and Humanitarian Aid Operations (ECHO) and the Association of Southeast Asian Nations (ASEAN) also play critical roles in disaster response and coordination within their respective regions.

These international organizations collaborate with national governments, local authorities, and other stakeholders to ensure a coordinated and effective response to disasters, whether they are natural disasters like earthquakes, hurricanes, and floods or man-made disasters such as conflicts and pandemics. Their collective efforts help save lives, alleviate suffering, and support the recovery and resilience-building of affected communities.

National Organizations

India has a robust system of organizations and agencies dedicated to disaster response and rescue. Given India's vulnerability to various natural disasters such as earthquakes, floods, cyclones, landslides, and droughts, as well as man-made disasters, these organizations play a vital role in providing immediate relief, rescue, and recovery efforts. Here are some of the key organizations involved in disaster response and rescue in India:

1. National Disaster Management Authority (NDMA): NDMA is the apex body responsible for formulating policies, plans, and guidelines for disaster management in India. It coordinates disaster response and recovery efforts at the national level and guides state and local authorities.

2. State Disaster Management Authorities (SDMAs): Each state in India has its own SDMA responsible for managing disaster response and rescue operations within their respective states. They work closely with the NDMA and other state-level agencies.

3. National Disaster Response Force (NDRF): NDRF is a specialized force established for conducting search and rescue operations, providing medical assistance, and undertaking other relief and rehabilitation measures during disasters. It has several battalions stationed across the country.

4. Indian Armed Forces: The Indian Army, Navy, and Air Force often play a critical role in disaster response and rescue operations, especially during large-scale disasters. They provide manpower, equipment, and logistics support.

5. Central Reserve Police Force (CRPF): CRPF units are deployed for disaster management and relief efforts, particularly in conflict-prone regions.

6. Indian Coast Guard: The Indian Coast Guard is involved in search and rescue operations, especially during coastal disasters such as cyclones and tsunamis.

7. State Disaster Response Forces (SDRF): Each state has its own SDRF, which is responsible for disaster response within the state. These forces are often the first to respond to disasters.

8. Fire and Emergency Services: State and municipal fire departments play a crucial role in firefighting, rescue operations, and medical assistance during disasters.

9. National and State Health Departments: These departments provide medical services and coordinate medical relief efforts during disasters.

Other Organisations:

1. Indian Red Cross Society: The Indian Red Cross Society is involved in providing humanitarian assistance, including medical aid and relief distribution.

2. Non-Governmental Organizations (NGOs): Numerous NGOs operate in India to provide disaster relief and support, including organizations like Goonj, SEEDS, and Oxfam India.

3. Community-Based Organizations: Local community groups and organizations often play a vital role in disaster preparedness, response, and recovery at the grassroots level.

4. Meteorological Departments: India's meteorological agencies provide early warning systems for weather-related disasters such as cyclones and floods.

5. Telecommunication and IT Services: Telecommunication companies and IT firms assist in maintaining communication networks during and after disasters.

These organizations work in collaboration with each other and with local governments to ensure a coordinated and effective response to disasters. Additionally, India has established disaster management plans, early warning systems, and evacuation procedures to mitigate the impact of disasters and protect the lives and livelihoods of its citizens.

Disaster Response Technologies

Disaster response technologies encompass a wide range of tools, systems, and innovations designed to enhance the effectiveness and efficiency of response efforts during and after disasters and emergencies. These technologies play a crucial role in improving coordination, communication, and the overall response to save lives, mitigate suffering, and reduce the impact of disasters. Here are some key disaster response technologies:

1. **Early Warning Systems:** Early warning systems use sensors, data analysis, and communication networks to provide advance notice of imminent disasters such as earthquakes, tsunamis, hurricanes, or floods. They help authorities and communities prepare for and respond to disasters more effectively.

2. **GIS (Geographic Information Systems):** GIS technology allows for the mapping and visualization of disaster-affected areas. It helps responders identify affected regions, allocate resources, plan evacuation routes, and assess damage.
3. **Satellite Imagery and Remote Sensing:** Satellites equipped with high-resolution imaging and remote sensing capabilities provide real-time or near-real-time imagery of disaster-affected areas. This technology is valuable for assessing damage, tracking changes, and identifying survivors.
4. **Drones (Unmanned Aerial Vehicles):** Drones can be deployed to gather aerial imagery, assess disaster impact, and locate survivors in areas that are difficult to access. They are particularly useful in search and rescue operations.
5. **Mobile Apps:** Mobile applications offer various functionalities, including real-time updates, communication tools, and emergency alerts. These apps help individuals stay informed and connected during disasters and can assist responders in coordinating efforts.
6. **Social Media and Crowdsourcing:** Social media platforms and crowdsourcing tools allow users to share information, report emergencies, and request assistance. They enable rapid information dissemination and can be used for situational awareness.
7. **Satellite Communication:** Satellite communication systems provide reliable connectivity in areas where traditional communication infrastructure has been disrupted by disasters. They are essential for maintaining communication among responders and with affected communities.
8. **Emergency Alert Systems:** These systems deliver critical information to the public through various channels, including text messages, sirens, and radio broadcasts. They warn people about impending disasters and provide safety instructions.
9. **Telemedicine:** Telemedicine technology enables remote medical consultations and support for disaster-affected areas. Medical professionals can guide responders and treat patients from a distance.
10. **Robotics:** Robots are used in search and rescue operations to access dangerous or confined spaces, deliver supplies, and assess structural integrity. They enhance the safety of responders.

11. **Weather Forecasting and Modeling:** Advanced weather forecasting models and systems provide accurate predictions of severe weather events, allowing communities to prepare and evacuate if necessary.
12. **Water Purification and Sanitation Technologies:** Portable water purification systems and sanitation solutions are crucial for providing clean drinking water and preventing the spread of waterborne diseases in disaster-affected areas.
13. **Blockchain Technology:** Blockchain can be used for transparent and efficient distribution of relief supplies and aid, ensuring that resources reach those in need without intermediaries or corruption.
14. **Artificial Intelligence (AI) and Machine Learning:** AI and machine learning algorithms can analyze large datasets to predict disaster impacts, optimize resource allocation, and enhance decision-making during response operations.
15. **Wearable Devices:** Wearable technology, such as smart helmets or vests, can monitor the vital signs and safety of responders in real-time, improving their safety and health during response efforts.

These technologies are continually evolving and adapting to address the specific challenges of disaster response. Effective integration and utilization of these tools can significantly enhance the capacity of response teams and organizations to save lives and support affected communities during and after disasters.

Search Techniques in Disaster Impact

Search techniques in disaster response are critical for locating and rescuing survivors in the aftermath of a disaster. These techniques are designed to efficiently and systematically search for individuals who may be trapped, injured, or in need of assistance. The choice of search technique depends on the nature of the disaster, the terrain, available resources, and the specific situation. Here are some common search techniques used in disaster response:

1. **Visual Search:** This is the simplest form of search, where responders visually scan an area to locate survivors or signs of life. It's effective in open areas, but less so in complex urban environments or debris piles.

2. **Canine (K-9) Search:** Specially trained search and rescue dogs can locate survivors by following their scent. Dogs are invaluable for locating people buried under debris or in confined spaces.
3. **Technical Search:** Technical search and rescue teams use specialized equipment like cameras, listening devices, and fiber-optic scopes to locate survivors in confined spaces, collapsed buildings, or under rubble.
4. **Grid Search:** Teams divide the search area into a grid and thoroughly search each section, ensuring comprehensive coverage. This method is useful in organized searches.
5. **Team Search:** Teams of responders work together, systematically searching an area and communicating with each other to cover a larger area more quickly.
6. **Rescue Drills and Shouts:** Rescuers may use loud noises, sirens, or even shouts to encourage survivors to make noise and signal their location.
7. **Listening Devices:** Acoustic and seismic listening devices can detect sounds or movements from beneath rubble or in confined spaces, helping locate survivors.
8. **Triage-Based Search:** Responders prioritize their search based on triage assessments, focusing on areas with the highest likelihood of finding survivors requiring immediate medical attention.

Triage-based search is a search and rescue strategy that prioritizes areas for search and rescue operations based on the principles of triage. Triage is a medical term used to assess and prioritize the treatment of casualties or victims in a disaster or emergency. In the context of search and rescue, triage-based search aims to optimize the allocation of resources and focus rescue efforts on areas where there is a higher likelihood of finding survivors who require immediate medical attention.

Here's how triage-based search works:

Assessment of the Disaster Scene: Initially, responders assess the disaster scene to understand the scope of the disaster, the extent of damage, and the number of casualties. This assessment helps them determine the scale of the response required.

i. **Triage Assessment:** Responders conduct triage assessments on the injured and trapped individuals they encounter. Triage involves categorizing victims into different priority

levels based on the severity of their injuries or medical conditions. The standard triage categories are:

a) **Immediate (Red):** Victims with life-threatening injuries who require immediate medical attention.

b) **Delayed (Yellow):** Victims with serious injuries but whose conditions are stable enough to wait for treatment.

c) **Minor (Green):** Victims with non-life-threatening injuries or minor medical issues.

d) **Deceased (Black):** Victims who have already succumbed to their injuries.

Table 8.1: Triage-Based Search

Triage-Based Search			
Priority Group			
Number	**Need for Treatment**	**Triage Colour**	**Description**
P1	Emergency/Immediate	Red	Patients who have life-threatening injuries that are treatable with a Minimum amount of time, personnel, and supplies. These patients also have good chance of recovery.
P2	Urgent	Yellow	Indicates that treatment may be delayed for a limited period of time without significant mortality or in the ICUsetting patients for whom life support may or may not change their outcome given the severity of their illness.
P3	Delayed	Green	Patients with minor injuries whose treatment may be delayed until the patients in the other categories have been dealt with or patients who do not

			require ICU admission for the provision of life support.
P4	Expectant	Blue	Patients who have injuries requiring extensive treatment that exceeds the medical resources available in the situation or for whom life support is considered futile.
P5	Dead	Black	Patients who are in cardiac arrest and for which resuscitation efforts are not going to be provided.

9. **Resource Allocation:** Based on the triage assessments, responders prioritize their search efforts. They concentrate on areas with a higher likelihood of finding immediate (red) and delayed (yellow) victims who require urgent medical care. This approach ensures that limited resources, such as medical personnel, equipment, and supplies, are allocated most effectively.
10. **Marking and Documentation:** As they search, responders mark the triage status of victims they encounter using colored tags or markings, making it easier to track and communicate the victims' conditions to medical teams. Documentation of these assessments is crucial for accountability and future reference.
11. **Ongoing Assessment:** Triage-based search is dynamic. As responders move through the disaster site, they continue to reassess victims' conditions, updating their triage status as needed. This allows for the adjustment of rescue priorities as new information becomes available.
12. **Coordination:** Effective coordination between search and rescue teams and medical teams is vital. Information on the location and status of victims is relayed to medical personnel to ensure a seamless transition for treatment once victims are found.

    Triage-based search is particularly valuable in large-scale disasters where resources are limited and the need for rapid and effective response is paramount. By focusing rescue efforts on those who require immediate medical attention, this approach maximizes the chances of saving lives in the critical early hours following a disaster.

It's important to note that these techniques are often used in combination, depending on the specific circumstances of the disaster. Effective communication, coordination, and continuous training of response teams are essential to ensure that these search techniques are applied successfully in the challenging and time-sensitive environment of disaster response.

8.4 SUMMARY

Disaster response and rescue is a critical phase in disaster management aimed at saving lives and minimizing harm in the aftermath of a disaster. It involves a systematic approach that encompasses various key aspects, including search and rescue operations, medical care, temporary shelter, communication, coordination, logistics, and psychosocial support. Responders prioritize the safety and well-being of both survivors and themselves while conducting systematic searches, providing medical attention, and ensuring basic needs are met. Effective coordination among agencies, clear communication channels, and resource management are vital for an efficient response. Continuous assessment, flexibility, and adaptation are essential to address evolving challenges and improve response efforts. Disaster response and rescue ultimately serve as the initial step in the broader disaster management cycle, setting the stage for subsequent recovery and rehabilitation efforts.

8.5 GLOSSARY

Drone: Drones, or Unmanned Aerial Vehicles (UAVs), are deployed for aerial imagery, disaster impact assessment, and locating survivors in hard-to-reach areas, notably aiding search and rescue operations.

Preparedness: A well-prepared and practiced disaster response plan is essential. This includes developing response protocols, identifying roles and responsibilities, and conducting regular drills and exercises.

National Disaster Management Authority (NDMA): NDMA is the apex body responsible for formulating policies, plans, and guidelines for disaster management in India. It coordinates disaster response and recovery efforts at the national level and provides guidance to state and local authorities.

Amplified Sound or Sonar Devices: These devices emit sounds or sonar waves to detect echoes, which can reveal the presence of voids or survivors within structures.

8.6 ANSWERS TO CHECK YOUR PROGRESS

1.Do you know that the United Nations Development Programme focuses on disaster recovery and long-term development in disaster-affected areas, helping communities rebuild and become more resilient.

2. Do you know that AI and machine learning algorithms can analyze large datasets to predict disaster impacts, optimize resource allocation, and enhance decision-making during response operations.

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8.8 TERMINAL QUESTIONS

Long Questions

1. Discuss the significance of the response phase in disaster management, highlighting its objectives and key activities, particularly emphasizing the role of coordination among response agencies.

2. How do search and rescue operations contribute to effective disaster response efforts? Provide examples of techniques and technologies used in search and rescue missions and their impact on saving lives and minimizing casualties.

3.Explore the importance of effective communication strategies during the response phase of disaster management. Discuss the challenges associated with communication in crisis situations and propose strategies to overcome them.

4. Analyze the role of technology, such as drones and satellite imagery, in enhancing response and search capabilities during disaster management. Highlight specific applications of technology in assessing disaster impact, locating survivors, and coordinating response efforts.

5. Write about the role different Organisations works in disaster response and rescue in disaster management?

Short Questions

1. Define the term "response" in disaster management and explain its primary objective.

2. What are the key components of a successful search and rescue operation during disaster response?

3. How does effective coordination among response agencies contribute to efficient disaster management?

4. What role do emergency shelters play in the response phase of disaster management, and how are they typically managed?

5. Describe the importance of timely and accurate communication during the response phase of disaster management.

6. Discuss the significance of damage assessments in guiding response efforts during and after a disaster.

7.What is the main goal of the response phase in disaster management?

8. What do search and rescue teams do during disaster response?

9.Why is effective communication important during the response phase of disaster management?

10.What role do emergency shelters play in disaster response efforts?

11. Write a short on role of triage-based search works.

12. Write a short note on role of disaster response technologies in disaster management.

Multiple Choice Questions

1.What is the primary goal of the response phase in disaster management?

a) Preventing disasters from occurring

b) Assessing the economic impact of disasters

c) Providing immediate assistance to affected individuals and communities

d) Conducting long-term recovery planning

2. Which of the following is a key principle of effective disaster response?

a) Delaying deployment of resources until the situation stabilizes

b) Centralizing decision-making processes

c) Ensuring coordination among response agencies and organizations

d) Minimizing communication with affected populations

3. What is the purpose of conducting damage assessments during the response phase of disaster management?

a) Identifying opportunities for profiting from disaster recovery efforts

b) Evaluating the effectiveness of early warning systems

c) Determining the extent of destruction and the needs of affected areas

d) Assigning blame for the occurrence of the disaster

4. Which of the following is an example of a primary response activity in disaster management?

a) Providing medical care to injured individuals

b) Conducting community meetings for long-term planning

c) Implementing building codes for future construction projects

d) Analyzing the economic impact of the disaster on local businesses

5. What role do emergency shelters play in disaster response?

a) Providing long-term housing for displaced individuals

b) Offering temporary housing and necessities to those affected

c) Acting as command centers for emergency response operations

d) Stockpiling resources for future disasters

6. What is the purpose of search and rescue operations during the response phase of disaster management?

a) Identifying potential areas for future disaster mitigation efforts

b) Recovering valuable resources from affected areas

c) Locating and rescuing individuals who are trapped or injured

d) Documenting the environmental impact of the disaster

7. Which of the following is a critical aspect of effective communication during disaster response?

a) Withholding information to prevent panic

b) Disregarding input from affected communities

c) Providing timely and accurate information to the public

d) Restricting access to information to authorized personnel only

8. What is the primary focus of logistical support in disaster response?

a) Maximizing profit from relief efforts

b) Ensuring efficient transportation and distribution of resources

c) Minimizing collaboration with international aid organizations

d) Assigning blame for the failure of disaster response efforts

Answer) 1. c, 2.c 3.c, 4. a ,5. b, 6.c ,7.c, 8.b

UNIT 9 – RESCUE AND EVACUATION

9.1 OBJECTIVES

The objectives of this unit are to outline the following major considerations which apply to rescue and evacuation:

- Understand the concept of rescue and evacuation in disaster management;
- Problem areas in rescue and evacuation; and
- Resources required for rescue and evacuation.

9.2 INTRODUCTION

In our daily lives, unexpected emergencies arise, ranging from natural disasters like earthquakes and floods to unforeseen accidents. In such challenging situations, the importance of a well-organized rescue and evacuation system cannot be overstated. These systems play a crucial role in ensuring the safety and well-being of individuals in the face of adversity. Rescue and evacuation involve the coordinated efforts of various professionals, including first responders, emergency personnel, and community members, to swiftly and safely move people away from imminent danger. The primary goal is to save lives and minimize harm by providing timely assistance to those in need. Whether it is a building collapse, a wildfire, or a medical emergency, having effective rescue and evacuation procedures in place is essential for a community's resilience.

One key aspect of these procedures is the identification and establishment of safe assembly points where people can gather to await assistance. These points are strategically chosen to be away from potential hazards and easily accessible to both rescuers and evacuees. Clear communication is another critical element, involving the use of alarms, sirens, and other warning systems to alert individuals about the impending danger and the need for evacuation. The importance of community preparedness cannot be emphasized enough. Educating the public about emergency procedures, conducting regular drills, and promoting awareness contribute significantly to a community's ability to respond effectively to crises. This knowledge empowers individuals to make informed decisions during emergencies, increasing the overall efficiency of rescue and evacuation efforts.

Additionally, technology plays a vital role in modern rescue and evacuation strategies. Advances in communication systems, satellite technology, and data analysis have enabled quicker response times and enhanced coordination among different agencies. The integration of these technologies ensures a more efficient and precise approach to identifying areas in need of immediate attention.

In brief, rescue and evacuation are integral components of emergency management that aim to safeguard lives and minimize harm during unforeseen events. By fostering a culture of preparedness, investing in advanced technologies, and maintaining well-coordinated response systems, communities can significantly enhance their ability to navigate and overcome the challenges posed by disaster. So, get ready to dive into the world of rescue and evacuation, where you will learn different aspects of rescue and evacuation.

9.3 RESCUE AND EVACUATION

9.3.1 Rescue in Disaster Management

9.3.1.1 Concept of Rescue: It is noteworthy here that the rescue is the part of post disaster phenomenon helping people moving from disaster hit place. Rescue involves quickly getting people out of harm's way and providing the help they need, like medical care or a safe place to stay. Rescue in a disaster means saving people and animals or life from danger or harm caused by unexpected and dangerous disaster events like earthquakes, floods, accidents etc. It involves organized efforts by trained individuals, such as first responders and emergency teams, to help those in trouble. The goal of rescue is to bring people to safety and provide immediate assistance during challenging situations. Whether it is pulling someone from a collapsed building or helping animals stranded in a flood, rescue efforts are essential in minimizing harm and ensuring the well-being of those affected by disasters.

9.3.1.2 Need of Rescue Operations: Disasters can happen unexpectedly, like earthquakes shaking the ground, floods rushing in, or fires spreading quickly. When these events occur, it's crucial to have rescue operations in place as part of disaster management. Rescue operations are like superheroes stepping in to help people in danger and bring them to safety. Let's take a look at why rescue operations are so important in different types of disasters.

1. Earthquakes: Imagine the ground shaking beneath your feet. During earthquakes, buildings can collapse, trapping people inside. Rescue teams rush in to save lives, using special tools and skills to reach those who need help. Their mission is to get people out safely from the rubble.

2. Floods: When heavy rains cause rivers to overflow, floods can occur. Houses get submerged, and people may be stranded on rooftops. Rescue teams, often using boats or helicopters, brave the rising waters to rescue those stuck in dangerous areas. Their goal is to bring people to dry land away from the floodwaters.

3. Fires: Fires can spread quickly, especially in crowded places or forests. In such situations, rescue teams, equipped with firefighting gear, work to control and put out the flames. They also help people evacuate, making sure everyone gets to a safe place away from the fire's reach.

4. Medical Emergencies: Disasters can also lead to injuries or medical emergencies. Rescue operations include medical teams who provide first aid and transport those injured to hospitals. These medical heroes play a crucial role in saving lives during and after disasters.

5. Landslides: In hilly areas, human activities and heavy rains can trigger landslides, causing rocks and mud to slide down mountains. Rescue teams clear blocked roads, find people stranded, and move them to safer locations. Their efforts ensure that communities can receive the help they need.

6. Storms and Cyclones: Strong winds and heavy rains during storms or cyclones can be dangerous. Rescue teams prepare for such events, helping people evacuate to sturdy buildings or shelters before the storm hits and also prepare to help the people have stacked in storm. They also work afterward to clear debris and restore normalcy.

In simple terms, rescue operations are like everyday heroes responding to emergencies. They save lives, provide help, and make sure everyone affected by a disaster is taken care of. Disaster management is about having a plan in place, with these rescue operations playing a key role in keeping people safe when unexpected events unfold.

9.3.1.3 Resources Required for Rescue: When disasters strike, be it earthquakes, floods, or other unexpected events, having the right resources is essential for effective rescue operations. Different types of disasters require specific tools and equipment to ensure a swift and

coordinated response. Let's take a look on the resources needed for rescue operations in various disaster scenarios.

1. Search and Rescue Teams: Trained professionals play a crucial role in rescue operations. These teams are equipped with the skills to locate and extract individuals in distress. Their resources include specialized training, rescue gear, and communication tools for search and rescue staked people in disaster.

2. Medical Personnel and Supplies: In the aftermath of disasters, medical assistance is often urgently required. Having medical professionals, ambulances, and first aid supplies on hand is vital for addressing injuries and providing immediate care to those affected.

3. Communication Systems: Effective communication is the backbone of any successful rescue operation. Radios, satellite phones, and other communication devices enable coordination among rescue teams, ensuring information flows seamlessly during critical moments.

4. Transportation: Access to reliable transportation is the key, especially in scenarios where quick evacuation is necessary. Vehicles such as ambulances, boats, helicopters, and even all-terrain vehicles become invaluable resources for reaching affected areas and transporting people to safety.

5. Shelters and Evacuation Centers: Providing temporary shelters for displaced individuals is essential. Tents, blankets, and other basic amenities help create safe spaces for those who have lost their homes during the disaster.

6. Technical Equipment: Depending on the nature of the disaster, specialized equipment may be required. This can include items such as ropes, harnesses, cutting tools, and heavy machinery to navigate and remove debris in situations like building collapses or landslides.

7. Food and Water Supplies: In the aftermath of disasters, access to basic necessities like food and clean water becomes critical. Stockpiling emergency food supplies and water purification systems ensures that the immediate needs of survivors are met.

8. Community Involvement: Local communities are a valuable resource in themselves. Trained volunteers, community leaders, and neighbors can provide support, share local knowledge, and assist in organizing and implementing rescue operations.

9. Information and Technology: Utilizing technology, such as drones and satellite imagery, can aid in assessing the extent of damage and identifying areas in need of immediate attention. Information systems help in coordinating efforts and allocating resources efficiently.

10. Training and Education Programs: Preparing communities for potential disasters is a crucial aspect of resource allocation. Training programs that educate individuals about evacuation procedures, first aid, and disaster preparedness contribute to a more resilient society.

In brief, successful rescue operations require a combination of well-trained personnel, appropriate equipment, and a coordinated effort from various stakeholders. By understanding the specific resources needed for different disaster events, communities can enhance their disaster management capabilities, ultimately saving lives and minimizing the impact of unforeseen events.

9.3.1.4 Challenges in Rescue Operations: Rescue operations during disasters are crucial for saving lives and providing assistance to those in needs. However, these operations come with various challenges that can make the process more difficult. Let's explore some of these challenges under the following heads.

1. Limited Access: In some disasters, like floods or earthquakes, access to affected areas can be challenging. Roads may be blocked, and traditional routes may become impassable. For instance, after a severe flood, rescue teams might struggle to reach people stranded in flooded neighborhoods due to submerged roads.

2. Communication Breakdown: During a disaster, communication systems can often be disrupted. This makes it difficult for rescue teams to coordinate and receive timely information. For example, in the aftermath of a powerful storm, power outages may lead to the failure of phone lines and internet connections, hindering communication between different rescue teams.

3. Resource Constraints: Limited resources, such as personnel, equipment, and supplies, can pose a significant challenge. In a large-scale disaster, the demand for help may exceed the available resources. Imagine a scenario where a major earthquake hits a city, requiring numerous rescue teams, but there aren't enough trained personnel or sufficient equipment to respond adequately.

4. Evacuating Vulnerable Populations: Some people, like the elderly, young children, or those with mobility issues, may face difficulties in evacuating swiftly. In situations like a wildfire spreading rapidly, ensuring the safe evacuation of these vulnerable populations becomes a challenge due to their specific needs and requirements.

5. Unpredictable Nature of Disasters: Disasters are often unpredictable, and their magnitude can change rapidly. This uncertainty can make it challenging for rescue teams to plan and execute operations effectively. For instance, a wildfire might start as a small blaze but quickly escalate, catching both residents and rescue teams off guard.

6. Emotional and Psychological Impact: Rescue operations can be emotionally taxing for both victims and rescuers. Dealing with the trauma and distress of those affected while maintaining focus on the task at hand is a challenge. In situations like a building collapse, rescuers may encounter emotionally charged scenes, making it difficult to provide assistance while managing their own emotions.

Addressing these challenges requires a combination of preparedness, training, and adaptive strategies. By understanding and proactively planning for these obstacles, rescue teams can enhance their effectiveness in providing aid during disasters.

9.3.2 Evacuation in Disaster Management

9.3.2.1 Concept of Evacuation: Evacuations are a disaster risk reduction strategy aimed at mitigating the short and long-term impacts of hazards (IOM, 2021). Evacuation in disaster management means moving people away from a place that is in danger. When there is a threat like a natural disaster, the goal is to take everyone to a safer location. This helps protect lives by getting them out of harm's way. Evacuation plans involve deciding where to go, how to get there, and making sure everyone knows what to do. It is like a safety strategy to keep people out of danger when something bad is happening, ensuring they are moved to a place where they can be safe until the danger is over.

IOM (2014) has defined the evacuation "**as the rapid movement of people away from the immediate threat or impact of a disaster to a safer place of shelter. It is commonly**

characterized by a short time frame, from hours to weeks, within which emergency procedures need to be enacted in order to save lives and minimize exposure to harm".

9.3.2.2 Need of Evacuation Operation: When a big disaster, like a flood, earthquake, or wildfire, strikes, it can be really scary and dangerous. In these tough times, evacuation operations become super important in keeping people safe. Imagine you are in a place where there is a big flood coming. The water is rising, and it's not safe to stay. That's where evacuation comes in. Evacuation means moving people from the dangerous area to a safer place. It is like a big team effort to make sure everyone gets out of harm's way.

Evacuation is crucial because it saves lives. When there is a disaster, things can get chaotic, and people might need help getting to a safe spot. Evacuation teams, made up of brave folks like firefighters, police, and volunteers, work together to guide everyone to safety. Having a plan for evacuation is like having a superhero strategy. It helps us know what to do and where to go when things get tough. Sometimes, there are special places called evacuation shelters where people can go for protection. These shelters have things like food, blankets, and medical help to make sure everyone is okay. In disaster management, evacuation is like a superhero rescue mission. It is about making sure no one is left behind in the face of danger. So, when the unexpected happens, having a well-organized evacuation plan is like having a superhero cape – it helps communities stay strong and safe together.

9.3.2.3 Resources Required for Evacuation Operation: Evacuating people safely before different types of disasters requires a variety of resources to ensure a well-organized and effective response. These resources play a crucial role in disaster management, helping communities respond to emergencies and protect lives. Let's take a look at some key resources needed for evacuation operations.

1. Communication Tools: Clear communication is vital during any evacuation. Resources like loudspeakers, sirens, and emergency notification systems help spread the word quickly, informing people about the need to evacuate and providing essential instructions.

2. Transportation: Having reliable transportation resources is essential for moving people away from danger zones. This includes buses, cars, boats, and even helicopters, depending on the type

of disaster. These vehicles ensure a swift and safe evacuation, especially for those who may have difficulty leaving on their own.

3. Evacuation Routes: Clearly marked and well-maintained evacuation routes are critical. Resources are needed to plan and establish safe paths that lead people away from the affected areas. Roadblocks and guidance from emergency personnel all contribute to effective evacuation routes.

4. Shelters and Accommodations: Providing safe and secure shelters is a key resource in evacuation operations. These shelters should be equipped with basic amenities such as food, water, blankets, and medical supplies. Schools, community centers, and other facilities can serve as temporary shelters during emergencies.

5. Medical Support: Disaster events often result in injuries. Having medical resources, including first aid kits, medical personnel, and ambulances, is crucial for providing immediate care to those in need. This ensures that people receive timely medical attention during evacuation.

6. Volunteers and Emergency Personnel: Trained individuals and volunteers are invaluable resources during evacuations. These dedicated individuals help with organizing and executing the evacuation plan, assisting vulnerable populations, and providing support to those in distress.

7. Technology and Information Systems: Modern technology aids in disaster management. Resources such as GPS, satellite imagery, and communication devices help authorities monitor the situation, coordinate response efforts, and provide real-time information to the public.

8. Community Education and Preparedness Programs: Educating the community about potential disasters and the importance of being prepared is a critical resource. Training programs, drills, and informational materials empower individuals to respond appropriately during evacuations, contributing to a more resilient community.

In brief, successful evacuation operations require a combination of communication tools, transportation, evacuation routes, shelters, medical support, dedicated personnel, technology, and community education. By investing in these resources and maintaining a well-coordinated

disaster management plan, communities can enhance their ability to protect lives and respond effectively to various emergency situations.

9.3.2.4 Phases of Evacuation: The nature o different disaster events vary from one another. So, all disaster events required different responses such some required immediate response while some early warning system. The duration from recognizing the hazard to the anticipated impact plays a significant role in determining the prioritization and timing of evacuation-related activities (CDEMA, 2014b). CCCM (2014) and CDEMA (2012) has discussed the seven following phases of evacuation, their brief description is presented below:

1. Pre-Event Phase: Before any disaster occurs, it's essential to prepare. In this phase, communities plan and get ready for potential emergencies. This includes identifying safe places, organizing resources, and educating people about what to do if a disaster happens.

2. Early Warning System: When there is a sign that a disaster might occur, an early warning system kicks in. This system uses alarms, signals, or messages to let everyone know about the potential danger. It is like a heads-up to get ready to move to the safer place.

3. Activation of Evacuation Procedures: Once the warning is given, the evacuation procedures are put into action. This involves using the plan that was prepared earlier to start moving people away from the danger zone. Emergency services and volunteers may also be called upon to help.

4. Public Evacuation Advisory Notice: To make sure everyone is on the same page, an official notice may circulate in the social media for public. This could be through announcements, messages on TV or radio, even alerts on mobile phones etc. The advisory notice provides clear instructions about where to go and what to do during evacuation.

5. Evacuation: This is the main phase where people leave the unsafe area and move to a designated safe place. It involves using transportation, following established routes, and cooperating with emergency personnel. The goal is to get everyone to a secure location as quickly and safely as possible.

6. Emergency Shelter and Relief: After evacuation, people need a safe place to stay. Emergency shelters are set up to provide a temporary home for those affected. These shelters offer basic

needs like food, water, blankets, and medical assistance. It's a place where people can find comfort and support during difficult times.

7. Return and Reintegration: Once it is safe, people are allowed to return to their homes. This phase involves carefully bringing everyone back and helping the community get back to normal. It might include support for rebuilding, counseling services, or assistance to ensure a smooth return and reintegration into regular life.

In brief, the phases of evacuation start with being prepared, getting a warning, putting plans into action, informing the public, moving to safety, finding temporary shelter, and eventually returning home and rebuilding. Each step is crucial in ensuring the well-being of individuals and communities during times of crisis.

9.3.2.5 Problems in Evacuation Operations: Evacuating people during disasters is a crucial task, but it comes with its own set of challenges. Overcoming these hurdles is essential to ensure everyone's safety. Let's explore some common challenges faced during evacuation operations and understand why they are significant.

1. Limited Time and Urgency: When a disaster strikes, time is of the essence. There is often a limited window to get people to safety. For example, during a flood, the water level can rise rapidly, leaving little time for evacuation. Quick decision-making and efficient communication become critical to saving lives.

2. Traffic Jams and Congestion: During disaster event, everyone in a community trying to leave at once. Traffic jams can clog evacuation routes, slowing down the process. In emergencies like hurricanes, roads may become congested, making it challenging for people to reach safe zones promptly.

3. Vulnerable Populations: Not everyone can move swiftly during evacuations. Vulnerable populations, such as the elderly, children, or those with mobility issues, require extra assistance. Evacuation plans must account for their needs to ensure no one is left behind.

4. Inadequate Infrastructure: Some areas may lack proper roads or transportation facilities. In such cases, reaching everyone and providing timely assistance becomes more complicated. In

developing and under developed countries, rural areas, for instance, might face difficulties due to limited access routes.

5. Communication Breakdowns: Effective communication is vital during evacuations. However, disasters can disrupt communication systems, making it challenging to convey timely and accurate information. Ensuring robust communication channels is crucial to keep everyone informed.

6. Shelter and Resource Management: Setting up temporary shelters is essential, but managing resources like food, water, and medical supplies poses a challenge. Displaced individuals need adequate provisions, and coordinating these efforts amidst chaos requires careful planning.

7. Evacuation Fatigue: Evacuations can be emotionally and physically exhausting. People may become fatigued, leading to difficulties in following evacuation procedures. Maintaining morale and addressing the mental well-being of evacuees is an often-overlooked challenge.

8. Unpredictable Nature of Disasters: Every disaster is unique, and their nature can be unpredictable. Earthquakes, for instance, strike suddenly without warning. This unpredictability makes it challenging to devise one-size-fits-all evacuation plans.

9.3.3 Difference between Rescue and Evacuation

In disaster management, rescue and evacuation are two distinct things but interconnected processes that focus on ensuring the safety of people during emergencies. Understanding the distinctions between rescue and evacuation is crucial in disaster management, as both play essential roles in safeguarding lives and mitigating the impact of emergencies. There is little bit difference between rescue and evacuation as a intergraded part of disaster management which is present in the following Table-9.1.

Table-9.1: Difference between rescue and evacuation as a part of disaster management.

	Rescue	**Evacuation**
Objective	Save individuals in immediate danger.	Move people to a safer location away from the threat.
Focus	Involves on-the-spot assistance and	Involves relocating people from danger

	aid.	zones to identified safe areas.
Scope	Typically addresses individual emergencies.	Addresses broader situations, often involving entire communities.
Timeframe	Immediate and short-term.	May take place over a longer duration, depending on the nature of the threat.
Example	Rescuing someone trapped in a collapsed building.	Evacuating a neighborhood due to an approaching hurricane.
Methods	Utilizes first responders, emergency personnel, and immediate resources.	Involves organized plans, transportation, and communication for mass movement.
Location	Primarily at the scene of the emergency.	Moves people away from the emergency site to predefined safe locations.

9.4 SUMMARY

In disaster management, rescue and evacuation are crucial elements designed to keep people safe during emergencies. When unexpected events like natural disasters or accidents occur, these processes involve organized efforts to quickly move individuals away from danger and provide timely assistance. The main goal is to save lives and reduce harm. This includes identifying safe places for people to gather, using alarms to warn about danger, and educating communities on what to do during emergencies. Technology, like advanced communication systems, Remote Sensing and Geographical Information System (GIS) also helps in coordinating these efforts more effectively. Overall, rescue and evacuation play a vital role in protecting lives and minimizing the impact of disasters by having well-prepared and coordinated response plans in place.

9.5 GLOSSARY

Assembly Point: A predetermined location where individuals gather after evacuating a building or area, facilitating headcounts and further instructions.

Communication Plan: A structured strategy for disseminating information and instructions during emergencies, ensuring clear and consistent messaging to the public and response teams.

Community Preparedness: The proactive efforts of individuals, communities, and organizations to plan, educate, and practice emergency response measures to enhance overall resilience.

Emergency Alert System (EAS): A communication system that disseminates information and warnings to the public during emergencies, using various mediums such as radio, television, and sirens.

Emergency: A sudden, unexpected situation or event that poses a threat to life, property, and the environment, requiring immediate action.

Evacuation: The organized and controlled movement of people from a dangerous or potentially hazardous area to a safer location.

First Responder: An individual, typically trained in emergency response, who arrives first at the disaster hit place to provide initial assistance and support.

Hazard Mitigation: Proactive measures taken to reduce or eliminate the long-term risk and impact of hazards, making communities more resilient to future disasters.

Incident Command System (ICS): A standardized management structure used to coordinate and control emergency response efforts, ensuring effective communication and collaboration among different agencies.

Mass Evacuation: The large-scale movement of a population from an area due to an imminent threat or disaster, requiring extensive planning and coordination.

Recovery: The phase of emergency management that focuses on rebuilding and restoring normalcy after a disaster incident, including the rehabilitation of affected communities.

Relief Supplies: Essential items such as food, water, medical supplies, and blankets provided to evacuees and affected populations during and after an emergency.

Rescue: The act of saving individuals from dangerous or life-threatening situations, often involving the deployment of trained personnel and specialized equipment.

Search and Rescue (SAR): The organized efforts to locate, assist, and extract individuals in distress or danger, often involving specialized teams and equipment.

Shelter: A designated safe place where evacuees can find refuge during emergencies, often equipped with basic necessities such as food, water, and medical support.

Warning System: A network of signals, alarms, or notifications designed to alert the population about imminent dangers or emergencies, facilitating timely action.

9.6 ANSWER TO CHECK YOUR PROGRESS

- The primary goal of rescue and evacuation is to save lives and minimize harm during emergencies.
- Safe assembly points provide a secure location away from hazards for evacuees to gather.
- Clear communication using alarms and warning systems alerts individuals to impending dangers and the need for evacuation.
- Community preparedness empowers individuals with the knowledge to make informed decisions during emergencies.
- Technology, including communication systems and data analysis, is a key element in modern strategies.
- Regular drills help communities practice and improve their response to emergencies.
- Technology allows for quicker response times and more efficient coordination among various agencies.
- Identifying safe evacuation routes ensures a smooth and secure movement of people away from danger zones.
- Satellite technology aids in the precise identification of areas requiring immediate attention during disasters.
- A culture of preparedness ensures that communities are better equipped to handle and overcome the challenges posed by emergencies.
- Public education promotes awareness and helps individuals make informed decisions in emergency situations.
- First responders, emergency personnel, and community members are key professionals involved in these efforts.

- Safe assembly points provide a centralized location for evacuees, making it easier for rescue teams to assist them.
- Alarms and sirens serve as auditory signals to alert individuals about imminent dangers and the need for immediate action.
- Communities can use technology for communication, data analysis, and coordination to enhance their overall disaster management capabilities.

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9.8 TERMINAL QUESTIONS

Long Questions

1. How does a community effectively integrate rescue and evacuation measures into its overall disaster management plan to ensure a swift and coordinated response to various emergencies, such as natural disasters?
2. Can you elaborate on the role of community preparedness in the context of rescue and evacuation? How can educating the public about emergency procedures, conducting regular drills, and fostering awareness contribute to a community's resilience in the face of disaster crises?

Short Questions

1. What is the primary goal of rescue and evacuation in disaster management?
2. How do safe assembly points contribute to effective evacuation?
3. Why is community preparedness crucial in rescue and evacuation efforts?
4. What role does clear communication play in emergency situations?
5. How can technology enhance the efficiency of rescue operations?
6. Why is it important to conduct regular drills for rescue and evacuation?
7. What are some common natural disasters that require rescue and evacuation measures?
8. How do first responders contribute to successful rescue operations?
9. What measures can individuals take to be better prepared for emergencies?
10. How does the collaboration between different agencies improve the overall effectiveness of rescue and evacuation in disaster management?

Multiple Choice Questions

1. What is the primary goal of rescue and evacuation in disaster management?

a) Protecting property

b) Minimizing harm and saving lives

c) Ensuring economic stability

d) Providing emergency shelter

2. Which of the following is a key component of effective rescue and evacuation procedures?

a) Ignoring community preparedness

b) Withholding information during emergencies

c) Clear communication and warning systems

d) Relying solely on individual efforts

3. What role does technology play in modern rescue and evacuation strategies?

a) Creating more hazards

b) Slowing down response times

c) Enhancing coordination and response efficiency

d) Decreasing the importance of community preparedness

4. Why is community preparedness important in the context of rescue and evacuation?

a) It increases economic stability

b) It empowers individuals to make informed decisions

c) It discourages the need for emergency drills

d) It minimizes the role of technology in emergencies

5. What are safe assembly points in rescue and evacuation?

a) Locations prone to hazards

b) Areas with no access to rescuers

c) Strategically chosen gathering places away from potential hazards

d) Temporary shelters for long-term stay

6. During a _____, rescue and evacuation procedures are crucial to ensuring the safety of individuals facing imminent danger.

a) Create chaos

b) Save lives and minimize harm

c) Promote panic

d) Disaster

7. Safe _____ points are designated areas where people can gather during an emergency, away from potential hazards.

a) Close to potential hazards

b) Difficult to access

c) Convenient for rescuers only

d) Assembly

8. Effective communication, including the use of alarms and warning systems, is essential to _____ individuals about the need for evacuation.

a) Chaos

b) Alert

c) Promote panic

d) Delay response efforts

9. Community _____ plays a significant role in enhancing the overall efficiency of rescue and evacuation efforts.

a) Coordination

b) Delayed response times

c) Preparedness

d) Ignorance and unpreparedness

10. Advances in technology, such as communication systems and data analysis, contribute to quicker response times and improved _____ among different agencies.

a) Coordination

b) Delayed response times

c) Coordination and response efficiency

d) Ignorance and unpreparedness

11. Designated assembly points are unnecessary in a rescue and evacuation plan.

a) True

b) False

a) False

12. Community preparedness has no impact on the effectiveness of rescue and evacuation efforts.

a) True

b) False

13. Technology does not play a significant role in modern rescue and evacuation strategies.

a) True

b) False

14. Clear communication systems, including alarms and warning messages, are not important for successful rescue and evacuation operations.

a) True

b) False

15. Rescue and evacuation plans do not need to be adaptable to different types of disasters.

a) True

b) False

ANSWERS

Q.No.	Answer	Q.No.	Answer
1	B	**9**	C
2	C	**10**	A
3	C	**11**	False
4	B	**12**	False
5	C	**13**	False
6	D	**14**	False
7	D	**15**	False
8	B		

UNIT 10 – LOGISTICS AND INCIDENT COMMAND SYSTEM (ICS)

10.1 OBJECTIVES

After go through this unit, the learner should be able to understand the following objectives:

1. What is logistics and incident command system (ICS)?
2. Understand the development history of incident command system (ICS).
3. The significance of logistics and ICS in disaster management,
4. Understand the function of incident command system (ICS), and
5. Relationship of disaster logistics and ICS with other aspects of the disaster.

10.2 INTRODUCTION

In the face of natural disasters and emergencies, effective coordination and swift response are critical to minimizing the impact on communities and ensuring the safety of individuals. Logistics and Incident Command Systems (ICS) play pivotal roles in managing and organizing resources, personnel, and information during these challenging times. This introduction aims to shed light on the significance of logistics and the Incident Command System in the realm of disaster management.

Logistics, at its core, involves the meticulous planning, implementation, and coordination of resources to ensure the right people, supplies, and equipment are in the right place at the right time and at the right order. In the context of disaster management, logistics become the backbone of response efforts. From transporting emergency supplies to establishing communication networks, logistics acts as the silent hero working behind the scenes to support frontline responders. In the aftermath of a disaster, the demand for resources surges, making efficient logistics a linchpin in delivering aid and relief to affected areas. Imagine the complexity of ensuring food, water, medical supplies, and other essentials reach those in needs promptly. Logistics strategies, such as pre-positioning supplies and establishing transportation networks, become instrumental in overcoming the logistical challenges posed by disrupted infrastructure (ADB, 2008).

While logistics deals with the 'what' and 'where' of disaster response, the Incident Command System (ICS) focuses on the 'how.' ICS is a standardized, flexible framework

designed to facilitate a coordinated and effective response to emergencies. At its essence, ICS establishes a clear chain of command, defines roles and responsibilities, and enhances communication among various responding entities. In simple terms, ICS is like a well-choreographed dance where everyone knows their steps and communicates seamlessly to ensure the performance (response) is harmonious. This system allows responders from different agencies, organizations, and disciplines to work together efficiently, preventing confusion and maximizing the use of available resources.

Recognizing the specialized nature of emergency response and the imperative for a coordinated approach during such critical times, the Government of India established the High Powered Committee (HPC). This committee placed significant emphasis on the development and institutionalization of a suitable emergency response system at various levels to ensure a timely and effective disaster response. Following a comprehensive review of global response mechanisms, the HPC identified the Incident Command System (ICS) as a best practice for emergency response. Consequently, the committee recommended its adoption in India.

The synergy between logistics and the Incident Command System is where disaster response gains its strength. Logistics supports ICS by ensuring that the right resources are available when and where they are needed. In this unit, we will study the intricacies of logistics and the ICS, exploring how they collaborate to navigate the challenges posed by disasters.

10.3 LOGISTICS AND INCIDENT COMMAND SYSTEM (ICS)

10.3.1 Logistics in Disaster Management

What is Logistics in Disaster Management?

Logistics in disaster management refers to the planning, implementation, and coordination of the movement and storage of resources, supplies, and personnel during and after a disaster. Effective logistics play a crucial role in ensuring a timely and organized response to emergencies. The key aspects of logistics include transportation, warehousing, distribution, communication system, information management, personnel management etc. Here, this is very important to understand that logistics is a part of incident command system (ICS), i.e., ICS is a larger aspect and logistic is its part.

The Importance of Logistics in Disaster Management

Logistics in disaster management is super important because it is all about making sure the right things get to the right places at the right time. Think of it like this: if people need food, water, or medical help, the logistics team is the one making sure these things reach them quickly. They figure out the best routes to travel, how much stuff is needed, and where to get it from. It is like organizing a big rescue mission. Without good logistics, it would be like trying to solve the puzzle without knowing where the pieces are.

So, in simple words, logistics in disaster management helps bring order to the chaos, making sure help arrives where it is needed most. It is like the behind-the-scenes heroes who make sure everything runs smoothly during tough times.

Logistics in Disaster Management

The Logistics Section (LS) includes Service, Support, and Finance Branches, and you can see the structure and details of each branch in the Figure 10.1. The person in charge of the section is called the Logistics Section Chief. When it comes to activating different branches of the LS, it depends on the specific situation and the size of the incident. A brief description of all the branches of logistic sections is given below:

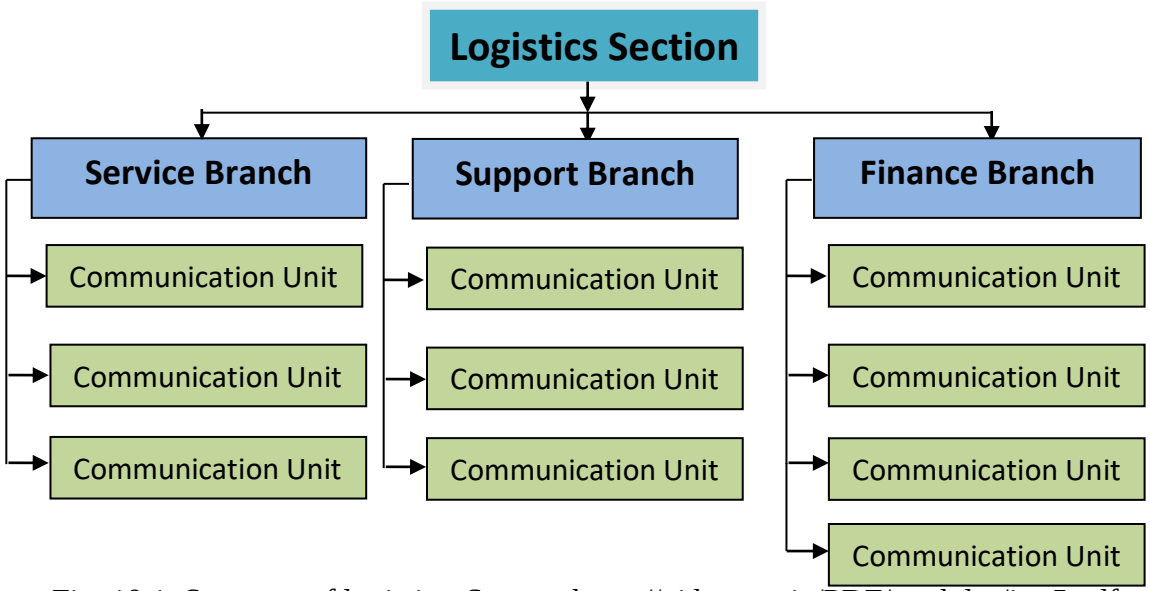

Fig. 10.1: Structure of logistics. Source: https://nidm.gov.in/PDF/modules/irs-5.pdf

Service Branch: In disaster management, the service branch of the logistics section plays a crucial role in ensuring that essential services are efficiently provided during emergencies. This branch focuses on three key aspects: communication, food, and medical units (Fig. 10.1).

Communication: In times of disaster, effective communication is essential for coordinating rescue and relief efforts. The service branch ensures that communication channels are established and maintained. This involves setting up radio systems, satellite communication, and other means to connect different response teams and keep them informed about the situation. Clear and reliable communication helps in the timely deployment of resources and aids in the overall coordination of disaster response efforts.

Food Unit: The food unit of the logistics section is responsible for ensuring a stable and sufficient food supply during and after a disaster. This involves stockpiling non-perishable food items, setting up temporary kitchens, and organizing the distribution of meals to affected areas. The goal is to prevent hunger and malnutrition among those affected by the disaster. This unit collaborates with local authorities, NGOs, and other partners to efficiently manage the procurement, storage, and distribution of food resources.

Medical Unit: The medical unit within the service branch focuses on providing immediate healthcare and addressing the medical needs of disaster-affected individuals. This includes setting up field hospitals, deploying medical teams, and ensuring the availability of essential medical supplies. The unit also coordinates the evacuation and transportation of injured or vulnerable individuals to medical facilities. Their goal is to prevent the spread of diseases, treat injuries, and provide necessary medical care to those affected by the disaster.

In brief, the service branch of the logistics section in disaster management is responsible for establishing and maintaining effective communication, ensuring a stable food supply, and addressing the medical needs of affected populations. This comprehensive approach helps create a well-coordinated and efficient response to disasters, ultimately saving lives and mitigating the impact on communities.

Support Branch: The support branch is a crucial component of the logistics section in disaster management. Its primary goal is to ensure that all necessary resources, facilities, and ground support are efficiently provided to address the needs arising from a disaster. Let's break down these elements in simple terms:

Resource Provisioning: In times of a disaster, various resources are required to meet the needs of affected areas. This includes food, water, medical supplies, and other essential items. The support branch is responsible for organizing and coordinating the acquisition and distribution of these resources. This involves working with suppliers, transportation services, and other partners to ensure a steady and timely supply.

Facilities: Establishing appropriate facilities is vital for effective disaster management. This involves setting up temporary shelters, medical clinics, and command centers to coordinate relief efforts. The support branch oversees the identification of suitable locations, the setup of facilities, and the provision of necessary equipment and infrastructure to ensure these facilities function smoothly.

Ground Support Unit: The ground support unit plays a hands-on role in disaster response. This unit is responsible for activities on the ground, such as transporting resources, setting up shelters, and providing immediate assistance to those affected. The support branch ensures that the ground support unit is well-equipped, well-trained, and operates efficiently to respond to the dynamic and urgent needs of the disaster-affected areas.

In brief, the support branch of the logistics section is like the backbone of disaster management. It focuses on securing and delivering essential resources, setting up necessary facilities, and coordinating the actions of the ground support unit to ensure a well-organized and effective response to the challenges posed by a disaster.

Finance Branch: The finance branch of logistics in disaster management is a crucial aspect that involves the careful management of resources and funds to ensure an effective and efficient response to emergencies. Let's break down the key components: time, claim, procurement, and cost.

Time Unit: The Time Unit has the responsibility of recording the time spent by hired equipment and personnel on a daily basis, adhering to government regulations. For instance, this includes the documentation of the usage duration in log books for boats, vehicles, and helicopters in the context of floods.

Claim Unit: In the aftermath of a disaster, organizations need to manage claims efficiently. This involves documenting and processing claims for various resources and services utilized during the response. Clear and transparent claim management helps in reimbursing expenses and maintaining financial accountability. Proper record-keeping is essential to streamline this process.

Procurement Unit: The Procurement unit is tasked with overseeing all financial aspects associated with vendors and contracts. It collaborates with the Finance Branch Director (FBD) to assess procurement requirements and, in accordance with established procedures, compiles a list of suitable vendors for procurement purposes.

Cost Unit: Cost management is a fundamental aspect of finance in disaster logistics. It involves budgeting, tracking expenses, and optimizing resource allocation. Keeping a close eye on costs helps organizations stay within budget constraints and ensures that funds are used effectively. This includes monitoring expenditures related to personnel, equipment, transportation, and other operational expenses.

In simple terms, the finance branch of logistics during disaster management focuses on using resources wisely, managing time efficiently, handling claims transparently, procuring needed supplies, and keeping a careful eye on costs. This ensures that financial resources are well-utilized to provide timely and effective support to those in need during disaster incidents.

Cataloging of Logistic tools

Cataloging logistic tools involves organizing and documenting various tools and equipment used in the field of logistics in a systematic and structured manner. This process is crucial for efficient management, easy retrieval, and effective utilization of these tools. The catalog serves as a reference guide, providing detailed information about each tool, including its purpose, specifications, and usage instructions. The cataloging process typically includes

creating a comprehensive list of logistic tools, assigning unique identifiers or codes to each item, and categorizing them based on their functionality or type.

Cataloging logistic tools for disaster management involves organizing and keeping track of important things like supplies, where they come from, where they are stored, and how they get to where they are needed. A brief description of cataloging is presented in given paragraphs:

Commodity (Supplies): This part is about listing all the things we might need during a disaster—like food, water, medical supplies, and blankets. Each item is described and categorized so we know exactly what we have.

Source of Supply: Here, we document where we can get the supplies. It could be from local stores, government agencies, or donations. Knowing where to get things quickly is crucial during an emergency.

Storage: This involves noting where we store the supplies. It might be in warehouses, emergency shelters, or other designated places. Keeping a record helps us locate and access items efficiently when needed.

Means of Transportation: This part focuses on how we move the supplies from storage to where they are needed. This could involve trucks, helicopters, or even volunteers carrying things. Understanding our transportation options helps us plan and respond swiftly.

10.3.2 Incident Command System (ICS)

What is ICS?

The ICS is a comprehensive management system designed for incidents of diverse types and sizes, ranging from natural disasters like earthquakes, floods, cyclones, and landslides to emergencies caused by accidents, epidemics, or planned events such as festivals and games. This system offers a framework to organize various functions, tasks, and personnel within the broader response process, with a key emphasis on enhancing coordination and communication among different organizations involved. Remarkably flexible and adaptable, ICS is capable of addressing emergencies/incidents of both natural and human-made origins, accommodating scales ranging from routine incidents like road or train accidents and festivals to large-scale,

complex, and multi-jurisdictional disasters such as the 2004 Tsunami. The strength of ICS as a management system lies in its ability to effectively apply to a wide spectrum of incidents and emergencies, showcasing its flexibility and suitability for various scenarios.

Why ICS is Useful

The usefulness of the ICS stems primarily from the specialized and diverse nature of emergency response functions, highlighting the essential need for their coordination to ensure overall efficiency. Failure to integrate these emergency functions within a unified framework poses the risk of duplication and inadequate resource management. A key objective of employing ICS is to transform the initial confusion of an emergency situation into a well-managed response process. This involves addressing crucial questions such as identifying the person in charge, determining whom to contact, and understanding specific actions to take. ICS achieves this by offering a comprehensive framework that integrates various management concepts, including a well-defined command structure with a clear line of authority, organizational flexibility adaptable to different emergency scales, standardized terminology for enhanced communication, and established resource management procedures. The aim is to systematically organize response functions in a coherent manner.

History of ICS

The roots of the ICS trace back to the early 1970s in the United States, emerging as a response to a series of wild fires in southern California. During this period, various agencies tasked with managing such fires encountered recurring challenges. These included issues such as an excessive number of individuals reporting to a single supervisor, diverse response organizational structures based on parent departments, a lack of reliable information, disparate terminologies and incompatible communication methods, unclearly specified objectives, and a deficiency in a clear line of authority. Moreover, there was a notable lack of flexibility in the responding organizations to adapt to the evolving situations.

In response to these challenges, multiple agencies collaborated to establish the Fire Fighting Resource of California Organized for Potential Emergencies (FIRESCOPE). This inter-agency initiative played a pivotal role in the development of the ICS model of management. While initially conceived to address issues specific to forest fires, it soon became evident that the

principles of ICS were universally applicable to a broader range of hazards. Many disasters, by their nature, involve multiple jurisdictions, heightened public and media visibility, and pose significant personal risks to responding personnel.

Over the course of the last four decades, the ICS model has undergone a transformative journey, evolving into an all-hazards and incidents type. Recognizing the broader applicability and effectiveness of ICS principles, several countries, including Australia, Canada, New Zealand, Sri Lanka, and Thailand, have embraced and implemented the ICS model in their emergency management frameworks. The adaptability and success of ICS in diverse international contexts underscore its status as a globally recognized and accepted system for managing disaster incidents.

ICS in India

In response to the recommendations outlined by the High Powered Committee, the Government of India has opted to customize the ICS to align with the Indian system of administration. The objective is to gradually institutionalize ICS, thereby enhancing the professionalism of disaster response in the country. To facilitate this adaptation, the National Institute of Disaster Management in New Delhi, along with the Lal Bahadur Shastri National Academy of Administration in Mussoorie and Six Regional Centers, has been assigned the responsibility of adapting, training, and institutionalizing ICS practices in India. It is essential to highlight that the approach adopted in India does not involve replacing the existing system of emergency management, which has evolved after a long experience, taking into account local conditions. Instead, the aim is to fortify this established system by integrating ICS through appropriate modifications, addressing any existing gaps. The process of adapting ICS in India has been in progress since 2003. Throughout this period, a significant number of personnel from various entities, including Central government departments, State Governments, non-governmental organizations (NGOs), the National Disaster Response Force, and Civil Defense, have undergone training in ICS methodologies.

Major Structure of ICS

Command Staff: In the Incident Command System (ICS), the command staff comprises the Incident Commander, who holds the overarching responsibility for incident management, along

with three additional positions: Information Officer, Safety Officer, and Liaison Officer. The Information Officer plays a pivotal role in developing and disseminating information to the news media, incident personnel, and other relevant agencies and organizations. For incidents involving multiple agencies or having a multi-jurisdictional nature, the Liaison Officer is appointed to facilitate coordination among various agencies, whether they are directly providing assistance or cooperating by offering non-critical resources to incident management. Meanwhile, the Safety Officer is tasked with devising and recommending measures to ensure the safety of incident personnel (responders). In situations where conditions pose a life-threatening risk to responders, the Safety Officer has the authority to directly halt unsafe operations if deemed necessary.

General Staff: The ICS framework encompasses several key positions, each responsible for distinct aspects of emergency response. The individuals within the General Staff include:

i. Operation Section Chief
ii. Planning Section Chief
iii. Logistics Section Chief
iv. Finance and Administration Section Chief

These appointed chiefs lead their respective sections, overseeing the coordination and execution of operations, planning efforts, logistics management, and financial administration within the ICS framework. Each role plays a crucial part in ensuring a comprehensive and well-coordinated response to incidents and emergencies.

Primary Functions of ICS

Command: The Incident Commander (IC) bears ultimate responsibility for all functions within the Incident Command System (ICS). This individual has the discretion to personally undertake all functions or delegate specific tasks to other positions. Consequently, while certain roles within an ICS team may be contingent upon incident size and requirements, the presence of an IC is constant. In circumstances necessitating it, a Deputy Incident Commander can be designated. This deputy may originate from the same agency as the IC or an assisting agency with equivalent proficiency, poised to assume the IC role if the need arises. The primary duties and responsibilities of the IC encompass determining incident objectives and priorities, establishing the Incident Command Post, forming the Incident Command Organization,

overseeing planning meetings, approving incident action plans, coordinating the activities of the command and general staff, keeping responsible officials informed about incident status, authorizing the release of information to the media, and ensuring the implementation of adequate safety measures.

Operations: The Operation Section holds the responsibility for overseeing and guiding all tactical actions aimed at achieving incident objectives. This section is composed of various components, including ground or surface-based tactical resources, aviation resources (such as helicopters and fixed-wing aircraft), and staging areas. Ground or surface-based resources can be organized in three ways—single resources, strike teams, and task forces—based on the specific application area and tactical requirements. Within the ICS framework, staging areas play a crucial role. These areas serve as temporary locations for positioning resources available for incident assignments. The chosen location should be in close proximity to the incident site, allowing resources to reach their assigned operational areas within three to five minutes. The ICS emphasizes the establishment of multiple staging areas within an incident, aiming to ensure that operational time is not compromised due to delays in resource readiness and deployment. This strategic approach enhances overall incident management efficiency and responsiveness.

Planning: The Planning section assumes responsibility for gathering, assessing and presenting incident information as well as maintaining the status of resources, and creating incident action plans and related documentation. Within the Planning section, four units can be activated based on specific needs. These units include:

- **Resource Unit:** This unit oversees the status of all resources, both primary and support, involved in an incident. Its responsibilities encompass managing the check-in processes for all resources, maintaining a comprehensive master list that includes key supervisory personnel and critical resources, and developing a system to track and display resource status, assignment positions, and other relevant information.
- **Situation Unit:** The Situation Unit focuses on collecting, processing, and organizing all information related to the incident. Additionally, it prepares future projections and likely scenarios for planning purposes. The unit has the capacity to engage three other positions: field observer, display processor (for information display), and weather observer.

- **Documentation Unit:** Responsible for maintaining accurate and up-to-date incident files, the Documentation Unit ensures that documentation is available for incident management, legal considerations, analytical purposes, and historical records.
- **Demobilization Unit:** In incidents of large or complex nature, the Demobilization Unit plays a crucial role in developing a demobilization plan. Such a plan becomes essential for the efficient utilization of resources during the demobilization process.

Technical Specialists: In specific incidents, the involvement of technical specialists with specialized knowledge and expertise, such as meteorologists, hydrologists, GIS specialists, etc., may be necessary. Typically, these technical specialists are positioned within the Planning Section, where they collaborate with units like the situation unit or other relevant units based on the specific needs of the situation. For instance, if a specialist's expertise lies in resource inventory, they may be aligned with the resource unit. Alternatively, in incidents involving hazardous materials, a dedicated unit for these specialists could be established within the planning section.

Logistics: The Logistics section plays a crucial role in offering assistance and services to incident management. Its key responsibilities include providing support for various incident facilities, such as bases and camps, as well as overseeing transportation, communication, food services, ground transportation, medical services, and resource procurement.

Finance and Administration: The designated section is tasked with monitoring costs associated with incidents, maintaining records of personnel and equipment, and managing procurement contracts. The necessity for an independent Finance and Administration section, or a more extensive Finance/Administration section, depends on various factors related to the incident, including its size, the involved agencies, and the type of resources required. The activation or deactivation of specific units within this section is contingent upon the specific needs of the incident.

10.4 SUMMARY

Logistics in disaster management is like making a plan to get the right help to the right place at the right time during a disaster. It involves organizing and moving resources, like food, water, and medical supplies, to where they are needed most. Think of it as a well-organized team

effort to ensure that aid reaches people affected by a disaster quickly and efficiently. This includes transportation, storage, and distribution of essential items to support those in need and minimize the impact of the disaster.

The Incident Command System (ICS) is a structured and flexible approach to managing emergency responses. Developed to enhance coordination among various agencies and personnel during incidents, ICS provides a clear framework for organizing, commanding, and controlling resources. It promotes effective communication, ensuring that everyone involved in the response understands their roles and responsibilities. ICS is scalable, adapting to incidents of different sizes and complexities. By fostering collaboration and a unified response, ICS plays a vital role in efficiently managing emergencies and disasters.

10.5 GLOSSARY

Command Staff: The key personnel assigned to support the Incident Commander, including the Public Information Officer, Safety Officer, and Liaison Officer.

Communication Plan: A strategy outlining how information will be shared among different parties involved in disaster management.

Demobilization: The process of releasing and reassigning resources after they are no longer needed for incident operations.

Emergency Response Team: A group of trained individuals responsible for immediate actions in response to a disaster, including rescue and initial aid.

Finance Section: The ICS organizational unit responsible for managing financial and administrative aspects of incident operations, including cost tracking, reimbursement, and personnel issues.

Incident Action Plan (IAP): A written plan that documents incident goals, operational objectives, and the overall strategy for managing an incident.

Incident Base: The location at which primary logistics functions for an incident are coordinated and administered.

Incident Commander (IC): The individual responsible for overall incident management, decision-making, and coordination of all activities. The IC holds the authority to establish an Incident Command Post and make critical decisions.

Logistics Section: The ICS organizational unit responsible for providing resources and support to meet operational needs during an incident. This includes procurement, communication, facilities, and catering services.

Logistics: The detailed coordination of a complex operation involving various resources, such as supplies, personnel, and transportation.

Operations Section: The ICS organizational unit responsible for managing tactical operations at the incident site, comprising various branches, groups, divisions, and units.

Planning Section: The ICS organizational unit responsible for collecting, evaluating, and disseminating information relevant to the incident. It develops plans and implements strategies to achieve incident objectives.

Shelter Management: The coordination of safe places for people affected by a disaster to stay, including temporary shelters and housing.

Supply Chain: The network of individuals, organizations, and activities involved in the production, handling, and distribution of goods and services.

Transfer of Command: The process by which responsibility for command is passed from one Incident Commander to another, often due to changes in the incident's complexity or jurisdiction.

Transportation: The movement of people and goods from one place to another, crucial for delivering aid and resources during a disaster.

Unified Command (UC): A collaborative approach where multiple agencies work together under a single command structure to manage incidents that affect all organizations.

Warehouse: A large storage facility for keeping and managing supplies and equipment needed during a disaster.

10.6 ANSWER TO CHECK YOUR PROGRESS

- In disaster management, logistics involves organizing and moving resources to help people in need.
- Checking progress in logistics means making sure supplies like food and medicine reach the right places on time.
- We need to track how quickly trucks and planes can deliver aid to affected areas during disasters.
- Monitoring progress in logistics helps ensure that help gets to those who need it most urgently.
- Simple checkpoints, like counting how many relief packages have been sent out, help gauge logistics progress.
- In disaster situations, efficient logistics means getting help to people faster and more effectively.
- Checking progress involves making sure communication systems are working well between aid organizations.
- Logistics in disaster management includes coordinating volunteers and organizing transportation for aid.
- Monitoring progress helps identify any delays or obstacles in getting aid to people impacted by disasters.
- Efficient logistics is crucial for saving lives during emergencies by ensuring timely and organized relief efforts.
- ICS stands for Incident Command System.
- The primary goal of logistics is to ensure the efficient flow of goods, services, and information during a disaster.
- The Incident Command System was originally developed by the United States Forest Service.
- Logistics involves activities such as procurement, transportation, warehousing, and distribution.
- ICS provides a standardized approach to the command, control, and coordination of emergency response.

- Logistics supports ICS by ensuring timely availability of essential resources where they are needed.
- The synergy ensures a well-coordinated and timely response by providing necessary tools and supplies to responders.
- Research emphasizes the need for strategic planning and coordination in logistics to enhance the overall effectiveness of disaster response efforts.

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10.8 TERMINAL QUESTIONS

Long Questions

1. In the context of disaster management, explain the role of logistics in ensuring an efficient and timely response.

2. Discuss the significance of pre-positioning logistics assets in disaster-prone regions. How does strategic placement of resources contribute to a faster and more effective response during emergencies?
3. Explain the concept of Incident Command System (ICS) in disaster management. How does ICS contribute to effective coordination and response during emergencies?
4. Discuss the role and responsibilities of different positions within the Incident Command System (ICS) hierarchy. How does the clear delineation of roles enhance the overall efficiency and effectiveness of emergency response operations in the context of disaster management?

Short Questions

1. What is the primary goal of logistics in disaster management?
2. How does efficient logistics contribute to timely disaster response?
3. What role do supply chains play in disaster logistics?
4. Why is pre-positioning of resources crucial in disaster logistics planning?
5. How does technology aid in enhancing logistics capabilities for disaster management?
6. What does ICS stand for in the context of disaster management?
7. Why is the Incident Command System (ICS) important in emergency response?
8. What is the primary goal of the Incident Command System during a disaster?
9. How does ICS help in organizing and managing resources during an incident?
10. Name one key principle of the Incident Command System and briefly explain its significance.
11. What are the main roles within the Incident Command System, and how do they contribute to effective coordination?
12. In what ways does ICS facilitate communication among different agencies involved in disaster management?

Multiple Choice Questions

1. What is the primary goal of logistics in disaster management?

A) To minimize the impact of disasters on human life and property

B) To maximize profits

C) To increase bureaucratic processes

D) To assign blame for the disaster

2. Which of the following is a key component of effective logistics in disaster management?

A) Delayed response

B) Communication channels

C) Limited resource allocation

D) Centralized decision-making

3. What is the primary purpose of the Incident Command System (ICS) in disaster management?

A) To assign blame and responsibility

B) To establish a hierarchical structure for decision-making

C) To distribute resources based on political considerations

D) To streamline communication and coordination among response agencies

4. In the Incident Command System (ICS), what is the role of the Incident Commander?

A) Manage financial resources

B) Make all operational decisions

C) Provide medical treatment to victims

D) Document and report incident details

5. Which ICS section is responsible for handling logistics, such as resource ordering, tracking and demobilization?

A) Operations Section

B) Planning Section

C) Logistics Section

D) Finance/Administration Section

6. The person responsible for overall management of the incident and coordination of all activities is known as the _____.

7. ICS is designed to be compatible with the _____ system to facilitate coordination between different agencies.

8. The Planning Section Chief is responsible for developing the _____, which includes incident objectives, strategies, and tactics.

9. Effective _____ is crucial in ensuring timely delivery of relief supplies during a disaster.

10. The use of advanced _____ can help optimize routes and minimize delays in transporting aid to affected areas.

11. Coordinating with various _____ is essential for seamless logistics operations during a disaster response.

12. In disaster management, logistics primarily involves the coordination of transportation and the distribution of relief supplies. (True/false)

13. Establishing communication channels is not a critical component of logistics in disaster management. (True/false)

14. Logistic planning for disaster management is only necessary during the immediate aftermath of a disaster and not in the preparedness phase. (True/false)

15. In the Incident Command System (ICS), the Incident Commander has the primary responsibility for determining overall incident strategy and tactics. (True/false)

16. ICS is primarily designed for managing large-scale incidents and is not suitable for small, routine events. (True/false)

Answers

QN.	Answer	QN.	Answer
1	A	9	Logistics
2	B	10	Technology
3	D	11	Stakeholders
4	B	12	True
5	C	13	False
6	Incident Commander	14	False
7	National Response Framework	15	True
8	Incident Action Plan	16	False

BLOCK 4 - MAJOR POST IMPACT FACTORS

UNIT 11 - RECOVERY, RELIEF & REHABILITATION

11.1 OBJECTIVES

- Recover the losses caused by the disaster.
- To provide relief work and financial assistance to the disaster-affected community.
- To re-establish settlements in disaster-affected areas.
- To formulate a concrete policy for damage, compensation, rehabilitation, and rehabilitation.

11.2 INTRODUCTION

The heartbeat of human beings starts increasing at the very mention of the word disaster, which is a fearful and harmful natural and human phenomenon in which the life of the living beings living in the place (land surface) where it occurs remains in danger, even though it sometimes leads to immense human suffering. Economic and cultural heritage gets damaged on a large scale, which remains impossible to compensate for a long time. Human disasters like earthquakes, volcanic natural disasters, and landslides (Bhopal gas leak, Chornobyl incident, Hiroshima Nagasaki) have been the most tragic events in human history.

The frequency of natural disasters in the world has increased since the Industrial Revolution, whether natural or man-made, whereas natural disasters have been occurring since the origin of the Earth. In which humans, through their intellectual development and coordination with nature to some extent, have carried out recovery work in disaster-affected areas, such as the construction of safety walls in landslide areas, earthquake-resistant buildings, the construction of floating and high-pillared houses in flood-prone areas, etc. Rehabilitation work has been done in disaster-affected areas by building post-coastal control walls in coastal areas. In cases of industrial disasters, fire, gas leakage, and other incidents in the areas affected by man-made disasters, modern technology and safety equipment are being used for recovery, and efforts are being made to bring the situation back to the previous level with national and international cooperation. At the national level, the institutional and organizational structure is being strengthened by the formation of the National Disaster Reserve Force (NDRF) and the State Disaster Reserve Force (SDRF) and the inclusion of many early warning equipment and modern technologies.

Disaster relief management work cannot be successful with limited resources; large-scale funds are required for structural development, the responsibility of which lies with the government and related responsible institutions established for disaster work. In relief work, first of all, food, shelter, and medical services are provided at the primary level. Thereafter, other preventive and permanent remedial work has to be done in the affected area.

Again, accommodation is determined based on immediate conditions and long-term security criteria. First of all, during a disaster, the affected people take shelter in safe places like government buildings and houses of non-government organizations and get out of the affected area. Secondly, when relief starts coming in the disaster-affected area, the government has to develop permanent, necessary infrastructure like land, housing, a school, a hospital, electricity, water, and communication in a naturally safe place for the people of the affected area. This is done keeping in mind the past occurrences of natural disasters in that area and future security.

Thus, there is a need to prepare a solid emergency plan after or before the disaster. Which mainly includes rehabilitation, relief, rehabilitation, construction of infrastructure development, etc., rescue work, housing schemes, food arrangements, water supply, transport development, communication facilities, and health facilities.

11.3 RECOVERY, RELIEF & REHABILITATION

Recovery

Disaster recovery includes the restoration of the environment, infrastructure, human assets, and livelihoods, which is beyond the capacity of the affected community. Where work is done to develop the capacity to rescue the affected people. These are earthquakes, storms, volcanoes, landslides, cloud bursts, tsunamis, cyclones, fires, droughts, floods (natural disasters), industrial accidents, terrorist attacks, pandemics (COVID-19), wars, social riots, cyber attacks (humanitarian crises) etc. Occur through a disaster recovery plan (DRP) is a part of a business plan that outlines how to start reconstruction and relief work in the disaster-affected areas at a rapid pace after the disaster. In the disaster recovery plan, a policy is planned for the structural framework work. Implementation is achieved through various IT technologies, in which success is achieved in achieving the objective of recovery in disaster areas, and the objective of disaster recovery is to plan action before, during, and after the

disaster due to a natural or man-made disaster. Development has to be done on a large scale, which is mainly conducted through the following points.

1. Disaster impact recovery plan
2. Human occupation reestablishment
3. Plan implementation inferiority
4. Disaster Management Plan (DMP)
5. Planning during disaster (Emergency plan)

1. **Disaster impact recovery plan-** First of all, a regional analysis of the disaster-affected area has to be done. After evaluating the effective damage caused in the disaster-affected area and assessing all the geographical and human conditions to put it in the previous structure, reconstruction works are carried out on a large scale.
2. **Restabilizing human occupation-** Under the second action plan for disaster recovery, the work of restoring human cultural infrastructure to its previous state or developing it in a planned manner is done by the governments. Which are formulated keeping in mind the new possible threats.
3. **Plan implementation continuity**- After the assessment of the Disaster Impact Plan (DEP) and human cultural activities, there is a need to continuously implement the strategies and works made for recovery in the affected areas so that the risk of natural disasters occurring from time to time can be reduced. Can be limited. Therefore, there is a need for constant monitoring in disaster-affected and prone areas.
4. **Disaster Management Plan-** Under the disaster management plan, an action plan is prepared on a large scale (including various technologies, warning systems, disaster reduction procedures, and various methods to be adopted during and after the disaster) for the conditions and possible threats occurring due to the disaster. Which implements recovery programs on the ground under a concise framework that is completed in four phases: mitigation, preparedness, response, and recovery?
5. **Disaster Emergency Recovery Plan-** Recovery in emergencies involves strategies to take immediate priority actions during a disaster. How human loss can be reduced, the affected community can be evacuated to a safe place, and the work of delivering essential goods is also included in this. Along with this, traditional techniques are also included in emergency recovery.

A disaster recovery plan is a strategy made to compensate for the possible consequences of disasters even before they occur. It is a concrete step in disaster relief, which is an action plan for the economic, social, and physical damage of the disaster in the affected area so that its goals can be achieved. It is done. Recovery from the effects of disasters occurs from individual to community. Recovery occurs through the process of adaptation and adjustment of the people affected by the disaster and the people affected by the disaster to the new ecosystem. Which includes the adverse effects arising or occurring during any natural or man-made disaster (such as economic, mental, social, cultural, pain, destruction of property, isolation of relatives, social behavior, destruction of ancestral home or culture of origin, etc.

Disaster compensation is generally limited to a low level, but recovery efforts are made to a greater extent through community participation and government cooperation. But removing the mental fear of the affected human community is the first compensation, so that the fear of disaster does not always remain painful for society or the victim, freeing them from the fear of disaster is also a part of disaster recovery. The most important step in disaster recovery is to bring the disaster-affected community into the mainstream of social life, heal the wounds of the disaster, and regain the previous trust of the victims. Disaster recovery in disaster-affected areas is divided into three categories.

1. Mental Health Recovery
2. Economic Compensation Recovery
3. Social Replacement Recovery

1. **Mental Health Recovery –** During and after the disaster, the victim or the affected community has to face many problems related to loss, separation from loved ones, death of relatives, injury, disability, housing, food, health, etc. Due to this, many times mental problems like mental disorders, insanity, fear, and loss of memory arise. A person suffering from a disaster reaches a stage of separation from the mainstream of his community, for which it is very important to get rid of mental pain to join the mainstream again, and there is a need to awaken the lost strength again.
2. **Economic Compensation Recovery-** As a result of a disaster, there is human loss along with life and property, damage to man-made cultural properties as well as natural heritage and resources, and hundreds of years of progress are destroyed in a moment. There are also obstacles in the way of future economic progress. Disaster-

affected geographical areas are left behind in developmental activities. Lack of proper management of economic recovery works gives rise to systems like corruption, but proper management and adequate economic support for corrective efforts in disaster-affected areas are two important dimensions through which economic recovery can be done.

3. Social Replacement Recovery- Social replacement recovery is the third dimension of disaster recovery. During the period of disaster, there is similarity in cultural-social values and separation among the people of one community, due to the decline of social or caste customs, many communities or individuals suffer from a feeling of social insecurity due to separation from their original culture. Therefore, in disaster compensation, it is very important to protect and settle people of the same caste, community, and culture together. Apart from this, change in the thinking and behavior of the affected person and community, awareness, improvement in the field of education, participation of the deprived classes in community programmes, information about reform programmes reaching the masses, rehabilitation, and economic stability by linking it with employment to replace the lost lives of the victims. Rebuilding self-confidence is social replacement recovery. For example, building human infrastructure again in earthquake-affected areas, carrying out human activities again in flood-affected areas, infrastructure development in coastal areas, rehabilitation in industrial disaster areas, implementation of the policies of the National Disaster Management Authority (NDMA) 2006, etc.

Relief

In cases of damage and animal crises caused by disasters caused by natural or man-made causes, the victims need immediate relief (protection, food, clothing, and medical care) during and after the disaster, which should be done on a war footing. There is a need to work at all levels to alleviate the suffering of the affected class. Whose work should be done at the national level on the basis of the work of many international organizations, the results of research, and the rules adopted during the disaster? The National Disaster Management Act 2005 and the establishment of disaster institutions for disaster relief can currently be seen as achievements and a leading positive step for the disaster relief-affected section.

In disaster relief management, mainly the following tasks are adopted: therefore a disaster, any type of disaster (natural or man-made) that causes harm to humans. To provide security, the first tasks are the collection of disaster data, map marking, development of an information system, and the development of a disaster safety plan in potential areas; preparation and need for modern and traditional technology; knowledge and coordination for prevention measures; and reaching the affected area. All transportation arrangements should be made in disaster-affected areas.

In cases of damage and animal crises caused by disasters caused by natural or man-made causes, the victims need immediate relief (protection, food, clothing, and medical care) during and after the disaster, which should be done on a war footing. There is a need to work at all levels to alleviate the suffering of the affected class. Whose work should be done at the national level on the basis of the work of many international organizations, the results of research, and the rules adopted during the disaster? The National Disaster Management Act 2005 and the establishment of disaster institutions for disaster relief can currently be seen as achievements and a leading positive step for the disaster relief-affected section.

In disaster relief management, mainly the following tasks are adopted:.

1. Before a disaster- Any type of disaster (natural or man-made) that causes harm to humans. To provide security to it, the first tasks are the collection of disaster data, map marking, development of an information system, and the development of a disaster safety plan in potential areas; preparation and need for modern and traditional technology; knowledge and coordination for prevention measures; and reaching the affected area. All transportation arrangements should be made in disaster-affected areas.

2. At the time of disaster- When a disaster occurs in any part of the earth, the first thing to be done is to protect the lives and property of the affected people and to provide relief material. Under this, rescue work on a war level includes evacuating people from the disaster-affected area to safe places, taking the injured to the hospital, finding shelters and shelter camps, taking the affected people to safe places, arranging food, drinking water, and supplies of medicines. This includes the establishment of temporary hospitals in the affected areas, proper arrangements for medical treatment, communication, etc.

3. After the disaster- Emphasis is laid on action planning for rescue and rehabilitation of affected areas and people and capacity development to deal with future disasters, which is described in detail in the unit.

In conclusion, during the disaster, before and after the disaster, in the form of relief work, measures to protect life and property and disaster awareness are adopted for the main relief work. Relief work in natural and human disasters depends especially on the level of economic development, geographical location, population, and awareness of a country. At present, the prosperous countries of the world have not been able to establish a strong mechanism to protect their citizens and fight the challenges even in big disasters, such as the disaster model of Japan, Australia, and America, which has been of little use in disaster relief, whereas India is still vulnerable to disaster relief (about 58% earthquake, 12% flood), in which no concrete strategy and measures for relief have reached the ground, due to which thousands of people are dying every year, Kedarnath Flood, Bhuj. Many incidents, like the earthquake and tsunami of 2004, and the Bhopal gas tragedy, are wounds of disasters in which many people have gone missing and we have no means to find them.

To overcome a disaster, concrete planning is required in advance, which depends on the economic system and willpower of a country. An example of this is the concrete steps taken during the COVID-19 pandemic and the unique work of Relief and Victory on humanitarian disasters. Apart from this, the social crowdfunding system can become a strong basis for disaster relief.

Disaster Rehabilitation-

Natural and man-made disasters are powerful forces that affect millions of people every year. A natural disaster is more powerful than a man-made disaster. It destroys any natural and cultural landscape and has a lasting impact on the economy, environment, and human life. Due to this, the affected persons have to undergo huge losses and undergo reconstruction processes, and there is a financial burden on the state and the country. Disaster rehabilitation is a long and expensive process. Under the rehabilitation process, the destroyed and organized systems have to be revived (water supply, housing, communication, and transportation); apart from this, the works of cultural, visual, land development, economic system establishment, and employment also have to be established. It depends on the economic strength of the country, yet it is not able to achieve victory (rehabilitation) on its strength; human knowledge and power become

helpless in front of nature. Therefore, to implement such schemes, there is a great need for other countries to crowd-fund disaster rehabilitation work. Whose example is the U.S.A.? In 2005, he appealed to the international community for help in the rehabilitation of the hurricane disaster that hit the city of New Orleans, whereas America is among the countries with the most powerful economic systems in the world.

Therefore, rehabilitation plans and works are not successful based on local resources. Therefore, for disaster reduction and rehabilitation planning, financial, administrative, and technical assistance must be obtained from the government, non-government organizations, and internationally. Because the implementation of an adequate rehabilitation process with the active participation of the affected families and aspects of security are included in this process, On the basis of the National Rehabilitation Policy 2007, It has been made clear that the government will have to make provision for benefits and compensation to the people displaced by land acquisition, purchase, or any other involuntary displacement, and it will have to provide such alternative living arrangements to them by setting up an integrated structure at a new place. Which compensates for the basic facilities and also creates means of employment for the disaster-affected community, etc? Rehabilitation facilities should be available to all the affected people on the basis of maximum equality of rights.

A problem that arises with the disaster rehabilitation community is that all powers do not get equal rehabilitation facilities. Due to the political access of powerful families, many times the weaker sections are left out of disaster relief materials and rehabilitation facilities. Therefore, concrete policy and monitoring should also be strictly implemented during disasters because many people in disaster-affected areas get injured, suffer permanent disabilities, and become economically weak.

The Directive Principles of State Policy state that the state should work for disaster rehabilitation, especially for the elderly, the sick, the disabled, and the unemployed. Whereas the Rehabilitation Council of India (RCI) was established by an Act of Parliament, its main objective is to humanize, regulate, and monitor training programs in the field of special education and disability. The National Institute of Rehabilitation and Research, Odisha, carries out rehabilitation training and research work in rehabilitated disaster-affected areas. Recently, the Rajasthan government has implemented the free grant housing facility "Mukhyamantri Punarvas Grih Yojana" 2022 through voluntary organizations to provide residential facilities to disaster-affected homeless, elderly, working women, and helpless/destitute.

Under the Rehabilitation Grant, free financial assistance ex gratia is provided to the affected families to purchase land together. Under the Disaster Rehabilitation and Resettlement (R&R) Scheme, an environment impact assessment and management plan, land acquisition, selection of a safe location for the affected community, and demonstration of fair compensation, especially for the vulnerable section, have been made a must. So that all the affected families can achieve socio-economic and cultural equality and stability. In the case of a disaster rehabilitation project, like replacement, the government should arrange basic facilities like housing, agricultural land, animals, grazing land, roads, electricity, water supply, sanitation, schools, community buildings, religious places, communication facilities, markets, medical care, displacement grants, etc. Apart from this, small cottage industry handicraft centers should also be given to the affected community for livelihood. Thus, under rehabilitation, homeless elderly people, working women, and helpless citizens of all classes are provided with housing, food, clothing, medical care, nutrition, care, entertainment, cultural and spiritual security, and social support through institutional care to lead a dignified life. A fear-free life with security has to be provided to all affected.

Rehabilitation planning is mainly divided into two phases.

1. Rehabilitation at the time of disaster

2. Post-disaster rehabilitation

Rehabilitation during disaster - Natural and human disasters are natural crises that occur immediately without prior notice. Permanent houses, flats, government buildings, and non-government buildings are used for temporary accommodation.

Post-disaster rehabilitation: The nature of the post-disaster rehabilitation plan should be under the master plan scheme. Needed In the present scenario, unplanned rehabilitation has given rise to many environmental, social, and housing problems, due to which there are many types of problems in the development of basic infrastructure like roads, drains, electricity, parks, sanitation, air, light, security, communication, etc. Development has taken birth as a problem. If the settlements of the disaster-affected community are established by adopting a planned process, then new developmental processes in the field of long-term housing can be implemented over time.

Rehabilitation areas, ideal models of modern development, will prove to be helpful in the development of other disaster-affected towns and cities and in solving urban problems. Disaster recovery is mainly identified in disaster rehabilitation. Disaster recovery, rehabilitation, mitigation, and management are of major importance after a disaster. The success of disaster recovery and rehabilitation: political (state, country) structure, strength, preparedness during the disaster period, collective participation, economic condition, organizational structure after the disaster, priority of social rehabilitation, role of voluntary organizations, rapid action plan, local community cooperation. Administrative assistance depends on human sensitivity, etc.

11.4 SUMMARY

Disaster is a terrible destructive phenomenon that causes harm to humans as well as the entire ecology, the compensation for which is sometimes beyond human limits. All organic and non-organic, living and non-living things disappear from this earth forever. The wrath of disasters has always been going on earth and will continue till eternity. Sometimes natural disasters and sometimes human disasters occur from time to time. It is beyond the reach of humans to prevent it, but the precautions taken before disasters and the protective measures adopted to deal with the problems depend on citizen alertness, awareness, education, and management.

But this chapter is not based on the disaster management of entire disasters but on the compensation, recovery, relief, and rehabilitation of environmental and human aspects caused by the disaster. Under recovery, the need for protection of disaster-affected communities is emphasized. And the reconstruction work is done at a fast pace. Which mainly includes infrastructure, means of livelihood, re-establishment, etc. The relief work includes providing shelter, food, medical treatment, and evacuation of people from the affected areas during disasters, as well as reaching safe areas. Under rehabilitation, the affected people are provided permanent residence, communication, transportation, employment resources, assessment of environmental elements and selection of suitable places from a human health point of view, and all the affected communities are replaced on the basis of their social similarity.

A disaster is a painful event that occurs without early warning. Humans cannot take any concrete steps to solve this problem because it is beyond their capacity. Such as the natural disasters that have occurred in the past years are Indian Ocean Tsunami 2004, Pacific Ocean Tsunami 2011, Bhuj Earthquake 2011, Haiti Earthquake 2010, Alaknanda Landslide 1970,

Malpa Landslide 1998, Kedarnath Disaster 16-17 June 2013, Orissa Super Cyclone, Mumbai Flood 2005, and humanitarian disasters like Bhopal Gas Tragedy 1984, Chrnovil Nuclear Ukraine 1986, Fukushima Japan 2011, etc. are the biggest disasters of destruction of mankind in the world. Even till now, it has not been possible to fully mitigate the damage caused by its effects, nor have the disaster reduction management plans adopted by the world stage been implemented. The consequences of the disasters have been so painful, and the recovery of the cultural environment created there and the relief and rehabilitation work have not been successful, even to the extent of 10%. Large-scale changes have taken place in physical elements; human knowledge, technical capabilities, and economic capabilities are also not being successful. In conclusion, disaster warning precautions are necessary for the success of disaster recovery, relief, and rehabilitation.

Awareness is the first medicine for relief. Life security of disaster-affected areas and communities on war footing; security of means of living; as described in the strategies adopted in the National Policy of Disaster Management, Disaster Management Act 2005, should be strictly implemented; Public participation in disaster recovery Appropriate management. Simple access for the affected remains the more important task. Also, in a country like India, there should be emotional support for the affected people, there should be relief, and emphasis should be given to increasing the economic limit further because the disaster cannot be borne by the government or the responsible organization alone, for which only joint efforts can be more successful. Have been considered.

11.6 GLOSSARY

Disaster:	A catastrophic event occurring without prior notice
Natural Disaster:	Catastrophic event caused by altered causes.
Settlements:	Residential forms were created by human culture.
Man-made Disaster:	Distress Caused by Human Activities.
Chornobyl Incident:	A nuclear disaster occurred in Ukraine in 1986.
Recovery:	Reconstruction in disaster-affected areas and providing relief to the affected.
Relief:	Providing safe shelter, food, and medical treatment to the affected people during disasters.
DRP:	Disaster Recovery Plan

Rehabilitation:	Providing housing to the disaster-affected persons again by the government.
Mental Health:	To correct the fearful mental condition of disaster-affected persons.
Social recovery:	Restore the social and cultural damage caused by the disaster.
Rehabilitation Grant:	financial assistance given by the government for housing and land for the disaster response community.
Master plan:	Long-term Planned Construction Policy.
Disaster Reduction:	Preventive measures are adopted to end natural and man-made disasters.

11.7 ANSWER TO THE CHECK YOUR PROGRESS

Question 1: A disaster is a destructive event caused by natural or human actions.

Question 2: Natural disasters include earthquakes and volcanoes. Floods, droughts, hot and cold currents, landslides, etc.

Question 3: Human disasters include nuclear exposure and gas dink. Biological attack, fire, social riot, war, etc.

Question 4: At the time of the disaster, take the displaced community to safe places and provide them with essential services. Like housing, free medicine, etc.

Question 5: Under disaster management, a special type of strategy has to be made during the disaster, after the disaster, and for disaster reduction.

Question 6: The process of bringing the affected people back to a normal state after the disaster and the monthly losses and fear-filled environment is called mental health recovery.

Question 7: Under disaster recovery, the environment, infrastructure, human assets, and livelihoods are restored.

Question 8: Relief in providing safe shelter, food, and medical treatment to the affected people during disasters.

Question: 9: Under disaster rehabilitation, institutional development is done by the government and responsible citizens to enable the homeless, working women, and helpless citizens of all sections to live a dignified life.

Question: 10: Disaster recovery a plan is a business plan that takes. Immediate action for reconstruction and relics in a disaster-affected area.

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11.8 TERMINAL QUESTIONS

Long Questions

1. Write in detail how disaster management and recovery work is done for humans in disaster-affected areas.
2. Describe in detail how disaster Relief work is done in disaster-affected areas.
3. Explain in detail what you understand by disaster rehabilitation.

Short Questions.

Question 1: What is the meaning of disaster recovery?

Question 2: Briefly describe how many parts disaster recovery is divided into.

Question 3: What do you understand by mental health recovery?

Question 4: Describe into how many parts the action plan is divided into in disaster-affected areas.

Question 5: What is social replacement recovery?

Question 6: What do you mean by disaster relief?

Question 7: Which tasks are included under disaster relief management?

Question 8: What do you mean by disaster rehabilitation?

Question 9: The disaster rehabilitation plan is mainly divided into how many phases?

Question 10: Describe the same selected disaster incidents in the world.

Multiple Choice Questions

Question 1: What does recovery mean?

a) Rebuilding Haman infrastructure
b) Providing at-risk individuals with the ability to recover
c) Adjusting to a new environment
d) All of the above-✓

Question 2: What is a man-made disaster?

a) Volcanic eruption
b) Bhopal Gas Tragedy
c) Cloud Burst
d) None of the above

Question 3: What is the full form of DRP?

a) Disaster Referral Plan
b) Disaster Recovery Plan
c) Disaster Ratio Plan

Question 4: When was the National Disaster Management Department established?

a) 2004
b) 2005
c) 2006
d) 2007

Question 5: What tasks are done before a disaster in disaster management?

a) Collecting data on past disasters
b) Identification of the disaster-affected area
c) Finding safety measures.
d) All of the bones.

Question 6: The main past disaster tasks are...?

a) Rehabilitation
b) Relief
c) Recovery
d) None of the above

Question 7: When is National Rehabilitation Year celebrated?

a) 2006

b) 2007

c) 2008

d) 2009

Question 8: When did the Chernobyl accidents occur?

a) 1984

b) 1986

c) 1988

d) 1996

Question 9: When did the COVID pandemic arrive?

a) 2020

b) 2021

c) 2019

d) 2018

Question 10: When did the Bhuj earthquakes occur?

a) 2010

b) 2011

c) 2013

d) 2018

Question 11: How many stages are there in the disaster rehabilitation plan?

a) 2

b) 4

c) 6

d) 8

Question 12: Not involved in natural disasters?

a) Earthquake

b) Landslide

c) Forest Fire

d) All of the above

Answer: 1. d 2. b 3. b 4. b 5.d 6.a 7. b 8.b 9.a 10.b 11.b 13.d

UNIT 12 - POST DISASTER REVIEW & DAMAGE ASSESSMENT

12.1 OBJECTIVES

- To be aware of the crisis that occurs after a disaster.
- Making a restoration management plan for the affected areas of the disaster.
- To study the overall physical and human aspects of the disaster-affected area before and after the disaster.
- To assess the damage caused by the disaster.
- Controlling the causes of disaster recurrence through sustainable development policies.

12.2 INTRODUCTION

As explained in the previous chapter or unit, a disaster is the result of natural or man-made actions due to which destructive processes are more affected and cause damage to all the living elements of the earth or surface, the ecosystem, as well as the physical elements. Delivers Most natural disasters are momentary but fast-moving (like earthquakes, volcanoes, cloudbursts and tsunamis), which do not give opportunity to not only humans but any creature to recover. Whereas in a Man-made disaster, by adopting some precautions, the risks can be reduced to some extent or the human loss can be controlled to some extent. Disasters have always occurred in the form of extreme environmental crises. A review and comparison of Man-made disasters has found that not all outbreaks become disasters unless they cause harm to human settlements and Man-made cultural environments. An example of this is the natural disasters occurring in uninhabited areas of oceans and continents, which have very little impact on humans. Sometimes humans are not even aware of these natural events and crises. Because disasters are related to human life, their consequences and severity are assessed to determine the damage caused to human society.

Disasters involve huge losses of life and property (for example: earthquakes, cyclones, epidemics) and also pose future threats to all types of living beings. It is difficult for humans to adjust because there is destruction of humans, animal life, and vegetation. Due to the birth of geographical disparities, a physical structure that is unfavourable for humans is created. What is the result after the disaster? The United Nations has also clarified that “an outbreak is an effectively damaging physical event or human action that

can result in loss of human life or property damage, social and economic destruction, or environmental degradation." It happens."

A disaster is the result of extreme weather or a problem occurring at an untimely and rapid pace. In critical works, the depth, intensity, and consequences of disasters on humans and their environment are assessed based on the economic loss caused by the adverse effects on human society. Thus, every year, many natural and man-made disasters occur in the world. Among these earthquakes, landslides, and cyclones are prominent, in our country, India, landslides, floods, and cyclones also cause immense loss of life, property, and economic loss. The Orissa State Model of Disaster Review and Management has become the best strategy in the country to reduce the loss. Therefore, in the disaster review, the review of the loss of the entire disaster, the causes of the disaster, the effects of the disaster and disaster control measures, public community participation, modern technology, warnings and disasters, sustainable construction works, demarcation of the affected area, security, etc. should be specially included. A correct assessment of disaster damage should help the affected community in recovery, relief, rehabilitation, and the development of basic facilities, and the affected people should get immediate benefits from relief and rehabilitation works.

12.3 POST DISASTER REVIEW & DAMAGE ASSESSMENT

12.3.1 Disaster Review: Meaning and Definition

The meaning of post-disaster review is taken from disaster management emergency pillar management, where it is a plan of action to be implemented to compensate for the losses caused by natural and man-made disasters. Which is a planning format for the recovery of affected human health, life property, and some environmental elements, which is made after in-depth analysis of various aspects, including human impact, natural aspects, and technical aspects based on the number, status, and social structure of the affected people. By definition, post-disaster review is planning work that is a disaster challenge prevention strategy based on government, private community, non-governmental, and international joint organizations for the safety, housing, medical care, education, and employment generation of the disaster-affected community.

12.3.2 Major aspects of disaster review-

Under the aspects of disaster review, first of all, it is analyzed as to what the nature of the disaster is, whether it is based on human-caused action incidents or a nature-borne disaster because nature-borne incidents And the impact of man-made incidents are reviewed in different ways depending on the damage caused by the disaster. Man-made disasters have not been as physically damaging as previous man-made disasters like the Bhopal gas leak, Japan's Fukushima reactor disaster, Russia's Chernobyl, Hiroshima, and Nagasaki, but they have caused damage to culture, i.e., man-made, landscapes and human beings. Disaster assessment includes the economic values of the physical effects and losses of a disaster, the experiences and consequences of affected communities, and initial and long-term recovery tools and strategies, but impacts are seen over a longer period than natural disasters. Natural disasters occur rapidly and cause immense damage to cultural and natural scenes, resulting in immense loss of life and property. Therefore, the aspects of post-disaster review can be studied mainly in two ways.

(i) Man-made disaster review: Under the review of man-made disasters, mainly all the events from the origin of the crisis until it becomes a disaster, due to which there is loss of life, property, and economy. There is an urgent need to study their micro-level analysis and know the impacts of events that happened historically in the past. The review work should be done considering the magnitude of the disaster, its impact, immediate treatment, safety and long-term security dimensions, employment resources, rehabilitation plans, disaster losses, recovery, and basic results for the future, considering local, regional, national, and international level standards as the basis. The critical aspects are almost similar to those of a natural disaster, which are described in the following headings.

(ii) Nature-caused disaster review: Nature-caused disaster, being a more effective, destructive, and immediate event than man-made disaster, increases the risks of disaster on a large scale, and due to being an unexpected event, it is beyond a human can control its forces. (Earthquake, flood, volcano, tsunami, avalanche, storm, cyclonic storm, cloud burst, landslide, etc.) Therefore, the impacts of natural disasters on different aspects of human welfare and public community safety are reviewed in different forms.

(i) Disaster Human Loss Review: After a natural disaster, a large number of human losses (death, physical injury, disability, and burial of human dead bodies) occur in

disaster-affected areas. Many houses disappear forever, and many people stay away from their relatives. According to the Meteorological Organisation, on average, in 50 years, 115 people are dying every day due to disasters. This period is reviewed in the form of human loss. The aspect is that the role of community and culture is mentioned in the treatment of injured and handicapped persons affected by the disaster and in the cremation of the dead because on average, about 60,000 thousand (2000–2019) people die every year due to natural and man-made disasters. 12.3 lakh people have died. According to the International Disaster Database (EM-DAT), the number of annual deaths due to natural disasters (floods, droughts, storms, earthquakes, forest fires, and extreme temperatures) has increased by 75% compared to previous years. Whereas in India, 79732 people died (2000–2019) with 32% catastrophic events. According to the UNDR, 5 lakh people were rendered homeless in 2020. Therefore, reviewing human losses is the first task after a disaster in a disaster-affected area. So that efforts can be made to reduce human loss in disasters coming in the near future.

(ii) Human habitation review: The second task in reviewing the effects of a disaster is the inspection and survey work of the affected human habitation areas and houses. A natural disaster is an earthquake that destroys most of the human-inhabited areas and houses. At the same time, other natural disasters also cause damage to houses, and as in every disaster, the disaster causes very little human loss, but human deaths occur due to the collapse of houses built by human damage and its construction materials. Therefore, the number of human settlements, details of damaged houses, the number of affected houses, the number of new houses constructed, etc. are the main elements of the human settlement review, as the 1950 Nagaland earthquake had driven 2000 houses underground in 8 minutes.

(iii) Economic aspect review: Economic elements or resources caused by disaster, human resources and Natural resources elements of capital formation, means of employment, technology elements, and livelihood resources are included in the economic review aspects. Other livelihood sources include labour, small and marginal agriculture, animal husbandry, forest products, fisheries, cottage industries, mining, and other non-agricultural activities. Due to the disaster, all the above elements are affected, and the people affected by the disaster become resourceless. Those who have economic means of livelihood get affected at an older stage and sometimes even get completely destroyed. It

becomes necessary to review the economic aspects after the disaster for the re-creation of new means of livelihood, cost, and employment for the affected class. A homeless person is in great danger of losing food, shelter, and financial resources. The production of man-made economic resources remains negative, and income inequality increases. The scale of poverty increases rapidly, and disaster risks become more acute. At the same time, there is a decline in the economic capacity of the economically weaker lower class. Weakness in the economic aspect reduces the economic development of the state and the country. For which an economic review of the disaster-affected areas becomes very necessary; otherwise, these areas remain far away from the main stream of development. According to the July 17, 2023, SBI Research Report, there will be an economic loss of Rs 10,000 to 15,000 crore in Uttarakhand and Himachal states due to floods. Have done. Whereas there was an economic loss of Rs 27000 crore in the entire country and Rs 52 billion on the Asian continent in 2019. There was a loss of US$3.64 trillion in the mid-period 1970–2019. According to the WMO Atlas, there is an economic loss of 202 million dollars every day in the world.

(iv) Social aspects of disaster review: Natural disasters have always been devastating in human society, i.e., residential areas, and have activated aspects of migration from crises like birth and cultural disintegration to livelihood crises by damaging financial resources. Besides, electricity, water, and communication systems in residential areas are also completely affected. After a disaster, the most compelling factors in the affected society are separation from relatives (distance), grief, mental distress, and risk to life, fear, feelings of panic, loss of property, and displacement. Due to this, the human community has to face social conflicts. (Especially religious and caste adjustment) Fear of disaster seriously injured people have to struggle with physical and mental health problems. Apart from this, due to religious activities, social relations, and general cultural migration, incidents of exploitation of women and lower-class communities, atrocities, and adultery are also seen in the new settlement areas. Sometimes caste conflicts also become the cause of social unrest. This is especially seen more in developing countries because the economic and social structure of these countries is weak and complete planning for the social adjustment of disaster-affected people is not possible. Social rehabilitation makes it clear that the capacity for social adaptation should be developed by the administration of a country or state government with community coordination without any discrimination (poverty, age, gender, racial identity, development of social infrastructure). In the review

of the social aspect of the disaster community, especially the disaster-affected community, social security should be provided to every section based on social harmony and uniformity.

(vi) Disaster Micro Database: Critical aspect to analyze and study the disaster crisis and disaster recurrence occurring after the disaster, from past to present time for strategic pre-planning (i.e. for pre-disaster preparation). The need for creating a local, regional, national and international disaster database of all natural, human-caused disasters is being felt for human security by looking at the incidents happening currently. Due to this weather, weather-related events are being predicted and forecasted and models are being created. Apart from this, environmental impact assessment is also being done easily based on a data base that simplifies disaster management. National and international disaster management information systems have to be developed and development targets can be achieved even after the disaster. The database brings together global experiences of disaster by providing real-time information to various stakeholders through research and relief rehabilitation policy intervention planning for the National Risk Information Development Plan.

The need for a disaster database is even greater in the context of India where all the disasters of the world occur from time to time and become a major disaster for a large population group. Therefore, disaster data collection for disaster affected and disaster-prone areas will provide security to life and livelihood infrastructure at the time of the disaster, based on which technical tool, Cloud Assistant Big Data Information Retrieval System is adopted for disaster data management. Which acts as a special weapon in disaster information data and accurate disaster prediction. Apart from this it also simplifies the use of computational models. This review has been experimentally successful for disaster management agencies. And also a new search for the current disaster management. The review aspect mainly includes the number of affected, damage, date of disaster, cause of the disaster, type of disaster, disaster rehabilitation relief and future strategies especially. From information technology, satellite wireless computer models have played a major role in disaster management. The main objective of disaster review is the work of the mitigation phase i.e. reducing the impact of the disaster.

(vii) Disaster Education Review – One aspect of disaster review is also community education, and disaster awareness. Apart from this, knowledge of emergencies and mitigation skills has to be imparted to the public. Through disaster education, the effects of disasters can be reduced and people's safety can be increased and to reduce the sensitivity to disaster, full awareness has to be created in the community. The risks of disasters can be reduced by providing disaster training. Disaster education serves as a functional, operational and cost-effective tool for risk management. Through this trained communities can better protect themselves and others during disaster periods. After the disaster, many atrocities and exploitative activities are seen against the injured and vulnerable communities, especially women. Therefore, by spreading education, disaster-affected people can protect their self-respect and the injured can better understand their rights and their protective measures. The critical points under disaster education include the positive impacts of disaster, human suffering, and disaster rehabilitation standards. Regional disaster education has been a parameter in preventive measures to know the real aspects of disaster and formulate different policies for vulnerable groups. Thus, in disaster warning review education, the main points are the development of the decision making capacity of common citizens, creating awareness about disasters and outbreaks, training policymakers to deal with the disaster challenge for any disaster and explaining disaster recovery techniques.

(viii) Disaster technical equipment and technology review: In the form of a review under disaster crisis technical use or technology development, appropriate communication, mapping, data, analysis, etc. are mainly included for information decision-making. To what extent are satellite and remote sensing, geographical information systems, and wireless communication used as technologies in disaster risk reduction in the disaster management phases, and how can more technical tools be incorporated in pre-disaster and post-disaster procedures? All these techniques are included in disaster assessment.

(ix) Disaster review of government and non-government policies: The most important point in disaster review is to evaluate the success and failure of government policies. Government and non-government policies strengthen the resolve to reduce the destruction caused by natural and man-made disasters. Assessment of the facilities provided by the government to the disaster-affected and disaster-prone areas, such as

disaster management committees, teams, mock drills, vulnerability assessment, disaster management plans, cooperation with NGOs, the role of the rescue and first aid side, food management, etc., is included. Happens. The effective aspects of government-employed and aided agencies, overall implementation and coordination of disaster activities at the national and local level, provision of funds and resources for recovery efforts, etc. are seen. The Government of India was formally launched on December 27, 2006, under the Disaster Management Act 2005 to create disaster-safe stakeholder planning through a holistic technology-driven sustainable development strategy for various disaster-prone areas through the National Institute of Disaster Management (NIDM). The NDRF has a National Disaster Plan 2016 that implements the goals and priorities of the Sendai Framework and formulates action plans in five functional areas. The point of the post-disaster review is to examine: (i) Understanding the risks; (ii) Collaboration between agencies; (iii) Collaboration in disaster risk reduction structural measures; (iv) Collaboration in DRR. Non-structural measures (v) capacity development, etc.

12.3. **Disaster Damage Assessment:** Disaster damage assessment is mainly a step in disaster management and damage reduction, providing the basis for action planning. Which assesses the damage caused after the disaster, which is determined based on the amount of short-term and long-term impact of the disaster, and completes the work of damage assessment at a rapid pace after the disaster through the following points:.

(i) Under short-term assessment- Assessments are made immediately after the occurrence of the disaster, such as the number of affected people, the number of people killed, the number of injured, the arrangement of resources for relief work, the management of various institutions for rehabilitation therapy, etc. And social service organizations that help and provide essential services have to be provided. A greater number of tasks to protect life and property are also determined.

(ii) Under long-term assessment: mainly a large micro-level survey of the damage caused after the disaster is done. The damage caused by disasters such as human, housing, economic resources, means of employment, private business, means of livelihood, rehabilitation system, development of education, communication, medical, and transportation means, and study of environmental elements would be included. Disaster

assessment is completed mainly in three stages. (i) Diagnostic; (ii) Constructive; (iii) Prognostic

(i) Prognostic: This disaster assessment is of the future information dimension, which expands the analysis and conclusion of the possibilities of disaster and clarifies the time limit of damage caused by the disaster. Also proposes a strategy to make the existing capabilities successful.

(ii) Formative Assessment: Formative assessment emphasizes disaster skills assessment, i.e., the process of alertness and incident during a disaster, through which the entire system of providing clothing, food, shelter, and medical care is responsible for removing the affected people from the crisis. Vigilance and security arrangements of institutions and supporting government machinery are included.

(iii) Diagnostic assessment: The diagnostic disaster phase includes evaluation of the psycho-physical, socio-economic, and long-term residential, medical, and employment facilities of the people affected by the disaster, government arrangements for development, finance, basic institutional development administration, etc. Which clarifies the sensitivity, security, and future government policies of a state or country towards its citizens after a disaster.

According to the SEDAI framework, post-disaster assessment is a qualitative or quantitative approach to determining the nature and extent of disaster risk by analyzing the potential threats to the disaster risk and evaluating the existing conditions of the contingent that may affect the property, services, and livelihoods of affected people. And cause damage to the environmental elements on which the community depends. According to the analysis of Down to Earth's report, the work of disaster review assessment is as follows:.

1. First of all, to know the progress of relief and rescue operations in the disaster-affected areas and to discuss the size and organizational structure of the teams engaged in relief operations.
2. After the disaster, an assessment of the effectiveness of the disaster management of the District Disaster Management Officer, the Revenue Department, and the centralized state.

3. Analysis and assessment of disaster costs, their payment, and payment-related problems by the state and central disaster management departments and governments.
4. Development of separate strategies for slow-moving disaster crises. Also, evaluation of international efforts for recovery and awareness support of governments in large disasters, for example, international efforts adopted in the 2013 Uttarakhand floods.
5. Assessment of relief compensation provided after the disaster, relief fund management amount, security budget of the state and central government, and allocation of funds among the affected people.

12.3.4. Disaster damage assessment aspect- Disaster damage is a situation in which the human emotional aspect is greatly affected, resulting in immense human and economic losses. For remedial diagnosis, a disaster impact assessment is required to understand the actual effects of the disaster in a holistic manner. This assessment process creates a new foundation for new developmental and protective plans for the disaster-affected state or country. This helps in healing the wounds of disaster. The major aspects of disaster assessment are briefly described in the following headings.

1. **Disaster Forecasting and Predictions:** Government and disaster management for disaster-prone and potential areas such as natural weather events such as floods, droughts, cyclones, extreme rainfall and snowfall, and destructive earthquakes, volcanoes, tsunamis, cloud bursts, forest fires, and cold and heat waves. Prior preparation of departments includes an assessment of the technical and actual condition of technological equipment, disaster awareness, etc.
2. **Disaster loss assessment:** a comprehensive list of all losses caused by the disaster, the status of affected humans, the assessment of affected means of livelihood, the number of people killed, the loss of livestock, agricultural land, and crop area, and damage to residential and public buildings. Assessment of damage to commercial works, public facilities, schools, hospitals, entertainment, sports, houses, grounds, parks, monuments, economic loss, etc. is also included. But in our country, disaster damage is assessed differently in different states because the nature, type, and level of damage of disasters occur in different forms in different parts. For example, different types of planning and assessment work are done for

severe earthquakes in seismic zones 3–4, tsunamis in coastal areas, cyclone floods, landslides in mountainous areas, fires in forest areas, and droughts in low-response areas.

3. **Disaster Recovery Readiness Assessment:** By forming special groups, determining the tasks of the group, and developing strategies according to the type of incident, access to victims, frequency of hazards, description of recovery efforts, use, and access to damage caused by disaster, For the recovery of the affected community, local stakeholders, NGOs, government system activation, etc. are included in the recovery assessment.
4. **Inter-departmental coordination:** After the disaster, immediate relief and rescue operations are required. Since disasters are devastating, they cannot be solved by any limited or single organization. For which the cooperation of many social workers, institutions, governments, and international levels is required. Apart from this, it is necessary to create mutual coordination between the organizations working at the local level for rescue and relief in disaster-affected areas. The study of all these aspects, which reduce the risks occurring during disasters to some extent, is called inter-departmental coordination assessment.
5. **LIDAR TOOL USE ASSESSMENT:** Airborne and Terrestrial Light Detection and Ranging is a method that provides many facilities and capabilities for high-quality elevation models and disaster recovery in disaster-affected areas after a disaster, which provides fine information at the surface level. But it is a relatively expensive instrument and also contains information below the surface, which is very useful for geological mapping and measuring geological features, which acts as a weapon in disaster warning and mapping. Therefore, the use of this technology is becoming necessary in disaster-prone and disaster-prone areas.
6. **Simulation Model Data:** Simulation model technology involves predicting natural disasters, modeling damage, and assessing the changes that occur after the disaster. Which provides large amounts of observational data during disasters, allowing the production and validation of disaster models and the identification of low-level environmental changes. It also develops a framework for human rescue operations in sudden disasters like landslides, volcanoes, floods, and tsunamis and also provides options for natural disaster management; hence, this model remains

useful in disaster-prone areas. It is appropriate to assess its use from a disaster point of view.

7. **Disaster data collection:** Disaster assessment requires a large amount of data collection through which various disasters and disaster areas occurring from time to time are detected. Due to this safety parameters are also adopted as per the disaster, like 321 catastrophic incidents that occurred in India from 2000 to 2014 and cost Rs 80 billion U.S.A. Had a loss of dollars. Major disasters (flood 52%, storm 30%, landslide 10%, earthquake 5%, drought 3%) contributed, which shows that floods and storms bring the maximum disaster. To solve this, the government and responsible institutions should take action against the disaster. All prior preparations should be maintained, which is part of disaster assessment.
8. **Long-Term Risk Assessment:** Assessment of the risk of disaster and future crises in disaster-prone and prone areas and the numerous basic development facilities adjusted to the disaster, including housing, schools, hospitals, fire stations, socio-economic development, transportation, and networks. Development results from long-term developmental stages. For this, human settlement and income activities have to be kept active even after the disaster, where many times the reconstruction work results in huge losses. Which is a risky task and a warning and painful task for local stakeholders, non-governmental organizations, government organizations, and individuals engaged in disaster relief work. where social and economic risks are high. For example, there are losses every year due to floods, cyclones, storms, lightning, etc. Therefore, after a disaster, disaster assessment is necessary for long-term risk-bearing in such disaster-affected areas.
9. **Rescue relief and rehabilitation equality assessment:** After the disaster, many types of immediate and long-term assistance (such as food, clothing, medicines, financial assistance, housing, employment, means of livelihood, and other uses) are provided to the disaster-affected communities and areas. Goods, etc.) are included. Apart from this, assistance is also provided to the affected community through social institutions, NGOs, government efforts, and international cooperation. But sometimes, due to middlemen or other reasons, poor people are left behind by not providing equal assistance to the affected persons, which makes their lives more miserable. Thus, the facilities and supporting

materials provided for disaster relief are reduced. The main function of assessment is to monitor and audit from time to time.

12.4 SUMMARY

The post-disaster critical aspect mainly studies the aspect of disaster impact loss. Which includes disaster damage, disaster-affected communities, access to housing, relief, and rehabilitation facilities for the affected persons, government support, preparedness for disaster resolution and mitigation, the nature and nature of the disaster, long-term plans for rehabilitation, and national and international cooperation. The evaluative aspect of relief processes is the post-disaster critical aspect. Especially the role of formulation of different types of strategies for man-made and natural disasters and their implementation at the community and government level, such as human loss, human habitations, economic aspects, means of livelihood, social, cultural, religious activities, conservation, and rehabilitation. To assess the actions taken in short-term and long-term strategies to reduce disaster damage through improved disaster data collection, disaster education, etc., and to make an action plan for the level of benefits the scheme can provide to the affected families at the superficial level. Apart from this, the main objective of post-disaster review and assessment is to know the level of use of new technologies adopted in disaster management and the plans for their use.

After the natural disaster, the primary work in the disaster-affected areas is the main one in which physical replacement works are done. Which is provided to the affected community based on immediate and future symptoms through social workers, governments, and voluntary organizations working at the international level and government efforts, but sometimes the government policies and responsible persons do not provide appropriate relief to the disaster-affected people. Relief material and rehabilitation-related facilities are not provided, due to which the affected families are not able to emerge from the disaster crisis and are not able to avail themselves of the benefits of government and non-government schemes and other facilities. Therefore, it becomes very important to review the work done after a disaster from time to time. Thus, the disaster review work should work on the principle of speed in providing relief in the affected areas and the possibility of every affected person getting the benefit of the scheme. Responsible persons and institutions should work honestly; hence, in the incidents

occurring after the disaster, recovery work should be done. And for disaster impact reduction, disaster review should be a simple means of dealing with short- and long-term challenges.

12.6 GLOSSARY

Extreme environmental crisis:	The recurrence of environmental crises caused by nature and humans.
Damage:	Damage caused by natural and man-made activities.
Assessment-	To assess the damage caused after a disaster.
Community Participant:	Community participation during and after disasters.
Restoration:	Post-disaster infrastructure development
Planning Format:	Pre-planning for disaster recovery is to be done with the participation of the community, government, and non-governmental organizations.
Physically affected:	Damage caused to physical environmental elements after a disaster.
Economic aspect:	Economic or financial elements are used to deal with any type of disaster.
Disaster social aspect:	Effects of disasters on society (problems of living, cultural problems, caste discrimination, and others)
Disaster database:	To prepare a repository of incidents of various types of disasters.
Disaster education:	Disaster education is provided to prepare an ordinary citizen to deal with disasters.
Remote sensing tool:	To carry out relief, monitoring, and early warning works without human access in

	disaster-affected areas with technical assistance.
GIS:	Computer-Based Geographic Information System Technology
NDRF:	National Disaster Reserve Force
LIDAR:	Disaster area assessment technical equipment based on a LIDAR drone camera
Disaster risk:	possibilities of a disaster occurring in a place

12.6: ANSWER TO CHECK YOUR PROGRESS.

Q.1: Post-disaster review means the management strategies made for the disaster.

Q.2: In the disaster review aspect, man-made and natural disasters are managed based on different incidents.

Q.3: According to the World Meteorological Organisation, on average, 115 people are killed every day due to disasters over the last 50 years.

Q.4: According to the Lomo Atlas, a loss of 3.64 trillion US dollars has been caused by various disasters in the world from 1970 to 2019 in the form of disaster damage.

Q.5: Under disaster impact physical review, damage to terrestrial areas and ecology is assessed.

Q.6: The disaster database provides a strong basis for preparation for the reduction of future disasters.

Q.7: Under disaster review, modern new technologies (GIS, RS, and LIDAR) have to be used in the disaster-affected area.

Q.8-Simulation data model technology is used to assess the predictive modeling of natural disasters.

Q.9: In inter-departmental coordination, all the responsible and non-responsible departments are engaged in mutual activity before and after the disaster.

Q.10: Disaster recovery readiness assessment also involves reviewing the immediate relief operations provided to the disaster-affected community.

Q.11: Constructive assessment skills emphasize the process of prevention and alertness during a disaster.

Q.12: The SEDAI Framework works on qualitative risk analysis in post-disaster assessment.

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12.8 TERMINAL QUESTIONS

Long Type Question

Question 1: What do you understand by disaster review? Describe in detail the various aspects of disaster review.

Question 02: Why is disaster damage assessment necessary? Describe the major elements of disaster damage assessment.

Question-03: Explain the main techniques used in disaster review and assessment and the use of simulation model data.

(ii) Short-Type Question

Question 1: Explain the meaning and definition of disaster review.

Question 2: Why do humans need disaster damage assessment?

Question 3: Explain disaster preparedness assessment.

Question 4: Explain the various aspects of disaster review.

Question 5: What is a disaster economic aspect assessment?

Question 6: Why is the need for social aspects important in disaster review?

Question 7: What do you understand by disaster physical impact review?

Question 8: What is the role of disaster education in disaster reduction?

Question 9: What do you mean by disaster database?

Question 10: Describe the main steps of disaster assessment.

Question 11: How should disaster assessment be structured according to down-to-earth?

Question 12: Describe the main elements of disaster damage.

Question 13: What is the Lidar tool?

(iii) Multiple-choice questions

Question 1: Is included in the disaster review?
(i) Safety of disaster-affected communities
(ii) Housing, medical, and education management
(iii) Means of employment
(iv) All of the above

Question 2: In how many parts are the elements of a disaster review classified?
(i) 2
(ii) 4
(iii) 5
(iv) 6

Question 3: What is included in the disaster damage review assessment?
(i) Number of dead persons
(ii) Physical disability
(iii) Both of the above
(iv) None of the above

Question-4 According to the mid-term period from 2000 to 2019 (International Disaster Data Base), the number of people killed due to disasters was...?
(i) 12.3 lakh
(ii) 14.3 lakh
(iii) 16.5 lakh
(iv) 10.0 lakh

Question 5: According to SBI Research Report 2023, India's disaster economic loss was in American dollars.
(i) 28000 crores
(ii) 27000 crores

(iii) 29000 crores
(iv) 30000 crores

Question 6: Why is a disaster database necessary?
(i) For disaster recurrence analysis
(ii) For disaster preparedness
(iii) For disaster reduction
(iv) All of the above

Question 7: Is mainly involved in disaster education?
(i) Disaster consciousness
(ii) Disaster Mitigation
(iii) Disaster assessment
(iv) Disaster forecasting

Question 8: The Disaster Management Act was made in India?
(i) 8 December 2006
(ii) 27 December 2006
(iii) 25 January 2007
(iv) 28 February 2007

Question 9: What is the full name of NDRF?
(i) National Disaster Response Force
(ii) National Disaster Impact Force
(iii) National Disaster Response Force
(iv) None of the above

Question 10: What are the steps of disaster assessment?
(i) Diagnostic
(ii) Creative
(iii) Pre-estimate
(iv) All

Question 11: Lidar technology is used?
(i) Model-making
(ii) Disaster recovery planning
(iii) Geological mapping
(iv) All of the above

Question 12: Simulation model data is used?
(i) Natural disaster prediction
(ii) Post-disaster assessment techniques
(iii) Verification of natural and human damage
(iv) All of the above

Question 13: What does disaster long-term risk assessment mean?
(i) Unstructured development
(ii) Socio-economic development
(iii) Both of the above
(iv) None of the above

Answer- 1 -IV 2-I 3-III 4-I 5-II 6-IV 7-I 8-II 9-II 10-IV 11-IV 12- IV 13-III

UNIT 13 - RESTRUCTURING

13.1 OBJECTIVES

- To create a strong framework for post-disaster reconstruction and rehabilitation work.
- To develop physical and economic infrastructure facilities to compensate for the damage caused by disasters.
- Rebuilding the livelihoods of affected communities.
- Presentation of details of works to be done as per the stages of immediate and long-term planning (pre-disaster, post-disaster), keeping in mind the sensitivities of disasters.
- To describe the role of government, non-government, and international authorities in disaster reconstruction.

13.2 INTRODUCTION

The work done by human efforts to compensate for the effects of disaster damage, i.e., after the disaster or before the disaster, is included in the disaster reconstruction plan. This is completed through local, regional, and central agencies. Under this, for the physical construction and improvement of social and economic conditions in the affected communities, necessary construction works are carried out through the government for basic works or rehabilitation such as the construction of public buildings (schools, hospitals, and public buildings), roads, communication means, electricity, and drinking water lines. Works like construction, etc., are prominently involved.

There is a need for a strong action plan and management for disaster reconstruction, such as the creation of an economic fund to compensate for the losses caused by the disaster, preparations for displacement, financial assistance, relief to the affected persons, and the supply of essential commodities, along with all the recovery activities. Management is also considered a part of disaster reconstruction planning. The primary and secondary phases of disaster recovery, such as restoring social and other infrastructure, revitalising the economy, and rehabilitation, are built on the basis of long-term planning. Apart from this, disaster recovery also includes enabling the victims to resume basic services, such as diagnosing physical damage, providing economic and social assistance to victims, restoring community services, and maintaining mental and cultural security. Taking help from psychological and social institutions and providing administrative and other security services, etc. The success of disaster reconstruction is mainly determined by the values of self-confidence, self-respect, self-reliance, and cooperation. Because these emotional and psycho-medical aspects strengthen the disaster-affected community internally. Besides, these are also compiled in the

series of minimum standards of the National Disaster Management Authority for the rehabilitation of affected communities.

Disaster reconstruction generally follows guidelines for the reconstruction of damaged buildings and phases of infrastructure development. Multi-partner collaboration typically pays off, depending on the willingness and technical strengths of the affected individuals. Reorganisation work has to be done intensively on the basis of timeliness, contingency, and the developmental plans of the state and the country. The emphasis should be laid on implementing the goals of disaster reconstruction in a phased manner and on the basis of sustainable development. Who is helpful in disaster rehabilitation and re-establishment?

13.3 RESTRUCTURING

Disaster Reconstruction Meaning

Disaster reconstruction means restoring the living conditions and resources of the affected communities or individuals. Which helps the disaster-affected people with temporary and permanent life improvements? This also includes the creation of better housing, infrastructure, and sources of income. According to the Disaster Management Act 2005, the reconstruction plan intends to conduct public utility works for the affected community.

In general, disaster reconstruction means arranging construction work for the development of infrastructure by arranging effective management for human settlement in the disaster-affected areas or in replacement areas to recover the damage caused by the disaster. The aim is to implement schemes for disaster relief, housing, livelihood resource development, and rehabilitation during and after the disaster, and to create permanent and safe settlements for unbearable crises with national and international cooperation on a large scale.

Disaster Infrastructure Reconstruction from the post-disaster-

The reconstruction phase usually begins last, after the relief phase, and continues for a long time. The form of restructuring should be in harmony with public utility and environmental conditions. They should be based on strategies that meet the mental, social, and economic needs of the affected community revive the housing, economic activities, and means of livelihood lost during the disaster, and protect cultural values. Which includes

infrastructure and institutional development, expansion of the service sector, activation of resources lying dormant due to disaster, management of disaster relief and its facilitation, establishing coordination between departments, transparent implementation of disaster rehabilitation policies, and sustainable development. The nature of disaster reconstruction depends on the plans for carrying out activities.

The success of disaster reconstruction is generally considered successful only then. When the work of making it according to the geographical conditions and human needs of a particular place is done by the responsible persons and working institutions. In this way, people of all classes get the economic and social benefits of disaster relief equally. In the current circumstances, the assessment of disaster reconstruction depends on the principles of sustainable development. When the selection of safe human habitation sites, easy access to physical and cultural elements, and construction work contain modern technical and engineering skills and qualities as per the requirements of the future, it is considered a successful reconstruction process. This works to simplify the complex relationships between physical environmental elements and social dimensions. The local government and administrative system play a vital role in the restructuring work.

This keeps financial facilities and monitoring functions effectively active. While doing the reconstruction work, it is kept in mind that the reconstruction work should be multi-purpose and based on community participation because India's geographical diversity, cultural diversity, and variation in disaster patterns force reconstruction based on different characteristics. Therefore, local variations and the nature of disasters have a special impact on the displacement, rehabilitation, and physical infrastructure development of disaster-affected communities. Disaster management officers, workers, trainees, engineers, and architects engaged in reconstruction and reconstruction work must be involved in minimizing the impact of various types of disasters (earthquake, flood, cyclone, drought, landslide, and hot and cold winds).

Disaster Reconstruction Area Delimitation

After the disaster, carrying out a geographical survey of the disaster-affected areas is considered the first step in the reconstruction process. Impact of different types of disasters and the delimitation of human loss. Area-wise demarcation on the basis of loss caused as a result of the disaster (1. highly affected area, 2. moderately affected area, 3. affected area, 4. area of possible impact, 5. safe area) in different parts By dividing the work into groups,

strategies are prepared to implement the restructuring work. It is only on the basis of the impact of disaster risk that people are provided protection from disasters, and various types of plans are made for the future, keeping in mind the possible crises. Human displacement work from vulnerable areas can also be done easily; hence, it is not only disaster reconstruction work but also an integral part of the previous plans made for recovery from disaster. Therefore, in disaster-affected areas, structural development and financial benefits can be easily delivered to all people as per the safety and needs of the affected community.

Disaster Reconstruction Requirement

Disaster reconstruction is a process based on risk and excessive financial arrangements. Immense funds are required for food, shelter, and medical relief work in the affected community, from immediate to long-term construction and reconstruction work after the disaster. Which cannot be afforded by any private person or middle- or lower-class community. For which the victim community has to depend on the regional and central governments and international agencies. Which requires an administrative system to operate? This develops basic infrastructure after the disaster. The frequency of natural and man-made disasters has been increasing in the last 4–5 decades. Due to this human, environmental, and cultural properties are being harmed on a huge scale. The slow pace of rehabilitation work in disaster-affected areas is also being affected by a lack of inter-departmental coordination. Due to this, the disaster-affected people are being left out of the stream of restoration work.

Effective agencies working in disasters are not able to carry out relief and infrastructure development works on a war footing for a long time, due to which the affected people do not get the benefits of housing and other daily needs or life-sustaining facilities quickly. Although many efforts have been made at different levels to control the recurrence of disasters or to modernize their systems, they have not been very successful, due to a lack of proper management and sympathy towards the affected class.

Therefore, the need for disaster recovery management is now becoming essential all over the world. In a huge population- and disaster-prone country like India, emphasis should be laid on providing support to the government and non-government agencies working at different levels as per the trend of disasters at the center, state, district, and development block levels. With time, it is becoming necessary to establish reorganization boards for the

immediate rehabilitation and expansion of public shelters, means of livelihood, and essential services by the district administration at the state level.

Features of Disaster Reconstruction

The principles of multi-model dynamics are applied to reconstruct the extensive damage caused by any natural catastrophe. Disaster recovery studies have shown that if reconstruction is based on basic principles, it provides unique opportunities for reconstruction. On the basis of this recovery targets are easily achieved in many disaster-affected areas. The main features of disaster reconstruction have been explained with the help of the following points:

1: To implement detailed guidelines to guide disaster recovery management efforts.
2. To develop capacity in all disaster-prone area
3: To consolidate from time to time the previous models and techniques used in disaster-affected areas.
4. To establish cooperation with agencies at the national and international levels.

5. To formulate policies for reconstruction according to the nature of the disaster.

6. Adequate financial arrangements should be made with the government and executing agencies for restructuring work.
7. To include the positive role of disaster-affected local communities, organizations, NGOs, and stakeholders.
8. All points of the social rehabilitation plan, including inequalities, should be formed according to the demands of the local community.
9. Construction works for disaster reconstruction need to be flexible and have disaster-bearing capacity.
10. Whether the reconstruction of a disaster reconstruction system is of a temporary or permanent nature, it must include the inclusion of technology.
11. The analysis and assessment of post-disaster reconstruction work should meet the standards of social and human security.
12 Depending on the nature of the disaster, the designs of reconstruction works should be made according to the disaster.

13. It is necessary for the restructuring work to be of maximum public utility.

Before and after the disaster, it is very important to assess the reconstruction work done by various supporting organizations for relief, financial support, and infrastructure development. Many organizations are working to compensate for the damage caused by the disaster. Correct implementation of the ground-level reconstruction works Based on the priorities of the affected community, large-scale reconstruction of human and material resources is conducted in the disaster-affected areas as a form of disaster relief, which includes food security, the construction of temporary shelters, and basic infrastructure.

The main requirements include easy access. Along with this, work on the rehabilitation of displaced people and the re-establishment of means of livelihood, along with alternative and permanent structures and institutions, is also conducted. There is a sense of consensus among the community in restructuring and housing, which assesses the level of rehabilitation work, housing and infrastructure, economic rehabilitation, and social rehabilitation aspects of the restructuring. Whether the affected community is useful or not Apart from this, whether separate arrangements have been made for mentally ill persons or not, whether the reconstruction work of the settlements reorganized as rehabilitation is being done as per the standards or not, what is the level of compensation for the repair of damaged houses? Whether the condition of roads and other structural works damaged by the disaster has returned to its previous state or not. Whether the funds provided for restructuring have been properly utilized or not, whether the strategies made for the present and future of restructuring are effective or not, many such questions are assessed in the restructuring work.

Disaster Reconstruction and inter-departmental Coordination

Coordination in disaster reconstruction means inter-departmental co-relationships in which many supporting institutions, officers, employees, and technical experts working in different departments are required as a whole during reconstruction. On the basis of which the delay in reconstruction work is reduced, due to a lack of coordination, services provided to the disaster-affected community take more time, due to which the victim becomes angry and disappointed. Sometimes he starts feeling cheated. In emergencies, which weaken the values of human compassion, the best results are seen in coordination. That humanitarian aid proceeds impartially and neutrally. Due to this, the development and availability of

basic resources become easier. The suffering class takes advantage of maximum services. Thus, strategic inter-departmental coordination is necessary for post-disaster reconstruction. It does not take much time to bring the affected community back to normalcy in disaster situations. The developmental work of reorganization is progressing at a rapid pace.

The exchange of information about disaster operations also becomes easier. Because disaster relief and reconstruction work is based on mutual cooperation, the shortcomings of weak people are removed, and the work of adaptation and adjustment in new places becomes easier. Thus, to heal the wounds of disaster in India's geographical diversity, there is a great need for coordination for disaster reconstruction works.

Disaster Reconstruction Disaster Fund Management

Post-disaster reconstruction work requires a disaster relief fund, which is provided to disaster-affected communities or areas for financial and physical infrastructure development. The State Disaster Fund has already been constituted by the state governments under Section 1(A) of the Disaster Management Act 2005. In which a consolidated fund is accumulated for disaster relief and reconstruction, which helps in compensating for disaster losses. This is used to fulfill needs like housing, roads, electricity, water, and communication.

Through the Disaster Fund, restoration of the affected works is achieved at a rapid pace in a short time. Apart from this, it is also easier to pay remuneration in the form of labour to the people and support forces engaged in construction work. SDRF and NDRF are provided to the security forces for the work done during disasters. This is mostly used for the reconstruction of human and natural objects affected by disaster, which acts as a medicine for disaster reconstruction work.

Disaster Reconstruction Infrastructure Strategies

The disaster reconstruction process is a huge financial and economic burden. For its implementation, there should be provisions for a state disaster fund, a separate tax system in the government budgets, and a tax collection process. This especially emphasizes dealing with crises and the systematic and directed use of resources in disaster management. Disaster recovery strategies involve the collaboration of a variety of actors, particularly affected

communities, private sector organizations, public sector agencies, non-profit and faith-based organizations, volunteers, donors, state governments, and international organizations.

One of the restructuring strategies for disaster response at the national level has been the establishment of nodal ministries at the national level that function in a hierarchical manner across all levels of state and district administration and other supporting ministries. All the work related to reconstruction and relief is mainly carried out by the central relief agencies at the central level, whereas at the state level, the work of coordination and reconstruction is done by various committees and sub-committees involved in disaster management. Who works organizationally for rescue, relief, and rehabilitation work during natural and man-made disasters? Where basic human needs are met services (infrastructure development, transport, and communication services) are accomplished.

Thus, the post-disaster reconstruction work strategy is based on strong willpower and political stability. In a country with multiple disasters and populations like India, the world's largest number of natural disasters occur, for example, the only drought in the year 2015. About 330 million people were affected in 10 states in 2016. Thus, it is necessary to formulate updated strategies from time to time for disaster reconstruction, along with incorporating new research and technical inclusion.

Implementation of post-disaster reconstruction plan

Disaster reconstruction is a targeted plan before a disaster, which includes works from the primary level to the higher level to avoid unpleasant and vulnerable events like disasters. The implementation of disaster recovery planning includes sustainable construction, livelihood improvement in emergency-affected communities, recovery of assets and means of production, re-generation or functional re-activation of basic services, and other resources that have been destroyed or disabled by the disaster. To be implemented through. This works on the rules of carrying forward developmental activities. In the reconstruction plan, the first objective is to develop the activities of rehabilitation and livelihood development in the affected area, like agriculture, animal husbandry, and cottage industry establishments, which are responsible for primary businesses.

Reconstruction planning is mainly based on the consequences of local disasters and the possibilities of disasters, according to which policies, strategies, and investment programs

for recovery are conducted at the local level, which takes into account the needs of the local affected community and the natural resources available there. It is prepared by focusing on the situation. In summary, the implementation of the disaster reconstruction plan aims at re-establishing basic services after a disaster, making idle facilities functional, restoring community facilities, and re-establishing all economic activities that support human livelihood and human well-being. Reconstruction works are carried out for welfare, which is considered to be the last step in the stages of a disaster, the implementation of which leads to achieving the goal of returning the affected community to normal routine.

Organizational form to achieve restructuring

To achieve disaster reconstruction tasks, an organizational structure is required. which stakeholders, district, state, country, and international authorities are included. This works to finalize the work of reorganization at the regional level. The details of various authorities working in organizational form have been explained through the following points:

(i) **Stakeholders**- Local participation in the successful operation and implementation of post-disaster reconstruction work Stakeholders have an important contribution. Because the community living in a disaster-affected area is the bearer of true knowledge. Who is intimately familiar with the geographical, social, economic, and cultural elements of that area, along with its climatic and ecological elements? Whose role in restructuring is greater than that of any trained or technically proficient person? Who has accumulated traditional local knowledge from many generations? Based on this, by coordinating modern technologies with traditional knowledge, restoration work is made easier.

(ii) **District Disaster Authority** – The institution that plays the biggest role in disaster management Is responsible for district disaster management. This plays a central role in delivering emergency government services to the ground. Whose head is the district magistrate of the district? It works to compensate for the damage caused to the infrastructure, cultural landscape, and land destroyed during the disaster and to carry forward rehabilitation and development activities. During reconstruction and rehabilitation work, the District Disaster Management Authority is the first institution to restore the local means of livelihood of the affected community and provide relief in local disasters.

(iii) State Disaster Management Authority- State Disaster Management Authority: The state governments of various states carry out the work of reconstruction by integrating disaster reconstruction measures and providing financial and technical assistance through the State Disaster Management Department. The State Disaster Authority, whose chairman is the head of the state, provides financial and technical assistance for the prevention of disasters and the development of reconstruction infrastructure. When natural disasters occur, the State Disaster Management Authority carries out search, rescue, relief, and reconstruction works on its own and with the help of the Central Government. At the state level, the work of natural disaster reconstruction is generally carried out through the Revenue Department. Apart from this, restructuring work is done by the State Housing Corporation, Building Materials and Technology Sarvadhan Parishad, Central Building Research Institute, Housing and Urban Development Corporation, and Structural Engineering Research Institute.

(iv) National Disaster Management Authority- The National Disaster Management Authority is the apex statutory body for disaster recovery in India. This was formed under the Disaster Management Act 2005 by a high-powered committee formed in 1999 and after the Gujarat earthquake of 2001, whose chairman is the Prime Minister. Whose main objectives to coordinate responses, develop capacity, and carry out disaster reconstruction work during natural and man-made disasters. For the first time, an ordinance for financial management for disasters was given for the disaster management assistance fund and financial management. At present, the main function of the authority is to approve the schemes made by the Central Government ministries as per the national plan and to carry out disaster reconstruction works.

(v) International organizations- Disasters are a process occurring all over the world, and international organizations are also working on a large scale for the rehabilitation and resettlement of the affected communities. Because bearing the risk of a disaster is beyond the capacity of a single nation, it requires international cooperation. Due to which middle- and low-income countries get ease in human security and basic structural development, The United Nations usually provides financial grants for different programmes during and after the disaster, such as building construction, technical assistance, and rehabilitation works. Apart from this, rehabilitation and restructuring are done by organizations like the United Nations Development Programme, the U United Nations Educational, Scientific, and Cultural Organization, the I International Bank for Reconstruction and Development, the Red Cross International Association, the Department of International Development, the United States

International Development Authority, the United Nations Development Programme, and the World Bank. The work is carried out in disaster-affected areas.

(vi) Non-Government Authorities- During and after the disaster, at present, non-government organizations are playing a more active role than government institutions. Which implements various types of structural and non-structural measures in the form of reconstruction works in disaster-affected areas. And work to reduce the risks of community-based disasters at the local level in a sustainable manner. This organization follows a participatory approach to work better among the marginalized sections of society and provide appropriate opportunities to the community to fight disaster vulnerability. The activities of NGOs make an integral contribution to international development and relief work, the main example of which is the Red Cross Society, which is the world's largest NGO and is always involved in carrying out development-related activities in different areas for human service. Remain prepared. The restructuring and development work being done by NGOs for the last two decades is becoming a milestone for the general public.

Disaster Reconstruction Challenges

Disaster is a frightening and terrible human and natural crisis. To overcome this, immense human resources, strong willpower and political stability are required. This can achieve disaster reconstruction or reconstruction works after a long interval and can provide housing, means of employment and security of life to the disaster-affected community. However, the nature and response to disasters hinder reconstruction efforts. Apart from this, the institutional structure of the national and state level restructuring policy and lack of inter-departmental coordination. Early warning and preparation also act as a barrier. Because disaster occurs suddenly and keeps recurring many times in an area, the reconstruction work is affected and the success in construction work is less. In the reconstruction work due to the disaster, not only the physical construction work but also the mental, social, economic, political and cultural activities of the affected community are affected, for which compensation is necessary. After a disaster, especially protecting the vulnerable people and their interests is the biggest challenge because reconstruction work has to be done keeping in mind the ecological relations of the poor and caste-diverse affected class, which is not possible. And if community-based restructuring work is not done, the poor person falls into further poverty.

During disaster reconstruction, huge funds are required for physical infrastructure development, and there is a demand for land on a large scale to carry out residential and economic activities for the displaced people. In the present scenario, due to a shortage of land, it is not available as per requirement. Along with this, the development of transportation networks, drinking water supply, means of employment, and the development of health, medical, and entertainment facilities are full of problems in disaster-affected areas. Apart from this, the major challenges faced in developmental work in disaster reconstruction areas are explained through the following points:

1. The challenge of planning in determining the restructuring programmes and determining the time taken for reconstruction.
2. The challenge of recovering from large-scale destructive disasters and implementing plans.
3. Inadequacy of mutual information among the agencies making the restructuring programme.
4. Lack of proper survey and evaluation of disaster damage.
5. Lack of sufficient funds to carry out disaster reconstruction works.
6. Lack of political and departmental coordination.
7. Lack of technical tools for disaster reconstruction operations.
8. Lack of access to disaster-affected persons in heterogeneous geographical areas.

Disaster Reconstruction Master Plan Suggestions

The master plan strategy in disaster recovery planning is a cost-effective and time-saving plan to achieve long-term disaster recovery goals. Because it prepares a road map for all future restructuring plans and development work decisions and establishes a balance between authorized housing and infrastructure, An effective master planning scheme works to reduce project costs in the long run and motivates the construction of basic infrastructure development, such as road networks and urban development plans, on the principles of sustainable development. A master plan effectively manages disaster recovery work in a phased manner.

Master plan planning in disaster reconstruction stages is based on prudent technology and planning to achieve the goals. Through which recoveries are taken into account even for a time interval of 20 to 25 years. Under this scheme, a long-term framework is made to

achieve corrective actions due to the effects of disasters, and private sector investments also get opportunities for planning. A master plan indicates a community development plan in the reconstruction work of a disaster management plan. With long-term and concrete plans, the challenges of disaster in disaster-prone areas can be reduced, and the possibilities of an organized direction and safe investment for the future are explored. Under the Disaster Reorganisation Plan, mainly river flood schemes, desert spread control, fire, landslides, and man-made disasters, and rehabilitation work in the master plan can be easily achieved and in accordance with safety standards. Construction works are prepared only under specific rules to provide socio-economic, cultural, and employment opportunities. Therefore, the master plan framework for rehabilitation and other structural work plays an important role in disaster reconstruction.

A person's life after a disaster and during normal times depends on various elements such as his housing, sources of income, health, food management and means of livelihood. But after disaster strikes, all those efforts become disorganized. Even human access to all the daily needs is lost and due to disaster, there is a shortage of many means of living and many problems arise.

For a permanent solution to all these problems, various levels and various organizations (self-help groups, government and non-government organizations) have implemented post-disaster reconstruction, relief and rehabilitation works in the disaster-affected areas under a special strategy under disaster management. This is the last stage of the disaster management process. Reconstruction is a pre-planned work of strategies adopted for long-term housing and livelihood development of the disaster-affected community, under which the people destroyed by the disaster are replaced. Restoration of cultural elements such as roads, bridges, housing and means of economic progress. Construction is involved. This construction work will be done without the financial resources, and social and economic resources of the state and country depending on political stability.

Thus, the objective of the reconstruction phase is to restore the previous conditions of life in the disaster-affected community. This provides support (by providing housing, infrastructure, and income-generation opportunities) to the disaster-affected communities in sustainable improvements and recovery from the disaster crisis. Therefore, before restructuring, it has to be ensured that the plans made at the beginning of the construction phase are accurate and in accordance with the needs occurring at ground level. This has to give lasting, strong results based on the co-consent of the local community and coordination

between the officials. Reconstruction activities require cooperation between local, regional, and international authorities and stakeholder development organizations. Which is considered to be the phase of successful planning in financial resources and permanent structural construction?

13.4 SUMMARY

From the analysis of the above unit, it becomes clear that disaster reconstruction work is a process of conducting permanent construction work after the disaster. Many supporting institutions, authorities, and NGOs and all the means of livelihood, along with the protection of socio-economic and cultural values of the community, are holistically included in it. This process, while being extremely cumbersome, also compensates for disaster losses on the basis of inter-departmental coordination. But with the efforts made at the state and national level for the disaster-affected community, it is a programme to provide revival to the disaster-affected people, disaster reconstruction to improve the lives of the homeless, disabled, poor, and backward class people, and to provide permanent housing and employment. This is invaluable cooperation. Most disaster incidents occur without any information. This does not give any person any opportunity to be alert or protect himself. Therefore, it is the moral responsibility of a responsible state and nation to implement reconstruction work at the surface level for the disaster victims so that it provides security of life to its citizens after the crisis.

13.5 GLOSSARY

Restructuring-	International authority to carry out permanent physical and structural development after disaster.
Physical infrastructure	To restore the disabled items caused by the Development disaster through physical works related to housing, road communication, transportation and rehabilitation.
Non-government organization-	Organizations operating without government support International organizations providing

	financial support in disaster reconstruction works
Disaster fund-	Fund created for relief, rehabilitation and reconstruction works during and after natural and human disasters.
Common services Development-	To develop livelihood facilities to the disaster-affected community along with services to manage their daily life during and after the disaster, such as food, clothing, medical care, education and housing.
Physical damage-	Human physical loss such as disability and mental bankruptcy during a disaster.
Community services-	Schemes made with the support of the government to serve the public and provide access to health, education, communication and entertainment services.
Psychiatric Disorder-	Mental health-related problems occur due to death or injury to relatives during a disaster.
Means of livelihood -	Live through agriculture, animal husbandry, wood cutting, hunting, labour and cottage industries.
Technical efficiency-	To use various types of techniques adopted for disaster reconstruction by trained persons.
Community displacement-	Migration of a large section of people from one place to another due to natural calamities.
Disaster delineation-	Delimitation of disaster-affected areas through direct geographical survey and modern techniques is called delimitation.
Restructuring risk-	Disaster events occurring repeatedly in a particular place Expenditure to be incurred in the restructuring of.

Cultural properties-	Landscapes created by humans such as cities, bridge construction, industries and other objects created through human knowledge.
Interdepartmental coordination-	Mutual coordination among all the working departments for post-disaster reconstruction work.

13.6 ANSWER TO THE CHECK YOUR PROGRESS

1. The disaster reconstruction phase is the last process of management after a disaster.
2. Does disaster reconstruction work on the principle of infrastructure development?
3. Disaster reconstruction delimitation includes a geographical and technical-based survey of the disaster-affected area.
4. After survey delimitation, the disaster impact is demarcated mainly by dividing it into five parts.
5. Need for disaster reconstruction. During a disaster, there is re-use of damaged and inactive items.
6. The main feature of disaster reconstruction is to create capacity for reconstruction in all disaster-affected areas.
7. Disaster reconstruction assessment, the access of the affected class and the development of socio-economic and physical elements are assessed.
8. Working together for construction works to recover from the impact of disasters in disaster reconstruction and inter-departmental coordination?
9. The Disaster Reconstruction Fund is made from the amount previously accumulated for the rehabilitation and permanent construction of the disaster-affected community.
10. Restructuring as a strategy for infrastructure development is done through policies made to deal with crises after and during disasters.
11. In the restructuring plan, the stakeholders, district, state, and national authorities—will mainly be involved in the organizational form?
12. Financial, social security and equality are the biggest challenges in restructuring work.

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13.8 TERMINAL QUESTION

Long Questions

1. What is the meaning of disaster reconstruction? Explain disaster reconstruction infrastructure, area delimitation, need, damage assessment, and inter-departmental coordination.
2. What are the main features of disaster reconstruction? Explaining the importance of the Disaster Relief Fund, explain the main strategies and organizational forms of infrastructure development.

Short Questions

Q-1: Explain disaster reconstruction.

Q -2: What is disaster reconstruction infrastructure development?

Q- 3: Why is area delimitation necessary in reorganization work?

Q -4: Describe the main features of restructuring.

Q-5: Explain your views on restructuring assessment.

Q- 6: What do you understand by inter-departmental coordination?

Q- 7: Explain the role of the Disaster Relief Fund in disaster reconstruction.

Q- 8: What are the main strategies of the restructuring plan?

Q- 9: Describe the main functions of the National Disaster Management Authority.

Q- 10: Name the major international disaster reconstruction organizations.

Q- 11: What is the role of non-government authorities in restructuring work?

Multiple-choice questions

Question 1: What is the general meaning of reconstruction?

1) To restore the conditions of reconstruction.
2) To make long-term permanent construction.
3) To expand basic services.
4) All of the above

Question 2: What is the phase of reorganization in disaster management?

1) First
2) Second
3) Third
4) Fourth

Question-3: In how many ways are disaster reconstruction delineation areas done?

1) 2
2) 4
3) 5
4) 6

Question 4: What is included in disaster planning?

1) Humanitarian rehabilitation work
2) Ecological and environmental elements
3) Basic service functions
4) All of the above

Question 5: What are the characteristics of disaster reconstruction?

1) Capacity Development
2) Coordination among national and international organizations
3) Implementation of disaster reconstruction policies
4) All of the above

Question 6: What is included in the restructuring assessment?

1) Inspection and assessment of disaster works

2) Progress of restructuring works

3) Implementation of restructuring works

4) None of the above

Question: What is the disaster relief fund used for?

1) In restructuring operations

2) For relief operations during disasters

3) For the victims' community

4) All of the above

Question 8: What is included in the Reconstruction organization?

1) Stakeholders
2) District Disaster Authority
3) State and National Disaster Management Authorities
4) All of the above

Question 9: Who is the head of district disaster management?

1) District Magistrate
2) Chief Minister
3) Governor
4) Ministers working in the Central Government

Question 10: Which international organization is not included in the restructuring plan?

1) United Nations
2) Department for International Development
3) United States International Development Authority
4) Self-help groups

Question 11: What is the duration of the disaster reconstruction master plan?

1) 10-20 years
2) 15 to 20 years
3) 20-25 years
4) 25-30 years

Answer 1-4. 2-3 3-3 4-4 5-4 6-1 7.4 8-4 9-1 10-4 11-3

BLOCK 4 - REGIONAL PATTERN OF DISASTER MANAGEMENT

UNIT 14 – INTERNATIONAL DISASTER ASSISTANCE (IDA)

14.1 OBJECTIVES

After going through this unit, the learner should be able to understand the following objectives:

1. What is International Disaster Assistance (IDA)?
2. Types of International Disaster Assistance (IDA), and
3. Local problems arising from IDA.

14.2 INTRODUCTION

In a world interconnected by borders and shared humanity, the need for international cooperation becomes ever more evident when faced with the unpredictable force of natural disasters. International Disaster Assistance (IDA) emerges as a beacon of hope and solidarity, embodying the collective efforts of nations to provide swift and effective support to communities in distress. International Disaster Assistance, often abbreviated as IDA, is a global endeavor aimed at providing aid and relief to countries grappling with the aftermath of natural or man-made disasters. These disasters can range from earthquakes and floods to conflicts and pandemics, leaving communities vulnerable and in urgent need of assistance. IDA functions as a crucial mechanism for nations to come together, transcending geographical boundaries to extend a helping hand to those facing adversity.

At its core, IDA operates on principles of compassion, solidarity, and a shared commitment to alleviate human suffering. It acknowledges that the impact of disasters extends far beyond the immediate geographical location, recognizing the interconnectedness of the global community. The primary objectives of IDA are to save lives, restore livelihoods, and foster resilience in affected regions.

IDA employs specialized teams that can be mobilized swiftly to disaster-stricken areas. These teams, comprising experts in various fields such as medicine, logistics, and engineering, work collaboratively to provide immediate assistance. IDA facilitates the delivery of essential supplies, including food, clean water, medical supplies, and shelter materials. These provisions are crucial in meeting the basic needs of affected populations and preventing further escalation of the crisis. Beyond immediate relief, IDA focuses on building the long-term resilience of

communities. This involves initiatives such as infrastructure development, education, and training programs to empower communities to better withstand future disasters.

IDA is a testament to the power of international collaboration. Countries, non-governmental organizations (NGOs), and international agencies work in tandem to pool resources, share expertise, and coordinate efforts. The United Nations plays a central role in facilitating this collaboration, acting as a coordinating body to ensure a unified and effective response.

While IDA has made significant strides in mitigating the impact of disasters, challenges persist. These include logistical hurdles, political complexities, and the need for sustained funding. Looking forward, there is a growing recognition of the importance of preemptive measures, such as early warning systems and community-based resilience initiatives, to minimize the impact of disasters.

14.3 INTERNATIONAL DISASTER ASSISTANCE (IDA)

14.3.1 What is IDA?

International disaster assistance refers to the provision of support and aid by one country or a group of countries to another that has been affected by a natural or man-made disaster. This assistance is typically provided to alleviate the impact of the disaster, address immediate humanitarian needs, and help affected communities recover and rebuild. International disaster assistance is often coordinated through international organizations, non-governmental organizations (NGOs), and governmental agencies. The aim is to provide rapid and effective assistance to minimize the human suffering and economic impact caused by disasters. The need for international cooperation is crucial, as disasters often exceed the capacity of the affected country to respond adequately on its own. International disaster assistance can take various forms, including:

Financial Aid: Providing monetary assistance to the affected country or region to support emergency response efforts, relief operations, and reconstruction.

Humanitarian Aid: Delivering essential supplies such as food, clean water, medical supplies, shelter, and sanitation facilities to those affected by the disaster.

Logistical Support: Offering logistical assistance in terms of transportation, communication, and coordination to facilitate the efficient distribution of aid.

Technical Expertise: Sending experts in fields such as medicine, engineering, and disaster management to assist in addressing specific challenges posed by the disaster.

Search and Rescue Operations: Providing teams and resources for locating and rescuing survivors in the immediate aftermath of a disaster.

Capacity Building: Supporting the affected country in building and strengthening its own capacity to prepare for and respond to future disasters.

14.3.2 Types of International Disaster Assistance (IDA)

International Disaster Assistance (IDA) refers to the support provided by countries, organizations, and individuals from around the world to help communities affected by disasters. These disasters can be natural, like earthquakes or floods, or human-made, such as conflicts or pandemics. IDA plays crucial roles in helping affected areas recover and rebuild. Carter (2008) has categorized the International Disaster Assistance into four parts. These are:

1. Pre-disaster assistance,
2. Assistance in response operations,
3. Assistance in recovery program, and
4. Assistance in future development.

A brief description of these international disaster assistances is presented in the following paragraphs.

14.3.2.1 Pre-disaster Assistance

International Disaster Assistance (IDA) in the pre-disaster phase involves a range of strategies and initiatives aimed at minimizing the impact of potential disasters and enhancing the resilience of communities and nations. The objective is to reduce vulnerability and build preparedness before a disaster occurs. Here are some types of IDA activities in the pre-disaster phase:

Capacity Building and Training: Providing training to local communities in disaster risk reduction, first aid, and evacuation procedures. This empowers individuals to respond effectively

in the face of a disaster. Building the capacity of government agencies, NGOs, and other relevant institutions to develop and implement effective disaster management plans and policies.

Early Warning Systems: Investing and supporting the development of early warning systems, including meteorological equipment, communication networks, and data analysis tools. Implementing systems that involve local communities in monitoring and disseminating early warnings, ensuring timely and targeted responses.

Infrastructure Development: Supporting the construction and retrofitting of buildings, bridges, and other critical infrastructure to withstand natural disasters such as earthquakes, floods, and hurricanes. Promoting sustainable land-use planning and ecosystem conservation to reduce the risk of disasters like landslides, wildfires, and floods.

Research and Risk Assessment: Conducting studies to identify areas at high risk of disasters, assessing vulnerabilities, and developing strategies to mitigate these risks. Integrating climate change considerations into disaster risk reduction planning to address the changing nature of risks.

Pre-positioning of Resources: Pre-positioning of essential relief items such as food, water, medical supplies and shelter materials in strategic locations for quick deployment in the event of a disaster. Search and rescue teams should be established and trained so that they can be rapidly deployed to affected areas to save lives and provide immediate assistance.

Public Awareness and Education: Conducting awareness campaigns to educate communities about potential hazards, evacuation routes, and emergency response procedures. Integrating disaster preparedness education into school curricula and community outreach programs.

Coordination and Networking: Facilitating collaboration and coordination among countries and international organizations to share knowledge, resources, and expertise in disaster risk reduction. Engaging with the private sector to leverage resources and expertise in developing and implementing pre-disaster initiatives.

14.3.2.2 Assistance in Response Operations

International Disaster Assistance (IDA) plays a crucial role in responding to disasters and emergencies around the world. There are various types of IDA that are deployed in response operations to provide timely and effective assistance. These types can be categorized based on

their nature and the specific needs of the affected population. Here are some common types of International Disaster Assistance in response operations:

Humanitarian Aid: Humanitarian aid focuses on meeting the immediate and basic needs of the affected population. This includes providing food, clean water, shelter, and medical assistance. Humanitarian organizations often collaborate with governments and local partners to ensure that these essential needs are addressed promptly.

Medical Assistance: In the aftermath of a disaster, medical assistance is critical. This type of IDA involves deploying medical teams, supplies, and equipment to treat injuries, prevent the spread of diseases, and ensure the overall well-being of the affected population. Mobile medical units and field hospitals are often set up to provide healthcare services.

Search and Rescue Teams: Rapid response search and rescue teams are deployed to locate and extract individuals who may be trapped or injured in the disaster-affected areas. These teams are equipped with specialized equipment and trained personnel to conduct rescue operations in challenging environments.

Logistics and Infrastructure Support: Infrastructure support is vital for the efficient delivery of aid. This type of IDA involves the transportation and distribution of relief supplies, the establishment of temporary shelters, and the repair or construction of essential infrastructure such as roads and bridges to facilitate the movement of aid and personnel.

Psychosocial Support: Disasters can have profound psychological effects on individuals and communities. Psychosocial support involves providing counseling, mental health services, and community-based interventions to help people cope with trauma and rebuild their lives.

Financial Aid and Funding: Financial assistance is crucial to support the overall response efforts. International organizations, governments, and donors contribute funds to facilitate the procurement of relief supplies, deployment of personnel, and the implementation of various response initiatives.

Coordination and Information Management: Effective coordination is essential in disaster response operations. International organizations often play a coordinating role, ensuring that aid efforts are well-organized and resources are used efficiently. Information management systems help gather and disseminate critical information for decision-making.

14.3.2.3 Assistance in Recovery Program

International Disaster Assistance (IDA) plays a crucial role in supporting countries affected by disasters in their recovery efforts. The types of IDA in a recovery program are diverse and multifaceted, addressing various aspects of the disaster-affected areas. Here are some key types of International Disaster Assistance in recovery programs:

Reconstruction and Recovery Assistance: Once the immediate crisis has subsided, IDA extends to reconstruction and recovery efforts. This includes rebuilding infrastructure, restoring livelihoods, and supporting long-term development projects to help communities recover and become more resilient to future disasters.

Humanitarian Aid: Providing immediate relief by supplying essential food and clean water to affected populations and offering temporary shelter and necessary items such as blankets, clothing, and hygiene kits to those displaced by the disaster is essential for recovery.

Healthcare Assistance: Deploying medical teams, supplies, and facilities to address the health needs of the affected population. Providing mental health services and counseling to individuals coping with trauma and stress.

Livelihood Support: Offering financial support and livelihood opportunities to affected communities to help them recover economically. Supporting farmers in re-establishing their agricultural activities through seed distribution, tools, and training.

Financial Aid and Funding: Offering financial support to governments and organizations for recovery efforts. Implementing innovative financial instruments, such as catastrophe bonds or insurance schemes, to mitigate financial risks associated with disasters.

14.3.2.4 Assistance in Future Development

In numerous instances, post-disaster recovery international aid may evolve or integrate with enduring development initiatives, such as the establishment of transportation networks or the implementation of agricultural programs.

14.3.3 Defining Responsibility for dealing with IDA

Responsibility for dealing with international disaster assistance needs at the government level entails a multifaceted commitment to providing timely and effective support to nations

facing crises. This involves recognizing the obligation to offer humanitarian aid, financial resources, and logistical assistance to affected countries. Governments must establish robust disaster response frameworks, coordinate with international organizations, and collaborate with other nations to ensure a comprehensive and efficient approach. Key elements of responsibility include swift decision-making, transparent communication, and the allocation of resources to address immediate relief and long-term recovery efforts. Governments also play a crucial role in fostering international cooperation, sharing expertise, and engaging in diplomatic efforts to facilitate a collective response to global disasters. Ultimately, the responsibility at the government level extends beyond national borders, emphasizing the importance of solidarity and collaboration in the face of shared humanitarian challenges.

14.3.3 Reception and Use of International Assistance

The reception and utilization of international assistance for disasters play a crucial role in mitigating the impact of calamities and facilitating effective response efforts. When a disaster strikes, affected nations often find themselves grappling with limited resources and overwhelmed infrastructures. International assistance becomes a vital lifeline during such times, offering financial aid, humanitarian relief, and expertise. The reception of this support requires a coordinated and transparent approach, involving both the affected nation and the international community. Timely communication, collaboration, and the establishment of clear channels for aid delivery are essential to ensure that assistance reaches those in needs swiftly.

The use of international assistance involves strategic allocation and deployment of resources to address immediate and long-term challenges. Efficient coordination between local authorities, non-governmental organizations, and international agencies is imperative for maximizing the impact of aid. Governments of affected nations must work in tandem with relief organizations to identify priority areas, such as providing emergency shelter, medical assistance, and essential supplies. Moreover, international assistance often extends beyond the immediate aftermath of a disaster, encompassing reconstruction and resilience-building efforts to help communities recover and withstand future adversities.

However, challenges may arise in the reception and use of international assistance, including issues related to cultural sensitivity, logistical complexities, and political

considerations. Striking a balance between the urgency of response and the need for sustainable recovery requires careful planning and collaboration. Despite these challenges, the reception and effective utilization of international assistance remain instrumental in fostering global solidarity and resilience in the face of disasters. Through ongoing cooperation, nations can build stronger, more resilient communities that are better equipped to confront and overcome the challenges posed by natural or man-made catastrophes.

14.3.4 Problems Arising from International Assistance

There are a lot of benefits of international assistance but some problems also arise. A brief description of problems arising from international assistance is given below:

Overdependence: Sometimes, when a place gets a lot of help from other countries, it can start relying too much on that help. It is like always borrowing toys from a friend instead of getting your own. This can make the local community lazy or not work as hard because they know someone else will always help them out.

Economy Issues: Imagine if you always got pocket money from someone else and never earned any yourself. That could cause problems, right? In the same way, if a place depends too much on aid from other countries, its own businesses may not grow. The local economy may struggle because people are not learning to make money on their own.

Corruption: When there is a lot of money coming in from outside, some people might be tempted to take more than their fair share. It is like if you were sharing candies with friends, and someone kept taking extra when you were not looking. Corruption means that the aid money does not go where it is supposed to go - like helping schools or hospitals - but ends up in the wrong pockets.

Dependency on Outside Solutions: Getting help from others is great, but if it is mostly coming from outside, local people might not learn how to solve their problems themselves. It is like always asking your friend for homework answers instead of trying to figure it out.

14.4 SUMMARY

International disaster assistance involves the provision of aid and support to countries and communities facing natural or man-made disasters. This assistance aims to alleviate the immediate impact and help affected areas recover. It encompasses various aspects, such as emergency relief, medical aid, food and water distribution, shelter, and long-term reconstruction efforts. When a disaster strikes, countries and organizations around the world collaborate to send resources, expertise, and financial aid to the affected regions. Coordination among international agencies, governments, and non-governmental organizations is crucial to ensure a swift and effective response. The goal is not only to address immediate needs but also to promote resilience and sustainable recovery, fostering the rebuilding of communities and infrastructure. International disaster assistance reflects a collective effort to provide timely and comprehensive support to those in distress, emphasizing global solidarity in times of crisis.

14.5 GLOSSARY

International Disaster Assistance (IDA): Aid provided by one or more countries to another country or region affected by a disaster, with the aim of alleviating the impact and aiding in recovery.

Humanitarian Aid: Assistance and relief provided to affected populations during and after disasters, focusing on preserving life, preventing further suffering, and supporting recovery.

Emergency Response: Immediate and coordinated actions taken to address the urgent needs of affected communities in the aftermath of a disaster.

Relief Efforts: The organized activities and interventions undertaken to provide immediate assistance to those affected by a disaster, including food, shelter, medical care, and other essential services.

Resilience Building: Strategies and programs aimed at enhancing the ability of communities and nations to withstand, adapt to, and recover from disasters more effectively.

Shelter and Settlement: The provision of temporary or permanent housing solutions for displaced populations following a disaster.

Early Warning System: A system designed to detect and alert communities about impending disasters, providing them with crucial time to prepare and take protective measures.

Reconstruction: The long-term process of rebuilding and restoring infrastructure, communities, and livelihoods after a disaster to promote sustainable development.

NGO (Non-Governmental Organization): A private, non-profit organization that operates independently of the government and provides various forms of humanitarian and development assistance.

Funding Countries: Nations that contribute financial, material, or technical assistance to countries affected by disasters.

Vulnerability Assessment: Evaluation of the susceptibility of a community or region to the impacts of disasters, considering social, economic, and environmental factors.

Displacement: The forced movement of people from their homes or communities due to the impact of a disaster, leading to the need for shelter and support.

Public-Private Partnership (PPP): Collaboration between government entities and private sector organizations to enhance disaster preparedness, response, and recovery efforts.

Accountability/responsibility: The obligation of organizations and individuals involved in disaster assistance to transparently and responsibly manage resources, respond to the needs of affected populations, and learn from experiences to improve future interventions.

14.6 ANSWER TO CHECK YOUR PROGRESS

- International disaster assistance helps countries affected by natural disasters like earthquakes, floods, or hurricanes.
- Donor countries provide aid to support affected nations in recovering from disasters.
- The progress of international disaster assistance is monitored to ensure timely and effective help reaches those in need.
- Funding is crucial for disaster assistance programs to provide essential resources like food, water, and medical aid.
- Donor nations collaborate with international organizations to coordinate relief efforts.

- Tracking progress involves evaluating how quickly aid reaches affected areas and impacts local communities.
- Continuous assessments help adjust strategies to address evolving needs in disaster-affected regions.
- Efficient communication between nations and aid organizations is essential for successful disaster assistance.
- Progress is measured by the effectiveness of relief efforts in rebuilding infrastructure and restoring normalcy.
- Monitoring the distribution of aid materials ensures that they reach the intended beneficiaries.
- Collaborative efforts among countries and NGOs enhance the overall impact of international disaster assistance.
- Assessments also focus on the long-term recovery and resilience-building efforts in disaster-prone regions.
- The success of disaster assistance lies in the ability to adapt strategies based on real-time feedback and changing circumstances.
- Evaluating the impact of assistance programs on the health and well-being of affected populations is a key indicator of progress.
- International cooperation and support play a vital role in ensuring that disaster-affected nations receive sustained assistance for recovery.

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14.8 TERMINAL QUESTIONS

Long Questions

1. How do countries work together to help each other during natural disasters, and what kinds of support do they provide to ensure that affected communities receive the assistance they need?
2. In what ways can the international community prepare and respond to disasters that happen in different parts of the world, and what role do organizations play in coordinating efforts to provide relief and support?

Short Questions

1. What is international disaster assistance?
2. Why do countries provide help during disasters?
3. How do countries coordinate assistance for disasters worldwide?
4. What types of support do countries give during disasters?
5. How does international disaster assistance reach affected areas?
6. Why is it important for countries to work together in times of disasters?
7. What challenges do countries face when providing international disaster aid?
8. How can individuals contribute to international disaster relief?

Multiple Choice Questions

1. What is the primary goal of international disaster assistance?

a) Profit generation

b) Humanitarian aid and relief

c) Military intervention

d) Environmental conservation

2. What is the main purpose of emergency shelters provided during disaster assistance?

a) Luxury accommodation

b) Long-term housing solutions

c) Temporary refuge for affected people

d) Wildlife conservation

3. Why is communication crucial in international disaster assistance?

a) To share memes

b) Coordinate relief efforts and resources

c) Plan a global party

d) Promote cultural exchange

4. What role do volunteers play in international disaster assistance?

a) Selling products

b) Providing free service

c) Promoting tourism

d) Conducting scientific experiments

5. How can individuals contribute to international disaster assistance efforts?

a) Donating money, goods, or time

b) Ignoring the situation

c) Creating chaos

d) Hoarding resources

6. When a _____ occurs, international disaster assistance helps provide relief and support to affected regions.

7. Emergency aid organizations send _____ to provide medical assistance and basic supplies during disasters.

8. International disaster assistance focuses on helping communities recover by rebuilding homes, restoring _____, and providing long-term support.

9. Humanitarian organizations work together to coordinate efforts and deliver aid to areas in need, promoting _____ and efficiency.

10. Donations from individuals and countries play a crucial role in funding international disaster assistance, ensuring that aid reaches those in need _____.

11. International disaster assistance is only provided by one country.

12. Disaster assistance includes various forms of support such as financial aid, medical assistance, and humanitarian relief.

13. International organizations and NGOs are not involved in providing disaster assistance.

14. Disaster assistance is only given to countries facing natural disasters, not human-made ones.

15. The primary goal of international disaster assistance is to rebuild and restore affected communities.

Answers

QN.	Answer	QN.	Answer
1	B	9	Collaboration
2	C	10	Promptly
3	B	11	False
4	B	12	True
5	A	13	False
6	Disaster	14	False
7	Relief teams	15	True
8	Infrastructure		

UNIT 15 – LEADERSHIP IN DISASTER MANAGEMENT

15.1 OBJECTIVES

After reading this unit, the learner should be able to understand the following objectives:

1. Importance of leadership in disaster management, and
2. Leadership in different crisis conditions.

15.2 INTRODUCTION

Disasters, whether natural or man-made, present significant challenges to communities, governments, and organizations. They disrupt normalcy, endanger lives, and often lead to substantial economic and social losses. Effective leadership in disaster and its management is crucial to mitigate these impacts, ensure efficient response, and facilitate swift recovery. Leadership in this context involves guiding and coordinating efforts across various sectors, making critical decisions under pressure, and inspiring confidence and resilience in affected populations.

Leadership in disaster management encompasses a wide range of activities, from preparedness and risk reduction to response and recovery. It requires a clear understanding of the complex dynamics at play, including the nature of the disaster, the vulnerabilities of the affected communities, and the resources available for response. Effective leaders must anticipate potential crises, plan accordingly, and build robust systems that can withstand and adapt to unexpected challenges. This involves collaborating with multiple stakeholders, including government agencies, non-governmental organizations, community groups, and the private sector.

One of the key aspects of leadership in disaster management is communication. Clear, accurate, and timely information is vital for coordinating efforts and making informed decisions. Leaders must establish reliable communication channels before a disaster strikes and ensure they remain operational during and after an event. This includes disseminating information to the public, providing updates on the situation, and offering guidance on protective measures. Transparent communication helps build trust and enables communities to act effectively in the face of danger.

Decision-making during a disaster is another critical area where strong leadership is essential. Disasters often present situations that require rapid, yet informed, decisions. Leaders

must assess available information, weigh the potential outcomes of different actions, and make choices that prioritize the safety and well-being of the affected populations. This process can be complicated by limited resources, conflicting priorities, and the sheer unpredictability of disaster scenarios. Effective leaders are those who can remain calm under pressure, delegate tasks appropriately, and make decisions that balance immediate needs with long-term recovery goals.

In addition to immediate response efforts, leadership in disaster management also involves planning for recovery and building resilience. This includes not only restoring infrastructure and services but also addressing the emotional and psychological impacts on individuals and communities. Leaders must advocate for policies and programs that support recovery, such as mental health services, economic aid, and housing assistance. Furthermore, they should promote practices that enhance future resilience, such as better building codes, sustainable land-use planning, and community education programs.

A significant challenge in disaster management is the equitable distribution of resources and assistance. Effective leaders recognize the varying needs of different community segments and strive to ensure that aid reaches the most vulnerable populations. This requires a deep understanding of social dynamics and an inclusive approach that considers factors like age, gender, disability, and socio-economic status. By fostering inclusive participation in planning and response efforts, leaders can help build more resilient and cohesive communities.

Leadership in disaster management also involves learning from past experiences to improve future preparedness and response. After-action reviews and evaluations are essential for identifying strengths and weaknesses in current systems and processes. Leaders must be open to feedback and willing to make necessary changes to enhance their organization's capacity to handle future disasters. This continuous learning and adaptation process is vital for building a culture of preparedness and resilience.

15.3 LEADERSHIP IN DISASTER MANAGEMENT

Leadership in disaster management is a critical component in mitigating the effects of disasters and ensuring swift and effective response and recovery efforts. It involves the coordination of various activities, such as preparedness, response, recovery, and resilience-building, to manage and reduce the risks associated with both natural and man-made disasters.

The role of leadership in different disaster management activities can be studied in the following paragraphs.

Leadership Under Crisis Condition

Leadership during a disaster crisis involves guiding and supporting a community or organization through extremely challenging times. When a disaster strikes, whether it's a natural event like a hurricane or an earthquake, or a man-made crisis like a major accident or terrorist attack, effective leadership becomes crucial. Leaders must act quickly and decisively to manage the situation. They need to communicate clearly and regularly, providing accurate information and instructions to keep people safe and informed. This helps to calm fears and prevent panic.

A good leader in a disaster crisis also coordinates the efforts of various groups and resources, making sure that emergency services, volunteers, and aid organizations work together efficiently. They must make tough decisions under pressure, prioritizing actions that will save lives and reduce harm. Additionally, they need to be compassionate and supportive, understanding the emotional and psychological impacts of the disaster on individuals and communities. By being present, visible, and approachable, leaders can inspire confidence and resilience in those affected.

Ultimately, leadership in a disaster crisis is about being prepared, acting swiftly, and leading with empathy. It's about bringing people together, ensuring everyone has the information and support they need, and guiding the community through the immediate dangers of recovery and rebuilding.

Leadership in the Direction of Response Operations

Leadership in the direction of response operations during a disaster is about guiding and coordinating all activities that help manage the immediate effects of the disaster. When a disaster strikes, whether it is a natural event like a hurricane or an earthquake, or a man-made crisis like a chemical spill, a quick and effective response is critical to save lives and reduce damage. Leaders play a crucial role in organizing these efforts.

First, leaders need to quickly assess the situation. This means understanding the extent of the damage, identifying the most urgent needs, and determining what resources are available.

They must gather accurate information from various sources, such as emergency services, local authorities, and community reports, to make informed decisions. Once they have a clear picture, leaders prioritize actions based on the severity of the situation. They must decide which areas need immediate attention, such as rescuing trapped individuals, providing medical care, or ensuring access to clean water and food. This prioritization helps in focusing resources and efforts where they are needed the most.

Communication is another key aspect. Leaders must ensure that there are reliable channels of communication to coordinate between different teams and organizations involved in the response. They need to keep everyone informed about the situation, what actions are being taken, and what the next steps are. Clear and constant communication helps in avoiding confusion and duplication of efforts. Leaders also delegate tasks to various teams, such as search and rescue units, medical teams, and logistics support. They must ensure that each team knows their specific roles and responsibilities. Effective delegation ensures that all aspects of the response are covered efficiently and that no critical tasks are overlooked.

Additionally, leaders must make critical decisions under pressure. These decisions can include ordering evacuations, setting up emergency shelters, and requesting additional resources from higher authorities or neighboring regions. Making the right decisions quickly can significantly impact the effectiveness of the response and the safety of those affected. Moreover, leaders need to remain calm and composed. Their demeanor can influence the morale and performance of their teams and the confidence of the affected community. By staying calm, leaders can think more clearly, make better decisions, and provide reassurance to those involved in the disaster response.

Lastly, leaders must be flexible and adaptable. Disasters are often unpredictable, and the situation can change rapidly. Effective leaders are those who can adapt their plans and strategies in real time, responding to new information and emerging challenges without losing focus on the overall mission. Leadership in the direction of response operations in disaster management involves assessing the situation, prioritizing actions, communicating effectively, delegating tasks, making critical decisions, staying calm, and being adaptable. Through these efforts, leaders can manage the chaos of a disaster and coordinate a response that saves lives and helps communities begin the process of recovery.

Leadership in Resource Organization

Leadership in resource organization during disaster management is essential for ensuring that all necessary materials and support reach those in need efficiently and effectively. When a disaster strikes, resources such as food, water, medical supplies, shelter, and personnel become critical. Effective leaders play a pivotal role in coordinating these resources to manage the crisis and aid recovery. Firstly, leaders need to assess the situation quickly and determine what resources are required and in what quantities. This involves a thorough understanding of the disaster's impact, the needs of the affected population, and the available resources. Leaders must prioritize these needs based on urgency and importance, ensuring that the most critical supplies are distributed first.

Coordination is a key aspect of resource organization. Leaders must work with various organizations, including government agencies, non-profits, and private sector partners, to pool resources and avoid duplication of efforts. This collaboration helps to create a unified response, where resources are shared and allocated according to a coordinated plan. Effective communication between all parties is vital to ensure that everyone is aware of their roles and responsibilities and that resources are directed where they are most needed.

Leaders also need to establish efficient logistics systems to transport and distribute resources. This includes setting up supply chains, arranging transportation, and managing distribution centers. They must ensure that these systems are flexible enough to adapt to changing circumstances, such as damaged infrastructure or evolving needs on the ground. By having a well-organized logistics network, leaders can ensure that resources reach affected areas quickly and are distributed fairly. Moreover, transparency and accountability are crucial in resource organization. Leaders must keep detailed records of resource allocations and usage to ensure that there is no misuse or wastage. Regular reporting and audits can help maintain trust among stakeholders and the affected community. Transparency also involves communicating clearly with the public about what resources are available and how they are being distributed, which helps to manage expectations and reduce panic.

Leadership in resource organization also involves foresight and planning for future needs. Effective leaders not only focus on the immediate response but also consider the long-term

recovery and rebuilding process. This includes planning for sustained support, such as continuous supply of medical care, ongoing food distribution, and reconstruction of homes and infrastructure. By thinking ahead, leaders can ensure that resources are available not just for immediate relief but also for the long-term well-being of the affected community. Leadership in resource organization during disaster management is about assessing needs, coordinating efforts, establishing efficient logistics, maintaining transparency, and planning for the future. Effective leaders ensure that resources are used efficiently and reach those in need, helping to manage the crisis effectively and support recovery. Their role is crucial in transforming chaos into a coordinated response, thereby minimizing the impact of disasters and aiding in the swift recovery of affected communities.

Community Leadership

At the community level, leadership in disaster management is like being the captain of a team during a tough game. It involves guiding and organizing the people in your neighborhood or town to prepare for, respond to, and recover from disasters like floods, storms, or accidents. Imagine you're the leader of your local soccer team. Before a big match, you'd make sure everyone knows the game plan, right? Well, in disaster management, you'd do something similar. You should work with others to create plans for what to do if a disaster happens. This could include things like where to go for safety or how to communicate with each other.

During a disaster, like when a big storm hits, leadership means staying calm and helping others stay calm too. You should check on your neighbors to make sure everyone is okay and might even help evacuate if needed. Just like in a soccer game, you'd make quick decisions about what needs to be done to keep everyone safe. Communication is super important here too. You'd make sure everyone knows what's happening and what they should do to stay safe.

After the disaster, leadership shifts to helping the community recover. This could mean organizing clean-up efforts or helping people find shelter if their homes were damaged. You'd work with others to figure out what the community needs most and how to get it. Just like after a tough game, you'd reflect on what went well and what could be improved for next time. Maybe you'd come up with new strategies or plans to make your community even stronger and more prepared for future disasters. In simple terms, leadership at the community level in disaster

management is about looking out for each other, staying organized, and working together to overcome challenges and keep everyone safe.

Some Leadership Attributes and Desirabilities

Leadership in disaster management demands a unique set of attributes and qualities that enable leaders to navigate complex and challenging situations effectively. Here are some key attributes and desirabilities of leadership in disaster management:

- **Clear Communication:** Leaders need to communicate information clearly and effectively to ensure that everyone understands the situation and knows what actions to take. This includes both giving instructions and actively listening to feedback from others.
- **Decision-Making Skills:** In times of crisis, leaders must make quick and decisive decisions based on the available information and the needs of those affected by the disaster. This requires the ability to analyze situations rapidly and prioritize actions accordingly.
- **Empathy and Compassion:** Effective leaders in disaster management demonstrate empathy and compassion towards those affected by the disaster. They understand the emotional impact of the situation and provide support and reassurance to those in need.
- **Adaptability:** Disasters are unpredictable and can evolve rapidly, requiring leaders to adapt their plans and strategies accordingly. Leaders must be flexible and open to change, able to adjust their approach as the situation unfolds.
- **Resilience:** Leaders in disaster management face immense pressure and stress, often working long hours in difficult conditions. Resilience is crucial for leaders to stay focused, maintain morale, and continue leading effectively despite the challenges.
- **Collaboration and Teamwork:** Successful disaster management relies on collaboration and teamwork among various stakeholders. Leaders must foster a spirit of cooperation, bringing together individuals and organizations to work towards common goals.
- **Strategic Thinking:** Leaders need to take a long-term view and consider the broader implications of their actions in disaster management. Strategic thinking involves planning for both immediate response and long-term recovery, anticipating future challenges, and identifying opportunities for improvement.

- **Calm Under Pressure:** In high-pressure situations, leaders must remain calm and composed, providing a steady presence and instilling confidence in others. This requires the ability to manage stress and emotions effectively while making critical decisions.
- **Transparency and Accountability:** Leaders must be transparent about their actions and decisions, providing honest and accurate information to the public and stakeholders. Accountability ensures that leaders are held responsible for their actions and helps maintain trust and credibility.
- **Inclusivity:** Effective leaders in disaster management recognize the diverse needs and perspectives within communities and ensure that everyone is included in decision-making processes. This involves reaching out to marginalized groups, listening to their concerns, and addressing their needs.

15.4 SUMMARY

Leadership in disaster management is like being the captain of a ship during a stormy sea. It's about guiding everyone through tough times and keeping everyone safe. Leaders in disaster management need to plan ahead, just like how sailors check the weather before setting sail. They make sure everyone knows what to do when trouble strikes and that there are enough lifeboats for everyone. Communication is key, so they keep everyone informed about what's happening and what they need to do to stay safe. When the storm hits, leaders make quick decisions to protect everyone, like deciding to change course to avoid danger. They work with others, like other ships in the area, to help each other out and make it through the storm together. After the storm passes, leaders help everyone get back on their feet by fixing any damage and making sure everyone has what they need to recover. They also learn from the experience to be better prepared for the next storm. Overall, leadership in disaster management is about keeping everyone safe, working together, and being ready for whatever challenges come our way.

15.5 GLOSSARY

Communication: The exchange of information and ideas between individuals, groups, or organizations. Effective communication is essential in disaster management for disseminating warnings and alerts, providing updates on the situation, coordinating response efforts, and sharing critical information with the public and stakeholders.

Coordination: The act of organizing and harmonizing activities and resources among various stakeholders to achieve common objectives. Coordination in disaster management involves collaborating with government agencies, non-governmental organizations, community groups, and the private sector to ensure a unified and efficient response to disasters.

Decision-Making: The process of selecting the most appropriate course of action from available alternatives. In disaster management, decision-making involves assessing risks, analyzing information, prioritizing actions, and allocating resources to maximize the effectiveness of response and recovery efforts.

Disaster: A sudden event, either natural or human-made, that causes significant disruption, damage, or destruction to lives, property, and the environment. Examples include earthquakes, floods, hurricanes, terrorist attacks, and pandemics.

Equity and Inclusion: Ensuring fair and equal access to resources, services, and opportunities for all individuals and communities, especially those most vulnerable to the impacts of disasters. Equity and inclusion in disaster management require considering the diverse needs and perspectives of different population groups and implementing measures to address disparities and promote social justice.

Leadership: The act of guiding and directing individuals or groups towards a common goal or purpose, especially in challenging or crisis situations. In the context of disaster management, leadership involves making decisions, coordinating actions, and inspiring confidence to effectively respond to and recover from disasters.

Preparedness: Activities and measures taken in advance to anticipate and mitigate the impacts of disasters. Preparedness efforts include developing emergency plans, conducting drills and exercises, stockpiling supplies, and training personnel to ensure readiness for potential disasters.

Recovery: The process of rebuilding and restoring communities and infrastructure in the aftermath of a disaster. Recovery efforts aim to repair damage, address long-term needs, and promote the physical, economic, and social well-being of affected individuals and communities.

Resilience: The ability of individuals, communities, and systems to withstand and recover from the impacts of disasters and other adverse events. Resilience involves building strong social

networks, implementing risk-reduction measures, and adapting to changing conditions to minimize vulnerability and enhance preparedness.

Response: The immediate actions taken to address the effects of a disaster and protect lives and property. Response activities include search and rescue operations, providing medical care and shelter, evacuating affected areas, and restoring essential services such as power and water.

15.6 ANSWER TO CHECK YOUR PROGRESS

- Regular progress checks ensure that leadership in disaster management remains effective and responsive.
- Monitoring the implementation of disaster management plans helps evaluate the leadership's ability to adapt to evolving challenges.
- Assessing the coordination among various agencies and stakeholders provides insights into leadership effectiveness in fostering collaboration.
- Reviewing the allocation and utilization of resources helps gauge leadership's efficiency in resource management during disasters.
- Tracking the communication strategies employed by leaders helps determine their effectiveness in disseminating critical information to the public and stakeholders.
- Evaluating the timeliness and adequacy of response actions taken by leadership during emergencies is crucial for measuring performance.
- Analyzing the decision-making processes during crisis situations provides an understanding of leadership's ability to make sound and timely decisions under pressure.
- Assessing the level of community engagement and involvement in disaster management initiatives indicates leadership's success in fostering resilience and community empowerment.
- Monitoring the implementation of post-disaster recovery plans helps measure leadership's commitment to long-term recovery efforts.
- Reviewing training and capacity-building programs for emergency responders assesses leadership's investment in preparedness and response capabilities.
- Examining the integration of technology and innovation in disaster management strategies reflects leadership's adaptability to modern challenges.

- Tracking the establishment and maintenance of early warning systems and evacuation protocols measures leadership's commitment to proactive risk reduction.
- Evaluating the inclusivity and equity of disaster management policies and practices reflects leadership's dedication to serving all segments of the population.
- Assessing the effectiveness of public education and awareness campaigns on disaster preparedness indicates leadership's efforts to enhance community resilience.
- Conducting regular feedback sessions with stakeholders and affected communities allows leadership to identify areas for improvement and adjust strategies accordingly.

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15.8 TERMINAL QUESTIONS

Long Questions

1. Describe the role of effective leadership in mitigating the impacts of natural disasters. How does leadership contribute to preparedness, response, and recovery efforts in such scenarios? Provide examples of successful leadership initiatives in disaster-prone regions.
2. Discuss the importance of inclusive leadership in disaster management, particularly in addressing the needs of marginalized and vulnerable populations.

Short Questions

1. What is the primary goal of leadership in disaster management?
2. How do leaders anticipate and prepare for potential disasters?
3. What are the key components of effective communication in disaster scenarios?
4. How do leaders ensure that information is accessible to all members of the community?
5. What challenges do leaders face in decision-making during disasters?
6. How can leaders balance immediate response needs with long-term recovery goals?
7. Why is it important for leaders to consider equity and inclusion in disaster management?
8. How do leaders address the specific needs of vulnerable populations during emergencies?
9. What role does coordination play in effective disaster management leadership?
10. How do leaders collaborate with different stakeholders to enhance response efforts?

Multiple Choice Questions

1. What does leadership in disaster management involve?

A) Managing the aftermath of a disaster
B) Guiding and coordinating efforts before, during, and after a disaster
C) Conducting risk assessments after a disaster occurs
D) Implementing recovery efforts without planning

2. What is a key aspect of effective communication in disaster management?

A) Withholding information to avoid panic
B) Providing updates only to government agencies
C) Disseminating clear, accurate, and timely information
D) Communicating solely through traditional media outlets

3. During a disaster, what is essential for leaders in decision-making?

A) Delaying decisions until all information is available
B) Making decisions without considering potential outcomes
C) Assessing available information and prioritizing actions
D) Relying solely on intuition without analyzing the situation

4. What is an important aspect of coordination in disaster management?

A) Exclusively relying on a single organization to manage all efforts

B) Disregarding collaboration with other stakeholders
C) Harmonizing activities among various stakeholders
D) Focusing only on individual response efforts

5. What does resilience entail in the context of disaster management?

A) Ignoring the need for long-term recovery efforts
B) Adapting to changing conditions and minimizing vulnerability
C) Prioritizing immediate response over long-term planning
D) Rejecting the importance of community engagement

6. What is the primary goal of preparedness in disaster management?

A) Reacting spontaneously to disasters as they occur
B) Developing comprehensive plans to mitigate disaster impacts
C) Exclusively focusing on short-term response efforts
D) Overlooking the need for training and resource allocation

7. In disaster management, why is equity and inclusion important?

A) To prioritize assistance to affluent communities
B) To address the needs of all community members, especially the vulnerable
C) To exclude certain population groups from receiving aid
D) To solely focus on the immediate response without considering long-term impacts

8. What role does continuous learning play in disaster management?

A) Ignoring past experiences to focus on immediate response efforts
B) Conducting after-action reviews to improve future preparedness
C) Rejecting feedback from stakeholders to maintain the status quo
D) Limiting training and development opportunities for personnel

9. Which of the following is a characteristic of effective leadership in disaster management?

A) Micromanaging response efforts without delegating tasks
B) Reacting impulsively to crises without assessing the situation
C) Building trust and confidence through transparent communication
D) Avoiding collaboration with other organizations and agencies

10. What is the purpose of recovery efforts in disaster management?

A) To exacerbate existing vulnerabilities in affected communities

B) To promote long-term resilience and restore normalcy
C) To prioritize short-term relief efforts over long-term recovery
D) To withhold assistance until all immediate needs are met

11. What is the primary responsibility of leaders during the response phase of disaster management?

A) Planning for long-term recovery efforts
B) Providing immediate assistance to affected communities
C) Ignoring communication with stakeholders
D) Avoiding decision-making until after the disaster passes

12. What is a critical factor in building resilience within communities?

A) Isolating vulnerable populations during recovery efforts
B) Ignoring social dynamics and disparities
C) Promoting inclusivity and addressing equity issues
D) Focusing solely on short-term response efforts

13. How do effective leaders approach decision-making during a disaster?

A) By delaying decisions until all information is available
B) By making decisions without considering potential outcomes
C) By assessing available information and prioritizing actions
D) By solely relying on intuition without analyzing the situation

14. What is a key component of effective communication in disaster management?

A) Withholding information to avoid panic
B) Providing updates only to government agencies
C) Disseminating clear, accurate, and timely information
D) Communicating solely through traditional media outlets

15. Why is collaboration important in disaster management?

A) To prioritize individual response efforts over collective action
B) To coordinate resources and efforts among various stakeholders
C) To exclude certain organizations from participating in response efforts
D) To delay response efforts until all stakeholders agree on a course of action

Answers:

1. B) Guiding and coordinating efforts before, during, and after a disaster
2. C) Disseminating clear, accurate, and timely information
3. C) Assessing available information and prioritizing actions
4. C) Harmonizing activities among various stakeholders
5. B) Adapting to changing conditions and minimizing vulnerability
6. B) Developing comprehensive plans to mitigate disaster impacts
7. B) To address the needs of all community members, especially the vulnerable
8. B) Conducting after-action reviews to improve future preparedness
9. C) Building trust and confidence through transparent communication
10. B) To promote long-term resilience and restore normalcy
11. B) Providing immediate assistance to affected communities
12. C) Promoting inclusivity and addressing equity issues
13. C) By assessing available information and prioritizing actions
14. C) Disseminating clear, accurate, and timely information
15. B) To coordinate resources and efforts among various stakeholders

UNIT 16: DISASTER SCENARIO & DISASTER MANAGEMENT SYSTEM OF UTTARAKHAND

16.1 OBJECTIVE

1. To do an in-depth study of the major disasters in Uttarakhand.

2. To provide information and education about natural disasters to the Himalayan people.

3. To formulate a strong local stakeholder-based strategy for disaster protection.

4. To create a concrete local community-based action plan for disaster reduction.

16.2 INTRODUCTION

Since most of the area of Uttarakhand state is in the new Himalayan region, many types of disasters always occur due to geological instability and the imbalance of tectonic processes. From the point of view of disasters, this region is a very sensitive area in which natural disasters like earthquakes, landslides, floods, forest fires, excessive rainfall, avalanches, and cloudbursts keep occurring from time to time, which have been continuously occurring from the origin of the Himalayas until the present time. is going on, and every year the frequency of these natural disasters is increasing day by day. The most frequently occurring disaster in Uttarakhand is an earthquake, which generally occurs in the form of seismic vibrations 2-3 times per month on average. Due to the high frequency of earthquakes, Uttarakhand state has been divided into two earthquake zones. (1) Dehradun, Tehri, Uttarkashi, Nainital, and Udham Singh Nagar are zone number 03 and (2) Chamoli, Rudraprayag, Almora, Bageshwar, and Pithoragarh. Placed in zone number 4 from 1803 to 2007, 12 major earthquake disasters occurred in the state, whose intensity was more than 5.0 reactor points. The second major disaster is a landslide, whose frequency has been 10 times from 1980 to 2013, which has been an event causing immense loss of life and property. The third natural and man-made disaster is a forest fire, which burns and destroys lakhs of hectares of forest land every year in a state rich in forest cover.

According to the daily newspaper, on June 13, 2023, due to the combination of rising global temperatures and other man-made factors, 78 forest fires occurred in 24 hours, due to which 98 hectares of forest were destroyed, while according to the Indian Forest Survey (Satellite), in May 2018, In the forest survey conducted continuously for eight days, fire incidents were observed in about 3,000 places, due to which on average 1,978 hectares of forest are burned every year. Excessive rainfall and cloud bursts are also giving rise to mountain floods like the Kedarnath flood by releasing an immeasurable amount of water in the hilly and plain areas of Uttarakhand every year. On the other hand, the water logging of October 2021 in the

plain area of Udham Singh Nagar has been an example of an immediate flood disaster. Avalanches have become a common occurrence in places at altitudes above 3000 metres in the state. 29 mountaineers have died due to an avalanche in Uttarkashi on October 8, 2022. Apart from this, countless avalanche incidents have been happening in many parts of the state. In the last 10–15 years, the number of natural disasters has been continuously increasing. Thus, keeping in view the sensitivities of disasters, there is a need to make an effective action plan and management to prevent and mitigate disasters in time, taking into account the geographical and human sensitivities of the state of Uttarakhand. It is necessary for protection.

In the state of Uttarakhand, work is being done on a fixed action plan from 2015 to 2030 based on the Australian Model (Sendai Framework) for disaster management planning and prevention of disasters, which will include the development of an understanding of disaster risk, strengthening of the disaster risk system, disaster risk reduction, investment, and strengthening of pre-disaster preparedness, recovery, rehabilitation, and reconstruction. Earthquake warning centres, radar, and geographical information system technologies are being included in the form of disaster early warning canters. So that the crises occurring during disasters can be reduced, apart from this, on the lines of the Centre, the creation of the State Disaster Reserve Force and Disaster Relief Fund has also been established for disaster management and security. The detailed explanation of the measures taken for the management of major disasters and crises occurring in the state of Uttarakhand is explained under the following headings.

16.3 DISASTER SCENARIO & DISASTER MANAGEMENT SYSTEM OF UTTARAKHAND

Due to Uttarakhand's special geographical structure, geo-thermal instability, abundance of tropic lines, and 86 percent mountainous terrain, many types of innumerable disasters keep happening in the land of Uttarakhand from time to time. Based on current frequencies, the major disasters that occur mainly are earthquakes, landslides, forest fires, floods, cloud bursts, avalanches, and soil erosion, a detailed description of which is given in the following headings.

Earthquake

Generally, earthquakes are related to changes in the thermal conditions of the Earth's interior and to tectonic events. Earthquakes are measured using the Richter scale, which indicates the intensity or magnitude of an earthquake (in M). Where is the origin of an earthquake? The origin of earthquakes in the Himalayan regions is found at an average depth of

20 to 30 km. The place where the earthquake first occurs is known as the epicenter. Earthquake waves are mainly divided into three types (primary, secondary, and surface).

Due to the state of Uttarakhand being a part of the Himalayan upliftment, it has not been able to achieve the state of equilibrium from a geo-thermal point of view. Apart from this, this area is also the path for gases coming out of the Earth's internal structure through fault lines, due to which earthquakes occur many times. According to geologists, this state is situated in seismic zones 3 and 4, in which Dehradun, Tehri, Uttarkashi, Nainital, and Udham Singh Nagar districts are highly sensitive zones, and Rudrapayag, Almora, Bageshwar Pithoragarh, and Champawat are situated in highly sensitive zone number 3. An earthquake has now become a common phenomenon in the state of Uttarakhand, which is mainly caused by tectonic activities.

In Uttarakhand, where the most destructive earthquakes are caused by tectonic activities instead of landslides and man-made factors, earthquakes occur more especially due to the mobility of plates and the presence of faults because the Central Fault Rift (M.C.), the Main Boundary Rift (MBT), the Himalayan Forward Fault (HFF), and the THF flow through the upper, middle, and lower parts of Uttarakhand state. Apart from this, the Indian Plate is shifting by 1 cm to 5 cm every year in the north and north-east directions, which is happening as a result of underground energy. Due to the release of energy, earthquakes with intensities ranging from 5 to 9 occur here. Estimate of the frequency of the earthquake: According to a Hindustan News report, it is known that in the year 2023, there were eight earthquakes in Uttarakhand in 46 days. In the same year, there were 9 earthquakes in 2016, 13 earthquakes in 2017, 5 earthquakes in 2022, and 10–12 earthquakes in 2023. Scientists at IIT Kanpur and Roorkee have expressed apprehension that major earthquakes may occur in Uttarakhand in the future, which may be up to 8 points on the Richter scale. It has been predicted that a major earthquake will occur in Uttarakhand after a period of 30 years. In the year 1505, the biggest earthquake of 8 reactor scale occurred in Laldhag, Haridwar. The earthquakes of the same year—1980 Dharchula, 1991 Uttarkashi, and 1999 Chamoli—were major disasters. Uttarakhand, which has caused immense loss of life and property and damage to natural resources, is considered to be the area with the maximum impact in the Himalayan region in terms of earthquake impact.

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upper, middle, and lower parts of Uttarakhand state. Apart from this, the Indian Plate is shifting by 1 cm to 5 cm every year in the north and north-east directions, which is happening as a result of underground energy. Due to the release of energy, earthquakes with intensities ranging from 5 to 9 occur here. Estimate of the frequency of the earthquake: According to a Hindustan News report, it is known that in the year 2023, there were eight earthquakes in Uttarakhand in a period of 46 days. In the same year, there were 9 earthquakes in 2016, 13 earthquakes in 2017, 5 earthquakes in 2022, and 10–12 earthquakes in 2023. Scientists at IIT Kanpur and Roorkee have expressed apprehension that major earthquakes may occur in Uttarakhand in the future, which may be up to 8 points on the Richter scale. It has been predicted that a major earthquake will occur in Uttarakhand after a period of 30 years. In the year 1505, the biggest earthquake of 8 reactor scale occurred in Laldhag, Haridwar. The earthquakes of the same year—1980 Dharchula, 1991 Uttarkashi, and 1999 Chamoli—were major disasters. Uttarakhand, which has caused immense loss of life and property and damage to natural resources, is considered to be the area with the maximum impact in the Himalayan region in terms of earthquake impact.

The Chamoli earthquake of 1999 was the biggest disaster in the state and the most powerful earthquake in the history of 90 years. According to the survey conducted by the Disaster Management Department under the Earthquake Disaster Risk, World Bank Project, if a major earthquake occurs in Uttarakhand, there is a possibility of economic loss of Rs 2480 crores per year, of which 59 percent impact will be seen in the residential buildings here. Because even today, the Himalayan region is continuously expanding, and earthquakes and human activities are adding more destructive force to this disaster.

The relief of Uttarakhand extends from sea level 200 metres to the height of 7817 metres in the Great Himalayas. In between, many wide valleys, steeply sloping mountain ranges, Bhavar-Tarai plains, and Doon valleys make it weak from a structural point of view because the plain part is limited to about 14 percent of the area and the remaining part is covered with mountainous parts, making it vulnerable to earthquakes. The details of major earthquakes that have occurred as disasters in Uttarakhand in the past years are explained in the following table number 16.1.

Table-16.1: Details of earthquakes that occurred in Uttarakhand from the years 1803 to 2023.

S.No	Earthquake Disaster Years	Earthquake Centre	Intensity of Earthquake
1	22 May 1803	Uttarkashi	6.0

2	1 September 1803	Badarinath	9.0
3	March 1809	Gadwal	8.0
4	28 May1816	Gangotari	7.0
5	28 October 1916	Pithodagad	5.5
6	14 May1935	Lohaghat	7.0
7	2 October 1937	Deharadun	8.0
8	4 June 1945	Almora	6.5
9	28 December 1958	Camoli/Dharchula	6.25
10	27 June 1966	Capkot/Bageshwar	6.3
11	28 August 1968	Dharchula	7.0
12	21 May1979	Dharchula	6.5
13	29 July 1980	Dharchula	6.5
14	20 October 1991	Uttarkashi	6.6
15	29 March 1999	Chamoli	6.8
15	14 December 2005	All Uttarakhand	5.2
16	23 July 2007	All Uttarakhand	5.0
17	6 February 2017	Rudraparyag	5.1
18	29 August 2023	Uttarkashi	3.1

Source: Uttarakhand Parikshawani & Google

Analysis of the above table shows that the number of earthquakes as a disaster in Uttarakhand has been very high, which presents the details of major earthquakes in the form of data collection, whereas in reality, the number of earthquakes here is similar to that of Japan. Can be assumed to be the same, but due to low-intensity earthquakes not being measured normally, the general parameters are not known.

Landslide

A landslide is a natural and man-made disaster. Landslides originate mainly in hilly, mountainous, and steeply sloping areas. Under a landslide, rocks break and are transported in mass toward the lower slope under the influence of gravity. This is given intense force by the presence of rain and snow. In simple words, a landslide is the process of sliding any part of the land from its original place and accumulating debris at another place. The presence of water during the rainy season and the weakening of base rocks are considered to be mainly responsible for the occurrence of landslide disasters.

The areas of the world vulnerable to landslides include the mountainous parts of the Himalayas, in which Uttarakhand has been placed in the highly sensitive category. The developmental works taking place in Uttarakhand, such as road construction, urbanization, agricultural land expansion, construction of buildings, and the construction of reservoirs and tunnels for power project construction, give rise to an unbalanced and disorganized land

structure on the hill slopes. Which flows with rainwater during the rainy season, takes the form of landslides and floods, and gives rise to incidents of landslides? In Uttarakhand, large-scale incidents of landslides occur every year due to the sediments separated during road construction. Due to the flow of rainwater, small sediments get aggregated together and give rise to major floods and landslides. Besides, they are also causing land erosion in the flowing drains and rivers.

In the state of Uttarakhand, only big landslides are included in the landslides that occur as disasters, whereas every year thousands of small landslides occur in many places, but their harmful effects do not occur on a large scale. More than 60 major landslides have occurred in the state from 1970 to 2002, due to which more than 35,000 people have died. If seen as a landslide disaster, from the year 2015 to August 11, 2023, about 3601 landslides occurred in which 266 people died, whereas in the year 2023, 87 people died from 1173 landslides. The details of major landslide disasters that have occurred in the state are given in the following sub-headings:

(1) **Kedarnath flood and landslide disaster-** This has been the biggest landslide disaster in the history of Uttarakhand. This disaster was a result of heavy rainfall in the state on June 16–17, 2013, resulting in widespread loss of life and property in Rudraprayag, Chamali, Uttarkashi, Pauri, and Tehri districts. The increase in water due to rainwater and avalanches in Chaurabari Lake (Mandakini, Doodh Ganga, Madhu Ganga, Saraswati, Assigga, Alaknanda, Pindar, and Bhagirathi rivers) had taken the form of a severe flood. Due to the intense landslide that occurred in the flood-affected area, along with the damage to thousands of houses and passenger accommodation, many cattle and human beings were also lost; they were buried alive forever under the debris, and many rivers were washed away in the flood water streams. Apart from this, hundreds of hotels and dharamshalas, thousands of motor vehicles, and six hydropower projects were destroyed, while 24 big hydropower projects suffered massive losses.

Due to this natural flood disaster, 3,886 people were killed, out of which only 644 bodies were found. Many villages were lost forever, and hundreds of villages were on the verge of destruction and are devoid of humans even today. All road and communication facilities were destroyed, due to which life was affected for months. The roads and footpaths of 103 villages in Ukhimath Tehsil were destroyed, and many villages were merged into Mandakini. The maximum loss was suffered by the residents of Rudrapayag district, Kedarnath Dham, and Mandakini Valley. According to the Indian Institute of Remote Sensing (IIRS), due to intense

rainfall, the upper layer of the Companion and Chorabari glaciers located on Sumeru mountain, north-east of Kedarnath, broke and fell into Chorabari Lake, causing a high-speed landslide with debris towards Kedarnath and It took the form of a flood and destroyed about 90 Dharamshalas and hundreds of shops in the Mandakini complex. It also buried the entire temple complex with debris, and more than 1,00,000 pilgrims and tourists were trapped there.

There was major devastation in the Mandakini river flow area, which flows into the lake, and the Kedar Ghati area. The small market in Gauri Kund with 100 shops had vanished forever. Mandakini had left its original drainage area and started flowing through a new route. Due to this, the length of the river was increased by about 5 km. About 4200 villages-59 villages were completely affected by the Kedarnath disaster, and rehabilitation was the only option for 435 villages. According to the Indian Space Research Organisation (ISRO), after the Kedarnath disaster, the problem of landslides arose in thousands of places in this region as well as in the state. 992 landslides occurred in the Kedar Valley region alone, which is becoming a big threat for the future.

(2) Malpa landslide disaster 1998- In Malpa village of Pithoragarh district, which is situated in the drainage area of the Kali River, at midnight of August 18, 200 citizens and 70 pilgrims going on the Mansarovar Kailash Yatra were killed forever by a landslide. The entire village was engulfed by the boulders and debris that fell from the mountain range situated on the right bank of the Kali River, where the thickness of the debris was up to 600 cubic metres, and there was heavy rainfall for several days. Due to this, no assistance could be provided for the safety and property of the affected people. Due to the debris, the path of the Kali River was blocked for some time, and a temporary lake was also formed in the Kali River. The cause of the landslide was considered to be the steep slope of the hill, a lack of forest cover, and heavy rainfall. Many earth scientists believe that the reason behind this incident is the geo-instability caused by the earthquake that occurred in Uttarkashi in 1991. The wounds of which are not healing even today. Apart from this, small and big landslides are continuously occurring in many parts of the district. In addition, on August 8, 2009, 43 people died due to a landslide in Kuti village of Munsiyari tehsil.

(3) Gohana Lake Landslide Chamoli 1868- Due to the landslide in the Birhi River of Gauna, located in the Nizmulla Valley of Chamoli district, the path of the river was completely blocked, and a lake was formed, which came to be known as Gauna Lake. Which broke at night on

August 25, 1894, and this lake was destroyed after the incident of 1973 that destroyed Chamoli city.

(4) Nainital Landslide 1880- This landslide is the biggest disaster in the history of Nainital district, where about 838 mm. of rainfall was received in 40 hours, due to which the entire Naina Temple was under debris due to the landslide at Snow View Mountain Peak. There was major damage to the temple area. About 151 people were killed in this disaster, which included 108 Indians and 43 British citizens. The plain area near Naina Devi temple was formed due to landslides. At present, the Ballia Nala landslide is at its peak and is spread over an area of about 1.5–2 km, due to which hundreds of families have been shifted from here. And in the future, there is a threat to the existence of the entire lake. Year 2022, October: Landslide on Haidakhan Road; Kathgodam closed the connectivity roads of about 120 villages for several months, which are still in the same condition. Apart from this, in the year 2021, landslides occurred in Thalajhadi, Bohrakot, Talla Ramgarh, and Basgaon of the district; six persons of the same family died in Thaladi; 25 families were displaced due to debris in Pande chod of Bhimtal; and landslides occurred in Kalsia Nalla of Kathgodam in the year 2023. About 20–25 families have been affected, whereas in Maluwatal, the houses of 3 families were completely washed away, and many cattle were washed away, where landslide activity has been the highest.

(5) Taponvan Flood/Landslide Disaster 2021– 7 February 2021 200 workers working in the tunnel of the Rishi Ganga Hydro Electric Project went missing due to the landslide in Rishi Ganga of Taponvan, Gaura, who is running the campaign of forest movement in the land of Uttarakhand. The existence of Devi's village, Reni, was also in danger due to this landslide. Which happened during the winter season, whereas most of the incidents of landslides happen during the rainy season only. During the winter period, only avalanche disasters occurred in Uttarakhand. But due to climate change and the increase in global temperature, extreme weather disasters have started happening here.

(6) Joshimath landslide 2023- The Joshimath landslide is an incident in a religious and tourist town located in Chamoli district of Uttarakhand state. Which is situated at a height of about 18,000 metres above sea level, where the occurrence of landslides has started since December 2022 and has not been able to achieve stability even till the present time. Due to the Joshimath area being in the central Himalayan region, it does not have any part of the Great Himalayas. Geologists consider it to be more vulnerable than other Himalayan parts due to the presence of sediment (soil) accumulation. However, the unplanned pattern of infrastructure development and

residential area construction is weakening the base level of local sediment accumulation, due to which landslides are becoming more frequent in this area. Man-made factors like tunnels being built for roads and hydropower projects, explosive materials, and unplanned urbanization are giving rapid direction to landslides. While landslides and subsidence are being seen in many places, residential areas are also suffering damage on a large scale. By the end of the year 2023, 223 families have been displaced from the landslide area, and 4000 thousand houses have been hit by this disaster, in which the employment and livelihood of 750 tourism businessmen are feared to be destroyed forever. The future of the city established in the 8th century is also in danger.

A plan to shift Joshimath city to another place is being considered by the state government. The financial burden of about Rs 3000 crore is likely to fall on the government for the reconstruction work in the city. But if seen in reality, on the one hand, this phenomenon has been affected by geothermal instability, and on the other hand, changes in the weather system due to extreme weather events due to the impact of climate change have led to disasters like irregular rainfall, cloud bursts, and landslides. Sensitive is being prepared for this.

(**7) Garhwal Landslide 1998-** The landslide that occurred in Ukhimath Tehsil of Rudraprayag district at midnight on August 11–12 killed more than 100 people. Many villages were buried under heaps of debris, and all basic services were completely stopped. Apart from this, Sial, Pakhi, Birahi, and Nand Prayag landslides have also been heartbreaking as landslide disasters in the state; thus, in the state of Uttarakhand, the landslide disasters have affected human communities more than the earthquake in the past years.

Forest fire disaster

Uttarakhand state, besides being rich in forest resource is most affected by forest fire. About 45 percent of the state is covered with forest, and 64 percent of it is covered with forest cover, but every year lakhs of hectares of forest get burned to ashes due to natural and man-made forest fires. In which the wild ecology and entire living ecology are affected, and all types of bio-inorganic assets are being destroyed by burning. Along with destroying the natural beauty of the state, it also gives rise to disasters like fire and landslides. Fires in Uttarakhand occur through natural and man-made factors. Among the natural factors, fire caused by the friction of stones during the dry period in the hilly areas and lightning are prominent; on the other hand, among the man-made factors are agricultural activities and animal fodder. Fires set for purposes such as

burning, deliberate throwing of beedis and cigarettes, fireworks, short circuits in electric heating lines, etc. are also included. But the fires in the state of Uttarakhand have been a historical, man-made phenomenon. The traditional agriculture and animal husbandry methods here have long been a part of the forest fire economy, which has become a disaster in the changing scenario.

At present, due to increasing global temperatures due to climate change, most parts of the state are becoming dry. With the increase in heat, the ease of fire is increasing, the effects of which are visible in the form of a rapid increase in human life, the atmosphere, and the global temperature. The area of forests in Uttarakhand is decreasing due to forest fires and an increase in temperature. According to the research results done in the past years and local experts, climate change and global warming have become major reasons for the increase in incidents of fire in the forests of the state. Due to this, even the high Himalayan snow-rich areas have now come under fire due to melting snow. According to the Down to Earth Report 2021, until November 2021, about 1.76 billion metric tonnes of carbon dioxide were emitted from forest fires, which made the air poisonous. Thus, the forest fire has worried the entire state. In Uttarakhand, especially, the period of forest fire is considered to be from the month of March to June, but now incidents of forest fire and forest burning have started happening from the month of January to February itself. In the year 2016, 4538 hectares of forest were burned to ashes due to a forest fire, due to which seven people also died. In conclusion, it has been found that with the changing trend of climate and weather, due to the increase in temperature, the risk of increasing incidents of forest fire has become more intense. Forest fires are spreading rapidly, especially due to an increase in dryness in the atmosphere due to a decrease in rainfall and the abundance of pine forests. According to the Forest Research Institute, Dehradun, the average loss due to fire per 100-hectare forest area is generally Rs 1 lakh, whereas in Sal forest, the loss is Rs 498 per hectare and in mixed forest, the loss is Rs 252 per hectare. Thus, in Uttarakhand, 4.056 hectares of forest get burned every day due to forest fires. May 3, 2022 According to the report from Down to Earth, there were 138 forest fire incidents in the state from February 15 to March 31, due to which 182.52 hectares of forest area were burned. A forest fire, which is no less than a disaster, causes huge damage to the innumerable medicinal herbs, insects, plants, and human assets found in the state. Many times, when forest fire reaches human residential areas, entire villages get burned, which is no less than a disaster.

Flood disaster

In the state of Uttarakhand, the risk of flood disasters is less as compared to other disasters because, due to most of the parts being mountainous, there are more rivers through which rainwater drains out quickly. But plain areas like Kichha, Sitaganj, Rudrapur, Haridwar, Roorkee, etc. sometimes get flooded during the rainy season. During the rainy season, when there is excessive rainfall, the water level in the rivers coming from the mountainous areas increases, due to which the plains become waterlogged and take the form of floods, as in the year 2021, Rudrapur and Nanakmatta were the areas of recent floods.

Cloudburst disaster

Cloudburst has been effective for more than two decades, and changes in weather elements and time due to climate change effects have been seen to be more active. Which occurs due to excessive rainfall in a short period of time in the high mountain valley parts of the state and completely destroys the topography, biodiversity, and man-made cultural heritage of that area? Apart from this, there is immense loss to people, property, and the human community. The incidents of cloud bursts are increasing year after year in Uttarakhand. The details of some cloud burst incidents that have occurred in the past few years are as follows.

1. On June 16–17, 2013, about 4200 houses and thousands of people died due to a cloudburst in Kedarnath, Rudraprayag.

2. On May 28, 2016, half a dozen villages were destroyed due to a cloudburst in Tehri district. More than 100 cattle had died.

3. On May 18, 2018, many vehicles got drowned in debris and mud due to a cloudburst in Chamoli.

4. The Soomgarh incident on the morning of August 18, 2010, resulted in the death of 18 innocent school children forever.

5. 22 July 2020: In the last 22 years, 13 cloud burst incidents occurred in Dharchula, due to which 350 people lost their lives.

6. July 2022: 3 people died and 9 went missing due to a cloud burst in Pithoragarh, and dozens of houses collapsed in Taga and Gela villages of Pithoragarh.

7. In August 2022, hundreds of acres of land and many cattle died in Ramgarh Khairna, Garampani, and Maluwatal villages of Bhimtal due to a cloudburst in Ramgarh, Nainital.

8. On August 2, 2023, Bharatpuri, Lakhan Mandi area, was hit by a cloudburst in Ramnagar of Nainital district, and many houses were submerged in the river.

9. The lives and property of about 200 people are in danger due to a cloud burst in Darma Valley on August 15, 2023.

Disaster caused by an avalanche or snowflake

In the high-altitude areas of the state (3000 meters), where snow accumulates throughout the year. Especially in Uttarkashi, Chamoli Rudraprayag, Pithoragarh & Bageshwar districts, incidents of avalanches are seen during the winter season. When more snow than usual accumulated on the hills or slopes, the snow would fall down the slope, which sometimes caused harm to snow climbers, mountaineers, and soldiers in the service of the country. January 30, 2023. Avalanche in Malari of Niti Valley, 2013 Chaurabadi Glacier in Kedarnath Tragedy, February 7, 2021, Rogathi Glacier of Tapovan Reni village, and June 4: Breakings of iceberg in Atlakoti Hemkund have been incidents of avalanches.

Factors of disaster in Uttarakhand

The main elements of natural disasters in Uttarakhand include its physical structure and geological conditions; apart from this, unplanned development work gives rise to many types of possibilities for disasters. Due to this, the simple residents of the region, which have peaceful valleys, are rich in natural resources, and have adverse physical conditions, have to face the suffering of various types of disasters every year or month in some form or another. The main elements that give rise to disasters in the newly created state of Uttarakhand can be described as follows:

1. **Geological instability:** The Himalayan mountain range is in a state of imbalance due to it being a newly born Himalayan mountain and due to the location of different types of faults and a lack of adequate earth balance. On the one hand, the Himalayan Mountains are still rising, and on the other hand, the rivers are still doing erosion work like in their youth. Due to this, deep valleys and villages are being born in many areas of the Himalayan region. The entire state of Uttarakhand, situated in the lap of the Himalayas, assimilates all these characteristics of the Himalayan Mountains. Due to this, geographical and geological events related to ground instability, earthquakes, landslides, and soil erosion always keep happening here from time to time. Earthquake and landslide disasters are mainly occurring;

apart from this, all types of weather events and disasters are also giving rise to natural disasters in the local area.

2. **Infrastructure development:** The factors of disasters include the infrastructure development works currently happening in the state of Uttarakhand, like roads, communication lines, power lines, the development of tourist towns, tourist facility development, big road schemes like Barah Masi, population pressure, and agricultural problems. Elements like work and forest destruction are giving rise to various kinds of disasters in the state.

Most of the construction processes being adopted for infrastructure development are not successful in maintaining harmony and balance with the environment and local ecology. Various types of construction work are being carried out without keeping in mind the local geographical conditions, due to which many types of disasters have been occurring here for a long time and more disasters will occur in the future, which will create havoc in the world's most dangerous places. The densely populated Himalayan mountain range and the states situated in it, with Uttarakhand and Himachal Pradesh being the most sensitive states, will register a positive increase in the number of threats from physical and weather-related events for the residents. At present, if all the natural disasters of the state are analyzed in depth, then it will be found that the unplanned construction works here are playing a role of about 60–70 percent in making the natural disasters bigger.

3. **Hydropower Projects:** There are immense possibilities for hydropower projects in the state of Uttarakhand. Existing hydropower schemes have been developed here since before independent India. North India's first hydropower project, Glogi, dates back to 1912. Construction of the proposed India-Nepal multipurpose hydropower project Pancheshwar, which is a 5800 MW power generation project, is planned to be built here. Hydropower projects ranging from 20 MW to 2400 MW have been constructed in the state, and plans are proposed for the development of big hydropower projects in the near future. The water resources of the state can produce about 40,000 thousand megawatts of electricity, but due to land instability and other types of physical conditions, a lack of adequate balance is not part of the ecological system here.

The development of hydropower projects without adequate geographical knowledge and without understanding the physical form of the Himalayas by policymakers and planning people proposes to prepare for a big crisis in the future,

which will lead to a huge loss of people and wealth in the state of Uttarakhand. Along with this, there will be disasters that will change the geography of the place, due to which the Himalayan inhabited areas will become devoid of humans. The disasters that have happened in Tapovan, Joshimath, and Tehri have completely happened due to hydropower project development. By the end of the year 2022, 59 new hydropower projects of about 12,716 MW are being built in the Uttarakhand Himalayas, and some have already been built, which has prepared the state for any major earthquake and land imbalance.

4. **Transport and hydropower tunnels**: Due to physical unevenness and topographic diversity, developing transport routes is a very risky and difficult task for the Uttarakhand government and its residents, but by adjusting to the environmental elements, the construction work can be done in a manner that is safe for humans and the environment. Disasters occurring here could have been reduced by making tailored plans, but humans' ambitious hunger, indiscriminate road construction, unplanned tunnel development, and lack of in-depth study of the ground conditions of Uttarakhand with an unbalanced land structure have led to the arrival of disasters. Motivates. While the indiscriminate construction of dams, landslides, floods, and the amount of sediment in rivers are giving intense force to erosion, the inner part of the surface is being hollowed out by rifting through tunnels. At present, the concept of tunnel construction has reached its peak. Of the underground tunnels being built for all hydropower projects and roads are prominent, Karna Prayag Rail Line Tunnel and the Bageshwar Rail Line proposed for the future, 41 workers buried in Silkyara Tunnel Uttarkashi, which is a big warning for the future, apart from these other water power projects that are becoming the result of human efforts to bring disasters to the entire Uttarakhand.
5. **Deforestation:** According to the 15th Forest Report 2018, complete forest expansion is found in 45.43 percent of the total forest area in the state of Uttarakhand. But forests have been exploited in different forms from prehistoric times to the present. Where forests are far from human reach, annual forest fires are destroying forests on a large scale. The level of degradation of forests is measured by the forest movements (Chipko, Paani Rakho, Raksha Sutra, Dungi-Pantoli, Jhapto-Chhineo, Maiti movement, and mixed forest farming model) carried out by the common people of Uttarakhand. Is applied easily. From the National Forest Policy of 1952 to the Forest Act of 2006, many efforts were made to stop the degradation of forests, but even today, much success has not been achieved in

protecting the forests. Every year, due to human activities and natural disasters in the state, an average of 4.056 hectares of forest per day is affected by forest fires, roads, and agricultural works. Encroachment of forest land is destroying the forest area, especially in the plains, and the temperature is increasing due to climate change. The forests themselves are drying up and coming into the grip of fire. In the middle and high Himalayan regions of Uttarakhand, where the regeneration of forests is possible only through nature, the destruction of forests provides an environment conducive to natural disasters.

6. **Unplanned urbanization:** Since most of the land in Uttarakhand is mountainous, these mountainous areas are not able to bear the brunt of large-scale urban expansion and construction, as it has been clarified earlier that the Himalayas are still in complete balance. Is not in a state of. the hilly urban areas, population, and construction load expanding in the state of Uttarakhand will lead to major disasters in the near future. Unplanned urbanization happening at a rapid pace (Garhwal division Uttarkashi, Gochar Chamoli, Joshimath, New Tehri, Pauri, Rudraprayag Mussoorie and Kamau division's Nainital, Bhawali, Almora, Ranikhet, Bageshwar, Garun, Kausani, Pithoragarh, Didihat, Dharchula, Lohaghat, Champawat, Munsiyari and large slums of urban areas which are situated near rivers and drains (Vanbhulpura of Haldwani, Vijay Colony of Ramnagar Dehradun, Jhanda Mohalla, Dalanwala East, Patel Nagar West, Rajiv Nagar, Nehru Colony, Brahapuri Udham Singh Nagar Kichha, Rudrapur Transit Camp, Kashipur, Sitaganj, Haridwar Main, Kankhal Salimpur Shivalik Nagar, Dera Baba Dargah Singh Ji etc. slums) where there is very dense population and active colonies where there are drains, drinking water system, sewer lines and other basic infrastructure. The facilities have not been developed, nor are there any possibilities of them being developed in the future. Due to this, the development of hilly cities is disturbing the land balance, and the exploitation of resources is happening at a rapid pace. Whereas in the plain areas, there are slums, filth, and epidemics. Is inviting.

7. **Lack of appropriate mining policy:** Along with water resource development in the state, natural resource mining there is also immense potential for mining; here, big river drainage systems like the Ganga, Yamuna, and Kali rivers have developed. On the other hand, there is immense mining material deposited in hundreds of small rivers; apart from this, Limestone, Chalk, Rock Phosphate, Dolomite, Sulphur, etc. The work of digging valuable minerals like Barites, Gypsum, Copper, Iron, Graphite, Gold, Silver, and Tin is

also done through mining. The use of mining is very important for human economic development, reducing river depression and preventing floods, but by not adjusting to the environment, mining operations are causing huge landslides in mountainous areas and unplanned landslides in the plains. Mining is causing damage to urban areas by cutting off rivers in their adjacent parts. Human settlements and agricultural land have been damaged in Ramnagar of Nainital, Kankhal of Haridwar, Bindukhatta of the Gaula River, and Shantipuri areas.

8. **Pilgrimage and Tourism:** Uttarakhand has inherited the name of God's land from ancient times, where there is immense potential for religious and natural tourism. Every year, lakhs of tourists come for natural and religious tourism (Kavad and Chardham Yatras). The development of tourist infrastructure (accommodation, roads, and communication) causes huge damage to forests and wildlife. Lakhs of tourists coming here do not treat the local environment in a friendly manner. Sometimes, due to overcrowding of tourists, an environmental crisis is created due to crowding in the local tourist areas. In the name of tourism development, forest land is encroached upon. Which, along with being unplanned, gives rise to many small and big disasters. In the year 2022, about 382 crore people came here for Kavad Yatra and 46 lakh people came for Chardham. It is expected to increase by 12–13 percent in the year 2023, which will be no less than a disaster in the absence of planned management.
9. **Changes in the aquatic system:** Due to landslides, floods, and earthquakes in mountainous areas, major changes have taken place in the drainage system of rivers from the rise of the Himalayas until the present time. Just as the Himalayas stand today, there was a deep Tethys sea in the Miocene era. Similarly, after the rise of the Great Himalayas, most of the rivers flowed from east to west (Sutlej and Shivalik), resulting in an increase of 5 km in the Madakini river drainage system and Every year, the erosion that occurs in river areas keeps changing its course even after mining, which may repeat the previous history of disasters in the future.
10. **Disregarding the principles of sustainable development:** Due to the heterogeneous geographical structure of Uttarakhand, there is a need to make eco-tourism in accordance with the local ecological rules and policies of sustainable development. The people responsible for the construction work here are destroying the resources here without thinking, and the special construction policies made for the Himalayan regions are not implemented, due to which there have been many types of disasters in the state.

11. **Climate change impact:** While the entire world is being affected by climate change, there are warnings of many changing factors of climate change in the Himalayan region (melting of glaciers, cloud bursts, arrival of hot and cold winds, change in the amount of rainfall, storms). An increase in the incidents of cloud bursts are sign of climate change in Uttarakhand, due to which many types of disasters are occurring in the unstable Himalayas.

Disaster Management System in Uttarakhand

Whenever disasters have occurred in the rugged hilly areas of Uttarakhand, there has been immense damage to roads, communication, and local ecology. Most of the mountainous areas are uninhabited and governed by limited human activities. Whenever natural disasters have occurred in human-inhabited areas, it has proved difficult to reach them due to adverse geographical conditions and limited resources; the disaster management preparations made by the governments remain the same and have not shown much success. Reaching the affected has been a challenging task. Therefore, to deal with the disasters that have occurred in the past and the ones that may occur in the future, emphasis should be placed on strictly adopting one's own resources, governments, and other international models, which should include local traditional knowledge and techniques and empower the local communities. It is necessary to provide special training. Components like health emergencies and environmental protection will have to be kept as priorities. Even though Uttarakhand was the first state in the country to have a disaster management policy in 2011 with the establishment of the department, its success during disasters is at a very low level. Barring a few special disasters, we have mostly failed so far. At present, work is being done as per the following points in the action plans adopted under the Disaster Management Plan to deal with disasters:

1. State Disaster Management Plan: The first work under the disaster management system in the state started right from the formation of the state. At present, the Disaster Management and Mitigation Centre (DMMC) and the State Disaster Management and Mitigation Authority (DMA). The State Disaster Response Fund (SDRF) and State Disaster Mitigation Fund (SDMF) have been constituted. Apart from this, a disaster office has been established in every district, in which subject experts from different areas have been included. To deal with natural disasters, many types of programmes, like communication-related campaigns, search and rescue, construction of earthquake-resistant buildings, public awareness, disaster education, etc., have

been launched in the state. Effective steps have been taken, like setting up SDRF forces on the lines of the centre, connecting emergency centres with district headquarters, and stopping construction work on river banks. Apart from this, a 7-member Disaster Management Committee (DMC) was also constituted in 2013 to deal with the risk of disasters and disaster crises.

2. Implementation of a disaster model based on the Sendai framework to deal with natural disasters in the state: For this, the Disaster Management and Mitigation Centre, (DMMC) State Disaster Response Fund, (SDRF) State Disaster Mitigation Fund (SDMF) have been formed at the state level under the chairmanship of the Ministry of Disaster Management (MDM)and the Disaster Management Minister on the Australian model in the state. The Sendai Framework is a progressive disaster response framework with the primary objective of reducing the number of people and infrastructure losses caused by disasters by 2030. The Framework is a 15-year voluntary and non-binding agreement to reduce disaster risks. Has been implemented in the state. Working in different ways at different levels. Such as reduction of disaster risk and loss of life, livelihood, health, and economic, physical, social, cultural, and environmental assets of the state, and management of disaster planning functions through the joint efforts of responsible local government, the private sector, and stakeholders. Are being implemented in the state.

3. Disaster education and training system: To make the residents of the state aware of disaster, a disaster programme has been included in the school curriculum (from grade 6 to grade 10), so that every citizen of the state is prepared to face the crisis of disaster. Can be ready. For public awareness, the earthquake-related film "Dandi-Kathi ki God Maa ke Darshan" and the Disaster Management quarterly magazine have been published. Apart from this, to provide the benefits of technology in disaster education, the local community has been trained in search and rescue techniques after and during the disaster. Emphasis is being laid on training in disaster management systems in the state so that the disaster management system in the state can be revamped and become capable of facing the outbreak of common humanitarian disasters even in remote geographical areas. With the use of technology, we can help human communities trapped in disasters move to safe places. Can be successful in reaching.

4. **Disaster Fund, Pre-Disaster Arrangements:** A separate disaster relief fund is being established by the state government to deal with the damage after the disaster and to provide housing, health protection, food management, and rehabilitation work to the disaster-affected community. Is. Which is provided by the District Magistrate of each district in the form of

immediate and long-term relief during and after the disaster, who can, on his own authority, provide an amount of up to Rs 50 lakh to the victim from the Disaster Management Fund.

5. **Disaster Management Force and Other Programmes-**(SDRF) was created by the state government in July 2013 after the Kedarnath tragedy, keeping in mind the sensitivities and frequency of disasters in the state, for rescue and relief work during disasters on the lines of the Central Government. The Disaster Reserve Force (SDRF) has been established. Disaster management-related action plans have been prepared in all the districts of the state, and disaster management committees and disaster intervention teams have been formed in 52 development blocks and 65,046 villages. Apart from this, doctors, firefighters, police personnel, officers, teachers, National Service Scheme volunteers, members of city disaster management committees, and panchayats are also being trained, especially during disasters. The work of connecting the emergency centres of the state with the district headquarters, broadcasting toll-free numbers to the public, installing radar, and connecting 10 hilly districts has been done through satellite phones.

6. **Ban construction works in disaster-**sensitive areas to avoid the outbreak of natural disasters and to stop human activities in disaster-sensitive areas, the government has banned all types of construction work up to a distance of 200 metres on the river banks. During the rainy season, water-logged areas of river areas have been declared submerged areas where no construction work will be carried out. Besides, the height of buildings and building construction techniques are also being changed in hilly areas. The emphasis is being laid on carrying out construction work only after considering the local underground structure. Also, big residential buildings are not allowed to be built without maps. The height of buildings is limited to a maximum of 30 metres in the plain areas of the state and 12 metres in the hilly areas. It has been made mandatory to create green areas in residential colonies larger than 500 square metres and to keep 10 to 15 percent of the area outside the house green in 300-yard plots. Which is being monitored from time to time by the State Disaster Management Authority (SDMA) and the National Green Tribunal (NGT).

7. Misuse of technology in disaster management: At present, many types of technologies have been adopted by the government for disaster reduction management in disaster-prone areas and disaster-affected areas. Mapping of all disaster-affected areas through Geographic Information System technology, 3D mapping through drone technology, and the Drone Application and

Research Centre (DARC) is being conducted. Modern safety walls are also being constructed to prevent erosion and landslides in river areas. Emphasis is also being laid on local community-based disaster preparedness in disaster-prone areas, and a large database of disasters that have occurred in the past is also being prepared through modern technologies. To fight disasters strongly, an International Disaster Management Global Conference (IDMGC) is being organized in Dehradun in December 2023, in which representatives of more than 50 countries are participating and more than 60 technical sessions will be organized in different fields. - It can be done in different types of disasters, as well as through the National Disaster Management Authority (NDMA), the Land Slide Atlas of India, (LSAI) the National Landslide Risk Management Strategy (NLRMS) 2019, the Landslide Risk Mitigation Plan (LRMS), and the Post-Risk Reduction Plan(PRRL) . Work is being done to control disasters in different areas. In this state of Uttarakhand, measures are being taken on a large scale to prevent natural disasters, but due to the very sensitive nature of disasters, preventing them has not been very successful.

16.4 SUMMARY

Uttarakhand, being a land with a new and mountainous structure, falls into the disaster-prone area, where many types of natural disasters keep occurring every year, due to which the natural and cultural landscapes, along with the biological community and wealth, are also harmed in unlimited quantities. The main disasters include earthquakes, landslides, floods, and forest fires. Apart from this, the network of various types of roads is built for structural development, hydropower projects, forest destruction, unplanned urbanization happening in hilly areas, and the recurrence of disasters. Provides strength to the state of Uttarakhand, being a region of Himalayan upliftment, has not been able to achieve a state of equilibrium even today from a geo-ecological point of view. Apart from being situated in seismic zones three and four, many fault lines are flowing here. Energy from the interior of the earth keeps coming out through these fault lines, due to which moderate to destructive earthquakes occur around these fault lines.

An earthquake is the first disaster among the major natural disasters that have occurred in the history of Uttarakhand state, whose intensity ranges from 5 to 9 points. The Chamoli earthquake of 1999 is counted among the biggest disasters in the state, and it was the most powerful earthquake in the history of 90 years. Major earthquakes have occurred here 18 times between 1803 and 2023, while from 1970 to 2002, more than 60 landslides have occurred in Uttarakhand, due to which more than 35,000 people have died. Kedarnath, Malpa, Tapovan,

Joshimath, Nainital, and Silkayara tunnels in Uttarkashi have been major incidents of devastating landslides and floods, while 4056 hectares of forest get burned every day due to forest fires.

To deal with and manage these disasters, the state government, NGOs, international organizations, and local stakeholders are working on the Australian Model for Disaster Reduction, the Disaster Relief Fund, the Disaster Reserve Force, and the Sandi Framework. Apart from this, to prevent disasters, efforts are being made to control disasters through the National Disaster Management Authority (NDMA), the Land Slide Atlas of India, (LSAI) the National Landslide Risk Management Strategy 2019 (NLRMS), the Landslide Risk Mitigation Plan (LRMS), the Flood Risk Reduction Plan(FRRP), and every To make the citizens of Uttarakhand aware of disasters, disaster education courses are being included in school education, and various types of modern technologies like radar are being included in disaster management and planning. Due to the geographical and environmental conditions of Uttarakhand being always vulnerable to disaster, the occurrence of disasters here and the resulting economic imbalance, human and ecological disorders, and hindrances to economic development are the biggest obstacles.

Takes disasters are processes occurring exclusively by nature that are not possible to stop by humans, but with caution and early warning, victory can be achieved to some extent, for which the physical conditions and ecosystem of Uttarakhand are suitable. The need to work with an environment-friendly spirit by adjusting to it is felt in the present scenario. Friendly behaviour towards the environment will prevent the loss of life, property, and wealth due to the geographical conditions of the state of Uttarakhand and the human communities here. The immense loss being caused in the Himalayan regions due to the development of unplanned action plans for the environment by many environmentalists, geologists, and local citizens for a long time is a sign of some big wound in the future, the proof of which is visible to us. Natural disasters have been happening in Uttarakhand for a long time, and there are chances of them becoming more sensitive. To reduce these, policymakers and citizens of the state need to be aware and work according to the physical conditions of the state. This will reduce disaster frequencies along with environmental protection.

16.5 GLOSSARY

Tectonic:	The Indian Plate is the huge solid land mass of the Indian Peninsula.
Earthquake:	Vibrations on the earth's surface caused by human and natural forces
Landslide:	The process of displacement or breaking of a land mass from its place as a result of the force of gravity and steep slope is called landslide.
Flood:	Water logging occurring rapidly in plain areas is called a flood.
Forest fire:	A massive fire that breaks out in forests due to a combination of natural and human factors is known as a forest fire.
Extreme rain:	Intense rainfall over a limited period
Avalanche:	Process of iceberg breaking in high Himalayan regions
Cloud burst:	The tendency for excessive rainfall to occur at one place in mountainous and valley areas.
Minimization:	Movement occurs on the earth's surface due to forces generated in the earth's internal structure.

Planning for long-term disaster impact control

Central Fault Rift (M.CT)	The fault line separating the Great Himalaya and the Lesser Himalaya
Main Boundary Thirst (MBT)	The fault line separating the Lesser Himalaya and the Shivalik Himalaya
Himalayan Frontal Fault (HFF)	The Himalayan frontal fault line separates the Shivalik and Bhabar plains:
Stakeholders:	A section of the local community that cooperates during a disaster
Boulder:	Big stones slipped from the mountain slope during the process of the landslide.
Re-infrastructure:	The process of reconstructing destroyed cultural landscapes in disaster-stricken areas
Chorabari Glacier:	Lake and glacier breaking during the Kedarnath tragedy

ISRO:	Indian Space Research Organisation The main government institution carrying out research and other work in space
Malpa landslide:	In the year 1998, there was a landslide at midnight in a place called Malpa in Pithoragarh district, due to which the entire village was buried under the debris.
Dadi-Kathi's ka God ma:	A film to create awareness about earthquakes

16.6 ANSWER TO THE CHECK YOUR PROGRESS

Question 1: Are the new Himalayan mountain structures and unplanned construction working the reason for the abundance of disasters in Uttarakhand?

Question 2: Chamoli, Rudraprayag, Almora, Bageshwar, and Pithoragarh fall in seismic zone number 4.

Question 3: The state of Uttarakhand has a disaster relief action plan for the years 2015–2030 based on the SEDA framework.

Question-4 Seismic waves are mainly divided into three types.

Question 5: M.B. The full name of T. is Main Boundary Rift.

Question 6: Uttarakhand's biggest seismic natural disaster occurred in Chamoli district in 1999.

Question 7: There were about 60 landslide disasters in Uttarakhand from 1970 to 2002.

Question-8 Kedarnath disaster occurred on June 16–17, 2013.

Question 9: Goina Lake was formed by a landslide in Chamoli district in 1868.

Question 10: On average, 4.056 hectares of forest area get burned every day due to forest fires in Uttarakhand.

Question- 11 In Uttarakhand, it mainly occurs in Udham Singh Nagar and Haridwar districts.

16.7 REFERENCES

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13.7 TERMINAL QUESTIONS

Long Answer Questions

1. Explain in detail the scenarios of disasters occurring in the state of Uttarakhand by describing the incidence of various disasters.
2. Discuss the efforts being made for the management of disasters in the state of Uttarakhand.

Short-answer Questions

1. What are the main factors of disasters occurring in Uttarakhand?
2. What are the major disasters occurring in Uttarakhand?
3. Why do landslides occur?
4. Briefly describe a Malpa landslide.
5. What do you understand by the Kedarnath tragedy?
6. Describe the Joshimath landslide or landslide of 2023.
7. Write about the forest fire in the forests of Uttarakhand.
8. What is a cloud burst? Describe the cloudburst that occurred in Uttarakhand.
9. What is the contribution of human intervention to the disasters occurring in Uttarakhand?
10. Describe the measures adopted in the disaster management system in Uttarakhand
11. What is the SEDA framework of Uttarakhand?
12. Describe the earthquakes that occurred in Uttarakhand.

Multiple-choice Questions

Question 1: On average, at what depth is the origin centre of earthquakes occurring in Uttarakhand considered to be?

a) 20–40 kilometres
b) 2 20–30 kilometres
c) 3. 25–30 kilometres
d) 4. 30–40 kilometres

Question 2: In which earthquake zone is Uttarakhand included?

a) Seismic Zone 3–4

b) Seismic Zones 4–5

c) Seismic Zones 1–2

d) Seismic Zone 2–3

Question 3: Where is the Main Border Fault (MBT) located?

a) Between the Great Himalaya and the Lesser Himalaya

b) Between Tibet and the Great Himalayas

c) Between the Lesser and Shivalik Himalayas

d) Between Shivalik and Bhabar

Question 4: The Kedarnath disaster was caused by the rupture of which lake?

a) Lokatat Lake

b) Chorabadi Lake

c) Satopatha Lake

d) None of the above

Question 5: When did the Malpa landslide incident occur?

a) year 1899

b) years ago, 1999

c) years 1998

4c) years 2000

Question 6: When did the Tapovan Rishiga seasonal flood incident occur?

a) February 2021

b) February 7, 2022

c) February 8, 2023

d) February 2023

Question No. 7: At what altitude in the Himalayan regions do avalanche disasters usually occur?

a) Altitude greater than 2500 metres

b) Altitude greater than 3000 metres

c) Altitude greater than 4000 metres

d) Altitude greater than 5000 metres

Question 8: Which is the oldest hydropower project in Uttarakhand?

a) Pancheshwar Hydroelectric Project

b) Sog Dam Hydroelectric Project

c) Glogi Hydroelectric Project

d) Tehri Hydroelectric Project

Question 9: Which country's model has been adopted to deal with disasters in the state?

a) Japan

b) America

c) Australia

d) Russia

Question 10: How much relief can be provided by the District Magistrate from the Disaster Relief Fund?

a) lakh

b) 50 thousand

c) 25 thousand

d) 2 lakhs

Question 11: When was the State Disaster Reserve Force established?

a) July 2014

b) July 2, 2015

c) July 2016

d) July 2013

Question 12: To avoid disaster on the river banks, how much distance should the state government cover has there been a ban on construction work?

a) 100 metres

b) 200 metres

c) 3300 meters

d) 3500 meters

Answer- **1-c 2-b 3-c 4-b 5-c 6-b 7-b 8-c 9-c 10-b 11-d 12-b**

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