Toppersnotes
Unleash the topper in you

UPSC – CSE

Civil Services Examinations

Union Public Service Commission

General Studies

Paper 3 – Volume - 4

DISASTER MANAGEMENT AND INTERNAL SECURITY

SIERRA INNOVATIONS

UPSC CSE – IAS

G.S. PAPER – 3 VOLUME – 4

DISASTER MANAGEMENT

S.No.	Chapter Name	Page No.
1.	**Basics of Disaster** • Crisis • Hazard • Disaster • Vulnerability • Risk	1

2.	**Disaster Management**
	• Need for Disaster Management
	• Disaster management life-cycle
	• Role of different actors in Disaster Management
	  ○ Community
	  ○ Media
	  ○ Private Sector
	• Role of Technology in Disaster Management
	  ○ Important Technologies in the field of Disaster Management and their usage
	  ○ Aerial Robotics -
	  ○ Modern Cameras
	  ○ Modern Communication
	  ○ Big Data and Disaster Management
		5

3.	**International Cooperation** • World Conference on Disaster Risk Reduction • First World Conference on Natural Disasters in Yokohama, Japan, 1994 • Second World Conference on Disaster Reduction in Kobe, 2005 • 2015 Third UN World Conference on Disaster Risk Reduction (WCDRR) in Sendai ○ Sendai Framework for Disaster Risk Reduction 2015-2030 • United Nations Office for Disaster Risk Reduction (UNDRR / UNISDR) • Global Assessment Report on Disaster Risk Reduction (GAR) • Global Facility for Disaster Reduction and Recovery (GFDRR) • Asian Disaster Reduction Centre (ADRC) • Asian Disaster Preparedness Center (ADPC) • Regional integrated multihazard early warning system (RIMES) • International Training Centre for Operational Oceanography (ITCOocean) • Activities under INCOIS • SAARC Disaster Management Centre • Sustainable Development Goals (SDGs) with target related to Disaster Risk • Paris Agreement at CoP 21 • Asian Ministerial Conference on Disaster Risk Reduction • Global Platform for Disaster Risk Reduction • United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA)	14

4. Disaster Management in India **19**

- Need for Disaster Management in India
- History of Disaster Management in India
- Institutional framework at National Level
  - Disaster Management Division, Ministry of Home Affairs:
  - National Executive Committee (NEC)
  - National Disaster Management Authority
  - National Institute of Disaster Management (NIDM)
  - National Disaster Response Force (NDRF)
  - Cabinet Committee on Security (CCS)
  - National Crisis Management Committee (NCMC)
  - National Platform for Disaster Risk Reduction (NPDRR)
  - National Centre for Medium Range Weather Forecasting (NCMRWF)
- Institutional framework at State Level
  - State Disaster Management Authority
  - State Executive Committee
  - State Disaster Response Force (SDRF)
- District and Local Level Authorities
  - District Disaster Management Authority (DDMA)
  - Local Authorities
- Financial Institutions for Disaster Management
  - National Disaster Response Fund (NDRF)
  - State Disaster Response Fund (SDRF)
  - Prime Minister's National Relief Fund (PMNRF)
  - National Disaster Response Reserve
  - PM - CARES Fund
- National Policies & Initiatives
  - National Disaster Management Act, 2005
  - National Policy on Disaster Management (NPDM), 2009
  - National Disaster Management Plan (NDMP)
- Disaster Resilient Infrastructure
  - Structural and nonstructural measures in disaster resilient infrastructure
  - Aspects in Disaster Resilient Infrastructure
  - Coalition for Disaster Resilient Infrastructure (CDRI)
  - NDMA Guidelines on Minimum Standards of Relief Infrastructure
- Community-Based Disaster Risk Management (CBDRM) in India
- Disability Inclusive Disaster Risk Reduction
  - United Nations Convention on the Rights of Persons with Disabilities
  - National Disaster Management Guidelines on Disability Inclusive Disaster Risk Reduction
- Disasters and Vulnerability of women
- Disasters and Animals
- National Disaster Plan for Animals

5. Natural Disasters in India **35**

- India: Vulnerability Profile
- Earthquakes
  - Types of Earthquake
  - Measurement of Earthquakes
  - Seismic Zones of the country
  - Impacts of earthquakes
  - Earthquakes Management Cycle

    - Government Efforts:
    - Current Developments
- Landslides
    - Landslide vulnerability Zones in India
    - Causes of landslides
    - Impact of landslides
    - Landslides Management Cycle
    - Government Efforts to Mitigate Landslides
- Avalanche
    - Types of Avalanches
    - Features of avalanches:
    - Causes of Avalanche
    - Avalanche Management Cycle
    - Snow and Avalanche Study Establishment (SASE)
- Glacial Lake Outburst Flood
    - GLOF Management Cycle
    - NDMA Guidelines on Risk Reduction
- Tsunami
    - Tsunami prone areas in India
    - Causes of tsunami
    - Impacts of Tsunami
    - Actions undertaken to deal with the tsunami
    - Tsunami Management Cycle
    - NDMA Guidelines on the management of Tsunamis
    - Current developments
- Meteorological Disasters
    - Cyclonic Storms
    - Classification of Tropical Cyclones
    - Distribution of Cyclones in India
    - How are Cyclones named?
    - Cyclone Mitigation as proposed by the UN-HABITAT
    - Cyclone Management Cycle
    - Government Measures
    - Tornadoes
    - Thunderstorms
    - Blizzards
    - Hailstorms
    - Lightning: A Disaster
    - Government safety guidelines to reduce the lightning impact
    - Flood
    - Types of Floods
    - Characteristics of flood
    - Causes of Floods
    - Flood prone areas in India
    - Consequences of floods
    - Flood Management Cycle
    - Government Efforts
    - Urban Flood:
    - Urban Flood Management Cycle
    - Government Efforts
    - Drought

- Drought Prone Area Delineation Criteria
- Gradation of Drought Prone Areas
- Key Variables for Monitoring Drought
- Drought Declaration by IMD
- Types of Drought
- Causes of Recurring Drought in India
- Impacts of Drought
- Drought Management Cycle
- Institutions for Drought Monitoring
- NDMA Guidelines about Drought Management
- Drought Management Manual 2016
- Extreme Weather
- Wildfires
- Types of wildland fires
- Forest fire distribution in india
- Effective Forest Management
- Forest Fire Management Cycle
- Government Efforts
- Heat Waves
- Causes of Heat Wave
- Impact of Heat Waves
- Management Cycle of Heat Waves
- NDMA guidelines
- Heat-wave Action Plan

6. Man-Made Disasters in India **79**

- Chemical Disaster
  - State of Chemical Disaster Risk in India
  - Factors causing Chemical Disasters
  - Chemical Terrorism
  - Types of Chemical Agents
  - Laws to Protect Against Chemical Disasters in India
  - Important Rules to prevent Chemical Disasters in India
  - ILO Recommendations
  - Steps to avoid such disasters
  - NDMA Guidelines for Chemical Disasters
  - Precautions to be taken during and after Accidents
  - General Precautions During Normal Time
- Nuclear Disaster
  - Institutional Mechanism
  - Nuclear Emergency Management Cycle
  - International Atomic Energy Agency (IAEA)
- Biological disasters
  - Classifications of Biological Disasters
  - Biowarfare
  - Bioterrorism
  - Bioweapon
  - Biomonitoring
  - Laws related to Biological Disaster in India
  - Prevention of Biological Hazards
  - Institutional Framework
  - Operational Framework
  - NDMA Guidelines on Management of Biological Disasters

- Desert Locusts
  - Favourable conditions for locusts attacks
  - Control Measures
- Oil Spills
  - Consequences:
  - Cleanup of Oil Spill:
  - National Oil Spill Disaster Contingency Plan
- Transport Accidents
  - Road Accidents Disasters:
  - Government Efforts
  - Supreme Court directions to ensure Road Safety
  - Aviation accidents:
  - Rail Accidents:
  - Maritime Disaster:
  - Transportation Disaster Management Cycle
- War & Armed Conflict induced disasters

7. Major Disasters **96**

INTERNAL SECURITY

S.No.	Chapter Name	Page No.
1.	**Security**	**99**

- National Security
  - Types of Threats
  - Global Challenges to Security
- Non-Traditional Security Issues
- Role of External State and Non-State Actors
  - Challenges posed by External State Actors
  - Challenges posed by Non-State Actors
- Internal Security
  - Aspects of Internal Security
  - Factors of Internal Threats
  - Internal Security Challenges
  - Government Initiatives
- Actors Responsible for Internal Security in India
  - Ministry of Home Affairs (MHA)
  - Assam Rifles (AF)
  - Border Security Force (BSF)
  - Central Industrial Security Force (CISF)
  - Central Reserve Police Force (CRPF)
  - Indo Tibetan Border Police (ITBP)
  - National Security Guard (NSG)
  - Sashastra Seema Bal (SSB)
  - National Investigating Agency (NIA)

2. Indian Borders and their Management **105**

- Geographical extent of India
- Features of Indian Borders
- Major Borders of India
  - India-Pakistan Border
  - India China Border

- India-Nepal Border
- India-Bangladesh Border
- India-Myanmar Border
- India-Bhutan Border

- Border Management
  - Issues Related to Border Management
  - Role of Technology in Border Management
  - Technology Deployment Challenges in Border Areas
  - Future Aspects
- Border Infrastructure
  - Need for Border Infrastructure
  - Limitation in Development of Border Infrastructure
  - Government Initiatives
- Border Area Development Programme (BADP)
  - Components of BADP
  - Policing Power to Central Armed Police Forces (CAPFs)

3. Coastal and Maritime Security **116**

- Coastal Security
  - Significance of COastal Security for India
  - Evolution of COastal Security Architecture
  - Issues in Existing Architecture
  - Ways to fill Gaps in Existing Architecture
- Maritime Security
  - Elements of Maritime Security
  - Need for Maritime Security
  - Importance of Maritime Security
  - Agencies and Institutions of Maritime Security

4. Terrorism **119**

- Types of Terrorism
  - Ideology Oriented Terrorism
  - Ethno-Nationalist Terrorism
  - Religious Terrorism
  - Narco-Terrorism
  - Environmental Terrorism
  - External State-Sponsored Terrorism
  - By Non-State Actors
- Causes of Terrorism
- Terrorism in India
  - Major Terror Attacks in India
- India’s Strategy to Counter-Terrorism
  - India’s Counter-Terrorism Measures
- Terror Financing
  - Sources
  - Government’s steps to curb Terror Financing
- Government Initiatives to Curb Terrorism
  - Legislative Measures
    - Indian Penal Code of 1860
    - Terrorist and Disruptive Activities (Prevention) Act (TADA)
    - Prevention of Terrorism Act (POTA)
    - Unlawful Activities (Prevention) Act (UAPA)
    - National Investigation Agency (NIA) (Amendment) Act, 2019

- Institutional Initiatives
  - Anti-Terrorism Squad
  - National Intelligence Grid (NATGRID)
  - Counter Insurgency and Anti-Terrorist Guard Schools
- Bio-Terrorism

5. Left-wing Extremism **126**

- Naxalbari Movement
- Evolution of LWE
- Role of State and Non-State Actors
- Current Situation
- Strategy of Naxalite Movement
  - Recruitment of Naxals
  - Front Organisations and Urban Presence
- Reasons for Left WIng Extremism
- Impact of LWE
- Government Initiatives
- Issues in Handling LWE
- Reasons for Extremism in Eastern India
- Reasons for Extremism in North East India
- Reasons for Extremism in South India
- Solution for Tackling Extremism

6. Insurgency in North East **131**

- Categories of Conflicts
  - Root Cause of Insurgency
- Historical Background of Northeast
- Significance of Maintaining Peace in North East
- Formation of Rebel Groups
  - Demands of various Extremist Outfits
- Armed Forces (Special Powers) Act (AFSPA), 1958
- Peace Accords
  - Nine Point Agreement (1947)
  - Sixteen Point Agreement (1960)
  - Shillong Accord (1975)
  - Assam Accord (1985)
  - Naga Peace Accord (2015)
- Role of Neighbours
- Government Initiatives
  - Constitutional Provisions
  - Ministry of Development of North Eastern Region (DoNER)
  - Inner Line Permit (|ILP)

7. Insurgency in J&K **137**

- History of Kashmir
  - Kashmir on the Eve of Independence
  - Main Divison of State
  - Accession of Jammu and Kashmir
  - State Assembly of Jammu and Kashmir
  - Article 370
- Proxy war and Kashmir
  - Adaptation of irregular warfare by ISI
  - Mechanism used for Proxy War in J&K
- Kashmir and Human Rights

- Issues in the News
- Government Initiatives

8. Organised Crime **139**

- Activities under Organised Crimes
- Factors Responsible
- Causes
- Types of Organised Crimes
- Challenges
- Linkages between Organised Crime and Terrorism
- Government Initiatives

9. Radicalisation **14**

- Factors Behind Radicalisation
- Forms of Radicalism
- Steps to Tackle Radicalism
- Recent Developments
- Digital Radicalisation

10. Communalism and Communal Violence **145**

- Nature of the Problem
- Constitutional and Legal Provisions
- Factors Causing Communal VIolence
- Measures to Deal with Communal Violence
  - Preventive Measures
  - Measures when an Outbreak of Violence is anticipated
  - Measures during Violence
  - Post Violence Meausres
- Major Communal Violence Incidents in India
- Impact of Communal Violence
- Government's Initiatives

11. Regionalism in India **150**

- History of Regional Movements in India
- Types of Regional Movements
  - Secessionism
  - Inter-State Dispute
  - Parochialism
  - Regionalism
- Reasons behind Growth of Regionalism
- Impact of Regionalism
- Regionalism Threat to National Unity and Integrity
- Regionalism vs. Nationalism
- Suggestions to Tackle Regionalism

12. Cyber Security **153**

- Key Terms
- Importance of Cyberspace
- Cybersecurity in India
- Types of Cyber Attacks
- Components of Cyber Security
- Need for Cybersecurity
- Critical Information Infrastructure (CII)
- Cyber Terrorism
- Government's Initiatives to Strengthen India's Cybersecurity

- Institutional Measures
- Legislative Measures
  - Information Technology Act, 2000
  - National Cyber Policy, 2013
  - National Cyber Security Strategy, 2020

- International Initiatives for Cyber Security
  - Internet Governance Forum (IGF)
  - Internet Corporation for Assigned Names and Numbers (ICANN)
  - International Telecommunication Union (ITU)
  - Budapest Convention on Cybercrime
  - Ground Zero Summit
- Challenges to Cybersecurity in India
- Data Protection
- India's Initiatives
  - Information Technology Act, 2000
  - Personal Data Protection Bill, 2019
  - Information Technology (Guidelines for Intermediaries and Digital Media Ethics Code) Rules, 2021
- 5G and Cyber Security
- Artificial Intelligence and Cyber Security

13. Media and Social Media in Internal Security 160

- Role of Media in India
  - Principles to be followed by the Media
  - Media asThreat to Internal Security
- Social Media
  - Types of Social Media
  - Characteristics of Social Media
  - Dimensions of Social Media
  - Impact of Social Media on National Security
  - Threats by Social Media to Internal Security
  - Other Issues Using Social Media
- Recent Internal Security Crisis due to Media/Social Media
- Government initiatives

14. Money Laundering 163

- Forms of Money Laundering
- Techniques used in Money Laundering
- Hawala and Money Laundering
- Impacts of Money Laundering
- Government Initiatives
  - Prevention of Money Laundering Act, 2002
  - Criminial Law Amendment Ordinance (XXXVIII of 1994)
  - Smugglers and Foreign Exchange Manipulators (Forfeiture of Property) Act, 1976
  - Financial Intelligence Unit
  - Enforcement Directorate
- Global Initiatives
  - Financial Task Force
  - International Monetary Fund
  - Vienna Convention
  - 1990 Council of Europe Convention
  - International Organization of Securities Commissions (IOSCO)

- United Nations Office on Drugs and Crime

15. Police Reforms **166**

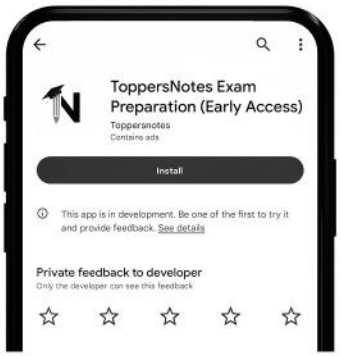
- Organizational Structure
- Evolution of Police
- Functions of Police
- Issues faced by Police
  - Issues in Existing Police Functioning
- Police Reforms
  - Core Principle of Police Reforms
  - Various Committees Established for Police Reforms
- Government Initiatives

Dear Aspirant,
Thank you for making the right decision by choosing ToppersNotes.

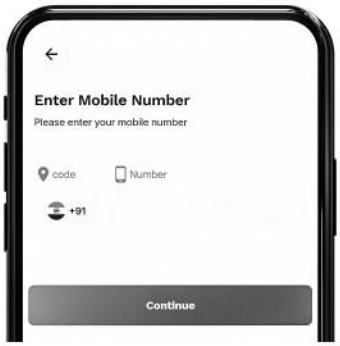
To use the QR codes in the book, Please follow the below steps :-

To install the app, scan the QR code with your mobile phone camera or Google Lens

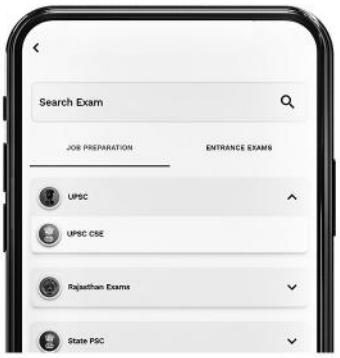
ToppersNotes Exam Prepration app



Download the app from Google play store

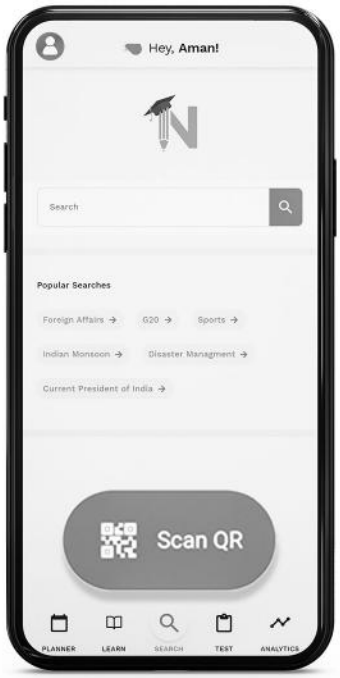


To Login **enter your phone number**



Choose your **exam**

Click on **search Button**



Click on **Scan QR**

Choose the **QR from book**

For any help,
write us at **hello@toppersnotes.com** or **whatsapp on 7665641122.**

1
CHAPTER

Basics of Disaster

Crisis

- An unstable or crucial time or state of affairs in which a decisive change is impending; especially, one with the distinct possibility of a highly undesirable outcome.
- May be defined as "an emergency situation arising out of natural or human activity which poses a threat to human life and property or leads to large scale disruption of normal life".

 # Crisis can be classified as follows:

(i) **By acts of nature-**
- **Climatic events:** cyclones and storms (associated sea erosion), floods and drought
- **Geological events:** earthquakes, tsunamis, landslides and avalanches

(ii) **By environmental degradation** and disturbance of the ecological balance

(iii) **By accidents** which can be further classified into: industrial and nuclear mishaps and fire related accidents;

(iv) **By biological activities:** public health crises, epidemics etc;

(v) **By hostile elements:** war, terrorism, extremism, insurgency etc;

(vi) **By disruption/failure of major infrastructure** facilities including communication systems, large-scale strikes etc; and

(vii) **By large crowds getting out of control**.

Hazard

- A dangerous condition or event that threatens or has the potential for causing injury to life or damage to property or the environment
- A potential source of harm.
- Substances, events, or circumstances can constitute hazards when their nature would allow them, even just theoretically, to cause damage to health, life, property, or any other interest of value.

Disaster

The **United Nations Office for Disaster Risk Reduction (UNISDR)** defines disaster as:

- "A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources."
- The **UNISDR** definition provides three important components of a disaster:
  - **Firstly**, there should be **serious disruption or abnormality in life of people**;
  - **Secondly**, the **community cannot deal with the consequences on its own** and;
  - **Lastly**, the consequences of the **event must be faced by a 'community'**, i.e., a group of people.

The **Disaster Management Act of India** defines disaster as, "A catastrophe, mishap, calamity or grave occurrence in any area arising from natural or man-made causes or by accident or negligence, which results in substantial loss of life or human suffering or damage to and destruction of property or damage to, or degradation of environment and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area.

Thus, a disaster is the result of the combination of hazard, vulnerability and insufficient capacity to reduce the potential chances of risk.

 # Difference between Disaster and Hazard:

	Disaster	Hazard
Definition	Disaster is an event that occurs suddenly/ unexpectedly in most cases and disrupts the normal course of life in affected areas. It results in loss or damage to life, property or environment. This loss is beyond the coping capacity of the local affected population/society. And therefore requires external help.	Hazard is a threat that has potential for causing injury/ loss of life or damage to property/environment.
Occurrence	in overpopulated areas	places with less population
Severity	Critical consequences and more catastrophic	Severity of a hazard is low compared to a disaster- less critical consequences.

Avoidance	Can be prevented	May be inevitable
Similarities	Both occur unexpectedly with little or no warning, produce negative effects, and require immediate response.	

Classification of Disasters

- **As per origin** - Natural and man-made disasters
- **As per impacts** - Minor or Major
- **Natural disasters -**
  - sudden ecological disruptions or threats
  - exceed the adjustment capacity of the affected community and require external assistance.
  - Natural disasters can be broadly classified into categories including -
    - **geophysical** - earthquakes and volcanic eruptions;
    - **hydrological** - floods;
    - **meteorological** - hurricanes;
    - **climatological** - heat and cold waves and droughts; and
    - **biological** - epidemics.
- **Man-made disasters -** can include hazardous material spills, fires, groundwater contamination, transportation accidents, structure failures, mining accidents, explosions and acts of terrorism.
- Hazards are also distinguished on the basis of timing:
  - **Slow Onset Disasters:**
    - develop over a long period of time.
    - can be predicted by early warning systems.
    - Examples - Climate change, global warming, droughts, desertification, Soil degradation, etc.
  - **Rapid Onset Disasters:**
    - appear suddenly without early warnings.
    - Examples - fires, flash floods, cloudburst, volcanic eruptions, earthquakes, etc.

Vulnerability

- Means the inability (of a system or a unit) to withstand the effects of a hostile environment.
- It signifies the extent of exposure of the people to suffer damage due to hazards.
- According to **UNISDR** Vulnerability is "a set of prevailing or consequential conditions arising from various physical, social, economic and environmental factors, which increase the susceptibility of a community to the impact of hazards".

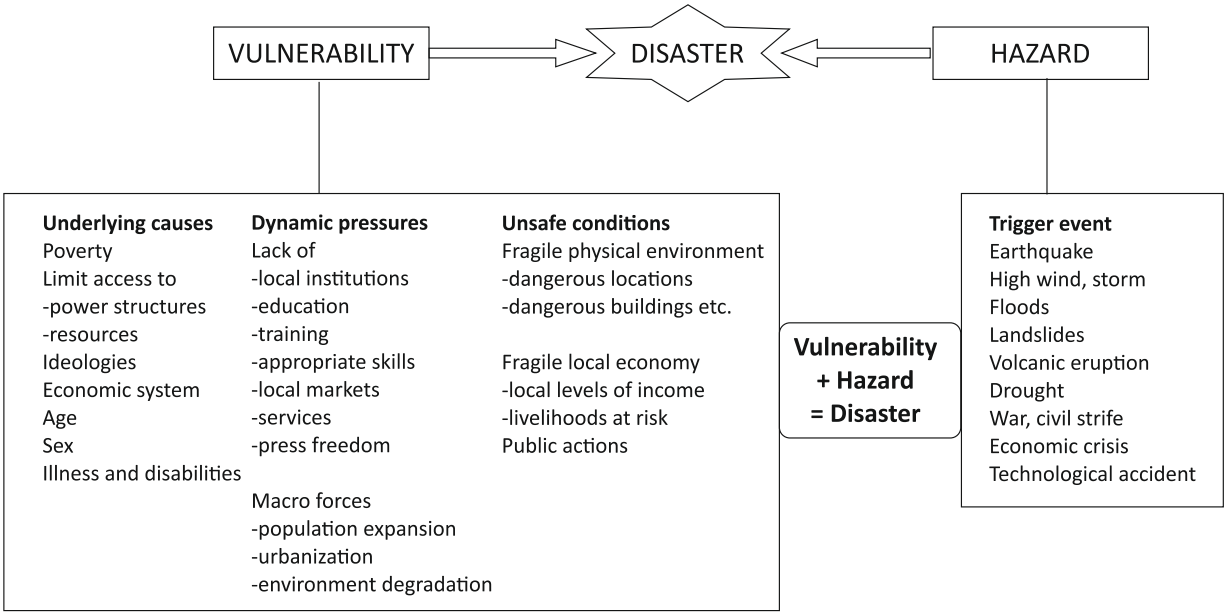
  Vulnerability = (Exposure) + (Resistance) + (Resilience)

  Where, Exposure: at risk property and population;
  Resistance: Measures taken to prevent, avoid or reduce loss;
  Resilience: Ability to recover prior state or achieve desired post-disaster state.
- **Factors Responsible for Increased Vulnerability**
  - **Natural Factors:** Geo-Climatic Conditions, Topographic features
  - **Human-Induced Factors:** Population growth, urbanization, industrialization, non scientific development practices

 # Types of Vulnerability:

	Physical Vulnerability	**Social Vulnerability**	**Economic Vulnerability**	**Environmental Vulnerability**
Meaning	Potential impact on the Physical Environment	Potential impact on society especially vulnerable sections	Potential impact on economic assets and processes	Potential impact on biosphere
Direct Losses	● Infrastructural damage	● Fatalities and injuries ● Loss of Employment ● Homelessness ● Women, children, elderly and specially abled persons at higher risk	● Interrupted economic activities ● Loss of productive human capital ● Economic burden of response and relief	● Sedimentation and Pollution ● Destruction of ecological zones
Indirect Losses	● deterioration of damaged infrastructure in the absence of repair and maintenance	● Disease Spread ● Permanent disability ● Low social cohesion	● Increased inflation, unemployment and poverty ● Lower investments ● Reduced Service sector activities ● Burdened Insurance sector	● Loss of Biodiversity

A Disaster occurs when hazards and vulnerability meet

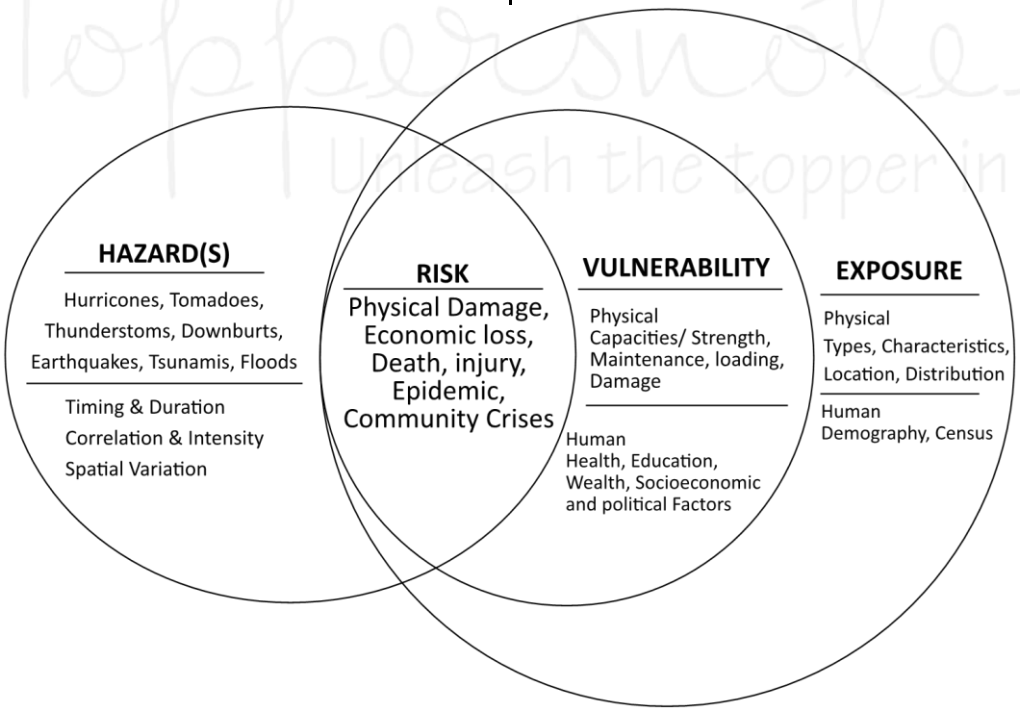


Risk

Risk is a "measure of the expected losses due to a hazard event occurring in a given area over a specific time period. Risk is a function of the probability of a particular hazardous event and the losses each would cause."

The terms "hazard" and "risk" are often used interchangeably. However, in terms of risk assessment, these are two very distinct terms.

- **A hazard is an agent that can cause harm** or damage to humans, property, or the environment.
- **Risk is the probability** that exposure to a hazard will lead to a negative consequence, or more simply, a hazard poses no risk if there is no exposure to that hazard.



Risk = Hazard * Vulnerability * Capacity to Cope

- The **risk** of a disaster **increases** when **as the frequency or severity of hazards increases, people's vulnerability increases, and people's capacity to cope decreases**.

- Here **Capacity to cope** means ability of people, organizations and systems, to use available skills and resources, to manage adverse conditions, risk or disasters.

Global Climate Risk Index, 2021

- Released annually by **Germanwatch**
- Analyses the **extent of impacts** of weather-related loss events (storms, floods, heat waves etc.).
- **Quantitative Analysis** in terms of fatalities and impact of extreme weather events
- Aims at contextualising ongoing climate policy debates, especially the International climate negotiations
- **Four Indicators:** Death toll, deaths per 100000 inhabitants, absolute losses in PPP and losses per GDP unit

Highlights of the Report:

- **Most Affected Countries in 2019:** Mozambique, Zimbabwe and the Bahamas
- **Most affected countries between 2000 and 2019:** Puerto Rico, Myanmar and Haiti
- **Loss between 2000 and 2019:** 11000 extreme weather events occurred across globe; 475000 people lost their lives and economic loss: around US$2.56 trillion (in purchasing power parties)
- **Storms and cyclones** were one of the major causes of damages in 2019. Of the ten most affected countries, six were hit by tropical cyclones
- **Climate change and extreme weather events cause the most distress** to the countries which are still developing and have a lower coping capacity. Eight out of the ten most affected belong to the low to lower-middle-income category

India's Status on the Report:

- India **ranked 7th** with a **CRI score of 16.67**.
- In 2019, the **extended period of monsoon** resulted into floods leading to death: 1800 people across 14 states; migration: 1.8 million people; economic loss: US$10 billion
- **Eight tropical cyclones** hit the country in 2019; **worst:** *"Cyclone Fani"* which affected 28 million people, economic losses of US$8.1 billion

Global Risk Report, 2021

- Released by World Economic Forum (WEF)
- **Aim:** To highlight the risks and consequences of widening inequalities and increasing societal fragmentation, due to the COVID-19 pandemic, in 2021 and over the next decade.

Key Highlights of the Report:

Top Risks by likelihood	Top Risks by impact
1. Extreme weather	1. Infectious disease
2. Climate action failure	2. Climate action failure
3. Human environmental diagram	3. Weapons of mass destruction
4. Infectious disease	4. Biodiversity loss
5. Biodiversity loss	5. Natural resource crises
6. Digital power concentration	6. Human environmental damage
7. Digital inequality	7. Livelihood crises
8. Interstate relations fracture	8. Extreme weather
9. Cybersecurity failure	9. Debt Crises
10. Livelihood crises	10. IT infrastructure breakdown

- **Impact of Covid-19:** huge immediate human and economic cost; increasing global poverty and inequality; reduced social cohesion and global cooperation
- **Climate concerns:** The report has described these threats as an existential threat to humanity.
- **Widening digital gaps:** Accelerated Digitalization has resulted in widening the digital gap between individuals and across countries and aggravating existing inequalities, polarization, and regulatory uncertainties.
- **Intensifying pressures on businesses:** Businesses under increasing pressures from inward-looking national agendas, greater market concentration, and popular scrutiny and volatility.

Recommendations:

- **Formulating analytical frameworks** that take a holistic and systems-based view of risk impacts.
- **Investing in high-profile risk champions** to encourage national leadership and international cooperation.
- **Improving risk communications** and combating misinformation.
- **Exploring new forms of public-private partnership** on risk preparedness.

2 CHAPTER

Disaster Management

Disaster Management

is defined as an integrated process of planning, organizing, coordinating, and implementing measures that are necessary for-

1. Preventing occurrence of any disaster
2. Reducing the risk of any disaster or its consequences
3. Readiness to face any disaster
4. Promptness while dealing with a disaster
5. Assessing the severity of any disaster
6. Rescue and relief measures adopted
7. Rehabilitation and Reconstruction of affected population and infrastructure

Need for Disaster Management

- As per the Institute for Economics and Peace between 1900 and 2019 the **number of disasters increased** from 39 incidents in 1960 to 396 in 2019.
- **Cost of addressing damage** caused by natural disasters **has risen** from US$50 billion per year in the 1980s to US$ 200 billion per year in the last decade.
- As per **World Meteorological Organization (WMO)** weather, climate or water hazards have occurred every day on average over the past 50 years – **killing 115 people and causing US$ 202 million in losses daily**.
- **Poor bear the brunt:** According to the **World Bank's** *Disaster risk management report*, more than 95% of all deaths caused by hazards and losses due to natural hazards are 20 times greater (as a percentage of GDP) in developing countries than in industrialized countries.

Disaster Management Life-Cycle

The comprehensive approach to disaster management comprises prevention, preparedness, mitigation, response and recovery to ensure a balance between the reduction of risk and the enhancement of community resilience, while ensuring effective response and recovery capabilities.

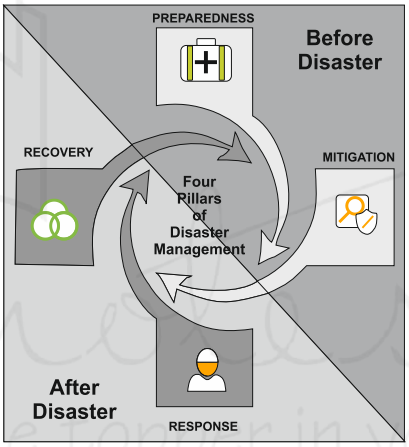


Figure : Disaster Management Cycle

	Prevention	Preparedness	Mitigation	Response	Recovery
Objective	• Ensure that human action or natural phenomena do not result in disaster or emergency • Reduce -avert- avoid the risk by getting rid of the hazard or vulnerability	• Ensure the organized mobilization of personnel, funds, equipments, and supplies within a safe environment for effective relief • Build capacities before a disaster situation prevails to reduce impacts	• Ensure long term measures for reducing or eliminating risk of a disaster.	• Set of activities implemented after the impact of a disaster in order to assess the needs, reduce the suffering, limit the spread and the consequences of the disaster, open the way to rehabilitation.	• Restore and improve, where appropriate, facilities, livelihoods and living conditions of disaster affected communities to pre-disaster levels.
Activities	• Hazard Identification • Vulnerability Assessment • Capacity building of community and implementing agencies • Early Warning (EW) that reach and are accessible to all • Public awareness • Frame inclusive disaster risk management act and policy	• Prepare database related to basic common services • Ensure effective Contingency Planning including inter alia, availability of food reserve, emergency reserve fund, seed reserve, health facilities, warning systems, logistical infrastructure, relief manual, and shelves of projects.	• Undertaking actions based on past experiences and knowledge • Mobilization of the community along with other actors like NGOs, civil society, government organizations, etc • Preparation of development plans, extensive public awareness strengthening institutional mechanisms and international cooperation.	• Rapid Needs Assessment • Resource Mobilization • Ensure responsive evacuation, search and rescue of victims including vulnerable groups • Emergency assistance including identification of needs for affected population when providing food, health care, shelter, water and sanitation , education and non-food items • Ensure safe spaces for vulnerable groups	• **Relief:** Damage and loss assessment; Integration of needs of vulnerable sections into recovery; Restore health and other social services • **Reconstruction** of destroyed and damaged housing; restoration of infrastructure, water, sanitation and communication • **Rehabilitation:** Livelihoods recovery by ensuring access to income generating programmes and employment schemes; Facilitate the recovery of property and other important documents.

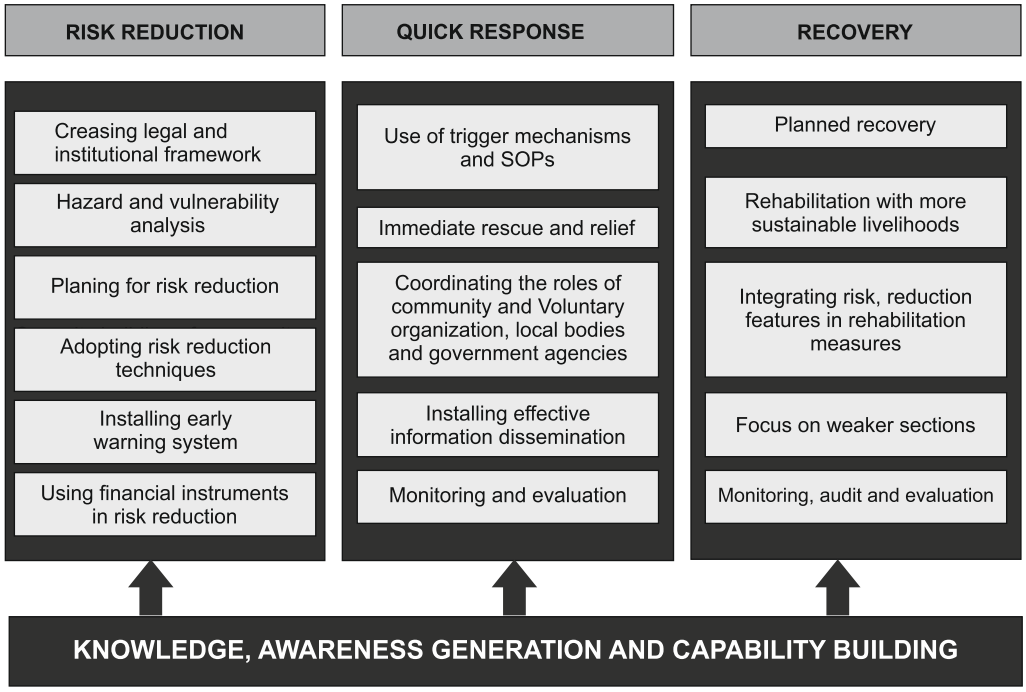


Figure : Elements of Crisis Management

Role of different actors in Disaster Management

Community

- An approach to **building the capacity of communities** to assess their vulnerability to hazards and develop strategies and resources necessary to prevent and/or mitigate the impact of identified hazards as well as respond, rehabilitate, and reconstruct following its onset.
- a **bottom-up approach**
- Empowers the community to be **proactive in disaster management** and develop strategies
- The **Great Hanshin Awaji Earthquake of 1995** hit the city of Kobe and other parts of Hyogo prefecture in **Japan** causing serious loss of life and property. **85 percent of the people were rescued** by the community efforts.
- **Elements of community involvement**: partnership, participation, empowerment and ownership by the local people
- **Community can**
    - Raise **public awareness** about disasters.
    - **Coordinate** disaster management and development activities.
    - Community **capacity building** at the social, economic and environmental levels.
    - **Educating people on how to mitigate the consequences of disasters** during relief, recovery and reduction preventive strategies periods.
    - **Providing psychological support** e.g. counseling for disaster survivors.
    - Tracking people down for **family reunions** after disasters.
    - Utilizing **interpersonal communication** for disseminating warning signals.
    - Familiar with the **local logistics, resource and coordination plans**.
    - Promoting the **needs of marginalized citizens** who are displaced or who have returned but are living in substandard conditions.

World Disaster Report 2004

- Had **'Building Community Resilience'** as its central theme.

Recommendations:

- **Systematic assessment is badly needed** to enable people to cope with, recover from and adapt to risks and adversities at household and community level
- **Strengthening social capital** should be the primary objective in relief, recovery or risk reduction; rather than a byproduct.
- **People-centred approaches** to development
- New **institutional strategies and cross-sectoral coalitions** to boost the resilience of local livelihoods in the face of multi-dimensional risks.
- **Good governance is essential** for communities to thrive.

Steps involved in CBDRM

1. **Community Preparedness-** involvement of the **community with their traditional coping mechanisms** to reduce their vulnerabilities with available resources which lead to **multi-pronged development interventions** and to a **self-reliant disaster-proof community**. Following steps can be undertaken-
   - **Community-Based Disaster Preparedness Plans (CBDP)** can be prepared where the community decides activities to prevent socio-economic losses during a disaster.
   - **Deliberation of responsibilities** amongst the members of the community on receiving a warning.
   - **Proper training** would be provided.
   - A **well acquainted community for preventive and preparedness measures** will substantially reduce the damage caused by disasters.
2. **Community Empowerment**- **Community capacity building** where goals and strategies, resources are decided and monitored by the community itself. Community empowerment demands their participation in risk assessment, mitigation planning, capacity building, participation in implementation, and development of a system for monitoring the disaster risk.
3. **Time and resource budgeting- Resource Inventory needs** to be prepared to analyze the local resources available within the community. **A well-framed timeline** needs to adhere to achieving the desired results.
4. **Convergence-** Convergence of **Government schemes and programs** implemented at the national and state level **empower communities**. **Standard forums of convergence** need to be formally created and must have **common points** like **community mobilization** and **awareness generation** and must devise **locally and culturally appropriate participation** methodologies.
5. **Gender-sensitive CBDRM-** Societies where the **socioeconomic status of women is low,** natural disasters **kill more women than men** and also at a younger age than men. The reason for this lies in the fact that women, in general, have **unequal access to opportunities and unequal exposure to risks**, making them more vulnerable to natural disasters. Several steps can be undertaken in this regard-
   - **Gender-inclusive elements** need to be included such as **gender-inclusive risk assessment and vulnerability and/or capacity analysis** and targets for women's involvement in developing risk and hazard maps.
   - **Ensure 40% of women's participation in local disaster risk management committees**
   - Support **skill-building on coping strategies** that would facilitate women and girls in disaster settings.
   - A **gender-sensitive early warning system** using communication channels that are easily understood, used, and accessible to both men and women.
   - Regular **preparedness drills** involving both women and men are to be conducted.
   - Ensuring that **women and girls have relevant documents** like identity cards and bank accounts **to access disaster response support**.
   - **Support women's organizations to organize microinsurance policies** to allow community women to protect their tools and sources of livelihood.
6. **Inclusive approach**- The **special needs of physically and mentally challenged and socially disadvantaged groups** need focused attention particularly in the aftermath of a disaster situation.

Media

Pre-disaster

- Can i**nfluence the government to prioritize Disaster Risk Issues**.
- It can **help disaster mitigation experts** create early warning systems. Emergency alerts using TV, radio, cable services across the country can be very effective.
- To **educate the community** in recognising symptoms and reporting them early if found.
- **Ensuring cooperation** of the community in risk reduction by forewarning the people about the consequences of their dangerous actions and operations.

During disaster

- **Broadcast real-time information** both for affected areas and interested people;
- **Receive real-time data** from affected areas;
- **Mobilize and coordinate** immediate relief efforts; **assist the authorities**, voluntary organizations and volunteers **in reaching the affected** with assistance and relief.
  - During the **Hudhud cyclone** that struck Visakhapatnam, PWD officials created a **WhatsApp group** that **acted as the main tool of communication** for sharing information.
- **Cautioning the affected** or to be affected people about the Dos and Don'ts, of scotching rumours and preventing panic and confusion.
  - For example, many individuals and organizations used **Twitter** in 2015 to convey critical information (helpline phone numbers, train timetables, relief counts, weather forecasts, and so on) regarding the **Chennai floods**.

- **Identifying the needy spots** and focusing attention on them, giving details on impassable roads and downed utility lines.
- Communicating the information in advance to take the necessary steps to **minimize the losses of lives and property**.
- It **provides the outside world with a glimpse** of what that affected community is dealing with.

Post-disaster

Collection of material resources and the enlisting of man-power by appealing to the people to come forward to render help.

- **Optimize recovery activities**.
- Ensure **effective and targeted** delivery of aids, identification, fundraising, etc.
- Helping the affected in **establishing contacts** with their closed ones
- Keeping a **watch and report on some anti-social elements** who try to take advantage of such situations

Negative Effects of Media

- The media **may exaggerate some elements of the disaster** and create unnecessary panic.
- **Biased coverage** for the purposes of sensationalism by choosing to capture only small incidents of devastation **leads to misreporting**.
- Can create tremendous "**congestion**" in the affected area.
- Live coverage of critical operations can **disrupt the counter-terrorism strategy** of the forces, as was observed in Mumbai 26/11 attacks.

Private Sector

- **Intersectoral collaboration** is part of the **Sendai framework for Disaster Risk Reduction 2015–2030**
- Framework advocates that the **government's responsibility to assume the leadership, regulation and coordination role** while the **public and private sectors** and civil society should collaborate and **create opportunities for collaboration, and integrate disaster risks into businesses' management practices**
- Businesses may help in **creating value in innovative social investments** in the community.
- Public-private partnership **increases the effectiveness and efficiency** of disaster management.
- **Provide immunity to governments** against the financial shocks due to disasters
- **Ensure Good Governance** by improved observance and transparency, better results with emphasis on planning and accountability during crisis.

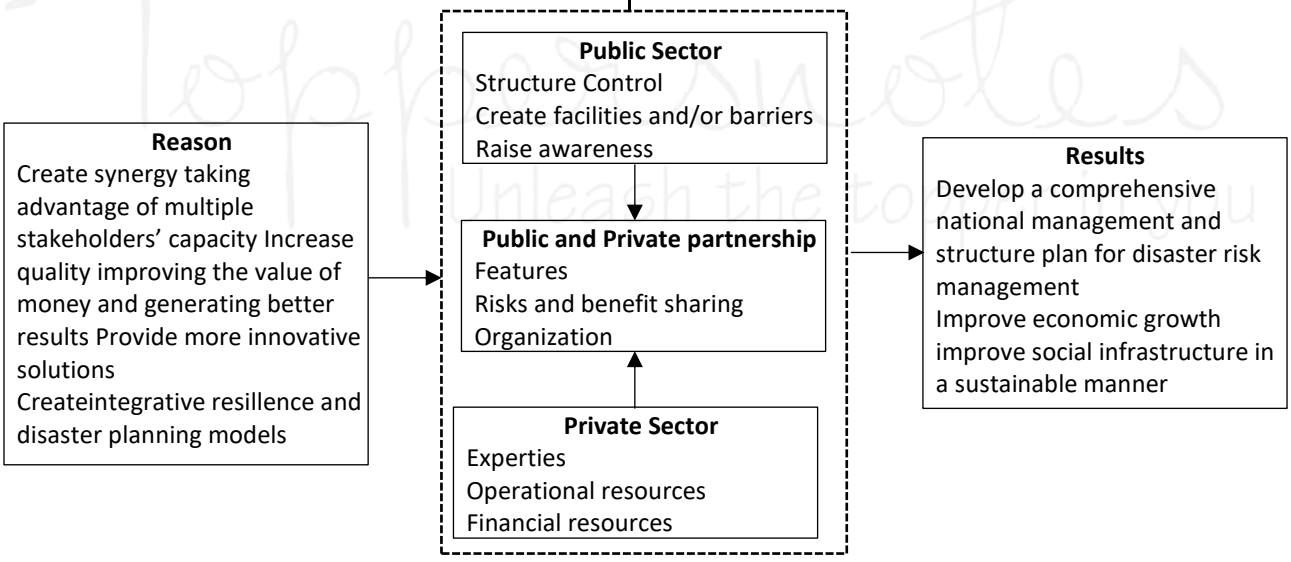


Figure : Public-Private Partnership in Disaster Management

Challenges in PPP in Disaster Management

Challenges	Solutions
Lack of mutla understanding	To specify the necessities as soon as participation channels are prede-fined so that expectations are met when and where needed.
Lack of transparency and responsibility	To agree on communication strategies to avoid conficting messages that may compromise the partnership validity.
Commitment level	To develop engagement rules that define needs in advance and that can be fulfilled by the alliance, together with protocols and guidelines to reach agreement on service level and clarify expectations of different levels and stages.

Role and Responsibilities	To determine areaas to improve skills and allow each party to focus on areasa where they can best contribute.
Relations management	To develop partnership in non-emergency period. Building relationship and getting to know each other requires significant investment from both sides.

Role of Technology in Disaster Management

Disaster management requires innovative thinking and fundamental changes like adoption of new technologies, methods, procedures, etc. for better prediction of such hazards. For example, "SATARK" (System for Assessing, Tracking, and Alerting Disaster Risk Information based on Dynamic Risk Knowledge), TNSMART, Early Warning Dissemination System, etc.

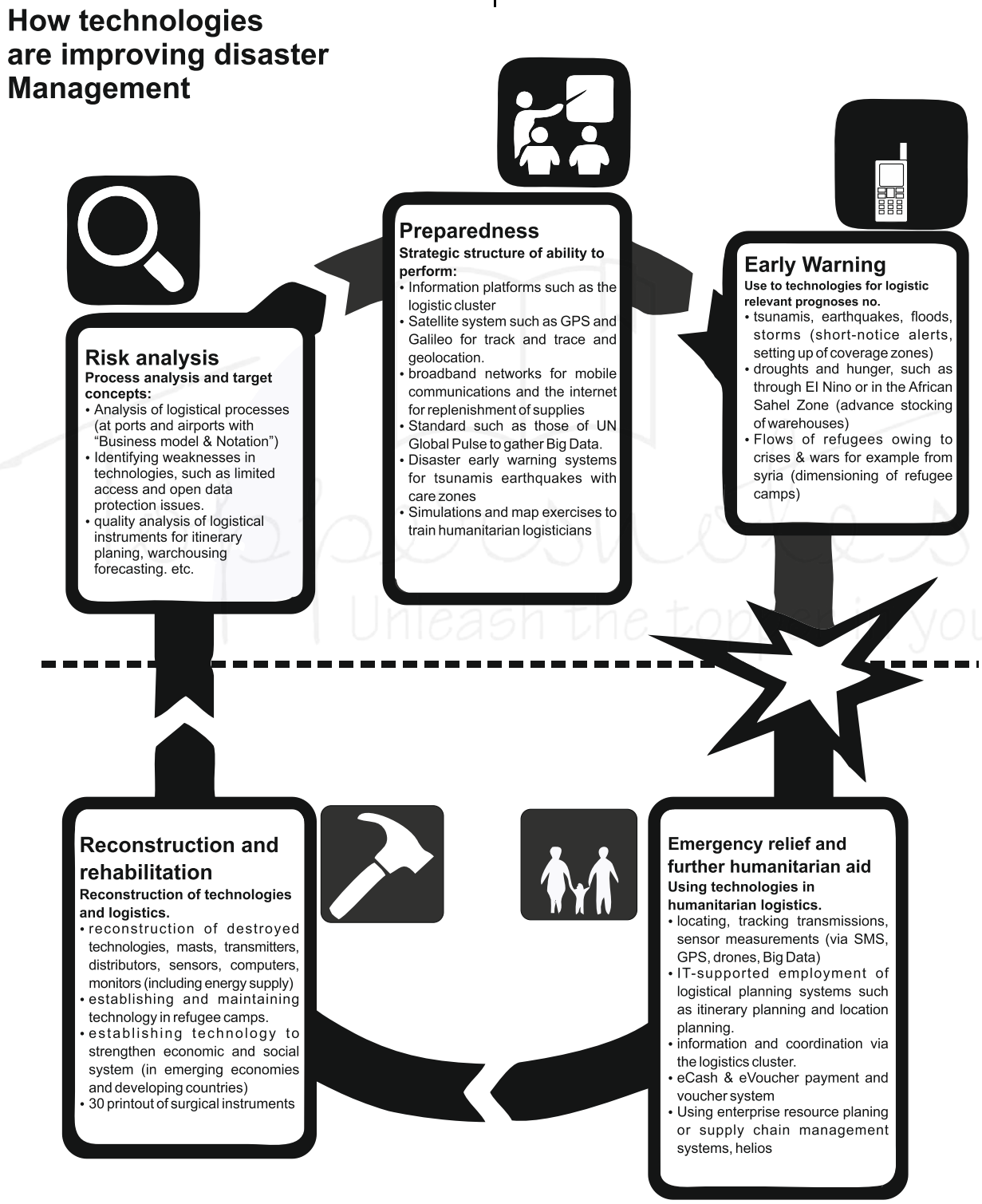


Figure : World Risk Report 2016 Report

Important Technologies in the field of Disaster Management and their usage

Aerial Robotics

- Helps organizations **effective mapping**, analyze damage in real-time, and ensure faster, cheaper and efficient delivery of services even to inaccessible places
- With infrared cameras and advanced listening systems **help in rescue missions**
- Provide **access to** locations that would otherwise be **inaccessible**.
- For example, **Drones** were used to find missing individuals and monitor the terrain during the **Uttarakhand floods of 2013**, providing authorities with vital updated information.
- potential to change **humanitarian relief**.

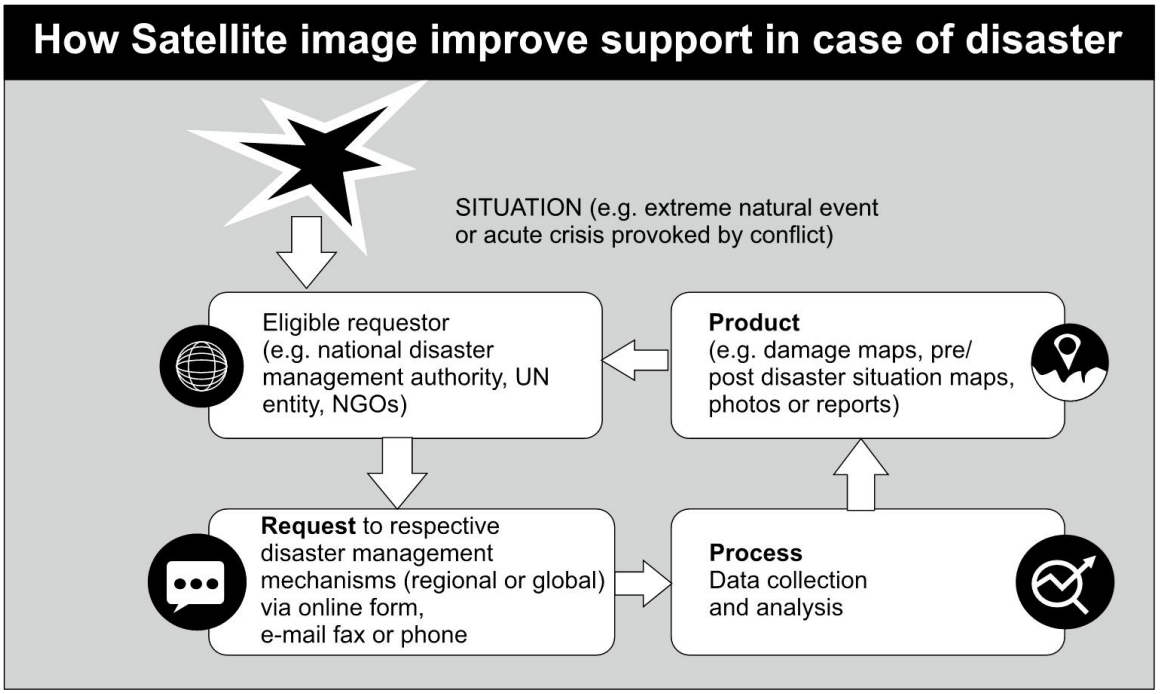
Modern Cameras

- High-definition cameras can **help in real time monitoring** of natural disasters
- Can provide a moving **alternate to satellite imagery**
- **UAVs** mounted with cameras **can be directed flexibly** with a high spatial and temporal resolution.
- Rapid-deployment cameras can **quickly track changing weather systems**.
- High resolution camera helps in **mapping the terrain** crucial for efficient disaster relief efforts
- Cameras placed at a strategic point **enable professionals to find potential danger points** before they become a serious problem during the rescue efforts.
- Infrared and night vision enabled cameras **help on locating victims**
- Deploying cameras **enables responders to find the easiest and safest path to victims**
- Gives **clearer and more focused views** which makes the rescue teams well verse with location before they move in.
- **Data and images can be collected from areas that are otherwise inaccessible**, allowing for greater information flow throughout the relief center crucial for rescue efforts.
- **Monitor relief efforts** and allow timely action whenever required.
- **Help in Efficient Planning**

Modern Communication

- **Geographic Information System (GIS):** Help planners with **quality assessments** and direct development activities, selection of mitigation measures and implementation of disaster preparedness and response plans.
- **Remote sensing:** Aid in the identification of hazardous locations, the **real-time monitoring** of the planet's changes, and the early detection of numerous imminent disasters.
- **Satellite communication:** Provides an **effective communication** channel in all weather and situations thus, ensures efficient management and mitigation

Satellites for Disaster Management Applications



A. International Efforts

- **International Charter "Space and Major Disasters"** is a venture between 17 space agencies to provide free satellite data to those affected by disasters
- **UN-SPIDER** facilitates the use of space-based technologies for disaster management and emergency response.
- **UNITAR/UNOSAT (Geneva)** provide United Nations funds, satellite analysis, training and capacity building
- **Sentinel Asia** is a regional collaboration for satellite based emergency response in Asia Pacific.
- Currently, the **U.S**. is putting up its third-generation advanced fleet of **Tracking & Data Relay Satellites (TDRS).**
- **Russia** has its **Satellite Data Relay Network.**
- **Europe** is building its own **European Data Relay System.**
- **China** is into its **second generation Tianlian II** series.
- **Canada** has Satellite **RADARSAT-2** and **RADARSAT Constellation Mission** in place for efficient disaster management

B. South Asia Satellite (SAS or GSAT-9)

- A **geosynchronous communications and meteorology satellite** launched by India in 2017
- **Application:** reliable weather forecasting, efficient natural resource mapping, capacity building by providing e-governance, telemedicine, e-education and e-banking services, better connectivity and communication, disaster information transfer between member countries.

C. Indian Efforts: Gagan Enabled Mariner's Instrument for Navigation and Information (GEMINI) device

- **Launched by:** Union Minister of Earth Sciences
- **Salient Features:**
  - A portable receiver linked to ISRO satellites
  - Can send signals up to 300 nautical miles
  - Map Potential Fishing Zones
  - Ocean States Forecast gives reliable information about the state of the ocean
  - Uses data from GAGAN (GPS Aided Geo Augmented Navigation) satellite
  - Provides only one way communication channel
- **Objective:**
  - Effectively disseminate emergency information and communication to fishermen beyond the range of telephonic service providers

 # Other Indian Satellites

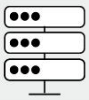
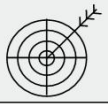
Satellite	About
EOS-01	● An earth observation satellite ● Intended for applications in agriculture, forestry and disaster management support.
RISAT-2BR1	● A radar imaging earth observation satellite ● Provide services in the field of Agriculture, Forestry and Disaster Management.
RISAT-2B	● A radar imaging earth observation satellite
INSAT-3DR	● An advanced meteorological satellite configured with an imaging System and an Atmospheric Sounder. ● Middle Infrared band images provide night time pictures of low clouds and fog ● Imaging in two Thermal Infrared bands provides estimation of Sea Surface Temperature (SST) with better accuracy ● Higher Spatial Resolution in the Visible and Thermal Infrared bands ● Carries a Data Relay and Search and Rescue Transponder
INSAT-3D	● An advanced weather satellite configured with an improved Imaging System and Atmospheric Sounder. ● Designed for enhanced meteorological observations, monitoring of land and ocean surfaces, generating vertical profile of the atmosphere in terms of temperature and humidity for weather forecasting and disaster warning.

Big Data and Disaster Management

- Satellite pictures, drone footage, simulations, crowdsourcing, social media, and global positioning systems are all examples of data sources.
- According to research by the **United Nations' Asia-Pacific Social Agency, technological advancements, Natural disasters in the Asia-Pacific region** have killed two million people since 1970, accounting for **59 percent of global deaths**. Climate CHange and Global Warming has further increased the frequency and intensity of floods, cyclones and droughts in the region.
- According to the research, **big data can assist to better predict disasters** in the Asia-Pacific area and decrease their impact.

The Six Vs of big data

Big data is a collection of data from various sources, often characterized by what's become known as the 3Vs: Volume, variety and velocity. Over time, other Vs have been added to descriptions of big data:

VOLUME	VARIETY	VELOCITY	VERACITY	VALUE	VARIABILITY
The amount of data from myriad sources. 	The types of data: structured, semi-structured, unstructured	The speed at which big data is generated	The degree to which big data can be trusted	The business value of the data collected 	The ways in which the big data can be used and formatted.

Predictive Policies

- **Social media monitoring** can support disaster management with **real-time information on the victim** location, effects and strength of the hazard.
- A sensor network powered by **Big Data** can **assist mitigate disaster** in the following ways:
  - **Flood and cyclone predictions** are now based on computer simulations, and machine learning can aid in predicting flood location and intensity.
  - **Sensor webs and the Internet of Things** can help **earthquake early-warning systems** work more efficiently.

Efficient Resource Allocation

- With **access to mobile network insights** under the GSMA's Big Data for Social Good Initiative, humanitarian agencies can more efficiently monitor the flow of people in the impacted areas aiding evacuation, response and recovery efforts (e.g. **Arogya Setu App during COVID-19 pandemic in India**).
- Satellites and drones use remote sensing to provide immediate evaluations of damage and people affected, allowing **disaster assistance** to be prioritised.
  - Drought-affected millions of small and marginal farmers can benefit from public data such as India's digital ID system (**Aadhar)**.

Economic Mitigation Plans

- **Disasters** in Asia and the Pacific further **increased the economic disparity**
- Help **identify** people in danger and post-disaster **identify beneficiaries** of **targeted relief packages**
- Typhoons in north and east Asia have resulted in significant reductions in fatalities and economic losses because of big data applications.

3 CHAPTER International Cooperation

World Conference on Disaster Risk Reduction

The World Conference on Disaster Risk Reduction is a **series of United Nations conferences focusing on disaster and climate risk management** in the context of sustainable development.

The **United Nations Office for Disaster Risk Reduction (UNISDR)** is the coordinating body

The World Conference has been convened three times. **Every conference was hosted by Japan**:

1. Yokohama in 1994
2. Hyogo in 2005
3. Sendai in 2015

First World Conference on Natural Disasters in Yokohama, Japan, 1994

It adopted the **Yokohama Strategy for a Safer World**: Guidelines for Natural Disaster Prevention, Preparedness and Mitigation and its Plan of Action.

 # Yokohama Strategy : Plan of Action

- **Recognizing** the human and economic losses as a result of natural disasters,
- **Recalling** to save lives and mitigate the effects of natural disasters,
- **Recalling** in adopting an integrated approach to catastrophe management and promoting a culture of prevention
- **Recognizing** the need for effective mitigation measures for sustainable economic growth and development
- **Reaffirming the Rio Declaration**, which emphasises the international community to aid affected countries
- **Reaffirming the role of the UN Secretary General** in promoting and directing IDNDR activities,
- **Emphasizing** the need for the United Nations system to pay special attention to the least developed and land-locked countries and small island developing States,
- **Responding** to the request of the General Assembly in its resolution 48/188 to:
  A. Review the Decade's accomplishments at the national, regional, and international levels;
  B. Plan a future course of action;
  C. Exchange information on the implementation of Decade programmes and policies;
  D. Raise awareness of the importance of disaster reduction policies;
- Emphasises on **Global partnership to build a safer world**, based on common interest, sovereign equality, and shared responsibility to save human lives, protect human and natural resources, and the environment
- **Inviting all countries to** protect individuals from physical injuries and traumas, protect property, and **contribute to progress and stability**

Second World Conference on Disaster Reduction in Kobe, 2005

 # Hyogo Framework for Action (2005–2015)

Building the Resilience of Nations and Communities to Disasters.

It is the first plan to explain, describe and detail the role of all different sectors and actors to reduce disaster losses.

During 2005 to 2015, set five specific **priorities for action**.

- Making disaster risk reduction a priority;
- Improving risk information and early warning;
- Building a culture of safety and resilience;
- Reducing the risks in key sectors;
- Strengthening preparedness for response.

2015 Third UN World Conference on Disaster Risk Reduction (WCDRR) in Sendai

The conference **adopted the Sendai Framework for Disaster Risk Reduction 2015–2030**.

It was endorsed by the UN General Assembly in June 2015.

 # Sendai Framework for Disaster Risk Reduction 2015-2030

It is the **successor agreement to the Hyogo Framework for Action** (2005–2015).

It is a **comprehensive framework** with achievable targets, and a legally-based instrument for disaster risk reduction.

Emphasized the need to tackle disaster risk reduction and climate change adaptation when **setting the Sustainable Development Goals**, particularly in light of an insufficient focus on risk reduction and resilience in the original Millennium Development Goals.

1 Outcome

To substantial reduction disaster risk and losses in live, livelihoods and health and in the economic, physical, social, cultural and environmental assests of persons, business, communities and countires.

1 GOAL

Prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic structural, legal social, health, cultural, educational, environmental, technological political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery and thus strengthen resilence.

4 PRIORITEIS

Understanding disaster risk	strengthening disaster risk governance to manage disaster risk
investing in disaster risk reduction for realience	enhancing disaster prepredness for effective response, and to build back better in recovery, rehabilitation and reconstruction

7 TARGETS

To Decrease

- ⇩ DISASTER MORTALITY BY 2030
- ⇩ NUMBER OF AFFECTED PEOPLE BY 2030
- ⇩ ECONOMIC LOSS BY 2030
- ⇩ INFRASTRUCTURE DAMAGE MY 2030

To Increase

- ⇧ DRRNATION/LOCAL STRATEGIES BY 2020
- ⇧ INTERNATIONAL COOPERATION BY 2030
- ⇧ EWS AND DR INFORMATION BY 2030

The **Sendai Framework** sets **four specific priorities** for action:

- **Understanding disaster risk;**
- **Strengthening disaster risk governance** to manage disaster risk;
- **Investing in disaster risk reduction** for resilience;
- **Enhancing disaster preparedness** for effective response, and to "Building Back Better" in recovery, rehabilitation and reconstruction.

Global Targets:

- **Reduce global disaster mortality** - Substantially reduce global disaster mortality by 2030, aiming to lower average per 100,000 global mortality between 2020-2030 compared to 2005-2015;
- **Reduce the number of affected people** - Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 between 2020-2030 compared to 2005-2015;
- **Reduce disaster economic loss** - Reduce direct disaster economic loss in relation to global gross domestic product by 2030. Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030;
- **Increase the number of countries** with national and local disaster risk reduction strategies by 2020;
- **Enhance international cooperation -** Enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of the framework by 2030;
- **Improved warning system -** Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to the people by 2030.

Priorities:

1. **Understanding Risk:** It is a priority 1 under Sendai Framework. It involves
   a) Observation Networks, Research, Forecasting,
   b) Zoning / Mapping,
   c) Monitoring and Warning Systems,
   d) Hazard Risk and Vulnerability Assessment (HRVA), and
   e) Dissemination of Warnings, Data, and Information. Having adequate systems to provide warnings and disseminate information is an integral part of improving the understanding of risk.
2. **Inter-Agency Coordination:** The major areas where improvement in top level interagency coordination is required are: Overall disaster governance, Response, Providing warnings, information, and data and Non-structural measures.
3. **Investing in DRR –**
   - **Structural Measures:** These consist of various **physical infrastructure and facilities** required to help communities cope with disasters.
   - **Non-Structural Measures:** consist of laws, norms, rules, guidelines, and techno-legal regime (e.g., building codes) etc. and empower the authorities to mainstream disaster risk reduction and translate disaster resilience into development activities.
4. **Capacity Development:** includes training programs, curriculum development, large- scale awareness creation efforts, and carrying out regular mock drills and disaster response exercises.